

# COMMUNICATING WITH SAM

## Content Networking:

### Linking Your IT and Marketing Strategies

Part II

#### Background:

In the previous issue, a reader posed the following problem: "...we have prioritized the implementation of a second hot site backup of all Web content, along with the associated network and Internet connectivity redundancy. Although the Web site will look and work essentially the same for our customers, this change marks a dramatic shift in IT strategy. ... the Web site will start relying on applications and databases on our local AS/400, as well as those residing on servers located in our affiliated companies around the world. ... Additionally, while increasing capacity, some critical business processes are migrating to the e-business strategy and availability of the system is more critical than ever. How do we achieve increased performance and also increase availability in the most cost effective manner?" Sam responded with an overview of Content Management and the evaluation criteria with which to make the decision to undertake this new architectural shift. Now to move to the technical design details...



Sam Johnston

#### Answer:

In discussing improved performance the two main areas where you can improve performance are; increased bandwidth to applications, and/or; increased application performance.

To talk about increased bandwidth to applications this can be achieved in a number of ways:

- ▶ Increase bandwidth of existing Internet connection
- ▶ Increase the effective Internet bandwidth by adding additional internet connections and load balance data paths
- ▶ Increase the effective internet bandwidth by adding bandwidth to multiple sites and splitting up content between multiple sites.

Notice that the last option also provides for inherent high availability. This may seem like a complex undertaking but we will discuss how this can be effectively undertaken.

Likewise, application performance can be improved through the following technologies;

- ▶ Upgrade the performance of Web Servers

- ▶ Upgrade the performance of data engine backend
- ▶ Increase application endpoints to distribute load through server load balancing
- ▶ Re-architect application for optimized web serving, application serving and database serving
- ▶ Offload processing of connection management i.e., SSL termination

As with the improved bandwidth case there is an option above that also provides increased availability inherently in the solution. This is the server load balancing option. The option of re-architecting your application is complex and where it may provide an answer to some of your needs it is beyond the scope of this discussion.

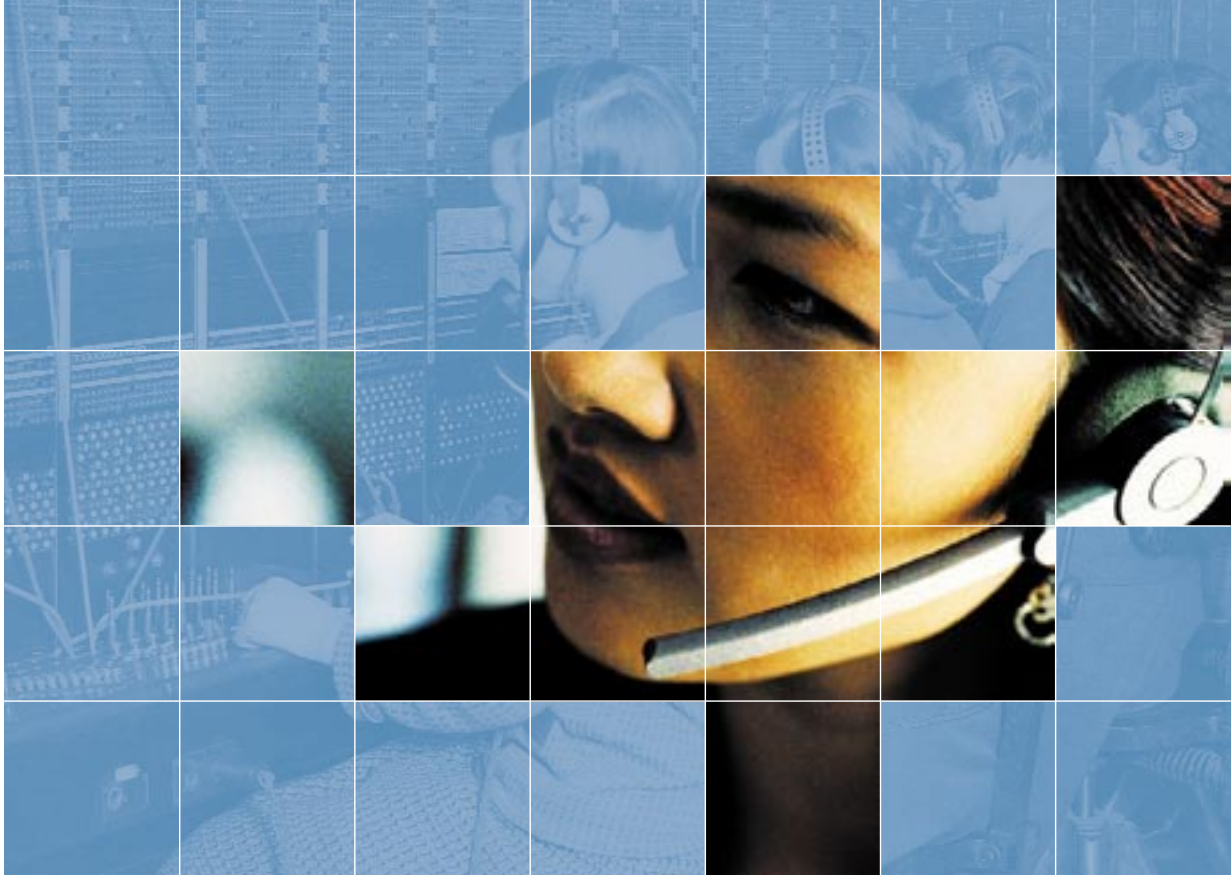
The simplest way to improve throughput to your web applications is to increase the size of your bandwidth pipe. This solution will only require you to upgrade your Internet access and possibly your connectivity equipment (e.g. router LAN extension to ATM) or IP address change due to change of service or ISP. This will not require any significant communications changes.

The second option of increasing effective bandwidth through adding additional

Internet connection provides for increased single site availability through the addition of a second link. The required changes to your infrastructure could be as little as adding an additional router interface, to more complex adding a second router, second firewall path and second set of network L2 equipment. Either solution requires the implementation of more sophisticated routing changes and may even require the step up to content routing and switching to support dual infrastructures and to manage session persistence.

While the second option provides for increased availability it does not provide any site/CO high availability. To truly gain the benefit of high availability a second internet connection to a geographically unique site will provide all the benefits of the second option but provide for more resiliency within your carrier model and site specific issues. However, this solution is does require an investment in most if not all of the network and server architectures.

The access router(s), firewall(s) and web/application servers would need to be duplicated at both sites. Backend access to database data can be achieved through the corporate WAN assuming enough resiliency and bandwidth. ▶



# Moving Forward

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The way to achieve this geographical separation while looking like a single cohesive web site is to leverage global DNS load balancing. Simply put the DNS server that answers requests for name to IP address resolution maintains a database of active hosts for these services and directs these users appropriately to the correct server. Many customizable settings can be used to effectively direct the users to the servers including; geographical proximity, availability of servers, server load or server latency. There are two primary approaches to DNS load balancing the first being a server based system running special DNS software the second being leveraging a content switch with built in DNS load balancing software.

To also look at application performance, the simple way to get improvements in performance is to upgrade raw hardware power of your server system. However, this will only provide benefits where the server is the bottleneck. Likewise, upgrading only the processing power of your data engine backend may not be the solution to your performance issues. Even if it solves short-term bottlenecks it will not scale to support your long term needs.

Increasing application endpoint i.e., load balancing web content across multiple servers provides for increased performance from a network standpoint (more endpoint bandwidth) and also provides more raw processing power.

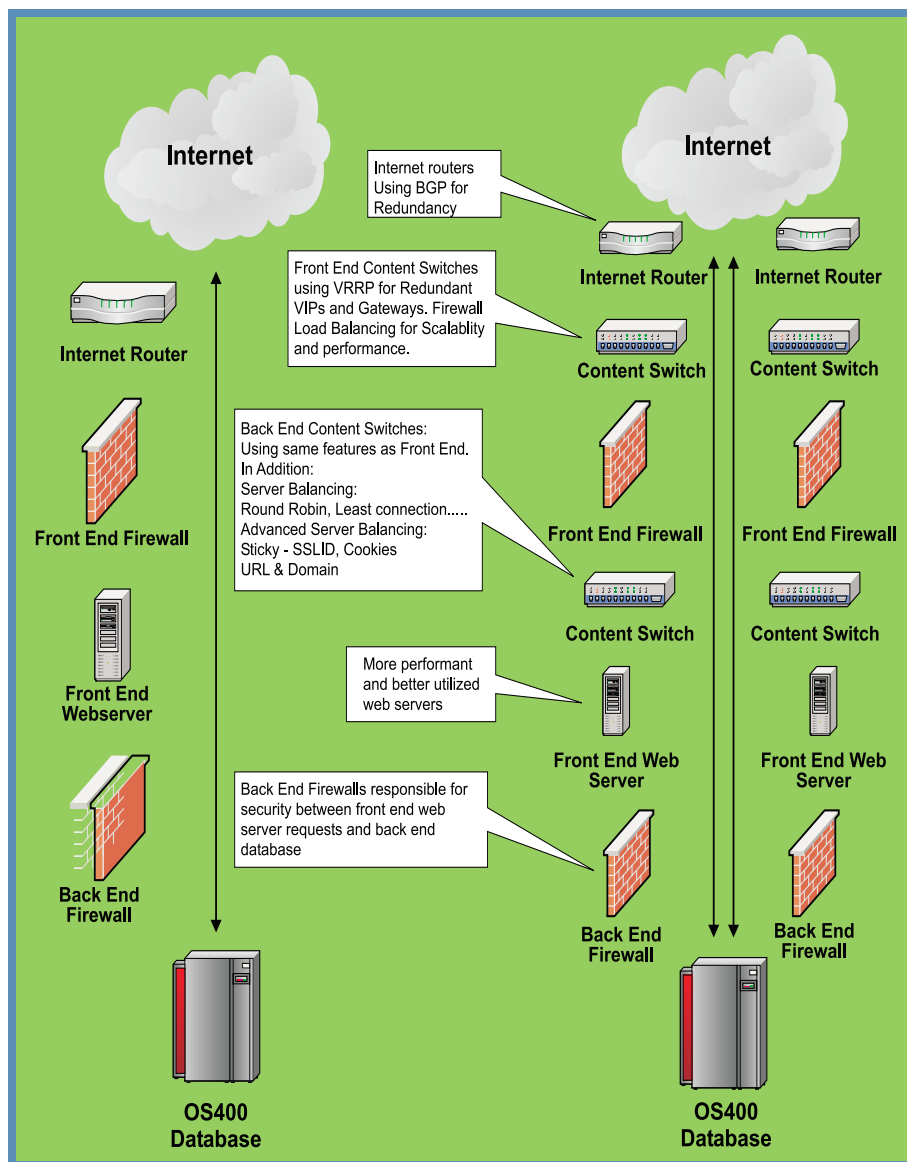
Additionally, this solution provides for higher availability whether deployed in a single-site or multiple-site scenario. The most common way to achieve the load balancing is to leverage a load balancing server or appliance or to leverage content switching. An added benefit of content switching is that it can support load balancing of content between multiple sites natively. Additionally, content switching products typically provide a more sophisticated level of content control and persistence through better visibility within the data flows.

Performance improvement can also come from offloading processor intensive tasks off of the web server. A prime example of this is SSL termination, which is highly processor intensive. Solutions to this challenge are to leverage bus cards within the server or to leverage a standalone appliance to offload the processing. Typically a standalone appliance provides the added benefit of more scalable performance and an operating system/server independence.

Up to now I have provided a lot of technical options to think about. What I would like to do last is to consolidate this technical detail into a single solution that can provide the 'best of both worlds'. While I will not be answering all the possible questions and options with this solution it will provide an excellent framework for design validation.

Leveraging a multi-site enabled Internet presence has never been easier or more cost effective. The level of redundancy within each infrastructure is dependent on how much cost/risk mitigation you are comfortable with.

Let's assume that you run a dual availability infrastructure at each site. The attached diagram highlights the overview of this topology. The solution consists of redundant Internet connections terminating on redundant access routers at each site. Inside of the access routers is a content switch that will be used to load balance traffic between the two firewalls inbound, maintain flow persistence and to perform global DNS load balancing with the other parallel Internet site.




In the first DMZ will be the SSL accelerator appliances that will front end the SSL serving web servers. These accelerators will connect to another content switch that will be responsible for maintaining persistence to the web servers and intelligent load balancing of the multiple content servers behind the content switch. Finally, an internal firewall system will exist that can either be load balanced or not to the internal application/database servers.

Clearly there is a significant deal of complexity within Content Networking solutions, but the technology is proven and reliable and can help achieve your business goals. However, the investment is not small, and obviously you will want to work with marketing to determine the ROI, as it is their needs driving your decisions. Some of the areas to focus on to justify the investment include the following:

- ▶ **Reducing the Cost of Web Infrastructure** – Content networking will reduce, over time, the number of servers, improve availability to eliminate costly outages and will optimize bandwidth usage to control network costs. Less expensive cache servers may lead to further server reductions, and by distributing content rather than duplicating a reduced number of software licences are needed.
- ▶ **Productivity Gains** – Faster downloads, better user experiences through improved transaction flows, and higher availability should all lead to higher customer satisfaction, more sales and greater employee productivity to reduce the cost of each transaction and clear ROI.
- ▶ **Business Positioning** – If the Web is crucial to your marketing effort, than technology that improves the experience should create “soft benefits” in terms of positioning your company through better Web performance. This should lead to long-term market share gains that marketing can measure in terms of sales and profits.

- ▶ **Reduced Support Costs** – Centralized intelligent management of content resources should reduce the number of support resources needed, while the improvement in performance and availability should eliminate help desk and customer service calls complaining of slow or incomplete transactions.

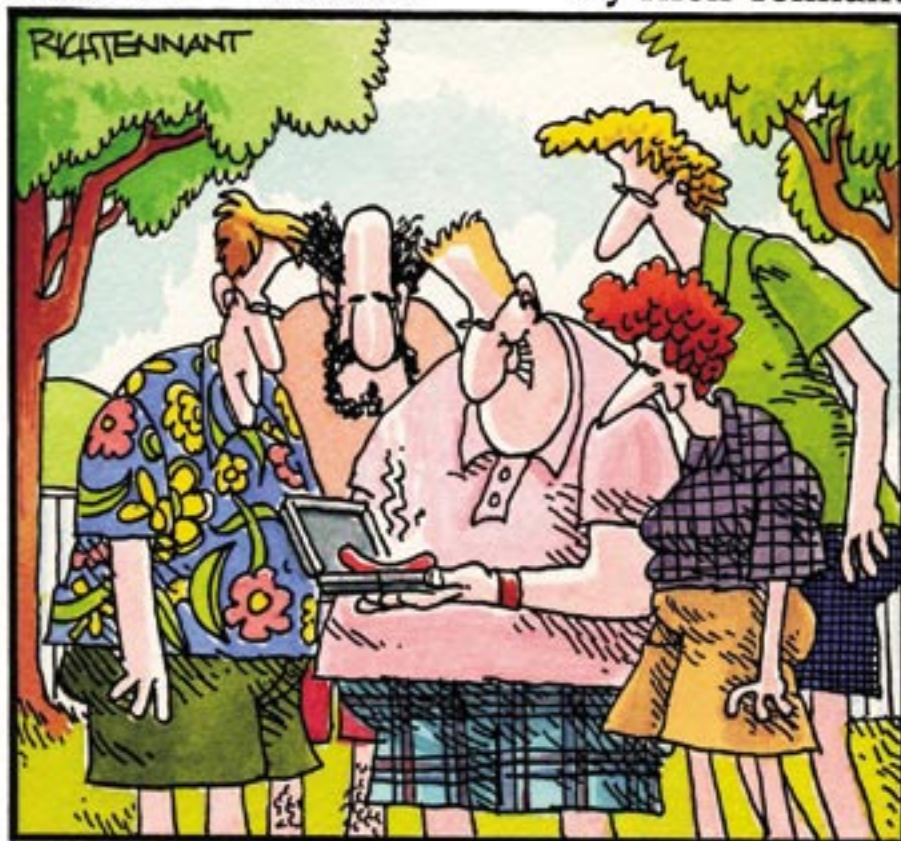
The Web is a sensitive topic in any organization, as it is crucial to the marketing image of most organizations, and as such gets much focus and attention from senior executives. In the end, Content Networks will allow organizations to bring traditional IT disciplines to support the execution of their Web content,

without inhibiting the creativity that is necessary to meet your marketing objectives. 

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By Rich Tennant



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