

Cisco Wide Area Application Services (WAAS) Software Version 4.1

Product Overview

Cisco® Wide Area Application Services (WAAS) Software is a comprehensive WAN optimization solution that accelerates applications over the WAN, delivers video to branch offices, and provides local hosting of branch-office IT services. It allows IT departments to centralize applications and storage in the data center while maintaining LAN-like application performance, rapidly deliver local branch-office IT services, and minimize device footprint in the branch office.

Main Benefits

Cisco WAAS enables organizations to accomplish these primary IT objectives:

- Improve employee productivity: Enhancing the user experience for important business applications regardless of the location of the employee
- Reduce the cost of branch operations: Centralizing IT resources such as branch-office server, storage, and backup infrastructure in the data center and minimizing the cost of WAN bandwidth
- Increase IT agility: Reducing the time and resources required to deliver new IT services to the branch office
- Simplify data protection: Supporting business continuance and regulatory compliance
- Main Features

Cisco WAAS Software Version 4.1 provides these main features:

- Ease of initial deployment:
 - Quickstart wizard enables easy, fast deployment
- Ease of ongoing operations:
 - Network transparency preserves existing network services, helping ensure easy maintenance
 - Streamlined management user interface includes customizable reporting, diagnostic, and troubleshooting tools
 - Intuitive workflow-based management
 - Real-time monitoring
- Improved user experience through application acceleration:
 - Microsoft Windows file sharing
 - Microsoft Exchange
 - HTTP, HTTPS, and SSL applications such as Oracle, SAP, IBM WebSphere and Microsoft SharePoint and Outlook Web Access (OWA)
 - Virtual desktop delivery
 - Windows printing over the WAN
 - UNIX network file services (NFS)

- Security:
 - Data-in-flight security is maintained by allowing Cisco firewalls to perform stateful inspection of accelerated traffic.
 - Secure acceleration of SSL encrypted applications is provided while preserving enterprise security architecture.
 - Data-at-rest security is provided by disk encryption based on the Federal Information Processing Standards (FIPS) 256-bit Advanced Encryption Standard (AES) to secure data even in the event of physical compromise.
- Live video delivery:
 - Wide-scale delivery of Windows Media live video to the branch through transparent edge-stream splitting eliminates the need for WAN bandwidth upgrades and complex configuration.
- Local hosting:
 - Flexible delivery of branch-office IT services through local hosting minimizes the device footprint.

Main Differentiators

Cisco WAAS offers the benefits described here that distinguish it from other WAN optimization products.

Application-Vendor Validation

Cisco WAAS is the only WAN optimization solution that has jointly published validated designs with major application vendors such as Oracle, SAP, Microsoft, and IBM. These validated designs cover the full range of Cisco application delivery products. They offer best practices and significantly reduce the risk of deploying WAN optimization to accelerate these applications.

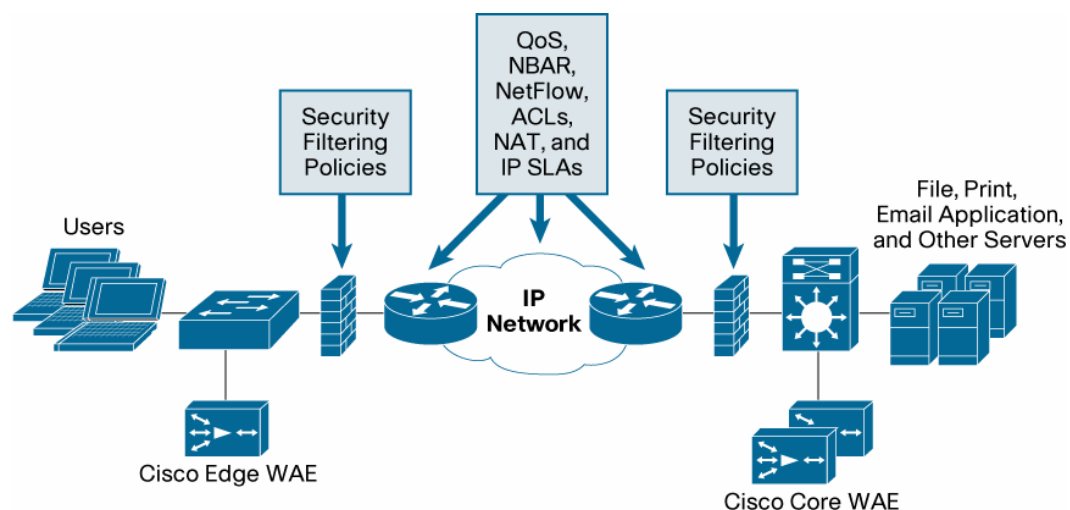
- With Microsoft, Cisco has developed the optimized branch-office architecture through which Cisco WAAS is used to optimize performance of centralized applications such as Microsoft Exchange, SharePoint, and File Services, while Windows core services such as Microsoft Active Directory and print services are integrated into branch-office Cisco WAAS devices using Cisco WAAS virtual blades for local hosting.
- The application-specific optimization in Cisco WAAS for proprietary Windows protocols used for Microsoft file services, Microsoft Exchange, Windows print services, and Microsoft Windows media technologies has been developed with Microsoft, and the relevant intellectual property rights (IPR) are licensed from Microsoft. Other WAN optimization products use a reverse-engineering approach that often breaks the applications.
- Cisco offers joint escalation support with some major application and storage vendors to help ensure that cross-vendor concerns are appropriately addressed.

Network Integration

Cisco WAAS transparent architecture (Figure 1) enables integration into the network and preservation of existing network services, thereby making WAN acceleration easy to deploy and operate. Network transparency and preservation of IP and TCP header information allows ease of operation and interoperability with network services such as quality of service (QoS), NetFlow, access control lists (ACLs), firewalls, Cisco Optimized Edge Routing, and IP service-level agreements (SLAs). Other WAN optimization products hide accelerated traffic in opaque tunnels

that break these network services, compromising the reliable operation of voice, data, and security in the network.

Figure 1. Cisco WAAS Network Transparency



- Cisco WAAS preserves network transparency of accelerated traffic, helping preserve network services in Cisco IOS® Software and other third-party products.
- Cisco WAAS offers automatic discovery of optimization devices, simplifying operations for all types of WAN architectures (including Multiprotocol Label Switching [MPLS], hierarchical networks, and hub and spoke topologies), with most types of traffic interception methods (including simple inline and robust out-of-band methods), for all types of Cisco WAAS devices (appliances and router-integrated network modules).
- Both inline and out-of-path Web Cache Communication Protocol (WCCP) deployment options are available to help ensure high flexibility. The out-of-path deployment option has been rigorously tested for high availability and to help ensure minimal CPU impact on the routers and switches that implement WCCP. In other WAN optimization solutions, either insufficient WCCP support can cause a spike in router and switch CPU use, affecting performance, or only inline deployment is supported, which is not a recommended option in the data center as it requires a maintenance window under failure conditions.
- Cisco WAAS integrates with all the Cisco firewalls-Cisco IOS Firewall, PIX® Firewall Software, ASA 5500 Series Enterprise Firewall Edition, and Catalyst® 6500 Series Firewall Services Module (FWSM) to provide the only solution in the industry that gives customers full stateful firewall inspection and network virus scanning capabilities for accelerated traffic. Other tunnel-based products invalidate firewall functions such as ACLs and stateful inspection, exposing enterprises to malicious attacks.
- Data-in-flight security is maintained by allowing Cisco firewalls to perform stateful inspection of accelerated traffic. Data-at-rest security is provided by disk encryption based on FIPS 256-bit AES to secure data even in the event of physical compromise such as a lost or stolen device.
- Cisco WAAS provides comprehensive role-based access control (RBAC) to help ensure secure management capability in large cross-functional organizations.

- Cisco WAAS is the only leading WAN optimization solution being certified for Common Criteria Evaluation and Validation Scheme (CCEVS) EAL 4 or ISO 15408.
- Because Cisco WAAS preserves network transparency, it integrates into the Cisco IOS QoS architecture and thus helps ensure reliable prioritization, bandwidth allocation, protection, and control of latency-sensitive voice traffic. Cisco WAAS in combination with Cisco IOS QoS creates a single, unified QoS framework, eliminating the need to manage and correlate two sets of independent policies, a problem that in other WAN optimization solutions increases operating costs through increased use of staff resources.
- For inline deployments, Cisco WAAS offers a low-latency voice-over-IP (VoIP) traffic bypass feature that has been stress tested with Cisco VoIP test beds.
- Cisco WAAS integrates with Cisco Performance Routing (PfR), which complements Cisco WAAS by providing optimized route selection for application and voice traffic based on latency, packet loss, monetary cost, capacity, and jitter of the various network links between the branch office and the data center. This feature helps ensure that latency-sensitive voice traffic gets the best route even when application acceleration is deployed.

Lowest Total Cost of Ownership

Cisco WAAS is cost effective and provides the lowest total cost of ownership (TCO) of any solution currently on the market.

- By integrating the Cisco WAAS network module into the Cisco Integrated Service Route, Cisco WAAS reduces capital expenditures (CapEx), operating expenses (OpEx), and support costs. By reducing the number of branch-office devices needed, Cisco WAAS decreases OpEx by up to 70 percent.
- The server offload architecture enables up to 10X reduction in the number of data center file, network attached storage (NAS), print, video, and software distribution servers, reducing server CapEx and OpEx and offering significant power and space savings in the data center.
- Cisco WAAS virtual blades provide local hosting with centralized deployment for Windows- and Linux-based branch-office services while reducing the branch-office device footprint.
- Cisco WAAS integrates into the existing WAN architecture and complements Cisco IOS Software features such as QoS and PfR to reduce WAN bandwidth cost.
- Cisco WAAS eliminates the need for WAN bandwidth upgrades and complex configuration for wide-scale delivery of live video to the branch office.

Deployment Options

Cisco WAAS provides flexible deployment options, as shown in Figure 2 and summarized in Table 1.

Figure 2. Cisco WAAS Deployment Options for Branch-Office and Mobile Employees (ISR = Integrated Services Router; NM = Network Modules)

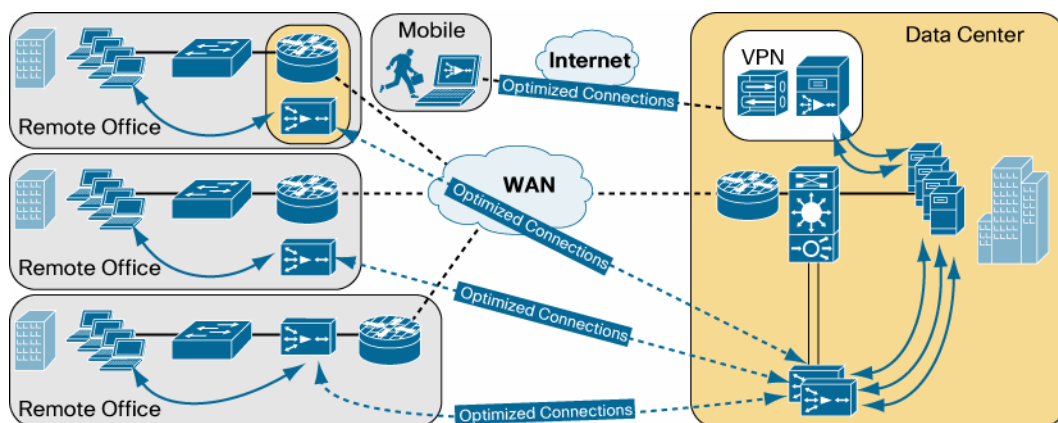


Table 1. Cisco WAAS Flexible Deployment Options

Deployment Location	Cisco WAAS			
	Cisco Wide Area Application Engine (WAE) Appliances	Cisco WAE Network Modules on Integrated Services Router	Mobile Client	Mobile Server
Branch Office	Yes	Yes	-	-
Data Center	Yes	-	-	Yes
Mobile or Home Office PCs	-	-	Yes	-

Features and Benefits

Table 2 summarizes the main features and benefits of Cisco WAAS. For detailed information about acceleration for mobile users, please refer to the Cisco WAAS Mobile data sheet. Cisco WAAS also offers a replication accelerator mode dedicated to the optimization of data center storage replication across WAN. For additional details please refer to the Replication Accelerator datasheet.

Table 2. Main Benefits and Features of Cisco WAAS

Benefit	Feature Description
WAN Optimization <ul style="list-style-type: none"> Eliminate or defer expensive WAN bandwidth upgrades 	<ul style="list-style-type: none"> Transport Flow Optimization (TFO): TFO improves application packet flow under unfavorable WAN conditions such as packet loss and small initial windows while helping ensure fairness. Data Redundancy Elimination (DRE): DRE is an advanced form of network compression that uses a bidirectional database to store previously seen TCP traffic and replace redundant patterns with very small signatures. DRE can provide up to 100:1 compression depending on the data being examined. Adaptive Persistent Session-based Compression: This type of compression can provide up to an additional 5:1 compression.
Application Acceleration <ul style="list-style-type: none"> Improve employee productivity Consolidate branch-office servers Centralize branch-office IT resources such as storage and backup tapes and reduce operating costs 	<ul style="list-style-type: none"> Protocol acceleration: Application-specific latency is minimized through a variety of application-layer techniques such as read-ahead, operation prediction, connection reuse, message multiplexing, pipelining, and parallelization, resulting in LAN-like performance despite deployment over a WAN. Application optimizers: Protocol-specific acceleration is available for Microsoft Windows file sharing (Common Internet File System [CIFS]); Microsoft Exchange (MAPI and MAPI over SSL); HTTP and HTTPS applications such as Oracle, SAP, and Microsoft SharePoint and OWA; Windows print services; and UNIX NFS. These features improve end-user application response time, significantly improving employee productivity.

Benefit	Feature Description
	<ul style="list-style-type: none"> • Local CIFS file server: Files accessed by branch-office users are temporarily stored in the remote Cisco WAE Appliance. Unchanged files are safely served from the cache without compromising data integrity or introducing version-control concerns. • Content prepositioning: Centralized policy-based file distribution and prepositioning can be used to push files to edge Cisco WAE devices, accelerating software patch distribution and file access for all users.
Ease of Initial and Ongoing Deployment	<ul style="list-style-type: none"> • Network transparency: Cisco WAAS preserves all existing network services. • Client, server, and application transparency: No modifications to clients, servers, or applications are needed. • Automatic peer discovery: Cisco WAAS devices automatically discover peers, minimizing configuration steps. • Quickstart wizard: Use of the wizard eliminates many configuration steps. The wizard includes defaults for faster deployment. • Management and monitoring: Intuitive workflow-based management and real-time monitoring are provided. Diagnostic and troubleshooting tools help reduce mean time to resolution.
Delivery of High-Quality Live and On-Demand Video <ul style="list-style-type: none"> • Eliminate need for expensive WAN bandwidth upgrades • Avoid complex configuration • Centralize branch video servers 	<ul style="list-style-type: none"> • Live video—Easy to deploy with edge-stream splitting: Automated edge-stream splitting helps ensure that only one video stream is downloaded over the WAN regardless of the number of users in the branch office viewing that stream. • Recorded Video on Demand (VoD): VoD files can be published using prepositioning on edge Cisco WAE devices . • Server offload: The live and on-demand video features offer server offload capability that can enable up to 10X reduction in the number of data center video servers.
Locally Hosted Branch-Office IT Services <ul style="list-style-type: none"> • Reduce branch-office device footprint • Deploy branch-office IT services with flexibility and agility 	<ul style="list-style-type: none"> • Network-embedded virtualization: Third-party services can be hosted on isolated virtual blades. This architecture maintains native performance for WAN optimization, while using the same hardware platform for additional hosted services. • Virtual blades: This feature can be used to deploy many different Windows and Linux branch-office services on Cisco WAAS appliances within hours instead of the days or weeks often required for dedicated hardware-based deployments. The first set of certified and supported hosted services includes Windows Active Directory, Domain Name System (DNS), Dynamic Host Configuration Protocol (DHCP), and print services using Windows Server 2008 or Windows Server 2003.
Simplified Central Management and Monitoring <ul style="list-style-type: none"> • Enhance usability with intuitive workflow-based management tools • Enhance visibility through real-time monitoring of connections with application performance management 	<ul style="list-style-type: none"> • Cisco WAAS Central Manager: This workflow-based tool manages central configuration, provisioning, real-time monitoring, fault management, and customized reporting with the capability to create scheduled reports for up to 2500 Cisco WAE devices within a Cisco WAAS topology. • Comprehensive statistics: Comprehensive logs, reports, graphs, and statistics for Cisco WAE device functions help IT administrators optimize system performance and troubleshooting. • Monitoring, reporting, traps, and alerts: Real-time monitoring of connections, Simple Network Management Protocol (SNMP) Versions 2c and 3, Simple Mail Transport Protocol (SMTP) authentication, and syslog are supported. • Centralized software upgrades: Administrators can remotely schedule upgrades or version rollbacks. • Application performance management: NetQoS SuperAgent and Cisco WAAS together uniquely provide accurate reports on end-to-end application response time and WAN bandwidth utilization. • Easy integration with software distribution tools: Tools include Short Message Service (SMS), LANDesk, Altiris, and BigFix solutions. • Extensible Markup Language (XML) API: The API can be used to integrate Cisco WAAS Central Manager into customers' network management and monitoring systems.
Scalability and High Availability	<ul style="list-style-type: none"> • Out-of-path deployment: Cisco WAAS can be deployed using WCCPv2 for high-availability clustering and N+1 load balancing for up to 32 Cisco WAE devices within a WCCPv2 service group. Policy-based routing (PBR) is also supported as a deployment mechanism. • Physical inline interception: Cisco WAE devices can be transparently deployed using a 4-port network interface card (NIC) with fail-to-wire capability in the event of failure, helping ensure that network connectivity is not lost. The inline option provides high scalability and active-active failover through daisy-chain clustering, • Cisco ACE Application Control Engine: Cisco WAAS deployed with Cisco ACE can scale up to 16 million TCP connections and up to 64 Gbps of bandwidth, supporting the largest deployments. • Configuration backup and restore: In the event of hardware failure, the reprovisioning and restore process can be handled remotely using the Cisco WAAS Central Manager. • Redundant WAN link support: Cisco WAAS supports environments with redundant WAN links, redundant routers, and asymmetric routing to improve high

Benefit	Feature Description
	availability and optimization efficiency. <ul style="list-style-type: none"> • Offline file access support: Cisco WAAS supports Microsoft Windows offline folders and an optional read-only disconnected mode of operation to provide data access when the WAN is disconnected.
Security	<ul style="list-style-type: none"> • Data-at-rest encryption: All data on the Cisco WAE disk is secured with 256-bit AES encryption and automatic key management. • Data-in-flight security: Allow Cisco firewalls to perform stateful inspection of accelerated traffic. • Acceleration of SSL Applications: Existing enterprise security architecture is preserved when accelerating SSL applications. • Data access security: All security-related protocol commands are delegated to the file server and the domain controller. No additional domain security or user configuration is necessary. • Management access security: The Cisco WAAS Central Manager offers authentication, authorization, and accounting (AAA) integration with external authentication providers such as Microsoft Active Directory, RADIUS, and TACACS+ and supports RBAC to help ensure security. • Network security: Cisco WAAS and Cisco firewalls secure accelerated traffic with stateful firewall inspection and network virus scanning using Cisco IOS Intrusion Prevention System (IPS). No other vendor preserves security for accelerated traffic

Licensing

Cisco WAAS offers the following licenses based on feature capabilities:

- **Cisco WAAS Transport License:** This license provides the WAN optimization features of Cisco WAAS, including DRE, Lempel-Ziv (LZ) Compression, and TFO, optimizing application delivery to the branch office.
- **Cisco WAAS Enterprise License:** This license provides Transport license functions plus application-specific accelerations for protocols including CIFS, MAPI, HTTP, SSL, NFS, and Windows print services, to facilitate application acceleration, WAN optimization, and IT consolidation.
- **Cisco WAAS Live Video License:** This add-on license provides wide-scale delivery of live video to the branch office across the WAN. It offers automated edge-stream splitting to help ensure that only one video stream is downloaded over the WAN regardless of the number of users in the branch office viewing that stream. This option is available only when Cisco WAAS Enterprise License is ordered.
- **Cisco WAAS Virtual Blade License with Windows Server Core 2008:** This add-on license offers organizations flexible delivery of branch-office IT services while minimizing the device footprint. The first set of certified and supported hosted services includes Windows Active Directory, DNS, DHCP, and print as part of the Windows Server 2008 core services. This option is available only when Cisco WAAS Enterprise License is ordered and is available for Cisco WAE-674 with Cisco WAAS Software Version 4.1.
- **Cisco WAAS Mobile License:** This license enables Cisco WAAS to accelerate any TCP application to any mobile employee, regardless of location.

Ordering Information

For ordering information, please contact your local Cisco account representative.

Upgrade from Cisco WAAS Software Version 4.0

Customers who have an active Software Application Support plus Upgrades (SASU) contract in place can upgrade from Cisco WAAS Software Version 4.0 to Version 4.1 with no additional cost.

WCCP Support

WCCP is a free Cisco IOS Software feature that runs on the following Cisco platforms: Cisco routers such as the Cisco 1800, 2800, and 3800 Series Integrated Services Routers, Cisco 3700 Series Multiservice Access Routers, and Cisco 7000 Series Routers; and Cisco switches such as the Cisco Catalyst 4500, 4900, and 6500 Series Switches.

Service and Support

Cisco offers a wide range of services programs to accelerate customer success. These innovative services programs are delivered through a unique combination of people, processes, tools, and partners, resulting in high levels of customer satisfaction. Cisco services help you protect your network investment, optimize network operations, and prepare the network for new applications to extend network intelligence and the power of your business. For more information about Cisco services, see [Cisco Technical Support Services](#) or [Cisco Advanced Services](#).

For More Information

For more information about Cisco WAAS Software Version 4.1, visit <http://www.cisco.com/go/waas> or contact your local account representative.



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