

A Forrester Consulting Thought Leadership Paper Commissioned By Cisco Systems

Integrating Application Acceleration Into The Network Fabric Is The Future

Efficiency And Cost Reductions Can Only Be Achieved Through Integration And Strategic Deployment Of An Enterprisewide Application Delivery Network

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FORRESTER

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Table Of Contents

Executive Summary.....	2
IT Is Aligning Efforts With Broader Business Initiatives, But Organizations Must Overcome Increasing Complexities ..	3
The Network Is Central To Achieving Today’s IT Objectives, Yet Companies Suffer Performance Issues	7
Embedded Application Delivery Networking Will Close The Performance Gap.....	9
Key Recommendations: Eliminate Waste, And Invest.....	12
Appendix A: Methodology.....	13
Appendix B: Demographics/Data.....	13
Appendix C: Endnotes.....	14

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Executive Summary

Today's network architectures need to evolve. The rest of the infrastructure stack has evolved, but the network isn't keeping pace. Today's IT executives need to invest in their network architectures by embedding more intelligence in their network infrastructure. Why? Because virtualization turned the data center on its head, and tomorrow's empowered distributed workforce and customized customer experience will turn the entire IT infrastructure inside out. The evolution started with embedding new features in existing networking hardware to increase efficiencies and to eliminate a one-off explosion. Businesses recognized the value of leveraging existing infrastructure and moved on to consolidating and virtualizing the rest of the infrastructure to achieve greater utilization, flexibility, and operational efficiency by standardizing and reducing the different types of equipment. This simplification and sharing of infrastructure between multiple workloads decreases the number of assets needed and operations performed, thereby streamlining and increasing efficiency within IT. Virtualization also brought the fruition of cloud. During growth periods, cloud services (i.e., x-as-a-service) offer a pool of abstracted, highly scalable, and managed compute infrastructure capable delivery IT capabilities and bill by consumption without extra capital expenditures. Therefore, companies can keep their efficiency gains with consolidation while having the option to offer more services to their employees, partners, or customers.

Tomorrow's business initiatives (closer to the customer, customized experience, and increasing its pool of resources) will require IT to:

- Deploy unified communications (UC), video, and other collaborative tools.
- Embrace Web 2.0 tools.
- Build out virtual desktop infrastructure.
- Empower employees by creating an infrastructure that allows them to bring their own devices to work.

The infrastructure will go through a metamorphosis from a static, manual, and cumbersome entity to a next-generation network that is dynamic and self-service, with many pieces of technology working together as one.

In December 2010, Cisco Systems commissioned Forrester Consulting to evaluate what was required to support the next-generation infrastructure. Forrester Consulting surveyed 338 IT decision-makers from North American enterprises and found that an enterprisewide architectural approach to application optimization is needed to enable 2011 and beyond IT initiatives. A pervasive solution that addresses all parts of the network — including those that are standalone, virtual, mobile, and network-embedded at either the core or edge — is required to deliver this architecture. Application delivery capabilities embedded in the network will deliver measurable benefits, including capex and opex savings, to all users and will enable a more reactive infrastructure. The future IT infrastructure will have elements of dedicated physical deployments, hard-wired dedicated pools, shared pools, and links to public cloud services and platforms where appropriate.

Key Findings

Forrester's study yielded four key findings:

- An architectural approach to optimizing how all applications are delivered in a distributed enterprise is only possible when optimization resides consistently throughout the network.
- A pervasive solution that addresses all parts of the network (appliance, virtual, mobile, and embedded) is required to meet the requirements of business.
- Optimization embedded in the network and compute will deliver measurable benefits, such as capex savings, opex savings, and productivity gains, to all users.
- Helping enterprises understand the benefits of deploying the technology and providing guidance on best practices can be as important as the features and functionality of application delivery networks.

IT Is Aligning Efforts With Broader Business Initiatives, But Organizations Must Overcome Increasing Complexities

“Conservative growth” is the key phrase at companies, and mandates are starting at the top. CEOs, like Vikram Pandit of Citigroup, are asking IT to focus on increasing the efficiency of the business:¹

“Efforts to centralize operations and technology, as well as other functions, contributed to new efficiencies and clearer accountability for performance.” (Vikram Pandit, CEO of Citigroup)

CEOs have become more tech savvy and are holding IT departments to the same high standards that they require from the sales team, manufacturing departments, and procurement teams; it’s no longer the Wild West where projects run amuck. Eighty-five percent of IT departments are intimately involved in driving the bottom line of the business (see Figure 1). To support cost reductions within IT, organizations are:

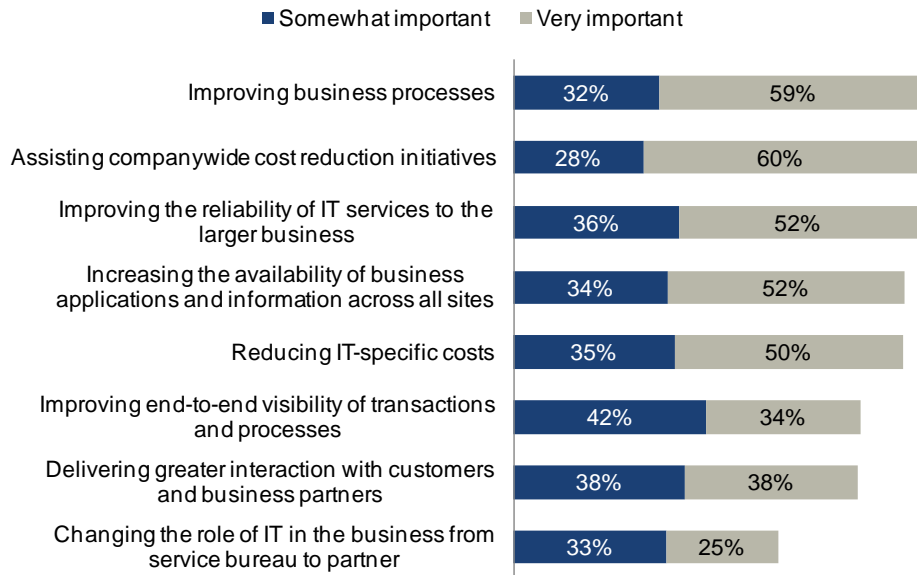
- **Continuing to consolidate because remote sites and branches still have a lot of infrastructure.** At least 74% of branch offices with more than 100 employees still have their own servers and applications on-site (see Figure 2). This means that there is still a large amount of redundant infrastructure that can be consolidated and that wasteful operations, such as support functions, upgrades, and relationships, can be eliminated by embedding point solutions in the foundation hardware or virtualizing infrastructure.
- **Supplementing growth or capabilities with cloud services.** These services keep risks low because they can be turned off instantaneously without the large liability associated with purchased hardware and software. Forrester found that 80% of organizations plan on leveraging software-as-a-service and 55% platform/infrastructure-as-a-service to support future growth in this unsteady economic era (see Figure 3).

Consolidation can take either or both paths — virtualization of infrastructure or embedding infrastructure services in the flow of data — thereby increasing efficiencies by reducing operations involved in deployment, maintenance, and upgrading hardware. Cloud services provide businesses a way to expand without adding more infrastructure and long-term liabilities during times of quick growth.

Figure 1

IT Is Continuing To Focus On The Bottom Line

“How important are the following priorities for your IT/IS organization over the next 12 to 18 months?” (rank 1 to 5 for each, with 5 being very important)



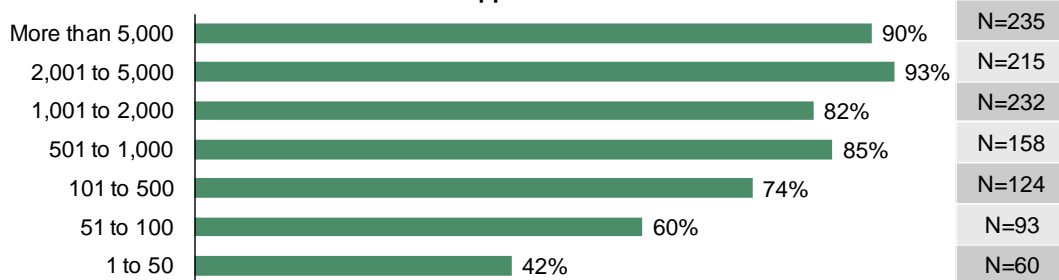
Base: 338 IT decision-makers

Source: A commissioned study conducted by Forrester Consulting on behalf of Cisco, December 2010

Figure 2

Remote Sites And Branches Still Have A Lot Of Infrastructure Services

“You indicated you had remote offices with the following employee sizes. Which, if any, of these offices have their own server and application infrastructure on-site?”



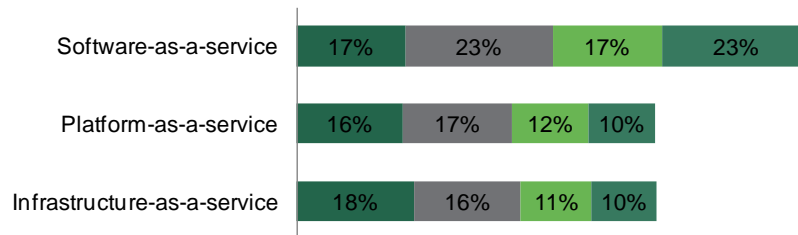
Base: IT decision-makers

Source: A commissioned study conducted by Forrester Consulting on behalf of Cisco, December 2010

Figure 3
Organizations Are Augmenting Their Capabilities With Cloud Services

“What are your firm’s plans to adopt the following cloud computing technologies or services?”

■ Planning to implement in a year or more ■ Planning to implement in the next 12 months
■ Implemented, not expanding ■ Expanding/upgrading implementation



Base: 288 IT decision-makers planning on implementing cloud computing services

Source: A commissioned study conducted by Forrester Consulting on behalf of Cisco, December 2010

The second set of long-term expectations from CEOs will force IT to re-architect the infrastructure. Customized experience and a global workforce are the drivers. The metamorphosis of business from a few large locations to many small ones aligns with businesses wanting to get closer to their customers; they want to offer them a more personal and customized set of services or products. For example, banks are closing large branch offices and creating smaller boutique locations inside grocery stores, malls, and other locations. Companies may have pop-up stores in the middle mall.

On the flip side of customized experience is the employee. Through technology the world is becoming much smaller, and companies are taking advantage and tapping into a global virtual workforce to support their distributed model. This gives companies a chance to get the best of the best from within their company anywhere in the world without being limited by the region where their physical buildings are located. There are four trends in IT supporting the second set of business imperatives:

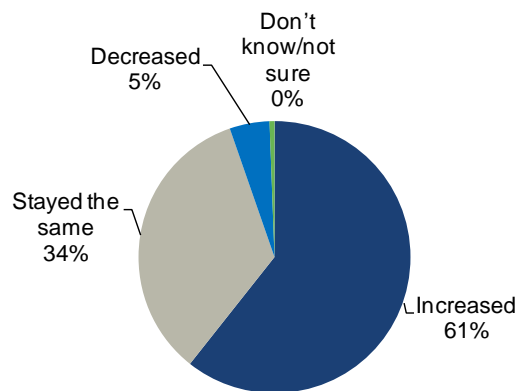
- **Employees are becoming increasingly distributed.** Finding talented individuals within a certain distance of headquarters is becoming more difficult as businesses grow, but customizing a customer’s experience requires organizations to be closer to their customer. These combined factors have caused a 61% increase from the past year in the number of employees who access the network from outside the main campus LAN, remotely, and/or from branch offices (see Figure 4).
- **Today’s organizations are placing the deployment of real-time communication applications at the top of their lists.** Communication is an essential ingredient for the efficiency of a company and becomes paramount as the distance increases between contributors. To facilitate teamwork and trust, collaborative applications, videoconferencing, file-sharing solutions, voice over IP, email, and messaging solutions offer multiple methods of sharing information and connecting users within an organization.

- **Employees are empowered with their own devices.** After seeing the success of employees purchasing their own phones and pushing the company to support smartphones, IT organizations are investigating the benefits of having employees bring their own devices to work. Companies don't usually provide contractors with equipment but require them to bring their own device and then segment part of the network for them.
- **Desktop virtualization and cloud computing are on the rise.** Virtual desktop infrastructure (VDI) opens the door to empower employees and take security to the next level. Forty-eight percent of respondents are planning on deploying some type of VDI (see Figure 5). Virtualization provides the mechanism to get work done anywhere while ensuring that intellectual property doesn't leave the "pseudo-walls" of the enterprise.

Past architectures were based on the assumption that applications and data were static and located in one location much like the users who leveraged them. Tomorrow's business initiatives and supporting IT initiatives create a third dimension — mobility. Services, information, and applications will be as transient as the users who want to get at the data. Mobility, security, data, applications, storage, and users will have a relationship to each other. These linkages are the complexities an organization must overcome.

Figure 4Employees Are Becoming Increasingly Distributed

"In the last year, have the number of employees who access the network from outside the main campus LAN, remotely, and/or from your branch offices:"

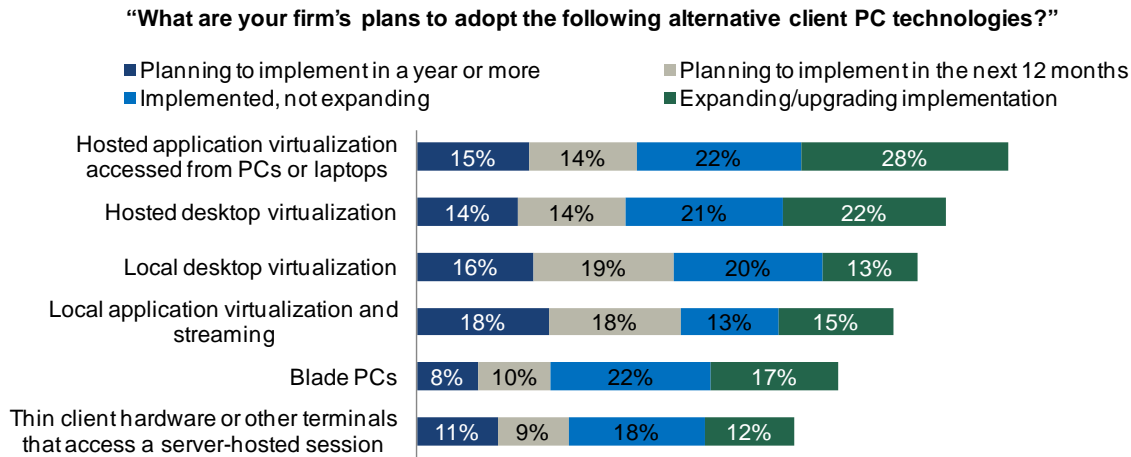


Base: 338 IT decision-makers

Source: A commissioned study conducted by Forrester Consulting on behalf of Cisco, December 2010

Figure 5

The Use Of Desktop Virtualization And Cloud Computing Is On The Rise



Base: 338 IT decision-makers

Source: A commissioned study conducted by Forrester Consulting on behalf of Cisco, December 2010

The Network Is Central To Achieving Today’s IT Objectives, Yet Companies Suffer Performance Issues

As organizations disperse their workforce so that they can get closer to their customers, vendors, or resources, they are also reining in years of build-out. Years of growing IP created a hodgepodge of servers, storage, email, firewalls, and other technologies at campus, branch, remote, and satellite offices. Many equate the build-out to the Winchester Mystery House in California. Stairs, doors, and hallways lead to nothing, because the builders were just responding to the owner’s whims. Competitiveness is changing the method of operation within IT. IT’s role in business is on the same level as procurement, sales, or any other business department. They are being measured against business goals. IT can’t afford to be the Wild West because one mistake can have devastating results for a business. Hence the push to bring lean process thinking: standardize IT capability (services, software, or infrastructure) delivered in a pay-per-use, self-service way.²

Pods of hardware, software, and storage are disappearing from branch locations and accumulate in a few monolithic locations. This alignment from a dispersed and uncoordinated set of resources to a flexible hub-and-spoke orchestrated solution to meet dynamic business cycles creates a whole new set of worries:

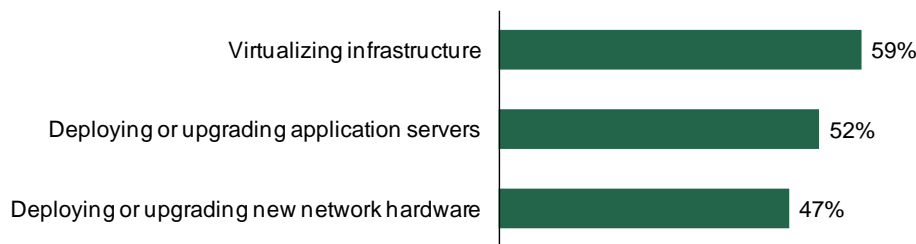
- The change in traffic patterns and loads on the network.
- The availability of applications relocated to distant areas.
- The end user’s experience with services that traverse WAN connections.

The network is a critical element; more than 50% of IT decision-makers believe the network is the key element to meeting today's objectives and has a direct influence on the security, performance, reliability, and cost of projects. However, there is a disconnect between IT priorities when addressing application performance. A knee jerk reaction might be to throw point solutions at the problem instead of embedding the service. Most organizations choose server virtualization and additional new servers to deal with issues encountered by end users — even though issues reported to the help desk are often attributed to the network rather than servers (see Figure 6).

Figure 6

Respondents Believe The Network Is Not The Only Issue . . . But The Network Is Still Not The Top Priority

“Which of the following initiatives are you currently leveraging to help improve the performance of applications and services across your infrastructure? (Select all that apply)” – TOP responses



Base: 338 IT decision-makers

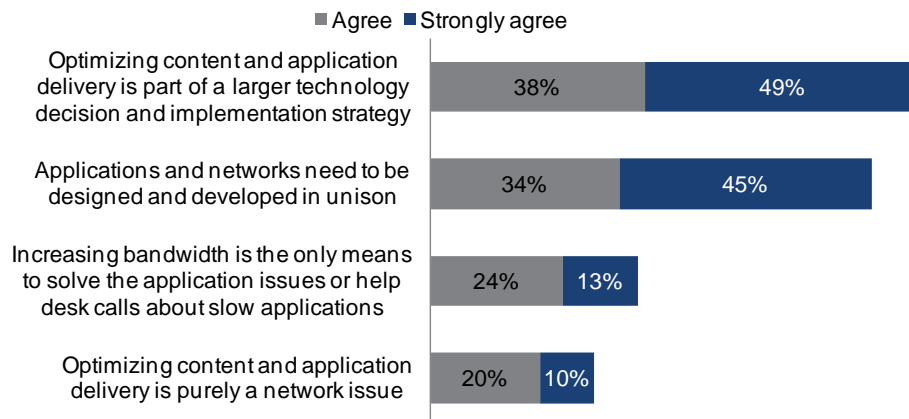
Source: A commissioned study conducted by Forrester Consulting on behalf of Cisco, December 2010

A balance must be struck between new IT initiatives and updating the supporting infrastructure. Organizations have been chasing the next exciting initiative over the past few years in hopes of achieving nirvana. Many have been disappointed with results. A key component of implementing new initiatives is reducing costs, but only one component. Applications and services don't run better if other parts of the infrastructure are not tuned as well. Eighty percent understand that the deployment of new applications and services is tethered to networks, which is the difficult part. The path of least resistance is to find a quick fix to quiet any complaints (see Figure 7).

Figure 7

It Takes More Than A Point Solution

“Based on your organization’s approach to optimizing network performance and delivery of content, to what extent do you agree with the following statements?”



Base: 338 IT decision-makers

Source: A commissioned study conducted by Forrester Consulting on behalf of Cisco, December 2010

Embedded Application Delivery Networking Will Close The Performance Gap

Traditionally, the way to deal with performance issues has been to throw point solutions at problems as opposed to upgrading infrastructure. If users were experiencing a slow Internet connection or email response at remote offices, WAN optimization controllers were installed. If web servers were slow, then load balancers and, later, application delivery controllers, were placed in front of servers. Sixty percent of respondents have WAN optimization controllers installed while 51% are leveraging ADC technology. IT feels very comfortable deploying application acceleration technology, but the return falls dramatically if it continues to be a tactical solution. Organizations need to wean themselves off the quick fix. Eighty percent of latency, security, and load-balancing fires were put out by emergency application delivery network drops. It feels good initially but is not sustainable. Only through an enterprisewide strategy that is embedded in the fabric will companies remain competitive.

Users will be able to work remotely on the road, within the office, or at a branch office, basically anywhere/anytime — connecting and creating a virtual work or personal environment depending on their immediate need. Customers, vendors, and partners will demand their own instantaneous virtual world to share information. The information may come from a centralized data center, a backup data center, or the cloud. No two links or flows will ever be the same in the new business world. To provide this, the infrastructure must: 1) have granular visibility in order to customize services for each user, with an understanding of his or her device, location, and needs; 2) optimize the transport mechanisms by combining the right technology and accelerating the required service; and 3) control the flow based on

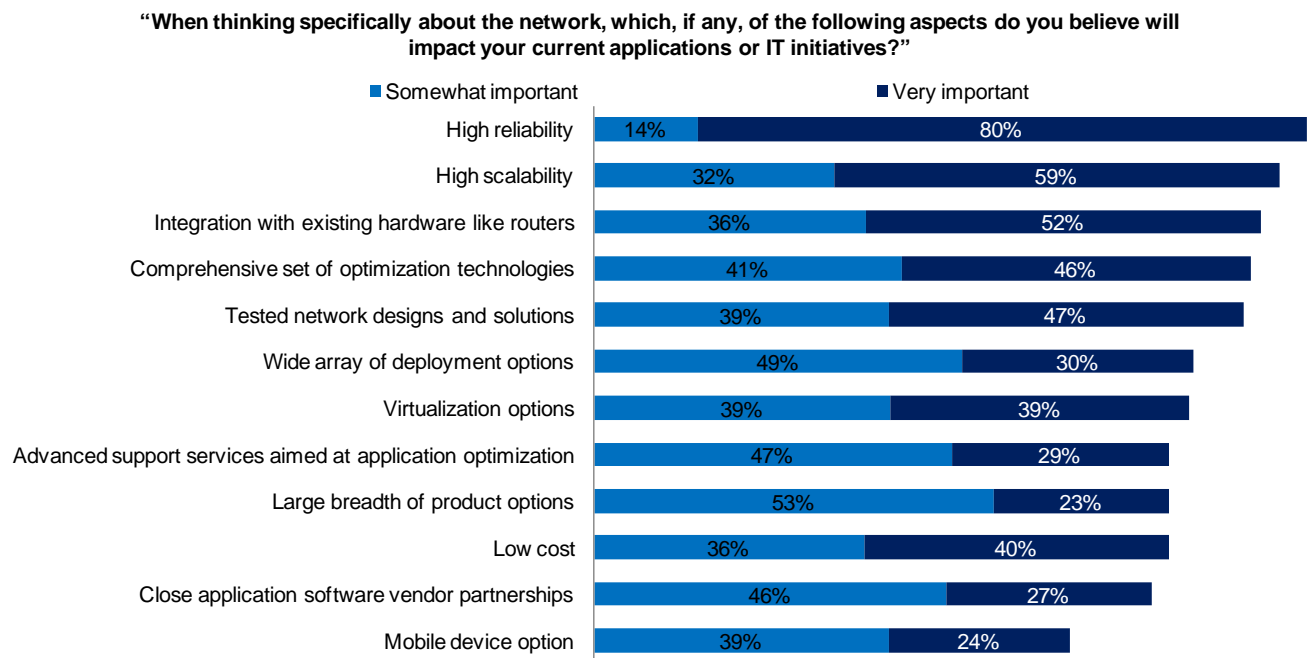
policies of the business. A macro view and architectural approach need to occur between the initiatives and related technology. By embracing an architectural approach, they will be able to stay in tune with business, drive costs out, and increase the services they deliver.

An enterprisewide view enables IT to determine where the technology should reside to optimize the flow and resources supporting applications and users. Virtualization is about optimizing and sharing resources. Switches and routers have gone from moving packets to inspecting and policing them. Connections that were dedicated to a single user have multiple streams running across them. Efficiencies have been gained by embedding functionality and virtualizing networking. The next step in the evolution is embedding more application delivery functionality in the device to leverage the best aspects of the foundation hardware. Close to 90% of our survey respondents believe that scalability, reliability, and integration have the most impact on IT initiatives (see Figure 8).

Inserting features into the flow costs less than standalone solutions, provides better security, is easier to implement and support, and provides better availability. More than a third of companies are already aggressively embedding acceleration in the network fabric. Another third have already started, but do so less often. That adds up to 72% of companies that are already embedding acceleration to some degree (see Figure 9). The logical role of specialized networking technology is to embed it in the underlying fabric.

Figure 8

Top Features Are In Alignment With Devices That Are Critical To The Infrastructure



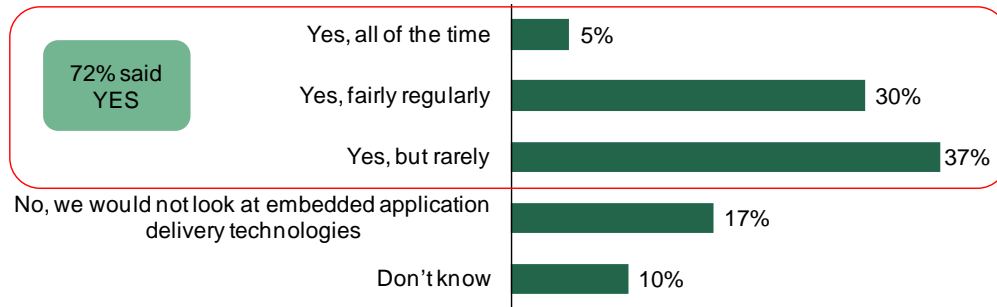
Base: 338 IT decision-makers

Source: A commissioned study conducted by Forrester Consulting on behalf of Cisco, December 2010

Figure 9

Integration Is Top Of Mind And A Critical Component In Supporting Business Initiatives

“We’re now going to specifically ask about application delivery networking technologies as a capability embedded in your existing infrastructure — in other words, as a set of capabilities or services that runs on your existing routers and switches. With that in mind, *would* your company look to embedded application delivery technologies?”



Base: 338 IT decision-makers

Source: A commissioned study conducted by Forrester Consulting on behalf of Cisco, December 2010

Embedding application delivery networks doesn't mean running out and buying new hardware so that it supports per-port capabilities; it's an evolution that will take infrastructure from point solutions to one that has services embedded in networking hardware or virtual instances that is dispersed over the infrastructure. This way the demands of users on a VM can be specialized on the unique aspect of environment in that area but leverage common hardware resources. Infrastructure and operations can then use policy to focus on building end-to-end services for a user rather than turning on features in a hardware appliance located in a specific data center or branch office that may never again see that user or set of users.

KEY RECOMMENDATIONS: ELIMINATE WASTE, AND INVEST

Competitive and agile organizations are increasing their pool of resources, getting closer to their customer, providing more customized services, consolidating infrastructures, and leveraging cloud resources. Designing infrastructure requires understanding the relationship of each moving piece and strategically architecting security, control, acceleration, and balancing into the fabric. The efficiency benefits can only be realized if organizations:

- **Focus on making infrastructure integrated, virtualized, scalable, reliable, cost-effective.** The next-generation infrastructure is now a critical dynamic entity that relies on multiple links working together with the ebb and flow of business. Survey respondents ranked these the highest criteria that the components and system should have to enable the next-generation infrastructure.
- **Select vendors that go beyond the technology and help with people and process.** Forrester found that people and processes are the biggest barriers to implementing application acceleration technologies. Companies may avoid adopting application delivery networks because: 1) they haven't been able to build a business case; 2) costs of these new technologies and services are too high; or 3) their IT staff has inadequate skills for implementing these technologies and services. Good partners can provide ROI calculators, best practice guides, or training to help your organization be successful.
- **Look for vendors that provide embedded, virtual, client, and appliance acceleration technology.** Infrastructures are continuously evolving and serving a variety of situations. More choices in form factor and function can provide you more options and flexibility in the deployment, maintenance, and upgrade of the infrastructure.
- **Demand support and integration for third-party management tools and integration into third-party hardware.** Data and services traverse across many types of technologies that are intermittently intertwined. Only through automation can infrastructures respond instantaneously to new demands. With unlimited relationships between technology components and a high-speed world, manual manipulation will be too slow and noncompetitive companies will go the way of the dinosaur.

Appendix A: Methodology

In this study, Forrester conducted an online survey of 338 organizations in North America to evaluate what was required to support the next-generation infrastructure. Survey participants included decision-makers in roles such as:

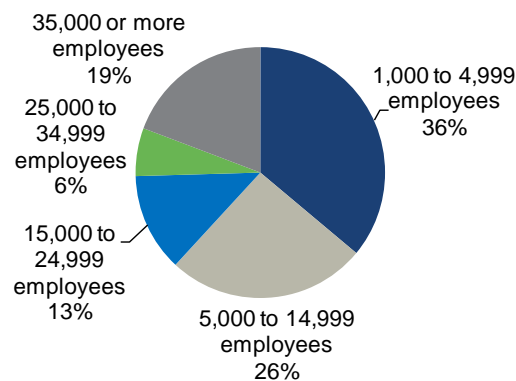
- Senior network administrators and engineers (individual contributor).
- Directors, VPs, and other senior decision-makers of network operations (managers).
- Infrastructure architects (to understand where the network fits into technical architecture).
- Enterprise or application architects (to understand project and personnel issues related to the network).

Respondents were offered survey vendor credit as a thank-you for time spent on the survey. The study began in November 2010 and was completed in December 2010.

Appendix B: Demographics/Data

Figure 9Number Of Employees

“Using your best estimate, how many employees work for your firm/organization worldwide?”



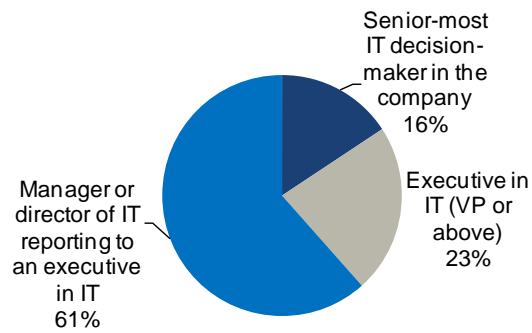
Base: 338 IT decision-makers

Source: A commissioned study conducted by Forrester Consulting on behalf of Cisco, December 2010

Figure 10

Job Title

“Which of the following most closely describes your job level?”



Base: 338 IT decision-makers

Source: A commissioned study conducted by Forrester Consulting on behalf of Cisco, December 2010

Appendix C: Endnotes

¹ Source: Vikram Pandit, “The New Citi: Commitment, Strength and Promise” (http://www.citigroup.com/citi/press/2010/100315a_en.pdf).

² Source: “You’re Not Ready For Internal Cloud,” Forrester Research, Inc., July 26, 2010.