Cloud Services Redefine the Need for WAN Optimization

In September 2009, Aberdeen found the business adoption of cloud computing carried enormous potential cost savings and other efficiencies, but not without risk. In the year since that study, IT managers in every type of organization and across every industry have had to address the question of cloud migration through taking specific actions: conduct a cost/benefit analysis, develop a strategy, allocate resources, and begin to execute. For many, only then do the risks become clear, materialize into real threats, and in some cases have disastrous results that could be avoided with the proper precautions. Based on a new study conducted by Aberdeen Group in December 2010, this document explores the changing - but still vital - role of network performance monitoring and management solutions in the successful cloud-enabled enterprise.

The Objective of WAN Optimization

The top two pressures compelling organizations with both on-premise and cloud-based architectures are the same: the thirst for more bandwidth and the need to accommodate an increasingly mobile workforce. After that, it gets more interesting (Figure 1).

Figure 1: WAN Optimization for Cost vs. Customer Satisfaction

As shown in Figure 1, organizations heavily invested in on-premise solutions are more than twice as likely to be looking to WAN Optimization as a cost-cutting measure. Organizations that have migrated to a cloud platform for their business-critical applications are more focused on improving user
experience. This finding points to the fundamental challenge in supporting cloud-based applications, the inherent latency introduced by a more complex network infrastructure and the impact that latency has on end-user experience. WAN Optimization technologies address both the cost and the user-experience challenges; however, the overriding purpose of investing in WAN Optimization solutions is a function of the nature of the network topology.

**Why Networking Cost is Less of an Issue for Cloud Users**

The finding also points to the fact that organizations that have migrated to a cloud environment have, in so doing, addressed the cost-of-networking pressure. Quite simply, the total cost of network ownership, management, and support is lower in a cloud computing environment (Figure 2).

**Figure 2: Annual TCO of Network Services Per Employee**

As is evident in Figure 2, the average total cost of networking services per employee in a cloud environment is less than half that of an on-premise environment. In addition, the projected increase in cost for the coming year (2011) is 5.8% for on-premise users and only 3.9% for cloud users.

**The Performance Hit from Cloud Migration**

It is important to draw a distinction between applications that are tolerant of latency and those that are not. Some latency introduced into an email system as a result of cloud migration does not demand compensation, since email is an asynchronous form of communication. Whereas, latency
introduced into an application that depends on real-time delivery of voice or video renders the application unusable without additional investment in bandwidth. As is shown in Figure 3, the cost benefit of cloud migration is negated in the case of VoIP.

**Figure 3: Change in Cost of Service from Cloud Migration**

![Figure 3: Change in Cost of Service from Cloud Migration](image)

This is why organizations that have migrated their critical business applications (especially synchronous communications applications, such as VoIP) to the cloud are turning to WAN Optimization for performance reasons.

**WAN Optimization for Network Throughput**

The key to maintaining end-user or customer satisfaction when working in dynamic, elastic, environments like the cloud - that is difficult or impossible to monitor and control - is in improving overall data throughput. WAN Optimization’s impact on throughput improvement in an on-premise environment is well-documented in prior Aberdeen research (see references at the end of this document). The left two bars of each group in Figure 4 show that the introduction of WAN Optimization solutions accelerates throughput performance increases for email, CRM and VoIP applications, just to identify three of the most common types of application. The interesting finding here is the relative importance of WAN Optimization for synchronous communications applications, typified by VoIP. Whereas its impact on an on-premise VoIP system is equal to about a 19% acceleration, applied in a cloud environment, the impact is over 30%. And while the net result is that voice communications in the cloud still suffer lower overall throughput improvement than their on-premise counterparts, the value of applying WAN Optimization to VoIP services is relatively much greater.
WAN Optimization Addresses Risks in Cloud Migration

Several significant risks arise when an organization considers migrating critical business systems to the cloud. They include:

- Increased system complexity
- Risk of data loss
- Vulnerability to security breach
- Inability to gain a holistic (end-to-end) view of network activity

Our research shows that WAN Optimization technologies provide an avenue for addressing and mitigating these risks. The risks vary depending on the type of cloud architecture (see sidebar on page 1) and solutions have been developed that are tailored to meet the individual requirements of each.

System Complexity

As critical business applications are migrated to a cloud platform, (particularly given the myriad underlying virtualization paradigms that may be introduced to support application delivery), the network, the servers and storage arrays, the data, and the applications change from a static set of technologies to a dynamic one. Real-time load balancing, dynamic provisioning of resources, and new sources of latency combine to make root-cause analysis challenging. In this scenario, providing IT support to maintain required service levels becomes more complex. Forty-seven percent (47%) of IT administrators surveyed indicate that the rising complexity of their infrastructure (at the network, server, and application
levels) is a major challenge. While WAN Optimization does not make the infrastructure simpler, it does provide deeper visibility into network traffic, resource utilization, and application delivery metrics. This gives the administrator a tool to improve root cause analysis and, ultimately, speeds issue resolution.

**Risk of Data Loss**

IT managers responding to our survey indicate that without WAN Optimization technologies in place, incidents of data loss have risen 8% over the last year. Especially in the case of cloud architectures involving third-party hosted infrastructure, the risk of data loss due to system crash, packet error, administrator error, or backup/restore failure is rising with the rise in infrastructure complexity (Figure 5).

![Figure 5: WAN Optimization’s Impact on the Risk of Data Loss](image)

However, as Figure 5 illustrates, WAN Optimization solutions address the rising incidence of data loss, giving on-premise IT administrators a 6.6% decrease in data loss events, year-over-year. Furthermore, WAN Optimization offers administrators of cloud-based systems an even greater return. The source of the advantage lies in the ability of the IT security team to implement additional safeguards in the form of redundancy, data mirroring, more frequent backups, software-based controls that guard against accidental user error, and deep packet inspection. While these are not necessarily features of a WAN Optimization solution, it is the optimization function that allows these additional controls to be put in place without a negative impact of system performance and, by extension, end user experience.
Data Security

Encrypting data is more important to overall IT security when the data is traveling along unpredictable paths, as is the case in a cloud environment. However, without WAN Optimization, cloud-based IT administrators are, on average, encrypting a lower percentage of their data than administrators of on-premise architectures (Figure 6). This is due to the unwanted addition of latency introduced by encrypting data in motion.

Conversely, those using WAN Optimization solutions are free to encrypt more of their data as it moves from server to server or from server to workstation because WAN Optimization eliminates much of the latency, not necessarily from the encryption process but from elsewhere in the system. Here again, it is the optimization function that allows additional controls to be put in place without a negative impact of system performance and, by extension, end user experience.

A Holistic View of Network Activity

Especially in the case of cloud architectures involving third-party hosted infrastructure, it is very difficult to gain a true end-to-end view of the movement of information, pinpoint bottlenecks, and manage the network to optimize throughput. A collection of tools can be used to reveal activity on each layer. However, without a unified platform to consolidate the information coming from those analysis tools, the IT administrator has a very difficult time gaining a holistic picture and making sense of the data.

For this reason, IT administrators who responded to Aberdeen’s survey indicating that they already use WAN Optimization solutions for their cloud infrastructure also indicated they have or plan to adopt integration tools to help them manage more holistically (Figure 7).
Within the next 12 months, over 80% of our survey respondents will have the ability to manage application performance and WAN quality of service in a single dashboard. Over half will have a single platform unifying WAN performance management and WAN security. In a dynamic and increasingly complex environment, only the fully armed IT manager will be able to keep pace with user demand, manage cost, and maintain or improve overall quality of service.

**The CTO's Business Case for WAN Optimization**

Our research reveals that technology obsolescence, the pending expiry of equipment leases and software licenses, and major new releases of software solutions are prime motivators causing CTOs to reevaluate the IT architecture. Twenty-one percent (21%) of survey respondents who lease WAN Optimization equipment indicate that their lease will expire within the next 12 months. This is significant because as the CTO contemplates renewing such a contract, other significant initiatives such as VoIP and telepresence deployments, server and storage virtualization projects, and potential managed services agreements influence the decision.

In these critical times, the well-prepared IT manager must present a comprehensive cost/benefit analysis to the CFO or other primary budget-holder using data that is not readily available. WAN Optimization tools can provide assistance in scenario planning through network emulation and performance impact simulations so that the CTO can present real numbers in the proposal. Here, the value of a holistic view of the infrastructure, architecture, and traffic helps to verify and validate emulation results.
Key Takeaways

When considering cloud migration, either at the network, server, or application level, the following are some of the strategic actions and best practices that curb costs, improve performance, and mitigate risk:

- Identify the sources of bandwidth demand within the organization and the cost of satisfying that demand
- Consider the cost/benefit of migrating critical business applications to a cloud architecture, and be careful not to ignore the inherent risks
- Understand the difference between synchronous and asynchronous data applications and allocate bandwidth and optimization technologies appropriately
- Evaluate the risk of data loss and network vulnerabilities and apply redundancy, encryption, and other security technologies – being careful not to introduce latency into applications that cannot afford it
- Adopt a unified platform for holistic, end-to-end network visibility and leverage the resulting intelligence to make strategic decisions relating to new bandwidth procurement, network upgrades, and cloud and virtualization initiatives
- Prepare a business case for WAN Optimization investment by understanding the impact of upcoming architectural and software changes

Aberdeen’s research has shown that IT managers in every type of organization and across every industry must address the challenge of providing cost-effective, high-quality network services to satisfy a growing demand for bandwidth, an increasingly complex infrastructure, and new choices in the data center. A critical component of the solution to those challenges is improving the performance of the WAN and an effective way to gain the intelligence and flexibility to accomplish that is by leveraging WAN Optimization tools.

For more information on this or other research topics, please visit www.aberdeen.com.
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