Cisco WAAS Express

Product Overview

Organizations today face several unique WAN challenges: the need to provide employees with constant access to centrally located information at the corporate data center or hosted at a cloud service, the desire to provide a satisfactory experience for IP phone and video communication, and the mandate to control bandwidth costs without sacrificing application availability and performance. Cisco® Wide Area Application Services (WAAS) Express is designed to help organizations address these challenges.

Cisco WAAS Express is an important component of the Cisco WAAS product portfolio and extends the WAN optimization solution across the entire Cisco Integrated Services Routers Generation 2 (ISR G2) family. Cisco WAAS Express is a cost-effective WAN optimization solution based on Cisco IOS® Software that increases the amount of available bandwidth for small to midsize branch offices and remote locations, while accelerating TCP-based applications operating in a WAN environment.

Cisco WAAS Express natively uses the capabilities of Cisco IOS Software and provides a small-footprint, cost-effective solution that transparently integrates into the Cisco ISR G2 product family. Cisco WAAS Express is fully interoperable with Cisco WAAS Modules for Services-Ready Engine (SRE) and Cisco WAAS Appliances and can be managed by a common Cisco WAAS Central Manager.

Cisco WAAS Express Benefits

- Bandwidth compression: Reduces bandwidth consumption and enables scaling of branch offices while eliminating increased recurring bandwidth costs.
- Enhances productivity: Mitigates the effects of WAN latency while transferring data faster.
- Cost savings: Allows significant savings in capital expenditures (CapEx) by enabling a small-footprint branch-office deployment.
- Network transparent and integrated: Uses the capabilities of the Cisco ISR G2 routers and integrates with security, quality-of-service (QoS), and other services native to Cisco IOS Software.
- Ease of deployment: Makes deployment easy with simple software activation on any Cisco ISR G2 router running Cisco IOS Software.
- Low total cost of ownership (TCO) and investment protection: Offers investment protection and deployment simplicity by interoperating with existing Cisco WAAS devices and providing management by Cisco WAAS Central Manager; fully supports a mixed environment of Cisco WAAS Express, Cisco WAAS Modules for SRE, and Cisco WAAS Appliances at different branch offices and data centers.

The Cisco WAAS Express Advantage

Designed to meet the needs of small and midsize branch offices with low-speed, and high-latency bandwidth, Cisco WAAS Express provides three primary advantages: better throughput, simplicity and integration, and low TCO.

Throughput

Bandwidth specifies the maximum data transfer rate achievable on a WAN link. Latency, congestion, and packet loss determine the actual transfer rate (throughput). Cisco WAAS Express uses four techniques to take throughput past the bandwidth limit:

- 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 for Cisco WAAS Express is an advanced form of network compression that uses a database to store previously seen TCP traffic and replace redundant patterns with very small signatures.
- Compression: Compression increases effective bandwidth and can provide up to 3:1 additional compression.
- Enhanced bandwidth optimization for file services and web applications: Selected acceleration for file-based Common Internet File System (CIFS; with Server Message Block Version 1 [SMBv1]) applications and HTTP/S web applications.

The combined effects of these technologies results in a dramatic expansion of available WAN link capacity and facilitates extremely fast data transfer rates over the WAN.

Simplicity and Integration

Cisco WAAS Express is part of the Cisco IOS Software and therefore tightly integrates into the network fabric. Such a close integration helps ensure that bandwidth optimization and routing decisions occur simultaneously without the added overhead of another interception. The tight integration has the added benefit of requiring little configuration plus compatibility with commonly used Cisco IOS Software services. Network transparency and preservation of IP and TCP header information allows ease of operation and interoperability with network services such as QoS, NetFlow, access control lists (ACLs), firewalls, and VPNs. Moreover, Cisco WAAS Express is extremely easy to configure with one single Cisco IOS Software command.

Low Total Cost of Ownership

Cisco WAAS Express is cost effective and provides the lowest TCO of any solution currently on the market. By integrating Cisco WAAS into Cisco IOS Software and Cisco ISR G2 routers, Cisco WAAS reduces CapEx, operating expenses (OpEx), support costs, and the number of branch-office devices required. The need for WAN bandwidth and expensive infrastructure upgrades are eliminated with Cisco WAAS Express. Designed to meet the needs of small and remote branch offices and retail locations, Cisco WAAS Express offers an exceptional ratio of price to performance, simplicity, and transparency.

Cisco WAAS Express Overview

Cisco WAAS Express performs optimization using a combination of DRE, Lempel-Ziv (LZ) compression, TFO, and selected bandwidth optimization for file services and web applications to provide exceptional bandwidth optimization gains.

DRE inspects TCP traffic and identifies redundant data patterns and quickly replaces them with signatures that the peer can use to reproduce the original data. As new data patterns are identified, they are added to the DRE database and can then be used in the future to help eliminate transmission of redundant data. With DRE, redundant data patterns are replaced with small signatures that tell the distant device how to rebuild the original message safely.

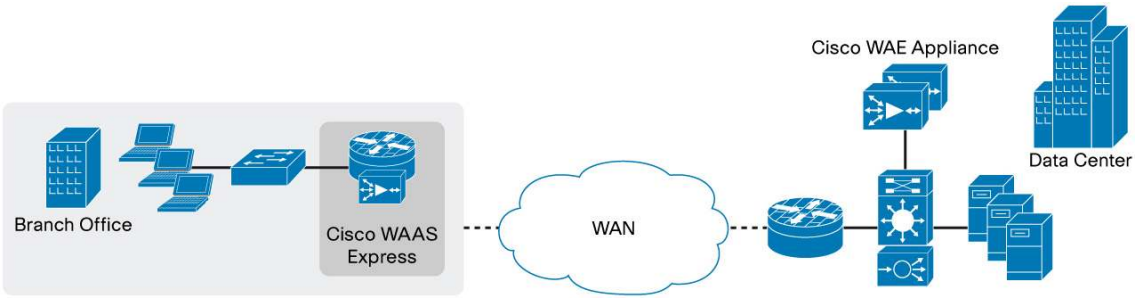
LZ compression has a connection-oriented compression history to further reduce the amount of bandwidth consumed by a TCP connection. Persistent LZ (PLZ) compression can be used in conjunction with DRE or independently.

TFO provides optimization that helps improve TCP behavior in problematic WAN conditions to alleviate challenges associated with packet loss, congestion, and recovery. With TFO, communicating nodes are shielded from WAN conditions, and Cisco WAAS devices manage WAN conditions on behalf of the nodes to help ensure that available capacity can be used advantageously, that the effect of packet loss and congestion is mitigated, and that throughput is increased. TFO maintains packet-network friendliness and safe coexistence with other network nodes that communicate using standard TCP implementations. Optimizations provided as part of TFO include large initial windows, advanced congestion-avoidance algorithms, and slow-start mitigation.

The Cisco WAAS Express SSL Express Accelerator feature integrates transparently with existing data center key management and trust models that both WAN optimization and application acceleration components can use. Encryption key pairs are stored securely in a secure vault on the Cisco WAAS Central Manager and distributed securely to the Cisco WAAS devices in the data center to be stored in a secure vault. The SSL Express Accelerator feature can accelerate secure enterprise applications such as Microsoft SharePoint and Exchange and Oracle and SAP solutions and optimize delivery of secure software-as-a-service (SaaS) applications such as Microsoft Office 365 and Salesforce.com solutions. Cisco WAAS Express includes express accelerators for file-based CIFS (SMBv1) applications and HTTP/S web applications. The CIFS Express Accelerator feature includes write optimizations, read-ahead optimizations, and negative caching. The HTTP/S Express Accelerator feature caches metadata information, which allows Cisco WAAS Express to respond locally to certain HTTP requests. These local responses are based on cached metadata from previously seen server responses and are continuously updated. It also includes hints to help DRE perform better optimization and offload compression from the web servers.

Figure 1 shows an overview of the Cisco WAAS Express system.

Figure 1. Cisco WAAS Express System Overview



Features and Benefits

Table 1 lists the features of Cisco WAAS Express.

Table 1. Cisco WAAS Express Features

Features	Description
WAN optimization	Using technologies such as DRE, TFO, LZ compression, and express accelerators, Cisco WAAS Express eliminates or defers expensive WAN bandwidth upgrades while providing instant access to centrally located information. Features include transport optimization and application latency reduction for selected applications.
Integration	Cisco WAAS Express is fully integrated into Cisco IOS Software, with no additional hardware requirement (maximum DRAM is needed in the router). This integration allows complete network transparency and

Features	Description
	integration with other Cisco IOS Software services such as VPN, QoS, firewall, and Network Address Translation (NAT), without the need for traffic redirection.
Ease of deployment and configuration	Cisco WAAS Express makes configuration simple with a single command-line interface (CLI) command, **waas enable**, on the router interface. Moreover, configuration options are available through the router CLI as well as through Cisco WAAS Central Manager. Autodiscovery of peers further reduces configuration steps.
Simplified management and monitoring	Common management across all Cisco WAAS devices including Cisco WAAS Express greatly simplifies the solution. Cisco WAAS Central Manager support allows management and monitoring not only for all Cisco WAAS devices but also for all routers enabled for Cisco WAAS Express. Cisco WAAS Central Manager is a workflow-based tool that manages central configuration and offers provisioning and real-time monitoring, fault management, logging, and customized reporting with the capability to create scheduled reports for up to 2500 Cisco WAAS devices within a Cisco WAAS topology.
Small branch-office footprint	By embedding WAN optimization capabilities natively into Cisco IOS Software, Cisco WAAS Express brings an innovative approach to bandwidth optimization. Now part of the network, and not an overlay technology, a single router is capable of handling your WAN optimization, security, voice, and routing requirements.
Investment protection and simplicity	Cisco WAAS Express facilitates support for mixed-mode branch-office deployment with Cisco WAAS appliances, Cisco WAAS Modules for SRE, and Cisco ISR G2 integrated Cisco WAAS Express, all with a common Cisco WAAS core appliance and management console (Cisco WAAS Central Manager), providing investment protection for your existing Cisco WAAS devices and offering a simplified solution.

Platforms Supported

Cisco WAAS Express is supported on the following platforms:

Cisco 881, 886, 887, 888, 891, 892, 1921, 1941, 2901, 2911, 2921, 2951, 3925, and 3945 Integrated Services Routers (ISRs).

Supported Configuration

Table 2 lists the supported configurations.

Table 2. Supported Configurations

Cisco ISR	Optimized TCP Connections	WAN Capacity	DRAM Required
Cisco 880 platform	75	1.5 Mbps	768 MB
Cisco 891 and 892	75	2 Mbps	768 MB
Cisco 819	75	2 Mbps	1 GB
Cisco 1921*	50	0.512 Mbps	-
Cisco 1941	150	4 Mbps	2.5 GB
Cisco 2901	150	6 Mbps	2.5 GB
Cisco 2911 through 2921	250	6 Mbps	2.5 GB
Cisco 2951 and 3900 Series	400	10 Mbps	4 GB

*Cisco 1921 routers have fixed, nonexpandable memory. DRE is disabled on these platforms.

Typical WAN interfaces for maximum benefit with Cisco WAAS Express include T1/E1, and multi-T1, and smaller interfaces such as 256 or 384 Kbps interfaces. 3G/4G Interfaces are not supported. WAN capacity refers to the maximum WAN bandwidth that is recommended on routers enabled for Cisco WAAS Express.

Licensing and Packaging

A single Cisco IOS Software Universal image encompassing all Cisco IOS Software technology feature sets is delivered with all Cisco ISR G2 platforms. You can enable advanced features by activating a software license on the Universal image. In previous generations of access routers, these feature sets required you to download a new software image. Technology packages and feature licenses, enabled through the Cisco software licensing infrastructure, simplify software delivery and decrease the operating costs of deploying new features.

Cisco WAAS Express is delivered through a feature license. You can activate the licenses through the Cisco software activation process identified at http://www.cisco.com/go/sa. The Cisco WAAS Express feature license can be activated on the IP Base technology package, which is also the default package.

Ordering Information

To place an order, visit the Cisco Ordering homepage and refer to Table 3, which provides basic ordering information. For additional part numbers, including the part numbers for the Cisco ISR G2 WAAS and Secure WAAS bundle offerings, please check the Cisco ISR G2 page or contact your local Cisco account representative.

Table 3. Cisco WAAS Express Ordering Information and Required Memory Part Numbers

Part Number	Product Description	Memory Part Number Required
FL-C880-WAASX	WAAS Express Feature License for Cisco 880	MEM8XX-256U768D
FL-C890-WAASX	WAAS Express Feature License for Cisco 890	MEM8XX-512U768D
FL-C1941-WAASX	WAAS Express Feature License for Cisco 1941	MEM-1900-512U2.5GB
FL-C2901-WAASX	WAAS Express Feature License for Cisco 2901	MEM-2900-512U2.5GB
FL-C2911-WAASX	WAAS Express Feature License for Cisco 2911	MEM-2900-512U2.5GB
FL-C2921-WAASX	WAAS Express Feature License for Cisco 2921	MEM-2900-512U2.5GB
FL-C2951-WAASX	WAAS Express Feature License for Cisco 2951	MEM-2900-512U4GB
FL-C3900-WAASX	WAAS Express Feature License for Cisco 3900 Series	MEM-3900-1GU4GB

For More Information

For more information on WAAS, please go to http://www.cisco.com/go/waas.

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

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco Website at www.cisco.com/go/offices.

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