Gain Strategic Advantages with Cisco ACE Application Control Engine

What You Will Learn

This document summarizes the most critical business and technical reasons that 1500 organizations including First National Bank and Harper College have standardized on the Cisco® ACE Application Control Engine. IT decision makers will learn why Cisco is one of the leading providers of applications delivery controllers (also known as application switches, server load balancers, or content switches), and why Cisco ACE continues to outpace and outperform the competition in this space.

Cisco Long-Term Viability

With its track record as number 1 or number 2 in all networking solution areas, including routing and switching (85 percent market share), unified communications (UC), security, mobility, and data center networking, Cisco outspends and innovates faster than other point-product vendors. Organizations receive three exceptional benefits when selecting Cisco as the long-term supplier for application delivery:

- Industry's only system-level solution, with best-in-class products working together to maximize its benefits, summarized in Table 1

Table 1. Product Portfolio

Application Delivery Optimization	Cisco Products	Ask Point-Product Vendor
Asymmetric Acceleration of Web-Based Applications	Cisco ACE	
Application Switching (Server Load Balancing and Content Switching	Cisco ACE	
Service-Oriented Architecture (SOA) and Extensible Markup Language (XML) Acceleration	Cisco ACE XML Gateway	
Global Application Availability	Cisco ACE and Cisco Global Site Selector (GSS) Software	
Application Security in the Data Center	Cisco Catalyst® 6500 Series Switches, Cisco ACE, and Cisco ACE XML Gateway	
Optimized Data Center Power Consumptions	Cisco ACE and Cisco Wide Area Application Services (WAAS) Software	
Symmetric Acceleration of Branch-Office Users	Cisco WAAS	
Symmetric Acceleration of Mobile Users	Cisco WAAS	
Video Distribution	Cisco Application and Content Networking System (ACNS) Software and Cisco WAAS	
Application Security in the Branch Office	Cisco Integrated Services Routers and Cisco WAAS	
Organization Wide Voice-over-IP (VoIP) Quality	Cisco Unified Communications and Cisco WAAS	

- One-stop advisory services and support, with Cisco being the only networking supplier awarded with prestigious J.D. Power and Associates certification
- Strategic supplier commitment; organizations get better accountability and use from Cisco solutions because of the Cisco commitment to making application delivery work reliably with organizations' entire network assets

Ease of Operation through Virtualization and Role-Based Administration

Cisco ACE application switches contain enhancements that are unique in the industry to further improve application deployment times while delivering significant power and cooling efficiencies and savings. These value-added functions include virtualization and role-based administration.

Virtualization means that architecturally, a single physical Cisco ACE application switch can function as multiple virtual ACE devices, substantially reducing capital, space, and power requirements in the data center and enhancing an organization's capability to scale its data center resources (Table 2).

Table 2. Virtualization Capabilities

Virtualization	Cisco	Ask Point Product Vendor
"First National virtualizes everything including servers, routing porting tables and the network. Now that we have the ability to virtualize or create secure virtual devices within the same ACE module and still obtain incredible throughput, there was nothing else to consider; the Cisco ACE made perfect sense." *—Patrick Stephens, network engineer with First National of Nebraska* First National Bank		
Capability to Create Multiple Virtual Instances on a Single Platform	✓	
Capability to Perform Upgrades Without the Need for New Hardware	✓	
Capability to Install New Virtual Devices Without Downtime or Degradation of Service on Existing Applications	✓	
Capability to Deploy Additional Applications without the Need for Additional Hardware, yet with the New Applications Isolated from Existing Applications	✓	
Capability to Deploy Virtual Devices In Minutes for Rapid Application Deployment any Time of Day	✓	

Role-based administration allows different IT personnel and organizations to provision and manage multiple virtual devices in parallel within a single Cisco ACE platform (Table 3). As a result, IT departments can deploy applications much faster than if the different groups had to provision the application switches in a serial fashion.

Table 3. Management Capabilities

Role-Based Access Control and Administration	Cisco	Ask Point Product Vendor
"Since Cisco ACE virtual devices are completely secure and isolated from each other, we have separated our production, test, and training environments using ACE virtual devices." *—John McManus, manager of Servers and Networks Group, Harper College* Harper College GoForward		
Departmental Control of Virtual Devices	✓	
Centralized or Role-Based Management of Virtual Devices	✓	
Configuration Rollback Support	✓	

Reliable Deployment with Enterprise Applications

Cisco offers high-performance acceleration for business applications. The combination of joint interoperability testing, proper licensing agreements, and escalation support in place among Cisco, Oracle, Microsoft, SAP, and other vendors allows networking and application groups within IT organizations to confidently deploy applications, and minimizes the risk of difficult troubleshooting and collaboration (Table 4).

Table 4. Partner Information

Reliable Deployment with Enterprise Applications	Cisco	Ask Point Product Vendor
Strategic Partnership with Oracle (Testing, Licensing, and Escalation): "As market leaders, both Cisco and Oracle have been working closely together to meet the latest application and network performance challenges to help customers successfully realize business productivity improvements." *—Vijay Tella, vice president for development, Oracle* ORACLE	✓	
Strategic Partnership with Microsoft (Testing, Licensing, and Escalation): "There are seven initiatives where we are focusing our joint investments, ranging from security, where we have been cooperating on integration of Cisco's Network Admission Control and Microsoft's Network Access Protection since 2004, to network infrastructure optimization, where the two companies are working to develop a joint architectural blueprint that will help customers reduce costs by deploying solutions that combine Microsoft and Cisco products in a consistent way." *—Steve Ballmer, CEO, Microsoft* Microsoft	✓	
Strategic Partnership with SAP (Testing, Licensing, and Escalation)	✓	
Strategic Partnership with IBM (Testing, Licensing, and Escalation)	✓	
Strategic Partnership with VMware (Testing, Licensing, and Escalation)	✓	
Strategic Partnership with EMC Backup Application	✓	
Strategic Partnership with NetApp Backup Application	✓	
Other Third-Party Software Vendor Partnerships	✓	

Application Acceleration

Application switching products should use a range of acceleration capabilities to boost remote end-user application response times. Some of the more advanced technologies include compression, flash-forward, and delta encoding features. These functions minimize distance-imposed latency when application requests are served to remote users by reducing the number of round-trip data transfers and messages required for any HTTP-based application. These functions also optimize bandwidth by delivering to the client just the differences between cached original pages and updated new pages. Customers using these acceleration technologies can achieve up to 300 percent improvement in response times.

According to the 451 Group, XML accounted for 15 percent of data center traffic in 2005, and by 2008 XML is expected to account for 50 percent of data center traffic. An XML message is 3 to 10 times larger than an equivalent binary message, which makes servers and infrastructure vulnerable to overload as XML traffic increases. General-purpose servers are expensive resources that should not be used for computationally intensive XML functions. Hence, another crucial differentiator in choosing a solution is whether the solution can accelerate XML applications (Table 5). Most solutions can.

Table 5. XML Capabilities

Application Acceleration	Cisco	Ask Point Product Vendor
XML Acceleration Support	✓	
Hardware-Based Compression Support	✓	

Security of Application Delivery

Application switches should provide an additional layer of security and should act as a last line of defense for the servers in the data center, performing deep packet inspection. The application switching solution must not disrupt the current security environment, nor should it create any new security vulnerabilities.

The application switching solution should provide an integrated data center firewall that protects against protocol and denial-of-service (DoS) attacks and encrypts mission-critical content. The application switching solution should also provide an application-layer firewall to prevent attacks embedded in application payloads, including zero-day attacks. Most traditional firewalls do not protect against application-layer attacks. An application-layer firewall secures mission-critical applications and protects against identity theft, data theft, application disruption, and fraud. It uses features such as efficient inspection, filtering, and fix up of popular data center protocols such as HTTP, Real-Time Streaming Protocol (RTSP), Domain Name System (DNS), FTP, and Internet Control Message Protocol (ICMP) to defend Web-based applications and transactions against known and unknown attacks by professional hackers.

With XML traffic increasing in data centers, it is imperative that the application switching solution also provides XML security.

Cisco ACE allows organizations to protect their application investments by offering these capabilities summarized in Table 6.

Table 6. Security Capabilities

Security	Cisco	Ask Point Product Vendor
"We are going to utilize security features of ACE to eventually replace our firewall. The Cisco ACE will also be used to front-end the server between load balancers and the server security." *—Jim Healis, network engineer, Weber State University* 		
XML Security	✓	
Static, Dynamic, and Policy-Based Network Address Translation (NAT)	✓	
HTTP Deep Packet Inspection of HTTP Header, URL, and Payload	✓	
Bidirectional Network Address Translation (NAT) and Port Address Translation (PAT)	✓	
TCP/IP Normalization and RFC Compliance	✓	

Optimized Server Operations

Application switches should offload server functions that can be handled better and more effectively by the network, allowing the server to do what it does best: process and serve information to users. TCP communications management functions and Secure Sockets Layer (SSL) encryption can be moved to application switches so that the servers can devote their computing cycles entirely to their primary mission: quickly fulfilling user requests for application content (Table 7).

Table 7. Offload Capabilities

Server Optimization	Cisco	Ask Point Product Vendor
"Cisco ACE is also helping First National offload SSL processing that had previously been a function of another vendor product. The capability of performing multiple tasks on the Cisco ACE makes it so much more appealing to us than having websites run through a traditional Web load balancer." *—Todd Kleinsasser, network engineer, First National Bank* First National Bank		
Offloading of SSL Encryption Processing	✓	
Offloading of TCP Server Processing	✓	

Lower Total Cost of Ownership

The use of both appliance-based and integrated solutions offers flexibility, and organizations also enjoy economic benefits by integrating application delivery within the switch. Environmental factors such as cooling, rack space, cabling, and power pose challenges for data centers. Server farms generate a large amount of heat, consume large amounts of power, and occupy considerable rack space in data centers. Application switching solutions that reduce the number of devices necessary to support a service or that offer more energy or space efficiency can mitigate these problems.

Virtualization thus reduces the number of individual application switches needed in consolidated data centers, which often have space limitations. Operating with fewer physical devices reduces capital costs, and having fewer devices in the data center frees up rack space and reduces power and cooling requirements by up to 94 percent according to testing by Miercom, an independent testing facility in Cranbury, New Jersey, thus reducing total cost of ownership (TCO; Table 8).

Table 8. Operational Efficiencies

Total Cost of Ownership	Cisco	Ask Point Product Vendor
True Device Virtualization	✓	
Capability to Add New Applications with Minimal Increase in Power and Cooling Requirements	✓	
Minimal Space Requirements	✓	

Application Availability and Uptime

To maximize application availability, the application switching solution should use best-in-class Layer 4 load balancing and Layer 7 application switching dynamic and adaptive algorithms coupled with highly available system software and hardware. These features together should offer many configuration options for intelligent failover and redundancy across the application switches, across the virtual devices, and across the data centers. The application switching solution should also offer an extensive set of application health probes to help ensure that traffic is forwarded to the most available server. The solution should also allow servers to be added or maintained without service disruption (Table 9).

Table 9. High Availability Capabilities

Availability Technologies	Cisco	Ask Point Product Vendor
Failover between Virtual Devices	✓	
Failover between Application Switches	✓	
Failover between Data Centers	✓	

Conclusion

The Cisco vision of using the network platform to minimize branch IT and application delivery costs is clear and highly differentiated compared to that of other vendors. By partnering with Cisco, organizations can focus on creating strategic advantage rather then on solving the problems that arise when information technology systems do not work together well.

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