Meet the Challenge of Scaling Application Performance for the Global Organization

What You Will Learn

To compete effectively in today's business environment, applications need to scale to enable business processes and they need to reach global users while performing at a level that helps ensure productivity. The IT infrastructure and global network play critical roles in making this happen. They host, process, and deliver applications to sustain the business worldwide: from customers to employees, suppliers, partners, and supply chain.

Typically, data centers have been built over time, with servers added as they are needed. This process has resulted in server sprawl, increasing power and cooling costs, and created challenges in management and security. In addition, the number and use of applications have greatly increased. At the same time, these applications have become increasingly complex, requiring ever more computing power to use.

To meet their requirements, organizations are employing virtualization on a broad scale on servers centralized in the data center. Virtualization provides a solution for consolidating workloads, improving asset utilization, and dramatically lowering IT costs, enabling the data center team to be more responsive to initiatives that produce real value for the business and to run operations more efficiently and cost effectively.

However, server platform and virtualization address only one part of the problem for the global organization. Not only does application complexity put a burden on the server resources, but applications increase the burden on the WAN. With a widely distributed user base, organizations must address the challenge of WAN performance if they are to deliver applications to remote users with an acceptable user experience.

To meet this challenge, Cisco provides a solution to host applications and deliver them over the WAN while helping ensure the highest levels of scale and performance, enabling organizations to achieve their business initiatives.

The Application Performance Challenge

Attempting to support server virtualization on an architecture that was not designed for it can limit benefits. Many solutions are based on outdated and overly complex architectures. To provide the fullest benefits, a virtualization solution must be designed from the start to deliver performance, responsiveness, agility, manageability, security, and cost savings.

The challenge in consolidating infrastructure to gain immediate cost savings—lower hardware, software, data protection, and operating expenses—is helping ensure performance for the remote user. Accessing information over a WAN is much slower than accessing information over a LAN, due to limited WAN bandwidth, packet loss, and latency.

To meet this challenge, a solution needs to both scale the server platform and increase WAN performance. To do this, the solution must use the right architecture for the IT infrastructure: one that enables efficiencies, reduces power, and provides flexibility in deploying virtualization. With such a design, the organization benefits from centralized servers and applications while also providing high application performance for remote users and helping increase productivity.

Thus, organizations need to include application performance as a part of the application solution architecture so that that they not only scale application performance on the server, but also reach remote sites with high performance to serve all the users at each location. Applications not only need to run fast in the data center; applications must run successfully for the end users wherever they may be.

IT departments are now undertaking initiatives to meet this objective. Cisco offers a solution to help them to reach their goals.

Data Center Consolidation

To optimize infrastructure, secure physical assets, and reduce costs of operation, IT departments are consolidating their IT infrastructure. Many organizations are consolidating from regional data centers to centralized data centers, often with a backup data center. These typically large data centers are deploying state-of-the-art servers that use virtualization in increase IT agility. As a consequence of these data center consolidation initiatives, users who were close to a regional data center now find themselves distant. The result is that the users often experience poor application performance due to latency and congestion over the network.

Branch-Office Server Consolidation

Organizations are consolidating servers from remote branch offices to central data centers to improve efficiency and reduce costs. The benefits of branch-office server consolidation include reduced server and server administration costs (fewer, larger, virtualized servers can be used), reduced compliance risk through centralized storage of data, and simplified backup and disaster recovery. However, moving applications and servers to the data center presents new challenges, specifically increased traffic across the WAN. Adding to the challenge, some applications use protocols, such as Common Internet File System (CIFS), that were designed for the LAN and do not operate efficiently over the WAN. Thus, application performance over the WAN is degraded.

Scaling for New Application Deployments

When deploying new applications, organizations are using high-scale servers that take advantage of virtualization, reducing the number of servers that they own. With these servers consolidated in the data center, organizations have reduced costs for server deployment and management. However, these high-performance servers are required to run applications that are increasingly complex and require ever more computing resources. After these applications are deployed, problems arise when users try to access them over the WAN. Limited bandwidth, congestion, and latency reduce application performance to the point where users call the support center looking for resolution.

Scaling for Virtualized Desktops

Organizations that are moving to virtualized desktops need to be able to host large numbers of desktop images; however, when desktop virtualization solutions are deployed over the WAN, latency and bandwidth constraints limit their effectiveness and the number of sessions that can be delivered. As a result, end users face performance challenges that affect their productivity. What is needed is an architecture that can optimize the performance of VMware View and other desktop virtualization solutions to increase the number of concurrent clients while reducing WAN bandwidth requirements and helping ensure performance for end users.

Mobility for Virtual Servers

For organizations that are deploying large numbers of virtualized servers, if a server failure or data center outage occurs, server resources and application images must be moved between data centers. This process can negatively affect applications and be a burden on the WAN due to limited bandwidth and distance. A suitable solution is needed to optimize the portability of virtual server images from one data center to a server in another and provide high performance over long distances, even while the traffic across the WAN is subject to latency, bandwidth, and protocol limitations.

Performance for Cloud Computing

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 to a private cloud hosted in corporate or outsourced data centers, and 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. Thus, traditional problems of WAN latency, packet loss, and bandwidth limitations for centralized application delivery continue to exist and may even be magnified.

Cisco Solution for Successful Applications

Cisco offers a solution to meet the challenge of making applications successful for all users: the Cisco Unified Computing System™ combined with Cisco® Wide Area Application Services (WAAS). This combined solution provides a highly efficient, virtualization-optimized computing platform tightly integrated with proven application acceleration benefits over the WAN.

Cisco Unified Computing System

The Cisco Unified Computing System is a next-generation data center platform specifically built to accelerate the server consolidation and virtualization process. It unites compute, network, storage access, and virtualization into a cohesive system designed to reduce the total cost of ownership (TCO), increase agility, and empower the IT team to more effectively support business requirements.

Organizations are deploying the Cisco Unified Computing System to take advantage of a number of advanced capabilities designed to scale their application delivery infrastructure. The Cisco Unified Computing System provides virtual machine–optimized services that enable shared pools of data center resources, further simplify cabling requirements, and reduce application downtime. At the platform site and organizational levels, the Cisco Unified Computing System helps reduce overall system size, thereby reducing power consumption and enabling more efficient use of space and cabling. With its intuitive and easy-to-use management console, the Cisco Unified Computing System enables a dramatic reduction in the time required to provision services, provides rapid repurposing of existing resources for new workloads, and enables better coordination during work processes. Prebuilt, serviced, and tested as a single system, the Cisco Unified Computing System provides preintegrated components that enable scalable 10 Gigabit Ethernet interfaces and deliver secure connectivity over Fibre Channel, Fibre Channel over Ethernet (FCoE), and Ethernet for unified access to storage and network traffic. The Cisco Unified Computing System allows thousands of virtual machines to run on as many as 320 servers. UCS systems have been certified and performance tuned on a wide range of key enterprise applications and s UCS has delivered world record-breaking results for these applications. With a full portfolio of system options, UCS is the most powerful and advanced computing infrastructure for x86 workloads: be they physical or virtual.

With these capabilities, the Cisco Unified Computing System is a highly efficient computing platform that delivers the highest levels of performance to support today’s business-critical applications.

Cisco WAAS

Cisco WAAS helps ensure application performance after applications have been centralized on virtualized servers in the data center. Cisco WAAS is deployed on either end of a WAN link in both remote offices and the data center. Coupling intelligent application-layer acceleration with advanced compression and flow optimization capabilities, Cisco WAAS mitigates the negative effects of WAN conditions to provide remote users with LAN-like access to infrastructure in the data center. This capability allows IT departments to confidently consolidate servers, storage, and data protection infrastructure into the data center without compromising the performance expectations that remote users have based on years of relying on local infrastructure.

Cisco WAAS mitigates the performance-degrading effects of the WAN, allowing remote users to experience levels of performance similar to users who are local to the application infrastructure in the campus network or data center. With infrastructure consolidated, organizations can centrally deploy new applications for the global network rather than having to distribute them to remote offices and manage the remote-office infrastructure. With Cisco WAAS, infrastructure can be consolidated safely to improve data protection, decrease ongoing management and capital costs, and meet regulatory compliance initiatives while extending the performance boundary of the data center to the remote office to help ensure performance consistency, regardless of where the user is located.

Benefits of the Joint Cisco Unified Computing System and Cisco WAAS Solution

As applications continue to evolve, IT departments find that the burden placed on the server and the network continues to increase as the applications themselves become more powerful. As a result, server performance requirements and network bandwidth requirements increase.

The Cisco Unified Computing System provides the scalable, high-performance architectural foundation to meet the requirements of these changing applications and business requirements in the data center. Using the Cisco Unified Computing System together with Cisco WAAS to eliminate the data center performance boundary and extend high-performance access to the global network, IT departments can deploy new applications confidently, and remote employees can confidently use these applications without concern about performance.

Deployment of the Cisco Unified Computing System with Cisco WAAS transforms the data center architecture, providing high scalability and virtualization and helping ensure application performance to the entire user base. The Cisco Unified Computing System and Cisco WAAS solution supports data center and server consolidation initiatives, enabling organizations to reduce IT overhead and meet business objectives. With Cisco Unified Computing System and Cisco WAAS technology increasing application scalability and performance over the WAN, IT departments can confidently deploy new applications meet their business requirements.

Conclusion

IT departments are challenged to meet today's business demands for cost savings and consistent global application performance. Together, Cisco Unified Computing System and Cisco WAAS can transform the data center. By combining the Cisco Unified Computing System with Cisco WAAS, organizations can gain the benefits of data center consolidation and server virtualization and provide the power of applications across the WAN to remote locations worldwide, enabling organizations to meet their objectives for user productivity while limiting IT costs. With the Cisco Unified Computing System and Cisco WAAS, the organization's application needs can be met as well as the needs for high application responsiveness and user productivity.

For More Information

- Cisco WAAS: http://www.cisco.com/go/waas
- Cisco Unified Computing System: http://www.cisco.com/go/ucs

Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
Singapore

Europe Headquarters
Cisco Systems International BV
Amsterdam, The Netherlands

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