Technology Brief

Accelerating Cloud Performance with WAN Optimization

Date: August 2010 **Author:** Jon Oltsik, Principal Analyst

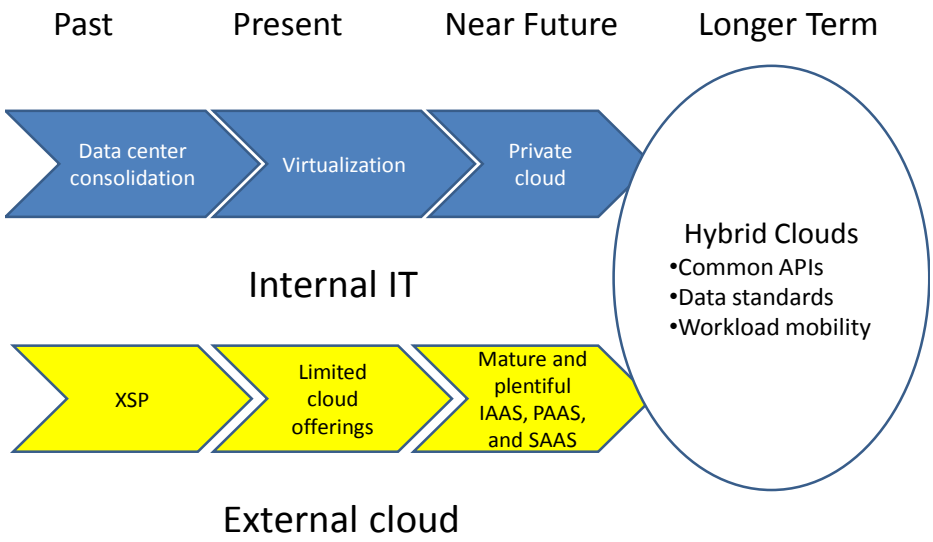
Abstract: *Is cloud computing real? Yes. When you sort through the hype and evaluate collective industry R&D efforts, cloud computing options may arrive sooner than most believe. In fact, smart CIOs are already assessing their workloads against business needs and analyzing where each workload should run—locally or in the public cloud. As they do, they will realize that cloud-centric WAN optimization is a critical enabling technology for high performance and central control. Furthermore, it will help maximize cloud computing options and benefits sooner rather than later.*

Overview

There is certainly a lot of hype around cloud computing as the technology industry positions itself for the "next big thing." Unfortunately, this rhetoric masks an important inflection point: cloud computing is real and will impact IT in unprecedented ways.

ESG envisions the cloud's evolution as a three-stage process (see Figure 1). On the enterprise front, cloud computing will follow ongoing technology initiatives like data center consolidation and server virtualization as large organizations turn their IT infrastructures into their own private clouds. At the same time, public cloud options of all types (i.e., IaaS, PaaS, SaaS) will also mature, driven by new standards, development tools, and services offerings. Enterprises will typically consume these services as an alternative to internal IT resources. Finally, as standards emerge, large companies will bridge internal private clouds and external public cloud services into a federated hybrid cloud architecture. When this happens, traditional IT walls will disappear as the cloud brings ubiquity to computing (i.e., application processing, storage capacity, etc.) just as the Internet and IP protocols delivered universal connectivity for networks.

Figure 1. Cloud Computing Evolution



Source: Enterprise Strategy Group, 2010.

CIOs Should Start Preparing for the Cloud

At present, the entire IT industry is pouring massive amounts of R&D dollars into cloud computing. This will likely accelerate the technology maturation process, making cloud computing an increasingly attractive enterprise option. Smart CIOs will quickly come to this realization and begin to adopt cloud computing by:

- **Betting on virtualization technologies.** Virtualization will be a foundational technology for cloud computing. Why? It disaggregates IT workloads from the underlying hardware. When combined with tools that enable workload mobility and flexibility, workloads can be moved from server to server, data center to data center, or private to public cloud services depending upon hardware contention, network traffic, IT resource limitations, or cost considerations.
- **Modernizing the network.** In the past, network traffic tended to flow in a "north and south" pattern from data centers to core, distribution, and then access networks. With the explosion of Web applications and server virtualization, more traffic flows "east and west" between the servers themselves. Make sure that data center networks are designed to handle this traffic, especially as the population of Web applications and virtual servers continues to explode. Don't forget to include data center to data center network capabilities in these plans as well.
- **Embracing flexibility.** With cloud computing, there is no "one-size-fits-all" model. Rather, cloud computing is an entirely new mindset where CIOs have unprecedented flexibility. For the first time, IT managers have the true luxury of placing IT workloads (i.e., compute, application, storage) in the most advantageous and effective places. As a result, future IT decisions should be based upon TCO, service quality, and time-to-market as much as existing IT infrastructure and organizational considerations.

What About Performance?

In spite of the promise of cloud computing, many IT professionals first conceive of two major hurdles: security and availability. Yes, addressing these important issues is essential for cloud's progress, but ESG believes that there is another key obstacle: high performance. In fact, high performance connectivity to cloud services is crucial for:

- **Connecting private and public clouds.** High performance and responsive connectivity is a "must have" in cloud computing use cases for distributing applications, running processor-intensive scientific computing systems, mirroring transactions, and leveraging vast pools of cloud storage. Even high bandwidth "best effort" Internet connectivity could still be victimized by an unrelated traffic spike, possibly interrupting cloud computing systems and business operations.
- **Providing user services.** Private or public cloud ROI won't matter if users experience reduced productivity due to unacceptable response time to access files, applications, or their virtual desktops.
- **Future flexibility.** Let's face it—without high performance in the cloud, computing alternatives will remain suspect. A few early performance problems could persuade risk-averse CIOs to abort their otherwise sound cloud initiatives and instead keep critical applications and services in-house, failing to realize the potential benefits. High performance data migration also allows CIOs to adapt their approaches to new offerings in the future.

WAN Optimization will Bridge the Performance Gap

The performance issues above are prospective "show stoppers" for cloud computing, but there is a potential solution. WAN optimization is usually equated with accelerating network traffic between enterprise data centers and branch offices, but ESG believes that it will also play a crucial role in cloud computing enablement. Why? Leading WAN optimization platforms already handle lots of diverse workloads to connect data centers to other data centers and a range of IT applications and services to end-users.

ESG sees cloud computing use cases as a new superset of WAN optimization functionality. That said, all WAN optimization solutions are not created equally.

To meet the challenges of cloud computing, WAN optimization offerings must provide high performance and:

- **Support for multiple services.** To connect cloud data centers, WAN optimization must accelerate network traffic, business system protocols and linkages, and remote mirroring application like EMC's SRDF for disaster recovery. At the other end of the spectrum, users benefit from WAN optimization for high performance connections to business unit applications, cloud services, and file services. Finally, WAN optimization solutions can help enable greater use of cloud-based storage services for backup, archival, and near-line capacity by accelerating specific block based storage protocols (like iSCSI or REST.) Each layer of IT resources, applications, servers, and storage can then be placed where it has the best mix of quality and cost, independent of other components' locations.
- **Multiple form factor choices.** As workloads and users become more mobile, WAN optimization must find its way into lots of locations in the cloud and across the enterprise. This will require additional form factors to traditional WAN optimization hardware appliances. ESG sees the need for virtual WAN optimization appliances that can be easily deployed or moved with workloads around both public and private cloud environments. In addition, WAN optimization agents will accelerate cloud service performance for mobile worker endpoints across the globe. Again, storage-specific cloud accelerators will also provide huge value.
- **Visibility and manageability.** Since the main goal is high performance, IT managers will want to monitor and adjust the network to ensure that business-critical traffic meets or exceeds SLAs, and plan for future moves of IT resources as desired. This will require WAN optimization systems to act as a network service, providing consolidated visibility of real-time application traffic. With this information in hand, network engineers need the ability to fine-tune network traffic based upon changes in the application mix, cloud service adoption, or workload location.

With these characteristics, WAN optimization could go beyond high performance delivery alone. ESG believes that these attributes could help large organizations take better advantage of cloud computing flexibility. Why? The combination of high performance, multiple form factors, and granular visibility will allow more choices for CIOs. Enterprises can easily experiment and rapidly adapt their infrastructure by moving workloads around and assessing which location delivers the "biggest bang for the buck." In this way, cloud-centric WAN optimization can also help improve the business's top and bottom lines.

The Bigger Truth

Cloud computing is on the horizon. It will be arriving far sooner than many people think. It's time that the cloud computing discussion moves beyond rhetoric and focuses on key issues. Beyond security and availability, ESG believes that high performance networking needs more attention.

WAN optimization is an obvious enabling technology as it is designed to accelerate network traffic between source and destination. With cloud, however, the sources and destinations will multiply and change rapidly. This requires a new type of WAN optimization built with the cloud in mind. Cloud-centric WAN optimization will ultimately support lots of services, come in an assortment of form factors, and provide central visibility and management regardless of cloud service location. Applications, servers, and storage can each be dynamically deployed and activated wherever most appropriate for the organization's changing needs.

ESG believes that cloud-centric WAN optimization is an enabling technology that will play a major role in the success or failure of enterprise cloud computing initiatives. The sooner CIOs realize this, the more they can take advantage of available and emerging cloud computing options.