Cisco Application Networking for BEA WebLogic

Faster Downloads and Site Navigation, Less Bandwidth and Server Processing, and Greater Availability for Global Deployments

What You Will Learn

To address challenges associated with today's mission-critical enterprise application deployments, Cisco®, in collaboration with BEA®, offers Cisco Application Networking for BEA WebLogic Portal. Cisco Application Networking for BEA WebLogic Portal is an enterprise network architecture with best practices and implementation guidance that optimizes application availability, performance, and security and lowers application ownership costs. See Figure 1.

BEA WebLogic Portal includes Web 2.0-enablement capabilities that simplify delivery of Web 2.0 benefits to portal users. It supplies a rich, graphical environment for development of portals, as well as Web-based configuration tools for business experts. In these tests Cisco used the GroupSpace application on top of WebLogic Portal to create a collaborative work environment.

This document shows how Cisco Application Networking for BEA WebLogic addresses the following business challenges for BEA WebLogic deployments through data center and WAN application optimization services from the Cisco Application Control Engine (ACE) and Wide Area Application Services (WAAS) Software products:

- Application response time and bandwidth utilization over limited WAN connections
- Recovery time and point objectives for business continuity
- Application, server, network, and service oriented architecture (SOA) security
- Reduced capital and operational costs for applications, servers, and networking

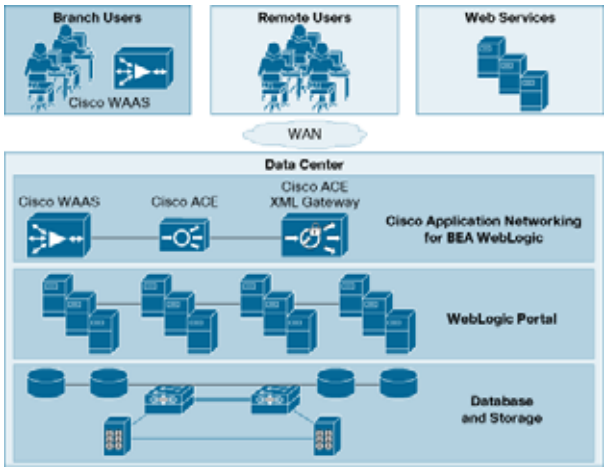
The solution uses Cisco WAAS to provide performance benefits on the WAN and the Cisco ACE Module to reduce resource load on the server farm. Individually, Cisco WAAS and ACE provide a unique benefit to the solution, and when used in conjunction as the solution becomes more complex, they provide additional gains.

Cisco ACE reduces resource load on the server farm by load balancing the data that is bound for the server farm. The Cisco ACE also provides Secure Sockets Layer (SSL) offload and TCP reuse functions. SSL offload reduces the load on the server CPU by allowing the Cisco ACE, instead of the server, to terminate the SSL connection.

Cisco WAAS provides performance benefits to the WebLogic Portal application by optimizing the traffic and data flowing across the WAN and caching data at the local devices. The cached data reduces the amount of traffic flowing across the WAN and allows more transactions and observations to occur.

Specific tests of this solution showed up to 7.67 times faster site navigation and 94 percent less bandwidth usage for BEA WebLogic deployments when paired with Cisco Application Networking solutions. Additional solution benefits include increased number of transactions processed and increased application security and availability.

Figure 1. Cisco Application Networking for BEA WebLogic



Business Challenge

In today's globally networked economy, enterprise application availability and performance are tightly linked to business success and profitability, and as a result application stakeholders are faced with new challenges. As applications are enhanced to automate new business processes and serve geographically dispersed user populations, increased complexity may affect service level and productivity. To serve a geographically diverse user base and reduce the cost of deployment, enterprise application deployments are likely to be run from a regional data center, serve users through Web browsers and standard Internet protocols, and use SOA to process data from diverse sources. This new business environment and associated application architecture intensifies four major IT challenges, each of which can be addressed by a strong enterprise network architecture using Cisco Application Networking for BEA WebLogic:

- Application availability challenges: Increasing business dependence on fewer but larger applications deployed in a central location requires a more careful look at application architecture, including single points of failure and product stability, to achieve recovery time and point objectives.
- Application performance challenges: Limited WAN links and inefficient standard Internet protocols such as HTTP and Extensible Markup Language (XML) result in poor application performance and bandwidth utilization for global users. In addition, increased demand on large applications in centralized data centers results in overload on servers that slows application response time.
- Application security challenges: Significantly increased business risk results from application security breaches from malicious or innocent end users or SOA Web service requests that attack application, server, or operating system vulnerabilities.
- Application ownership cost challenges: The increasing scope of application business logic and geographically and organizationally dispersed users, coupled with higher availably, performance, and security needs, requires a new approach to application support to keep costs in line with lean budgets.

Given these significant challenges, it is increasingly important to turn to application-savvy infrastructure vendors, such as Cisco, whose solutions cost-effectively address today's business-level application and IT challenges, and who are committed to rigorous feature and system quality testing and global and local language support 24 hours a day and have a strong history of security

expertise. (See Table 1.)

Table 1. Application-Savvy Infrastructure Vendor Requirements for Today's Enterprise Application Deployments

Requirements
• Strong application optimization solutions • Minimized application ownership costs • Rigorous feature and system quality testing • Global and local language 24-hours-a-day support • Outstanding security history and experience • Strategic partnerships with application vendors

Equally important is an application infrastructure vendor that partners with leading application vendors, such as BEA, to yield tested, documented, and validated joint architectures that optimize application availability, performance, and security and lower application ownership costs.

Business Benefits

The Cisco Application Networking for BEA WebLogic solution offers optimized application availability, performance, and security and reduced deployment costs by providing application optimization services as described here.

BEA WebLogic Application Availability

Cisco ACE application optimization services for high availability:

- Cross–data center load balancing: Efficiently routes end-user and Web services requests to the best available data center
- Application health monitoring: Continuously and intelligently monitors application and database availability
- Server load balancing: Efficiently routes end-user and Web services requests to the best available server
- Network platform health monitoring: Helps ensure continuity of business operations through mirroring of end-user transaction states across pairs of network devices

BEA WebLogic Application Performance

Cisco ACE and WAAS application optimization services for high performance:

- WAN optimization: Provides intelligent caching, compression, and protocol optimization that yields up to 45 times faster downloads, 26 times faster site navigation, and 96 percent reduction in bandwidth usage (see Table 5 later in this document)
- Server offloading: Provides specialized hardware that offers greater processing efficiency for the application optimization services listed in Table 2, freeing application server processing and memory to focus on business logic computations

Table 2. Services Offloaded from Servers by the Solution

Service	Description
Cross–Data Center Load Balancing	Provides site selection capability
Server Load Balancing	Shares load across available servers
SSL Termination	Increases number of SSL connections per second
TCP Connection Management	Significantly reduces number of TCP connections to server

Service	Description
Application Health Monitoring	Helps ensure validity of server requests
Traffic Compression	Increases throughput
Object Caching	Reduces number of requests to server
XML Schema Validation	Increases number of schema validations per second

BEA WebLogic Application Security

Cisco ACE product optimization services for optimized data security:

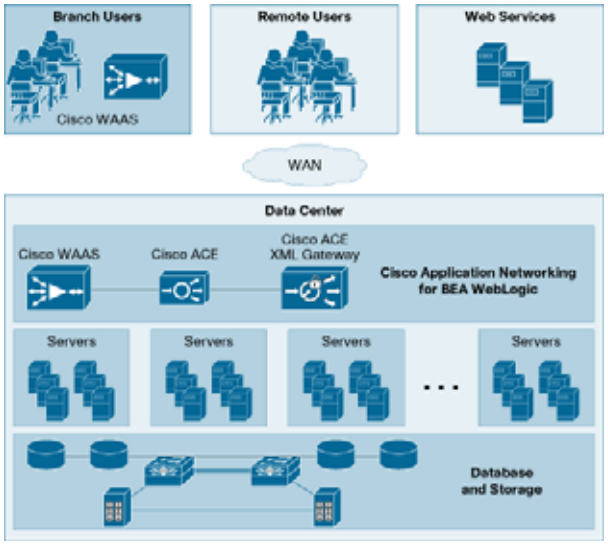
- SSL termination: Efficiently encrypts and decrypts SSL-enabled traffic, which facilitates the use of intrusion detection and prevention solutions before traffic reaches the servers, reduces server CPU usage, and centralizes certificate management
- End-user access control: Provides access control lists (ACLs) to protect client-to-server traffic from worms and intruders that attack vulnerable open server ports not used by the application
- XML firewall: Examines SOA Web services requests for compliance with schemas and protects against identity, message-format, and denial-of-service (DoS) attacks

BEA WebLogic Ownership Cost

Cisco Application Networking for BEA WebLogic reduces application capital and operating costs through the following:

- Server cost reduction: Offloading of the application optimization services listed in Table 2 from servers to cost-effective network devices frees server processing and memory, allowing resources to focus on business logic computation.
- Networking cost reduction: Virtualization of application optimization services supplies the services listed in Table 2 for multiple BEA WebLogic servers as well as other enterprise applications (see Figure 2).

Figure 2. Virtualization of Application Optimization Services



- Operating costs reduction: Application optimization services reduce operating costs as shown in Table 3.

Table 3. Operating Cost Reduction from Application Optimization Services

Cost Reduction	Description
WAN Bandwidth Usage	Up to 94% savings
Server Power, Cooling, Space, and Administration	Increased costs savings
Application Deployment Administration	Up to 250 virtual application services

Solution

Cisco Application Networking for BEA WebLogic combines the Cisco ACE and WAAS platforms with the BEA WebLogic architecture to provide optimized availability, increased performance, enhanced security, and reduced cost of ownership.

BEA WebLogic with Cisco ACE

Within the BEA WebLogic architecture, scaling to handle more end users requires the addition of BEA WebLogic application server instances, which creates a need for load balancing. Cisco ACE provides server load balancing and SSL termination in addition to end-user access control, server health monitoring, and TCP connection management.

Virtualization within Cisco ACE allows a single active-active pair of Cisco ACE products to serve multiple BEA WebLogic applications as well as other enterprise applications. Also, if Cisco ACE is already deployed in the data center, additional virtualized contexts can be added to accommodate new WebLogic applications without the need to order and configure additional equipment.

Additionally, Cisco ACE virtualized contexts can be created using Cisco ACE role-based access control (RBAC, which constrains the commands and actions for unique application, database, security, and systems management administrators. Cisco ACE comes prepackaged with a number of predefined roles, and others can be customized as needed.

Cisco ACE specifically provides server load-balancing session persistence for BEA WebLogic Access through the cookie sticky methodology. Also, if the application architecture requires, Cisco ACE can decrypt SSL traffic for SSL offload and for intrusion detection and prevention. For end-to-end security, Cisco ACE can then reencrypt traffic to the server. Because the database is typically a clustered single instance, Cisco ACE is not used at that part of the architecture.

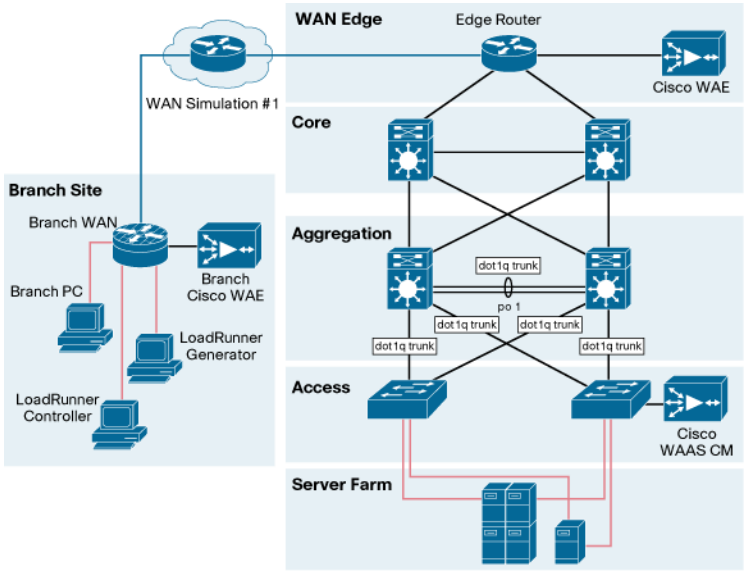
BEA WebLogic with Cisco WAAS

Completing transactions on applications running on BEA WebLogic involves numerous components of the application architecture, including the client, application servers, database servers, storage hardware, networking hardware, LANs, and WANs. (See Figure 3.)

Each transaction typically requires several steps that, when requested by a remote user, travel over the WAN and introduce network delay that slows end-user performance. When network delay is significant due to constrained or overburdened bandwidth, distance of users to servers, or a high number of steps to complete a transaction, end-user performance and bandwidth utilization improvement can be achieved through Cisco WAAS technologies such as data redundancy elimination (DRE), TCP flow optimization (TFO), and compression.

When Cisco WAAS TFO was used with BEA WebLogic, tests showed significant round-trip time and bandwidth reduction, as described in the “Testing” section later in this document.

Figure 3. Cisco Application Networking Architecture for BEA WebLogic

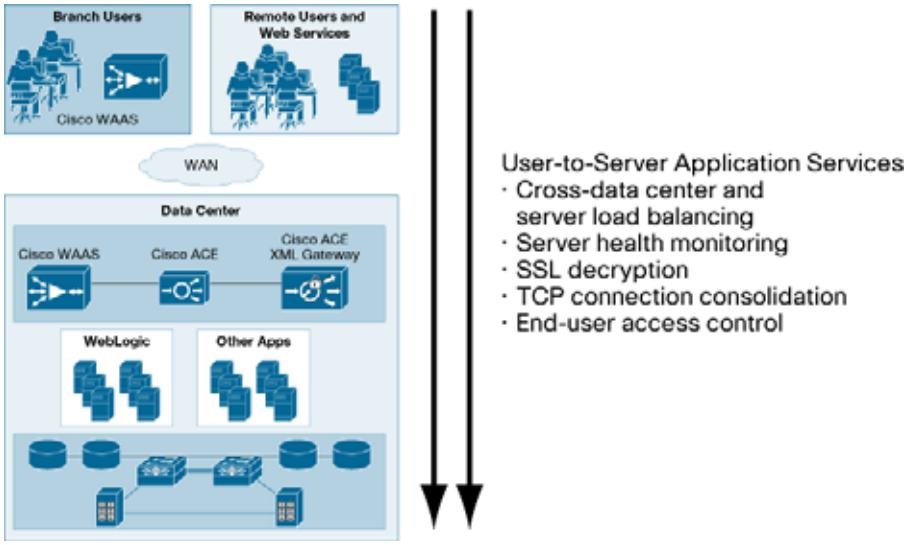


Solution Deployment

Cisco ACE, ACE XML Gateway, and WAAS reside in the data center and can provide virtualized application optimization services for multiple BEA WebLogic deployments as well as other enterprise applications.

Because of their unique location, these solutions can take intelligent action on end-user traffic before it is routed to the BEA WebLogic application servers, including load balancing, server health monitoring, SSL decryption, TCP connection consolidation, and security access control (see Figure 4). Cisco Application Networking for BEA WebLogic provides these services cost effectively, freeing server processing and memory capacity.

Figure 4. Data Center Application Optimization Services

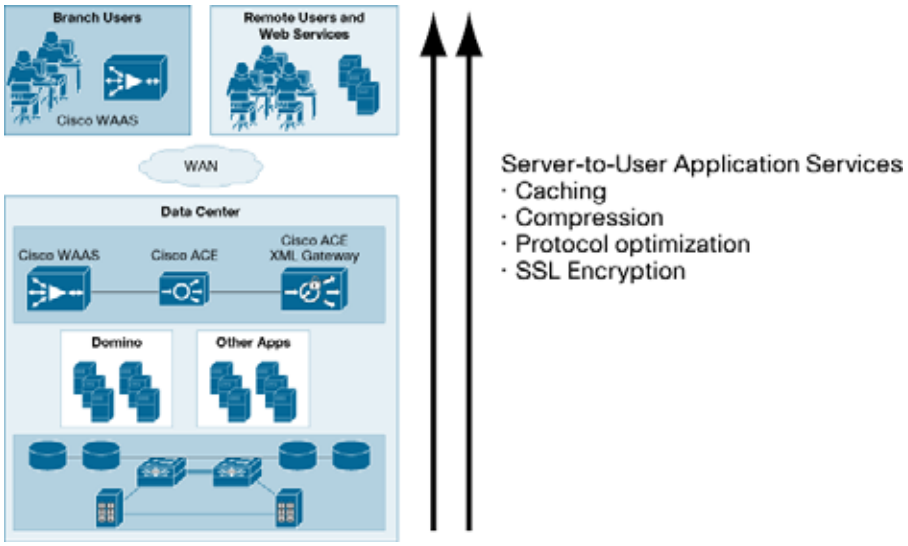


Cisco WAAS also resides in the branch office and can provide virtualized application optimization services for all application users in that location. The Cisco WAAS data center and branch-office deployments together offer a WAN optimization service through the use of intelligent caching,

compression, and protocol optimization.

When the BEA WebLogic application servers respond to end user-requests, the response is most efficiently passed across the WAN, with minimal bandwidth usage and maximum speed. Commonly accessed information is cached both at the Cisco WAAS solution in the branch and in the Cisco ACE solution in the data center, significantly reducing the burden on the servers and the WAN. (See Figure 5.)

Figure 5. WAN Application Optimization Services



The recommended best practices and implementation guidance for the Cisco Application Networking for BEA WebLogic solution, including specific configurations for each Cisco network solution, can be found in the Cisco Application Networking for BEA WebLogic Deployment Guide at http://www.cisco.com/go/optimizemyapp.

The Cisco ACE solution can be deployed in the data center as a module in the Cisco Catalyst® 6500 Series Switches or as an appliance. Cisco WAAS can be deployed in the branch office as a module in Cisco Integrated Services Routers or as an appliance.

Testing

Cisco, in collaboration with BEA, conducted a series of functional, load and performance tests over 3 months that resulted in the Cisco Application Networking for BEA WebLogic architecture, best practices and implementation guidance.

Cisco WAAS Performance Testing

User transaction tests were conducted for site navigation. An automated testing tool was used to simulate user transactions. Two simulated WAN links were tested to represent typical branch office–to–data center connections, as shown in Tables 4 and 5 and Figures 6 and 7.

Table 4. Cisco WAAS for BEA WebLogic: Two Simulated WAN Links

Description	Bandwidth	Round-Trip Latency	Packet Loss
Intracontinental	1.544 Mbps	100 ms	0.1%
Intercontinental	512 Kbps	200 ms	0.2%

Table 5. Cisco WAAS for BEA WebLogic: Site Navigation Performance Improvement

WAN Link	Bandwidth Savings	Increased Transactions
Intracontinental	92%	2.12X
Intercontinental	94%	7.67X

Figure 6. Bandwidth Savings for Site Navigation on Intercontinental Link Is 94 Percent per Transaction

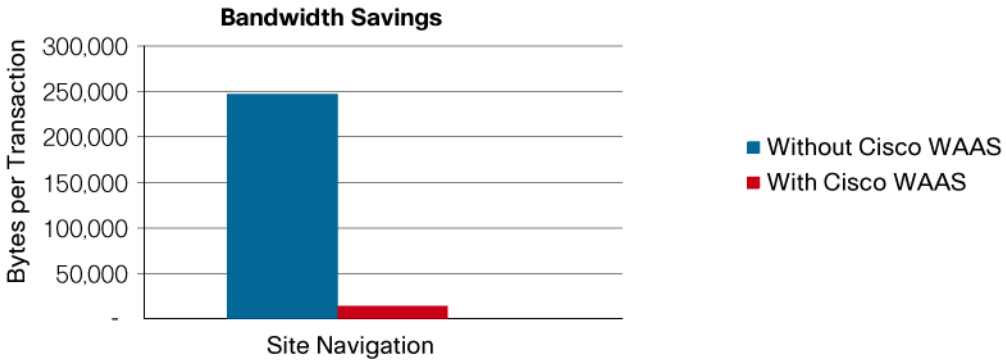
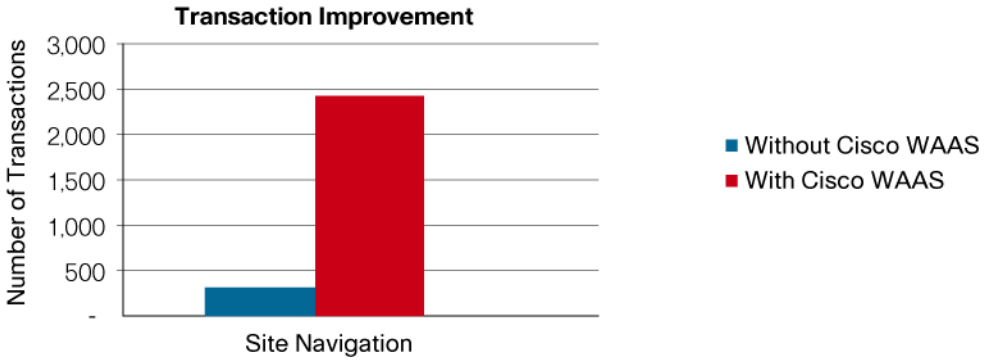


Figure 7. Site Navigation on Intercontinental Link Shows 7.67 Times Increase in Number of Transactions



From these results, it is clear that there are strong network performance benefits to be gained by adding Cisco WAAS in situations with geographically far-reaching BEA WebLogic deployments with high-latency or low-speed WAN connections.

Representative summaries of test results for bandwidth utilization improvements for site navigation transactions without and then with Cisco WAAS showed up to a 96 percent decrease in bandwidth utilization. As with conclusions drawn from the performance tests, it is clear that strong cost savings can be achieved by deploying Cisco WAAS with BEA WebLogic for specific scenarios.

Cisco ACE Function Testing

Cisco ACE function tests succeeded and the deployed configurations were documented for these tests, which included the following features: server load balancing with persistence, server health monitoring, TCP connection management, and end-user access control.

Statement of Cooperation

Cisco and BEA cooperated in all phases of the Cisco Application Networking for BEA WebLogic testing, including lab setup at Cisco offices, solution function and performance testing, and solution overview and deployment guide documentation. Cisco and BEA jointly validate that the lab setup and solution testing represents best efforts in creating a realistic customer deployment and accurate documentation of such deployment.

For Further Information

http://www.cisco.com/go/applicationservices.

http://www.cisco.com/go/ace.

http://www.cisco.com/go/waas.

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