



Looking Deeper, Reaching Farther

An intelligent network infrastructure featuring Cisco routers enhances the **value of IT investments** across the extended enterprise.

Successful companies run on information. It's that simple, and this reality drives unprecedented demands—and opportunities—for the people at the wheel of the enterprise network. Consider the case of one Global 100 manufacturer: With four technical assistance centers, a dozen regional offices, and more than 300 independent dealerships across the U.S., it's no simple feat to keep the bits flowing.

Yet flow they do, and not just in the form of data. By deploying high-performance, feature-rich Cisco routers at key sites, the company was able to extend IP telephony services securely across its wide-area network. As a result, they cut the cost of calls to the technical assistance centers by eliminating the need for separate phone services, increased employee productivity by reducing the amount of time spent searching for information, and improved customer service by ensuring everyone is up-to-speed on products and services.

Is it the Network, or the Application? Yes. Because the applications that are transforming business today are completely reliant on the enterprise network. By investing in an intelligent network infrastructure, companies create a highly secure, robust foundation for any number of applications, and even help improve performance of those applications for users throughout the company. And that allows them to reap a greater return on countless IT investments—past, present, and future.

High Availability

These days, it's hard to distinguish the network from the company. If one stops working, so does the other. That's why networks based on equipment from Cisco Systems offer unsurpassed availability, and, just as importantly, unsurpassed resilience in the face of interruptions.

To maintain productivity—and by extension, profitability—networks must be available all the time, providing employees with global, around-the-clock access to business applications and information, while ensuring appropriate internet access.

And since a network is only as reliable as its weakest link, all segments must be resilient enough to immediately bounce back from unexpected connection, component, or power failures.

To some extent, availability depends on the overall design of the network. In many cases, companies will deploy dual routers with the Hot Standby Routing Protocol that Cisco pioneered, enabling one device to seamlessly take over if the other one fails.

But availability also hinges on the design of the individual routers themselves. That's why Cisco builds layers of redundancy and resiliency into the hardware, from backup processors and power supplies to hot-swappable line cards.

Such safeguards work in tandem with Cisco IOS® Software features, including several recent enhancements collectively known as Globally Resilient IP, or GRIP. Cisco Nonstop Forwarding with Stateful Switchover, for example, enables a router's primary and backup processors to synchronize state information. That way, if a hardware or software problem knocks out the primary processor, the backup processor will pick up where it left off, without needing to reboot the system or line cards, and without losing a single data packet.

And because Cisco IOS Software runs from the enterprise backbone to the outermost reaches of the WAN, these capabilities can increase the availability of every segment of your network, and increase the productivity of every branch of your company.

Advanced Quality of Service

Imagine a city with wide roads and plenty of lanes, but no traffic lights. Things might flow smoothly enough at 3 a.m., but come rush hour, the resulting free-for-all would inevitably leave some motorists stranded in gridlock.

On the highways and byways of corporate networks, quality of service, or QoS, brings order and control to the bare asphalt of bandwidth. By prioritizing traffic, QoS ensures your most important applications and users get the bandwidth they need. For example, even slight delays in IP voice traffic will impact sound quality. But if an e-mail gets held up for a few seconds, no one will know the difference. So instead of just letting these applications compete for bandwidth, QoS mechanisms step in to direct traffic, waving voice and video packets through while the e-mail momentarily waits behind metering lights.

By establishing priorities and policies that recognize such distinctions, companies can better meet the needs of all users and applications. The alternative is to blindly throw more bandwidth at every performance problem that comes along, an unrealistic expectation in these tough economic times. QoS tools provided by Cisco Systems allow our customers to meet the business requirement to do more with less.

An intelligent infrastructure based on Cisco switches and routers provides a level of QoS sophistication that is simply unmatched in the industry. To provide true end-to-end QoS, Cisco routers classify and mark both inbound and outbound data packets, inserting tags that tell other network devices how traffic should be handled. As packets move across the network, policing and shaping mechanisms regulate the flow of traffic to ensure policies and priorities are enforced.

At the first sign of bottlenecks, congestion avoidance features take active steps to clear the way for the most vital data. Weighted Random Early Detection, for example, selectively drops packets based on IP precedence to keep high-priority traffic flowing.

At the same time, advanced QoS features lend networks greater flexibility, making it easy to adjust to changing requirements and priorities. So easy, in fact, that policies can shift according to time of day, accommodating different business needs and patterns of network usage.

When you deploy Cisco high-performance routers, you enable the intelligent movement of information across the WAN, seamlessly and securely linking multiple networks. IP communications, optimized content and application delivery, and embedded security features ensure you can safely deploy Internet business solutions such as e-learning, executive communications, customer relationship management applications, and more.

These solutions can be extended to local, remote, or even mobile workers, increasing the overall value of technology. You can create tighter feedback loops, reduce transaction costs, and make more informed decisions on a global level, making your company more productive and profitable.

For many organizations, the return on investment can be quite rapid. As Colonel Bill Hose of the Minnesota National Guard noted after deploying IP telephony over a Cisco intelligent infrastructure, "We're planning to expand our multimedia collaboration applications like videoconferencing, and with the money we save on telecommunications bills and network administration, we can also afford to put more money into bandwidth for our end users."

Understanding and Managing the Data on Your Network. Through the combination of high-performance routers and multilayer LAN switches, an intelligent infrastructure is able to utilize not only the Layer 2 header information attached to every data packet, but also Layer 3 IP address information, Layer 4 port information, even Layer 5 through 7 content and user information.



Cisco's portfolio of routers—including the Cisco 7200, 7300, 7400, 7500, and 7600 series routers pictured above—provides the flexibility, versatility, scalability, and feature richness to enable new applications and services.

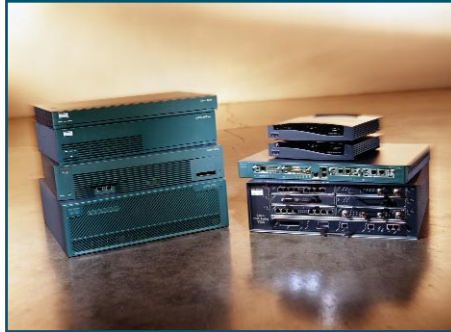
By looking deeper into streams of data, an intelligent infrastructure gains a more complete understanding of all the traffic flowing through and between networks. It can classify and mark traffic based on users and applications, and then use this information to carry out whatever policies and guidelines you set.

You can establish priorities, control and conserve bandwidth, and manage access to optimize employee productivity and to suit the unique needs of your company. You can adapt to changing requirements, from a routine shifting of priorities based on time of day to the deployment of new applications across the LAN and WAN. And you can extend robust, secure network services to partners, suppliers, customers, and employees anywhere in the world.

Improving Productivity—The emergence of this global, scalable approach to networking comes at an opportune time. Over the past several years, network-enabled applications have emerged as the leading driver of corporate productivity. At the same time, they've reduced the cost of doing business. In a study sponsored by Cisco Systems, researchers at the University of California at Berkeley, The Brookings Institution, and Momentum Research Group last year estimated that the adoption of Internet business solutions had yielded cumulative savings of \$155 billion in the U.S. alone. They projected an additional \$373 billion in future cost savings, most of it to be realized by 2005.

Yet many organizations lack the network infrastructure to make the most of their existing applications, much less future ones. One reason is that access to these applications frequently does not extend beyond the walls of corporate headquarters, despite the fact that an estimated 42 percent of enterprise employees work out of remote locations.

An intelligent network infrastructure provides everyone with the resources to do their jobs more efficiently and effectively. Applications can be securely extended out from headquarters routers to any location with intelligent, high-performance WAN aggregation routers which connect to access routers across the enterprise, linking branch offices, mobile workers, partners, suppliers, and customers in a seamless network.



Cisco's portfolio of routers—including the Cisco SOHO, 800, 2600XM, 1700, and 3700 series routers pictured above—offers companies the ability to deploy advanced applications throughout their networks.

Integrated Security

These days, it takes a lot more than a firewall to protect corporate networks.

After all, access is rapidly being extended beyond traditional corporate boundaries to branch offices, mobile workers, partners, suppliers, and customers. And that's a good thing, since it allows companies to do business more quickly and efficiently than ever. But it also opens up new risks, both internally and externally.

Cisco integrated security solutions provide the industry's most comprehensive and scalable safeguards, enabling you to protect productivity gains and reduce network operating costs from the head office to the branch office and beyond.

It starts with the Cisco SAFE Blueprint, which simplifies all aspects of security design and rollout. Whether you're reinforcing the entire network at once or taking incremental steps, SAFE serves as a guide to best practices in enterprise networks, focusing on expected threats and methods of mitigation, rather than specific topologies. It's a flexible, dynamic strategy for implementing multiple layers of defense, so the failure of one system will not be likely to compromise network security overall.

By the same token, the array of security features integrated into Cisco routers gives you the choice of implementing whatever levels of protection measures they need, wherever they need them. Integrated AAA services (Authentication, Authorization, and Accounting), virtual private network services, intrusion detection systems, content filtering, and stateful firewalls are all available to keep data safe as it moves through and between networks—without impacting performance.

In a study released last year, the FBI and the Computer Security Institute surveyed 503 U.S. computer security practitioners in the public and private sectors, and found that 90 percent had detected security breaches within the previous 12 months.

The most commonly reported problems included employee abuses of network resources, system penetration by hackers, and denial-of-service attacks. Any of these issues would be alarming, but together they demonstrate the range of threats companies face today, and show why no single point of defense is enough.

Integrated security is a hallmark of all Cisco products, from the switches and routers that form an intelligent network infrastructure, to Cisco PIX® Firewalls, VPN Concentrators, Intrusion Detection appliances, IP phones, and wireless access points. That level of protection should be reassuring to employees, partners, and customers alike.

The Answer is Cisco—As the worldwide leader in networking for the Internet, Cisco offers the industry's largest and most versatile portfolio of routers to suit every need, from the home office to the branch office to the enterprise campus. Modular designs allow you to expand network services incrementally as new needs and opportunities arise.

Integrated features such as virtual private network services, firewalls, intrusion detection systems, content delivery, survivable remote site telephony, inline power, and low-density switching allow you to confidently deploy the most demanding solutions, including converged data, voice, and video applications.

Cisco routers also offer a unique level of investment protection. Cisco Systems devotes approximately 18 percent of sales to R&D, giving our engineers unmatched resources to build upon established products and technologies. Take Cisco IOS® Software, for example, the operating system that unifies all Cisco routers and switches and provides most of the intelligence in the network. At this very moment, 1,200 people are working to enhance and expand the capabilities that have made it a pillar of networks the world over.

By designing products with the future in mind, Cisco offers the best value over the long term. New features and functionality can be incorporated as needs change and technologies evolve, which lowers the total cost of ownership by saving you the expense of replacing something that won't be supported a year or two down the road.

And at Cisco, support means much more than simply providing hardware and software. As *Fortune* magazine recently observed, "Whenever there is a problem big or small, the folks running the networks in corporations know they can call Cisco."

That peace of mind might not be your only motive for building an intelligent infrastructure with Cisco routers and switches, but it's a surefire sign of an intelligent investment.

Learn how Cisco routers can offer
your company a greater return on its
investments in technology.

www.nwfusion.com/cisco/infrastructure

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Superior Manageability

While an intelligent infrastructure offers powerful benefits, managing something so sophisticated can sound overwhelming, particularly to a harried IT department. But with the right tools, you can actually simplify most administrative tasks even as you gain greater control over network resources.

Cisco Systems provides those tools, ensuring you can capture all the benefits of an intelligent network infrastructure, without having to be an expert on every feature and capability.

One reason is that Cisco IOS® Software unifies all Cisco switches, routers, and other devices, creating a network that is inherently more manageable and providing a rich source of data to help you optimize network operations.

Drawing on that rich IOS data and unmatched industry expertise, Cisco has built best practices into the CiscoWorks family of Web-based network management tools, helping you to streamline management tasks and secure your network from end to end.

CiscoWorks templates and wizards simplify and automate complex configurations to help you implement security policies, use QoS to prioritize traffic for IP telephony or other time-sensitive applications, and manage a range of other operations. These tools also help prevent human errors—mistakes that can open holes in security or even bring down the network, cutting into your company's profits.

If a problem does occur, you won't be caught off guard. A properly managed intelligent infrastructure continually monitors for faults, and can even spot deteriorating conditions before they get out of hand, providing a safety net for your business.

CiscoWorks management applications give you the visibility to monitor the impact of the network policies and priorities you establish, and the flexibility to fine-tune things as you go along, and add new technology as your needs change and the network grows. As a result, you can get more out of your business applications today, and also do a better job of planning for the future.

If that sounds like good news just for the IT department, consider this: It's been estimated that for every dollar a company spends on new technology, it can spend another four trying to make it work. So it stands to reason that the better you're managing your network, the better you're managing your business.