



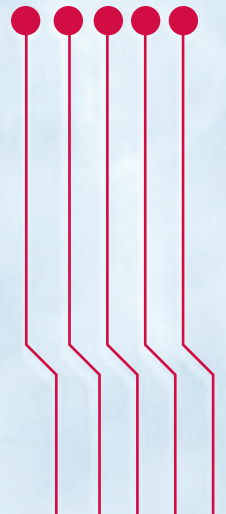
Maximizing IT Investments

RECESSION-PROOFING YOUR NETWORK



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Networking and Business Imperatives

In demanding economic times, organizations must focus on reducing budgets. This brief will discuss effective technologies that network teams should deploy to help their businesses succeed, even when faced with budget constraints. Also, this brief will point out how these technologies enable network teams to support key business initiatives as well as reduce cost.

Despite a constrained economy, market research¹ indicates CIOs' top three *business* priorities in 2008 are:

- Business Process Improvement
- Attracting and retaining new customers
- Creating new products and services

This research also indicates that CIOs' top three *technology* priorities are:

- Business intelligence applications
- Enterprise applications such as ERP and CRM
- Servers and storage technologies

Even in a booming economy, network teams are challenged to support these priorities. This is, in part, because at least two-thirds of all IT spending is allocated to business-critical tasks, not to those designed to change the business.² As such, only a small percentage of the IT budget is available to support new CIO-level priorities and objectives.

IT organizations cannot let the business fail. In fact, businesses depend on the functionality provided by IT even more when external economic factors make it difficult to meet revenue goals. The business needs to harvest all of the value it can get from IT, so if IT organizations are late deploying a key application such as ERP or CRM—or if the network suffers a significant outage—the business is unlikely to recover and still meet revenue goals.

To be successful in these demanding economic times, networking teams need to ensure their priorities support CIOs' top two technology priorities, which means they must support effective application delivery. It is imperative for the network team to ensure that the organization's applications are:

- Delivered securely
- Always available, even when faced with a disaster
- Meeting user performance requirements
- Implemented quickly
- Delivered cost-effectively

Given that the CIOs' third technology priority concerns servers and storage, network teams also need to ensure they are deploying technologies in the network that leverage the investment IT organizations have already made—and will continue to make—in servers and storage.

Recession-Proof Networking Technologies

This section of the brief will discuss a set of initiatives that enables network teams to implement a comprehensive plan to optimize application performance, specifically for web-based applications. It will also identify the business value and some of the primary technologies—referred to as recession-proof networking technologies—associated with specific initiatives, as well as the business challenges they address.

ACCELERATE WEB APPLICATIONS

Challenge

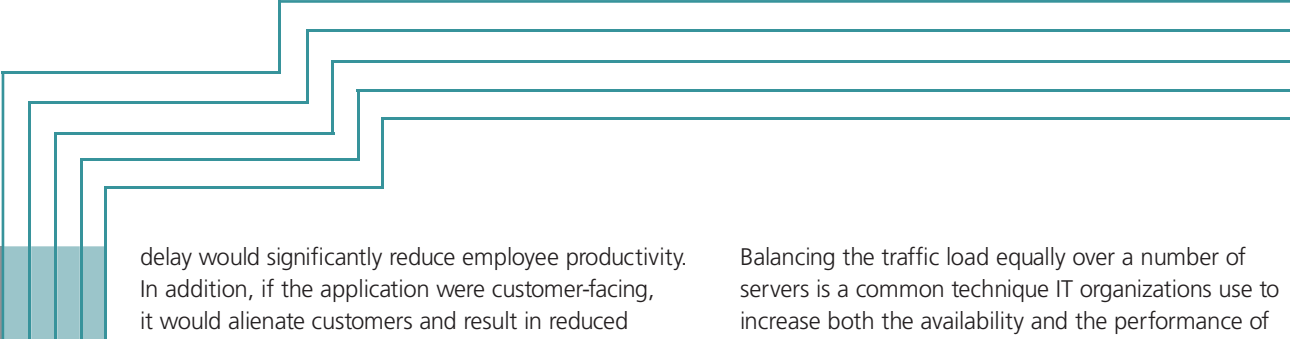
The phrase *Webification of Applications* refers to the growing movement to implement web-based user interfaces with both existing applications as well

as those under development, which can have both advantages and disadvantages.

For example, organizations rely on dynamic web applications like Microsoft SharePoint, Oracle Portal, Microsoft Outlook Web Access, and Siebel CRM. But while users working near data centers have virtually instant access, mobile and remote users typically experience long delays, or find that an application simply doesn't work. Chatty web-specific protocols like HTTP and HTTPS impact performance, causing simple transactions to take tens of seconds to complete. Often, a delay of that magnitude would render a company's million-dollar application unusable. Even if the application were deemed usable, the lengthy

¹ Gartner CIO survey predicts major global IT change, <http://wistechology.com/articles/4559/>

² Gartner Says Eight of Ten Dollars Enterprises Spend on IT is "Dead Money," <http://www.gartner.com/it/page.jsp?id=497088>



delay would significantly reduce employee productivity. In addition, if the application were customer-facing, it would alienate customers and result in reduced revenues.

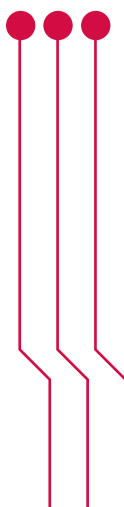
Opportunity

Deploy solutions that improve the performance of web-based applications delivered to remote offices and mobile users. Web application acceleration solutions provide a wide variety of intelligent technologies that overcome performance issues related to browsers, web application platforms, and WAN latency. These technologies include caching functionality to keep copies of static data close to the user, pipelining technologies that enable multiple sessions to be opened simultaneously and, as explained below, offloading of server functions onto a purpose-built appliance.

By decreasing page download times, this type of solution increases the usability of applications and user productivity. For example, HP deployed a web application acceleration solution and as a result, the time it took to open SharePoint documents decreased by a factor of 20.³ In addition to improving performance, these technologies can also result in direct cost savings. MSN Games, for example, experienced a \$144,000 per year savings in bandwidth costs as a result of deploying a web application acceleration solution.⁴

MAXIMIZE SERVER INVESTMENTS

Challenges



As new applications are implemented and the use of existing applications grows, the number of servers typically increases. One of the ways IT organizations increase server utilization, and hence lower costs, is through server virtualization. Server virtualization refers to dividing one physical server, including the CPU, RAM, and hard disk, into multiple isolated virtual environments, each of which is capable of running its own operating system and applications. However, because the number of virtual servers greatly exceeds the number of physical servers, the task of load balancing across virtual servers is significantly more difficult than the task of load balancing across physical servers. Further complicating matters is the fact that a given application may reside on multiple virtual servers.

Balancing the traffic load equally over a number of servers is a common technique IT organizations use to increase both the availability and the performance of applications, but many server tasks are very processor-intensive. Performing them on general-purpose servers significantly reduces the servers' performance and results in the IT organization unnecessarily acquiring additional servers.

Opportunities

To both improve performance and maximize the server investment that has already been made, IT organizations should deploy a purpose-built appliance in front of the servers. This appliance—an Application Delivery Controller (ADC)—can balance the traffic across a number of servers and offload some of the processor-intensive tasks from the general-purpose servers.

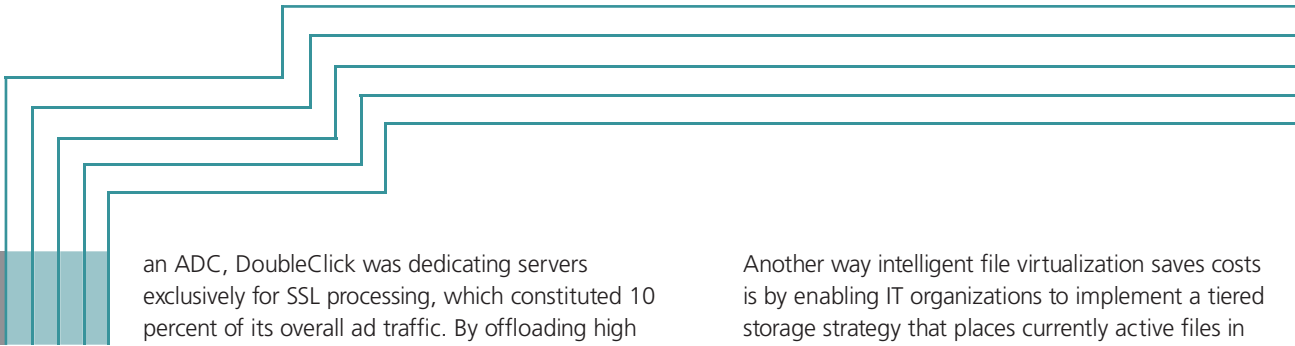
Performing computationally intensive tasks on a purpose-built appliance instead of a general purpose computer enables the IT organization to either reduce or eliminate the need to acquire additional servers. The cost savings associated with this are far greater than just that of the servers themselves; they also include avoiding the costs associated with server maintenance, software licenses, software maintenance, administration, electricity, and real estate. In some cases, reducing the need for additional servers can even eliminate the need to move to a larger data center.

Some of the technologies the ADC must support include SSL processing and dynamic caching and compression. The ADC should also be able to optimize the performance of key web protocols such as HTTP, HTTPS, and TCP. For example, each object on a web page requires its own short-lived TCP connection. Processing all of these connections can consume an inordinate amount of the server's CPU resources. Acting as a proxy, the ADC terminates the client-side TCP sessions and multiplexes numerous short-lived network sessions initiated as client-side object requests into a single, longer-lived session between the ADC and the web servers. These sessions decrease processing overhead on the server and increase application delivery efficiency by reducing the communications overhead.

DoubleClick, a leader in digital marketing, processes billions of transactions per day. Prior to implementing

³ Deploying F5 Networks BIG-IP Local Traffic Manager with WebAccelerator for Microsoft Office SharePoint Server 2007, <http://www.f5.com/pdf/solution-center/hp-wp-deploy-ltm-sharepoint.pdf>

⁴ F5 MSN Games case study, <http://www.f5.com/pdf/case-studies/msngames-cs.pdf>



an ADC, DoubleClick was dedicating servers exclusively for SSL processing, which constituted 10 percent of its overall ad traffic. By offloading high performance SSL and network processing onto ADCs, combined with an upgrade of its ad servers to HP ProLiant DL385 dual-core servers, DoubleClick reduced the number of ad servers from 900 to 300. This reduction resulted in significantly less infrastructure management, mitigated the need for additional server purchases, and gave DoubleClick the ability to scale its infrastructure to meet growing traffic demands.⁵

MAXIMIZE STORAGE INVESTMENTS

Challenge

The demand for storage, along with the related costs and management complexity, is growing rapidly. There are many factors driving the increasing need for storage. For example, networks are often used to store engineering and scientific data, medical images, and videos, which are increasingly used for distance learning. Regulatory requirements are also driving the need for more storage. For example, the Securities and Exchange Commission requires that every stock broker must keep complete records of all communications with clients, which includes recording all phone calls and archiving all email.

Opportunity

Deploy intelligent file virtualization to increase storage utilization. Intelligent file virtualization treats previously independent islands of storage as one virtual storage device. It also reduces the burden associated with managing storage resources in general and the issues associated with disaster recovery (see below) in particular.

One of the ways intelligent file virtualization saves costs is by enabling IT organizations to implement tiered storage that can automatically migrate non-critical data off of expensive storage and onto a lower cost alternative. For example, consider an organization that has 15 terabytes of network-attached storage. Assume that the cost of tier 1 storage is \$20/gigabyte and that the cost of tier 2 storage is \$10/gigabyte. Moving 10 terabytes of data to tier 2 storage results in a savings of \$100,000. In addition, if the organization purchases three terabytes of additional tier 1 storage each year, tiering the data so that only one terabyte of tier 1 storage is required results in \$20,000 in recurring CapEx savings.

Another way intelligent file virtualization saves costs is by enabling IT organizations to implement a tiered storage strategy that places currently active files in tier 1 storage and places files that have not been accessed for several months in tier 2 storage. In most organizations three-quarters of the files are not current and would be placed in tier 2. The tier 2 storage is backed up just once, whereas tier 1 storage is backed up regularly. By implementing this type of tiering, the IT organization eliminates the need to regularly back up three quarters of its data.

There are additional savings that result from file virtualization. For example, most IT organizations replace their disk storage systems with larger systems once the utilization of the existing devices reaches 80 to 90 percent. In many cases, the system that gets replaced is not reused. Even if it is put back into production, 10 to 20 percent of its capacity is never used. In contrast, file virtualization enables IT organizations to fully utilize their disk storage systems and avoid wasting up to 20 percent of their capacity. In addition, if new storage capacity is needed, a relatively small, and hence less expensive, system can be added because the new and existing systems will function as one large storage device.

In addition, an intelligent file virtualization solution includes the ability to automate data replication to support disaster recovery and the ability to do load balancing across multiple storage devices. All of the technologies used to implement an intelligent file virtualization solution:

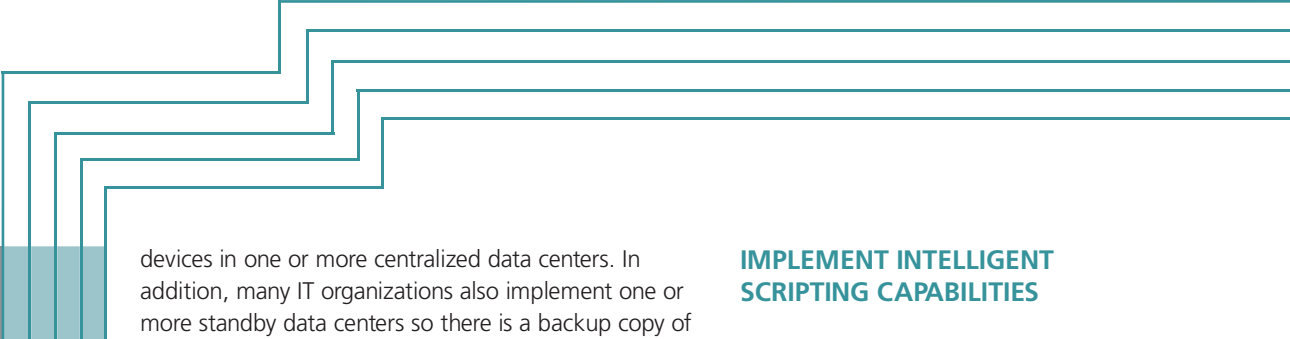
- Need to support a heterogeneous and multi-vendor environment
- Must not degrade availability by introducing a single point of failure
- Must not introduce a performance bottleneck

ENSURE BUSINESS CONTINUITY AND DISASTER RECOVERY

Challenge

Business continuity (BC) refers to keeping certain key business processes functioning despite a natural catastrophe, such as a fire or flood, or a man-made catastrophe, such as a terrorist act. Disaster recovery (DR) refers to the process of putting IT resources back into production after a catastrophe. As part of their DR plan, IT organizations need to be able to back up data from branch office PCs and servers onto storage

⁵ F5 DoubleClick case study, <http://www.f5.com/pdf/case-studies/doubleclick-cs.pdf>




devices in one or more centralized data centers. In addition, many IT organizations also implement one or more standby data centers so there is a backup copy of any data that is critical to the company's BC plans.

The task of backing up large volumes of data between a branch office and a data center or between two data centers can be daunting. Acquiring high capacity WAN links sometimes solves the problem of moving these massive volumes of data. However, associated with this approach is the high monthly recurring cost of WAN links, which may not be an option for network organizations with constrained budgets. In some instances, merely adding additional bandwidth does not significantly reduce the amount of time it takes to transmit large files.

Opportunity

Part of the opportunity is to deploy a global traffic manager that can automatically route users to the appropriate backup data center if the user's primary data center becomes unavailable. Another is to deploy an appliance in each branch office and data center with the purpose of both reducing the amount of time it takes to back up critical data and avoiding expensive WAN upgrades. For example, consider an organization that has 20 branch offices that it connects to a headquarters site using a frame relay network. Further assume that each branch office connects to the frame relay network using a 128 Kbps PVC (permanent virtual circuit), each has a 256 frame relay port, and that headquarters connects to the frame relay network using a T3 frame relay port. To support growing WAN traffic, the organization is considering roughly doubling the capacity of its network. The incremental cost of this upgrade is approximately \$13,000 per month. Over a three-year planning period, the incremental cost of the upgrade is roughly \$450,000. By deploying WAN optimization devices, the organization will be able to at least delay the upgrade and may be able to eliminate the need entirely over the planning period.



These WAN appliances should include technologies such as compression and SSL encryption and decryption. They should also be able to accelerate chatty protocols such as CIFS (Common Internet File System) as well as improve the performance of TCP by implementing functionality such as selective acknowledgements, fast connection setup, and optimized TCP window size.

IMPLEMENT INTELLIGENT SCRIPTING CAPABILITIES

Challenge

One of the characteristics of most IT environments is the large and growing number of servers and applications. Another characteristic is that most IT organizations have very limited control as to which users access which applications and which servers.

The challenge presented by this lack of control can be manifested in several ways. For example, from a security perspective, consider a business that experiences a denial of service attack because a hacker has caused thousands of clients to send valid HTTP requests to the business' servers. The IT organization needs a way to limit the number of valid requests from any given ID. Alternatively, consider an IT organization that discovers a security breach in a critical application that it acquired from a software vendor. While waiting for the vendor to fix the problem, the IT organization needs a way to implement a patch without having to directly touch the vendor's code.

Opportunity

Deploy devices with intelligent scripting capabilities that give the IT organization control to directly manipulate and manage any IP application traffic. In particular, IT organizations should implement devices with intelligent scripting capability that enables the organization to customize how it intercepts, inspects, transforms, and directs inbound or outbound application traffic based on specific events.

A Fortune 1000 telecommunications company recently demonstrated the value of using ADC devices with intelligent scripting. The company discovered a problem with the users of a particular type of phone who dialed *67 to make an anonymous call. When the caller hung up, the phone connection and port would stay open on the soft switch to which the phone was connected because the caller ID had been lost. Because of this glitch, the soft switch would eventually run out of ports for new calls. The switch manufacturer estimated that modifying its software to eliminate this problem would cost the telecommunications company \$1 million and would take nine months. Instead, over a weekend the telecommunications company implemented a script that, upon call completion, reinserts the caller ID, which then signals the soft switch to free up the port, resolving the problem.⁶

⁶ F5 Fortune 1000 Telecommunications Company case study, <http://www.f5.com/pdf/case-studies/fortune1000-cs.pdf>



REDUCE IMPLEMENTATION TIME AND MANAGEMENT OVERHEAD

Challenge

Network and application optimization solutions have proven to be very beneficial in many situations. However, configuring the solutions to be able to support the applications the organization relies on to run the business can be a lengthy process.

In addition, if a business unit wants a change made to the IT infrastructure that supports its piece of the business, it has to go through the IT organization. This typically involves submitting a change request and then waiting for IT to have the time to make the change. This approach delays getting the change implemented, consumes IT resources needlessly, and estranges the business unit from the IT organization.

Opportunity

Part of the opportunity is for the network team to implement an ADC that provides specialized and pre-validated policies to optimize the performance of key

enterprise applications, such as Microsoft SharePoint, Oracle PeopleSoft, and SAP NetWeaver. ADC vendors should have thoroughly tested and documented configuration scenarios with multiple enterprise application vendors. This significantly shortens the overall implementation time and ensures the successful deployment of the applications that are important to the CIO.

Another part of the opportunity is for IT organizations to change their processes to give other business units more control over *their part* of the IT environment. As part of this change, IT organizations should implement role-based access controls that enable the business units to make changes to just their component of the IT infrastructure. For example, some businesses create a portal that the different groups (e.g. web server, application) can log into to manage only their particular systems and perform the most frequent and basic tasks of their respective pool. This operator role simply lets them enable or disable a member of the pool. The additions and core changes to the pool, however, are still set by the network administration team.

Summary and Call to Action

Even in good economic times, it is important for the network team to demonstrate the business value it provides. The importance of showing value increases significantly in difficult economic times, when budgets are under tighter scrutiny.

Below is a checklist of activities that network groups should implement to ensure they are supporting the CIO's top technology priorities:

1. Accelerate Web Applications: Deploy solutions that improve the performance of the web-based applications that are critical to the CIO.
2. Maximize Server Investments: Minimize or eliminate the need to add additional servers.
3. Maximize Storage Investments: Minimize or eliminate the need to add additional storage.
4. Ensure Business Continuity and Disaster Recovery: Ensure the availability of the applications that are critical to the CIO and the business.

5. Implement ADC Devices with Intelligent Scripting Functionality: Reduce the time and cost associated with making changes to an application.
6. Reduce Implementation Time and Management Overhead: Reduce the deployment time, cost, and complexity associated with the applications that are critical to the CIO.

As noted, the technologies exist in the marketplace to allow network teams to implement the initiatives listed above. However, network teams must be proactive in identifying when they can add value by helping to leverage existing assets such as servers and storage. Network teams must also position themselves to be part of the initial planning process of deploying a new application. In this way, they can demonstrate up-front the value they provide in ensuring the availability and performance of the application.