DATA SHEET

CISCO FILE ENGINE SERIES APPLIANCES

Enterprises and organizations face significant challenges in the deployment, management, and protection of file servers at remote sites. Furthermore, there is increased need to protect data generated in the branch offices due to regulatory compliance and business continuity needs. Total cost of ownership (TCO) continues to rise as the volume of data grows in the branch office, and the current decentralized file server and backup management continues to increase in complexity. The management burden includes operating system patches, anti-virus software updates, unreliable backups, and complex data recovery.

Enterprises want to centralize file servers and storage in their data centers where IT personnel and centralized data protection infrastructure is readily available. However, standard file access protocols involve many round-trip messages and incur severe latencies across the wide area network (WAN), resulting in poor user experience.

CISCO WIDE AREA FILE SERVICES SOLUTION

The Cisco® Wide Area File Services (WAFS) solution facilitates the consolidation of all branch-office data into central file servers that reside at the data center. WAFS overcomes WAN latency and bandwidth limitations with the Cisco Systems® proprietary optimization technologies, offering users at branch offices a LAN-like experience when accessing the centralized files over the WAN. The end result is a significantly lower TCO, enhanced protection of branch-office data with reduced administration, and low-latency access across the WAN.

The benefits of the Cisco WAFS solution include:

- **Lower TCO**—WAFS provides file and print services at the branch with a ready-to-use appliance, replacing unreliable tape backup and file servers from the branch.
- **Enhanced Data Protection**—A master copy of all files generated from the branch is moved in real time to the data center, improving protection, management, and usage of storage resources.
- **Reduced Administration**—IT administrators can centrally manage file services such as usage quota, backups, disaster recovery, restores, access control, and security policies.
- **Fast File Access and Sharing**—The Cisco WAFS latency-reduction technologies provide LAN-like access performance to remote users, increasing user productivity and enabling distributed collaboration.

WAFS uses sophisticated protocol-level caching, compression, protocol-specific latency reduction, and network-optimization techniques to ensure efficient operation of standard file-system protocols (Common Internet File System [CIFS] with Windows, Network File System [NFS] with UNIX) over the WAN while maintaining file coherency to ensure data integrity. The WAFS solution does not require software to be installed on client machines or file servers. Its operation is transparent to the end user and is easily integrated into the existing networking and storage infrastructure. The WAFS solution includes ready-to-use appliances with the following components:

- The Cisco **Edge File Engine** is deployed at each branch office or remote campus, replacing file and print servers and giving local clients fast, near-LAN read and write access to a cached view of the centralized storage.
- The Cisco **Core File Engine** resides at the data center and connects directly to one or more file servers or network attached storage (NAS) gateways, performing WAN-optimized file requests on behalf of the remote edge file engines.
- The Cisco **WAFS Central Manager** provides remote management and monitoring of all the file engines.

The Cisco WAFS solution offers:

- High performance, scalability, and reliability for file services
- Complete branch file server replacement with remote management
- Uncompromised data integrity
- Superior network integration
- Global support and service
- Part of the Cisco end-to-end storage networking, business-ready data center, and branch architecture

Figure 1 shows the deployment scenario for WAFS with the Cisco File Engine Series Appliance components. Figure 2 shows the Cisco FE 511 File Engine.

Figure 1. Deploying Wide-Area File Services Solution with Cisco File Engines

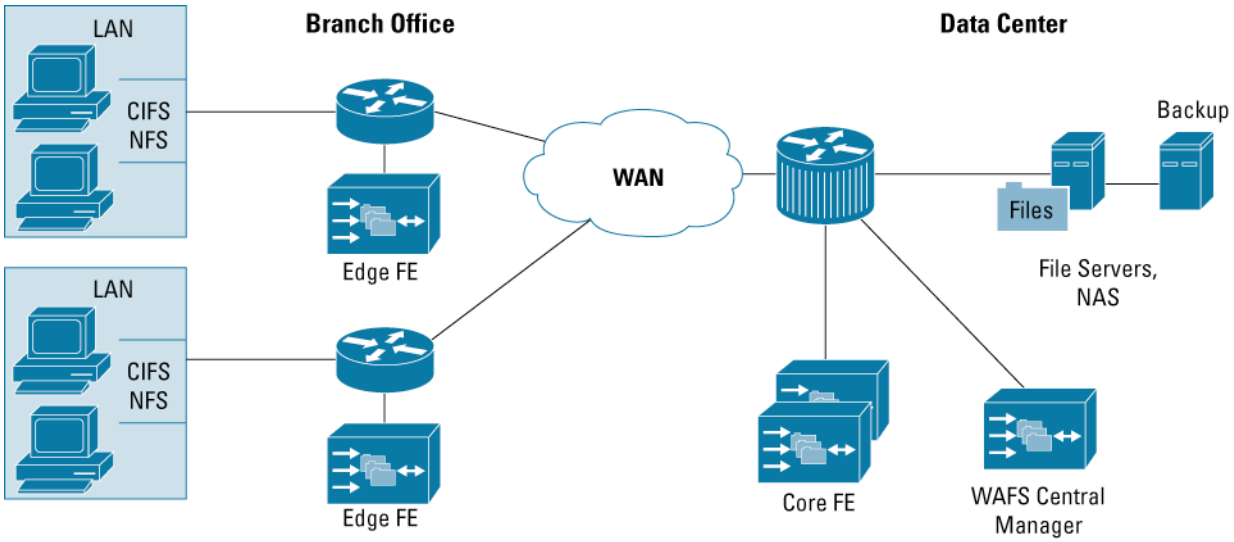

Figure 2. Cisco FE 500 Series Engine Appliance

PRODUCT DESCRIPTION

The Cisco WAFS solution includes the ActaStor Version 2.5 software running on the Cisco 500 Series File Engine. Each file engine can be configured to be an Edge File Engine, a Core File Engine, or a WAFS Central Manager. These File Engine components can also run concurrently on the same appliance if resources and capacity are sized appropriately. For example, a file engine appliance can be configured both as a Core File Engine and a WAFS Central Manager for smaller deployments. For larger deployments, the various components should be run on separate appliances.

Table 1. Important Features and Benefits of the Cisco WAFS Solution with Cisco File Engines

Features	Description and Benefits
Complete Branch File-Server Replacement	Provides file and print services, including distribution point services for software image and patch distribution, such as Microsoft Systems Management Server (SMS).
Protocol-Level Caching	• Provides LAN-like Read and Write access performance while using data center file services for backup administration, disaster recovery, data security, and usage quota. • **Local CIFS and NFS File Caching**—Files stored centrally appear as local files to the branch office. Changes made to files or directories are immediately stored in the local File Engine and then "streamed" real-time to the central file server. • **Local Metadata Handling and Caching**—Metadata such as file attributes and directory information is cached and served locally, optimizing user access. • **Partial File Caching**—Propagates only the segments of the file that have been updated on write requests rather than the entire file to optimize WAN transport. Does not require entire file to be cached, serving read requests as soon as the requested byte range arrives.
Protocol-Specific Latency Reduction	• **Write-Back Caching**—Facilitates efficient write operations by allowing the Core File Engine to buffer writes from the Edge File Engines and to stream updates asynchronously to the file server without risking data integrity. • **File Read-Ahead**—When an application is conducting a sequential file read, WAFS reads the file ahead of user requests to increase performance. • **Negative Caching**—Information about missing files is stored to reduce round trips across the WAN. • **Microsoft Remote Procedure Call (MSRPC) Optimization**—Local request and response caching reduces the round trips across the WAN. • **Signaling Messages Prediction and Reduction**—Sophisticated algorithms for reducing round-trips over the WAN without loss of semantics.
WAN Bandwidth Optimization	Minimizes the amount of traffic over the WAN and shields the user from poor WAN links. Techniques include: • **Pipelining**—Persistent connections, prioritized message queues, and asynchronous operations allow for efficient pipelining of CIFS requests. • **TCP Optimization**—Dynamic socket allocation, multiplexing over multiple sockets, and TCP optimization improve efficiency. • **Extended Segments**—Larger read-ahead segments are fetched over the WAN to reduce traffic. • **Configurable Bandwidth Throttling**—Provides automatic tuning with bandwidth-throttling and latency-optimization configurations. • **Segment Compression**—Compression algorithm reduces WAN bandwidth utilization. • **WAN Quality of Service (QoS)**—Allows interactive CIFS messages to be set at higher priority than large messages, resulting in higher throughput and a better interactive user experience.
Data Integrity	**Flush-On-Close**—While optimizing write activity for performance enhancements, WAFS ensures that upon the close operation, all data is safely stored in the file server, protecting applications from unknown data loss and situations such as exceeding quotas or disk failures.
Multilevel Coherency	WAFS complies with CIFS semantics with respect to data and metadata freshness, ensuring fast access to the latest file version. Global coherency supports inter-site collaboration, and a local coherency mode can be used for intra-site collaboration and home directory access with enhanced performance.
Policy-Based Pre-Positioning	Centralized policy-based automatic file distribution enables IT to centrally push and locally serve files that change less frequently, such as software images and patches, to branch offices. Intelligence includes efficient transfer of missing blocks and changed files, content and destination selection as well as time-of-day and bandwidth throttling controls.

Features	Description and Benefits
High Availability	Several failover mechanisms help ensure uptime: • **Edge File Engine**—Persistent caching and autorecovery reduce management overhead. Clustering and failover are provided by Microsoft Distributed File System (DFS). • **Core File Engine**—n+1 clustering at the data center provides load balancing and failover. • **Configuration Backup and Restore**—Enables rapid replacement of a File Engine in case of hardware failure.
Easy Integration	Transparent to applications, file systems, and protocols and does not require software to be installed on client machines or file servers: • **Transparent integration with Windows networking** for usage quota, access control, file-server naming, and client redirection using Microsoft WINS, Broadcast Domain, or DFS. • **Pass-through authentication and authorization** to the data-center file servers for client file accesses with NT LAN Manager and Kerberos support for CIFS. • **Integrated replication for "Day Zero" migration** allows branch file-server data to be moved to the data-center file server at initial deployment.
Centralized Control and Monitoring	• **Web-based management tool and auto-provisioning** enables IT administrators to remotely provision, configure, and monitor each File Engine or groups of File Engines. • **Comprehensive statistics, logs, and reporting** provides monitoring and reporting allowing IT administrators to optimize system performance and utilization. • **SNMP-based monitoring, traps, and alerts** enables easy troubleshooting and integration with third-party management tools. Includes e-mail alert support. • **Troubleshooting tools** such as system reports, logs, system operation history, and debug modes allow for quick and efficient resolution of operational issues.
Windows Print Service	• **Generic printer support** through the File Engine acting as a print server for networked printers in the branch. The client performs the rendering using original printer drivers available from Microsoft and printer vendors. • **Standard Windows-based configuration and setup support**. • **Remote print services and queue management** is provided with a Web-based GUI. • **Printer security** supports standard Printer ACL and is fully integrated with Active Directory or NT Domain authentication.
Scalability	• **Edge File Engine Scalability**—Designed to support hundreds of users per Edge File Engine. Performance is determined by user activity, average file size, and WAN bandwidth. • **Core File Engine Scalability**—Disk storage requirement at the Core File Engine is minimal as it does not store files in transit to the data center file servers. Core File Engine processing is also offloaded with the local protocol-level caching and prediction at the Edge File Engine. Core File Engine is stateless allowing for simple clustering for load balancing and failover with the internal WAFS mechanism, which does not require third-party devices. • Designed to support thousands of users per Core File Engine. The number of Edge File Engines supported per Core File Engine is determined by Edge File Engine load and WAN bandwidth.

ORDERING INFORMATION

Table 2 lists the hardware and software part numbers available for the Cisco file engines.

Table 2. Cisco File Engine Part Numbers

Part Number	Description
FE-511-K9	Cisco FE 511, includes (1) 80-GB Serial ATA (SATA) disk drive, ActaStor v2.5 software, 50-user base licenses
SF-Astor-50-K9	50-user incremental licenses for use with Cisco FE 511

HARDWARE SPECIFICATIONS

Table 3 lists the hardware platform specifications for Cisco file engines.

Table 3. Hardware Platform Specifications for Cisco File Engines (Cisco FE 511)

Feature or Description	Specification
CPU	2.8 GHz
Synchronous DRAM (SDRAM)	512 MB
Baseline Internal Storage	80 GB
Network Interfaces	Two 10/100/1000BASE-T
Flash Memory	128 MB
Power	300W AC
Rack Units (RUs)	1 RU
External Connectors	1 serial port
Dimensions	Height 1.72 in. (43.7 mm); Width 17.3 in. (440 mm); Depth 20 in. (508 mm)
Weight	Maximum weight: 28 lb (12.7 kg)
Universal input	Input voltage: Low Range 100–127 VAC; High Range 200–240 VAC
Maximum power	300W (115 to 230 VAC)
Operational temperature	50 to 95ºF (10 to 35ºC)
Nonoperational temperature	–40 to 140ºF (–40 to 60ºC)
Humidity	Nonoperating: 8 to 80%
Altitude	Maximum altitude: 2133 m (7000 ft)
Compliance	CE marking
Safety	• UL 1950 • CSA-C22.2 No. 950 • EN 60950 • IEC 60950
EMC	• FCC Part 15 (CFR 47) Class A • ICES-003 Class A • EN 55022 Class A with UTP cables • CISPR22 Class A with UTP cables • ASNZ 3548 Class A with UTP cables • VCCI Class A with UTP cables • EN 55024 • EN 50082-1

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Cisco support solutions are designed to help ensure customer success through the delivery of a suite of proactive solutions. Cisco services and support include planning, design, implementation, operational, and optimization solutions. By including services and support with Cisco equipment purchases, customers instantly gain access to extensive resources. Cisco service and support solutions enhance a customer's network investment, helping reduce the cost of doing business, among other benefits.

Cisco SMARTnet® maintenance and Cisco SMARTnet Onsite services are available for Cisco File Engines. More information is available at: http://www.cisco.com/en/US/products/svcs/ps3034/ps2827/ps2978/serv_group_home.html

ADDITIONAL RESOURCES

For more ordering information, visit:
http://www.cisco.com/en/US/ordering/index.shtml

Corporate Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 526-4100

European Headquarters
Cisco Systems International BV
Haarlerbergpark
Haarlerbergweg 13-19
1101 CH Amsterdam
The Netherlands
www-europe.cisco.com
Tel: 31 0 20 357 1000
Fax: 31 0 20 357 1100

Americas Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-7660
Fax: 408 527-0883

Asia Pacific Headquarters
Cisco Systems, Inc.
168 Robinson Road
#28-01 Capital Tower
Singapore 068912
www.cisco.com
Tel: +65 6317 7777
Fax: +65 6317 7799

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