

Maximizing IT Investments: Recession-Proofing Your Network



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Networking and Business Imperatives

In demanding economic times many organizations pressure their support groups such as IT, to reduce their budgets. With these internal and external pressures in mind, the goal of this brief is to discuss effective technologies that network teams should deploy to help their businesses succeed, even if their budgets are highly constrained. This brief will also point out how these technologies enable network teams to support key business initiatives and at the same time, lower cost.

In spite of a constrained economy, market research¹ indicates that in 2008 CIOs have a wide range of *business* priorities and that their top three are:

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

The same market research also indicates that CIOs' top three *technology* priorities in 2008 are:

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

Even in the best of economic times, network teams would be challenged to support the CIO priorities listed above. This is, in part, because at least two-thirds of all IT spending is allocated to tasks that are necessary just to sustain the business, not to tasks designed to change or transform the business². As such, only a relatively small percentage of the IT budget is available to support new CIO-level priorities and objectives.

Regardless of the economic state, the IT organization is not allowed to let the business fail. And in challenging economic times, a business is often more reliant on the functionality provided by IT due to the external factors that make it difficult for a business to meet revenue goals. Accordingly, the business needs to harvest all of the value that it can get from IT (i.e., the deployment of business intelligence applications). 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 be able to recover and still meet its revenue goals.

In order to be successful in these demanding economic times, networking teams need to make a more concerted effort than usual to ensure that their priorities support those of the CIO. Given that the CIOs' top two technology priorities involve applications, the network team needs to ensure that their objectives support effective application delivery³. That means that 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 end-user performance requirements
- Implemented quickly
- Delivered cost-effectively

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>

³ The 2008 Application Delivery Handbook, Dr. Jim Metzler,
<http://www.webtorials.com/abstracts/Kubernan2008handbook.htm>

Given that the CIOs' third technology priority concerns servers and storage, network teams also need to ensure that 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 organizations to support their CIO's priorities. As above, two of the CIOs' top technology priorities involve applications, many of which will be Web-based. As a result, network teams need to implement a comprehensive plan that will optimize the performance of Web-based applications.

This section of the brief will identify the business value as well as some of the primary technologies and other key features associated with specific initiatives, as well as the business challenges they address. Because of the value that these technologies bring to a business during difficult economic times, they will be referred to as recession-proof networking technologies.

Accelerate Web Applications

Challenge

The phrase *Webification of Applications* refers to the growing movement to implement Web-based user interfaces to both existing applications as well as those under development. While this approach has many advantages, it also has some significant 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 the data centers have virtually instant access, mobile and remote users typically experience long delays, and in some instances they find that an application doesn't work at all. Part of the reason for the poor performance is chatty web-specific protocols like HTTP and HTTPS. As a result, simple transactions can take tens of seconds to complete. In many cases, a delay of that magnitude would mean that the application that the company spent millions of dollars to either develop or acquire was not usable. Even if the application were deemed to be usable, the lengthy delay would significantly reduce the productivity of the employees. 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. Examples of these technologies include caching technology 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 the productivity of end users. For example, HP deployed a Web application acceleration solution and as a result, the time it took to open SharePoint documents improved by a factor of 20. 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.

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 that IT organizations increase the utilization, and hence lower the cost associated with servers, is through implementing 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 are capable of running its own operating system and applications. However, server virtualization presents its own challenges. In particular, since the number of virtual servers greatly exceeds the number of physical servers, the task of load balancing (see below) across virtual servers is significantly more difficult than the task of load balancing across physical servers. Also complicating the task of load balancing across virtual servers is the fact that a given application may reside in multiple virtual servers.

Opportunities

One common technique that IT organizations implement to both increase the availability and performance of applications is to balance the traffic load equally over a number of servers. In addition, there are a number of server tasks that are very processing intensive. Performing these tasks on general-purpose servers significantly reduces the performance of those servers and causes the IT organization to have to unnecessarily acquire additional servers. In order 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 will be referred to in this brief as an application delivery controller (ADC). The ADC can balance the traffic across a number of servers and offload some of the processing intensive tasks off of the general-purpose servers.

As noted, performing computationally intensive tasks on a purpose-built appliance vs. a general purpose computer allows 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 the cost savings of the servers themselves. The cost savings 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 also eliminate the need to move to a larger data center.

Some of the technologies that the ADC must support include SSL processing, dynamic caching, and dynamic 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. The single longer-lived sessions decrease processing overhead on the server and increase the efficiency of application delivery by reducing the communications overhead.

DoubleClick, a leader in digital marketing, processes billions of transactions per day. Prior to implementing an ADC, DoubleClick was dedicating servers exclusively for SSL processing, which constituted 10% of their overall ad traffic. By offloading high performance SSL and network processing onto ADCs, combined with an upgrade of DoubleClick's ad servers to HP ProLiant DL385 dual-core servers, DoubleClick has been able to reduce 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 their infrastructure to meet growing traffic demands.

Maximizing Storage Investments

Challenge

The demand for storage, and hence the related cost and management complexity, is growing rapidly. There are many factors driving the increasing need for storage. For example, networks are often being used to store engineering and scientific data, medical images, as well as videos, which are increasingly used for distance learning. In addition, some regulatory requirements are driving the need for increased storage. For example, the Securities and Exchange Commission requires that every stock broker must keep complete records of all communications with clients which drives the requirement to record all phone calls and archive all email.

Opportunity

Deploy intelligent file virtualization to increase storage utilization by treating what had been independent islands of storage as one virtual storage device. Intelligent file virtualization 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 that intelligent file virtualization enables cost savings is by allowing IT organizations to implement tiered storage whereby IT organizations 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 and 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.

One of the other ways that intelligent file virtualization enables cost savings is by allowing IT organizations to implement a tiered storage strategy whereby IT organizations 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 eighty to ninety percent. In many cases, the system that gets replaced is not reused. Even if it is put back into production, ten to twenty percent of its capacity is never utilized. In contrast to this situation, file virtualization enables IT organizations to fully utilize their disk storage systems and hence avoid wasting up to twenty percent of its capacity. In addition, if new storage capacity is needed, a relatively small, and hence less expensive, system can be added because the new storage system and the existing system will function as one large storage device.

Some of the primary technologies found in an intelligent file virtualization solution include the ability to support the tiering of storage in order to achieve the cost savings that were previously described, 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:

- Needs 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 & Disaster Recovery

Challenge

Business continuity (BC) refers to keeping some number of key business processes functioning in spite of a natural catastrophe such as a fire or flood, or in spite of 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 the PCs and servers in branch offices onto storage devices in one or more centralized data centers. In addition, many IT organizations also implement one or more standby data centers so that 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. As a result, this alternative may not be an option for network organizations with constrained budgets. In addition, in some instances merely adding additional bandwidth does not significantly reduce the amount of time that 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 part of the opportunity is to deploy an appliance in each branch office and data center the purpose of which is to both reduce the amount of time that it takes to backup critical data and to avoid expensive WAN upgrades. To exemplify the potential cost savings, 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), has a 256 frame relay port, and that headquarters connects to the frame relay network using a T3 frame relay port. In order 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 technologies to both encrypt and decrypt SSL traffic. These appliances 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 they intercept, inspect, transform, and direct 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. The problem was that 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 their software to eliminate this problem would cost the telecommunications company \$1 million and would take nine months. 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, and hence resolved the problem.

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 that the organization relies on to run the business can be a lengthy process.

In addition, in most organizations if a business unit wants a change made to the IT infrastructure that supports their piece of the business, they have to go through the IT organization. This typically involves submitting a change request and then waiting for IT to have the time and 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 SharePoint, PeopleSoft and NetWeaver. Consider ADC vendors who thoroughly test and document 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 in order 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 (and they can only manage their systems) to 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 that it provides. The importance of showing value increases significantly in difficult economic times when budgets are under tighter scrutiny.

In order to show value, network teams must implement initiatives that directly support the CIO's top technology priorities:

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

Below is a checklist of activities that network groups should implement in order to ensure that 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 so 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 that are associated with the applications that are so critical to the CIO.

As noted in this brief, the technologies exist in the marketplace to allow network teams to implement the initiatives listed above. However, network teams must be proactive in terms of 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 relative to deploying a new application. In this way, they can demonstrate up front the value they provide relative to ensuring the availability and performance of the application.