Cisco Wide Area Application Services Optimizes Application Delivery from the Cloud

What You Will Learn

The adoption of cloud-based computing and applications promises to improve the agility, efficiency, and cost effectiveness of IT operations required to provision, scale, and deliver applications to the enterprise. However, as with other new technology trends, delivering applications from the cloud to the remote sites creates additional challenges in application performance, availability, and security.

Enterprise IT departments are continuing to invest in technologies that generate cost savings while making their business applications more agile and available. These initiatives, such as consolidation of branch-office servers and virtualization of data center servers, are increasingly being adopted by the enterprise; however, they have not been without consequences. For example, branch-office server consolidation projects, while reducing the server footprint, can result in a poor end-user experience and increased bandwidth utilization because applications traverse a WAN link with higher latency and packet loss and lower bandwidth than they traverse a LAN link. WAN optimization solutions, such as Cisco® Wide Area Application Services (WAAS), are implemented to deliver LAN-like application response times for end users and to defer a WAN bandwidth upgrade.

Now cloud-based architectures promise agility, efficiency, and cost effectiveness for application delivery as well as reduced operational and management costs, but as with other IT initiatives, potential challenges exist with the adoption of this trend. Again, organizations are looking to WAN optimization for an answer, and organizations are finding that Cisco WAAS also provides acceleration and optimization of applications delivered from the cloud, such as collaboration and software-as-a-service (SaaS) applications, increasing performance, improving disaster recovery, and securing application traffic. By deploying Cisco WAAS, organizations can achieve cost savings promised by the cloud architectures, while overcoming IT challenges and meeting data-compliance goals.

This document discusses some cloud deployment scenarios and shows how Cisco WAAS solves application-delivery challenges for customers.

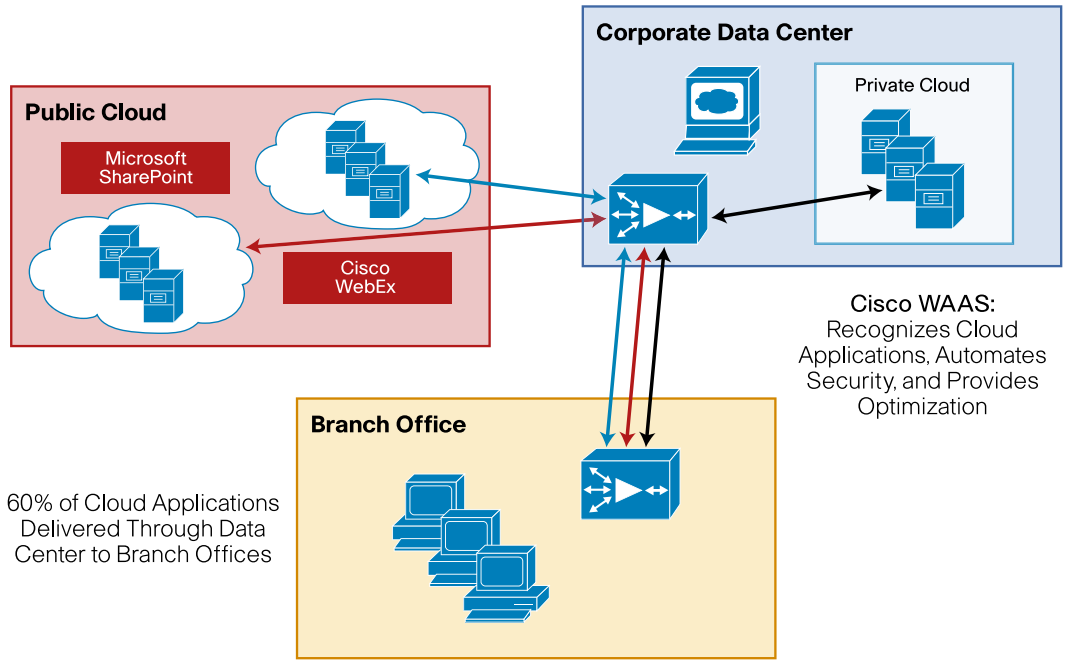
Challenges in Delivering Cloud-Based Applications

Adoption of cloud architectures requires enterprise IT departments to move resources such as applications, compute, and storage to the public or private cloud. As enterprises make these changes, compute resources may be migrated first to a private cloud hosted in corporate or outsourced data centers. Other organizations may use public clouds directly. In either architecture, application delivery to remote users in branch offices requires more WAN hops than with prior designs. A recent report from IDC states that 60 percent of SaaS applications are accessed from the SaaS hosting center and then backhauled through the corporate data center branch offices. See Figure 1. Thus, traditional problems of WAN latency, packet loss, and bandwidth limitations for centralized application delivery continue to exist and may even be magnified.

Delivery of applications from the cloud creates challenges in areas such as:

- **Performance:** Application response times for branch-office and mobile users
- **Security:** End-to-end application security for optimized traffic
- **Availability:** Disaster recovery and survivability in the event of an outage or data loss

Figure 1. SaaS Sessions Backhauled through the Corporate Data Center and Then Optimized by Cisco WAAS to the Branch Office



Cisco WAAS Enables Enterprise Adoption of Cloud Services

Cisco WAAS provides innovative solutions for the optimization of private and public cloud–based application delivery, including SaaS applications, while improving availability and security. Cisco WAAS is proven in many customer networks and data centers today and plays an important role in enabling organizations to achieve the significant cost savings promised by the cloud architectures.

The following are common scenarios in which Cisco WAAS can accelerate application delivery from the cloud:

- Delivery of public cloud–hosted SaaS applications such as Cisco WebEx™ and Salesforce.com
- Delivery of public cloud–hosted collaboration applications such as Microsoft SharePoint and Cisco WebEx Connect
- Applications and services delivered from a private cloud, such as Microsoft Exchange, VMware View, and other corporate IT applications

Delivery of SaaS Applications such as Cisco WebEx and Salesforce.com

Organizations are adopting SaaS applications primarily to save costs; with SaaS, the organization does not have to own the application and the supporting infrastructure. These applications can be delivered to branch offices connecting to the hosting provider using backhauled connections from the corporate data center. A widely used SAAS application is Cisco WebEx, which is used for conference calls. Users can provision a Cisco WebEx session on demand and can choose web-based application sharing and telephone service.

Cisco WebEx is delivered from a public cloud over secure Internet communication channels (using SSL) to help ensure data security. While SaaS provides the flexibility of on-demand application service provisioning and provides anywhere access, it also poses challenges to optimal application performance and WAN utilization for remote branch offices:

- Increased WAN bandwidth use limits the number of concurrent users of SaaS applications.
- Security must be maintained while optimizing delivery of SaaS applications.

SaaS applications, such as Cisco WebEx, create multiple data streams, with data streams that traverse the enterprise network for each user session. The resulting redundancy increases WAN bandwidth use, and the enterprise may need to upgrade, incurring increased WAN bandwidth costs. Also, the existence of multiple streams carrying redundant data limits the number of end users who may be able to use collaboration tools at a given time, resulting in reduced productivity.

Cisco WAAS optimizes SaaS applications by removing the redundancy in connection streams. Up to 80 percent WAN bandwidth reduction is often obtained using Cisco WAAS. This reduction can eliminate the need for a WAN bandwidth upgrade and increase the number of users who can connect concurrently to a SaaS application. Cisco WAAS also maintains SSL security while optimizing SaaS data flows (discussed later in this document). With these optimizations, Cisco WAAS improves the user experience for on-demand SaaS applications, enabling users to collaborate more effectively.

Delivery of Hosted Collaboration Applications Such as Microsoft SharePoint and Cisco WebEx Connect

Work groups often use collaboration tools to share files such as Microsoft Office documents. Users of collaboration tools often repeatedly download or upload the same files or documents across the WAN, which can affect the user experience. Microsoft SharePoint is a collaborative tool that allows users to work on a set of common documents regardless of the users' geographic separation. In Microsoft SharePoint, Portal Server workspace sites serve as central repositories for these document and files. Although Microsoft SharePoint sites are accessed from a web browser using HTTP, the documents are opened, edited, and saved using Microsoft Office.

When accessing these documents over the WAN, users often encounter performance bottlenecks as a result of link latency, protocol chattiness, and limited WAN bandwidth. These problems exist regardless of whether the hosting architectures are traditional data center based or cloud based. Native Microsoft SharePoint applications result in redundant data traversing the WAN due to the collaborative nature of the application. This behavior in turn can lead to poor application response times, which affect users' productivity, and increased WAN bandwidth use, forcing enterprises to consider a WAN bandwidth upgrade.

For hosted Microsoft SharePoint architectures, Cisco WAAS has been shown to provide WAN data compression exceeding 80 percent, with application response time improving by a factor of 3. Thus, Cisco WAAS can often eliminate the need for a WAN bandwidth upgrade, reducing the total cost of ownership (TCO) for application deployment. Cisco WAAS can be critical to the success of application deployments that allow enterprises to foster collaboration and improve user productivity by giving them anywhere access.

Delivery of Applications from the Private Cloud

With private cloud services, IT departments can scale their infrastructure while reducing management overhead and decreasing deployment times by consolidating distributed IT resources and virtualizing them in the data center. However, private cloud services can strain IT resources, and performance for branch-office users is affected by latency on the WAN. Cisco WAAS provides WAN optimization for all TCP applications, helping organizations reach their goals for cost savings, scalability of services, and delivery of the performance required for high end-user productivity.

For example, when desktop virtualization solutions are deployed from a private cloud over the WAN, latency and bandwidth constraints limit their effectiveness, and customers face performance, bandwidth utilization, and scalability challenges that affect user productivity. Cisco WAAS optimizes, for instance, delivery of VMware View from private clouds, improving performance by 70 percent, increasing the number of concurrent clients supported by 2 to 4 times, reducing WAN bandwidth requirements 60 to 70 percent, and reducing bandwidth use by more than 90 percent. Cisco WAAS can provide similar results for a wide range of applications and IT services hosted in the private cloud: Microsoft Exchange, SAP Enterprise Portal, etc.

If a server failure or data center outage occurs, especially in private cloud architectures, server resources and application images must be moved between data centers. Cisco has partnered with its alliance partners EMC and VMware and is working to optimize VMware vMotion to move the memory contents of the servers that provide an application workload to another server in another data center. The traffic movement across the WAN is subject to latency, bandwidth, and protocol limitations. Test results have shown that Cisco WAAS can reduce a single 512-MB server memory-content transfer to 30 MB, providing up to 94 percent compression.

With Cisco WAAS, organizations can accelerate access to private cloud services and optimize the movement of virtualized machines and data to secondary data centers, while reducing the bandwidth needed to support branch-office users.

Cisco WAAS Helps Ensure Access to Data in the Cloud

As server farms and data centers are moved to private cloud architectures, Cisco WAAS can be used to help ensure that disasters resulting in outages continue to be mitigated through optimal data replication, thus supporting the business-continuity and disaster-recovery goals of the enterprise.

Enterprises maintain more than one data center to provide high availability and to protect against data center outages. Data center replication and backup applications such as EMC SRDF/A and NetApp SnapMirror are commonly used to mirror data from one data center to another. These are block-level applications that contain a high volume of data, with a low number of TCP connections, which are constrained by WAN throughput.

Cisco WAAS accelerates and optimizes both EMC SRDF/A and NetApp SnapMirror applications across enterprise data centers and from private clouds to backup data centers. These solutions are jointly validated, and Cisco WAAS has achieved EMC eLabs certification for SRDF/A replication across native IP and Fibre Channel over IP (FCIP) transport. WAN throughput performance typically improves up to 10X, significantly reducing the size of the backup window.

Cisco WAAS Optimizes and Secures Data Delivered from the Cloud

As applications are increasingly delivered from the cloud across WAN links not directly under the control of the enterprise, it is important that applications be secured end to end. Cloud providers are increasingly looking to provide secure communication channels using HTTPS as the transport protocol given the industrywide adoption of the SSL standard for web applications.

Cisco WAAS extends this SSL protection to the branch office, while applying full optimization. Cisco WAAS also provides disk encryption features on the branch-office device to protect data at rest. For SaaS applications delivered to the branch office through the data center over SSL connections, Cisco WAAS provides secure optimization. These features provide optimization benefits without sacrificing security objectives critical to cloud-delivered applications.

Conclusion

Cloud-based architectures promise agility, efficiency, and cost effectiveness for the IT operations that are required to provision, scale, and deliver applications and services to the enterprise. Delivery of applications from the cloud to the branch-office user creates challenges in areas such as performance, availability, and security. Cisco WAAS provides innovative solutions for the optimization of private and public cloud–based application delivery, including SaaS applications, while improving availability and security. Benefits include enhanced user productivity, bandwidth optimization, and acceleration for the cloud-based SaaS applications typically used for enterprise collaboration plus end-to-end secure communication to meet compliance needs.

For More Information

For more information, please visit http://www.cisco.com/go/waas.

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