Data Sheet

Cisco FS Family of Integrated NAS Devices

The Cisco® FS Family of Integrated NAS devices provide enterprises a high-performance and scalable solution for centralizing corporate file storage resources. The Cisco FS Family, an ideal complement to Cisco Wide Area File Services (WAFS) software, helps customers to consolidate not only data center and campus file storage resources, but also remote office and branch office file storage infrastructure, facilitating enterprise-wide consolidation from a single vendor. The Cisco FS Family provides an easy-to-deploy, single-box solution that supports file access protocols (Common Internet File System [CIFS], Network File System [NFS], FTP) and block-level storage-access protocols such as Small Computer System Interface over IP (iSCSI). The Cisco FS Family is well suited to provide capacity for many applications such as collaborative project data, personal user storage, e-mail, databases, multimedia and video, and engineering.

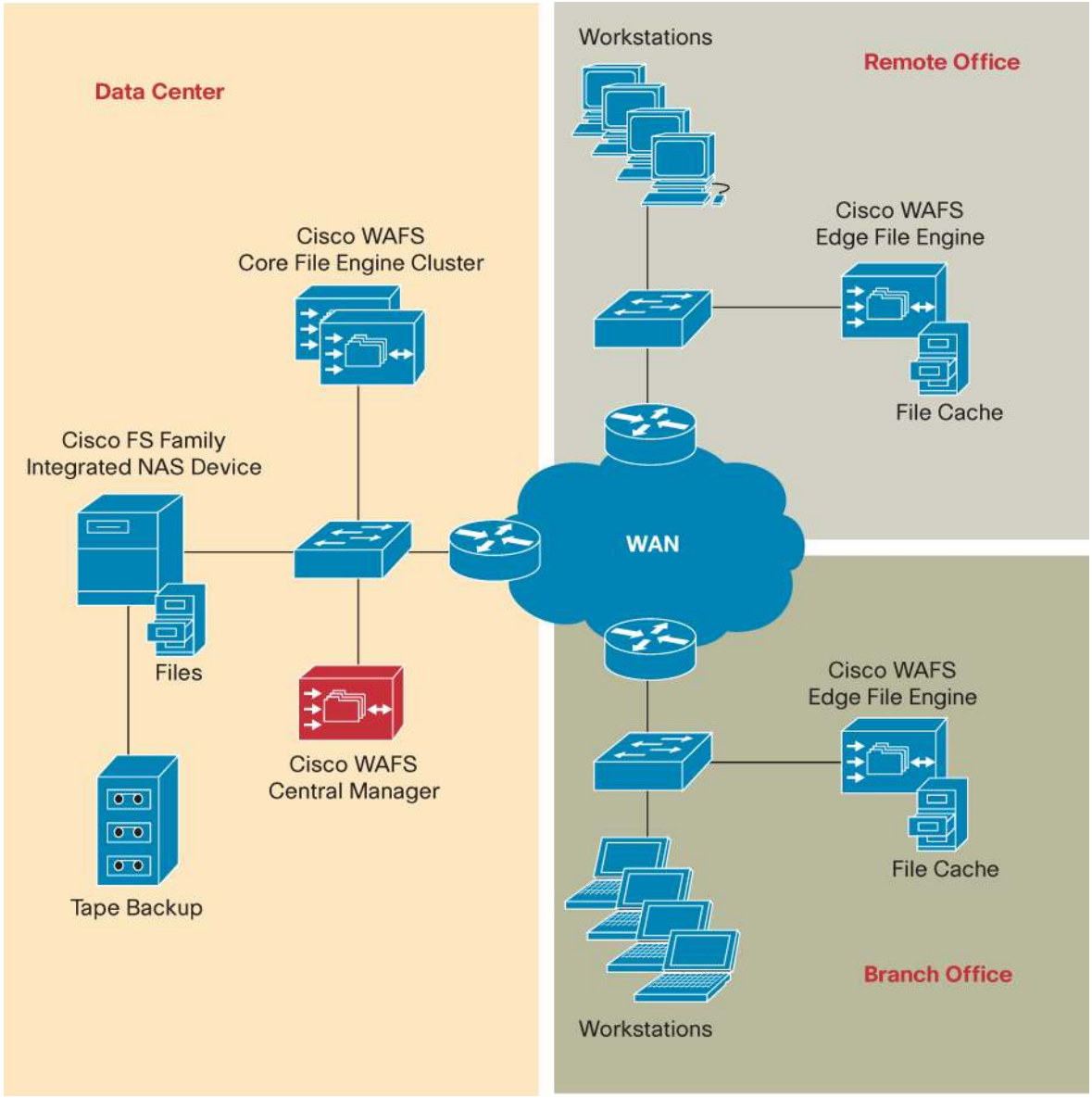
The Cisco FS Family currently consists of the Cisco FS 5500 Series Integrated NAS and Cisco FS 5700 Series Integrated NAS (Figure 1), which are OEM versions of the EMC NS500 Series Integrated NAS and EMC NS700 Series Integrated NAS. The Cisco FS Family architecture uses the performance and heritage of the EMC CLARiiON CX architecture and the maturity of EMC Data Access Real Time (DART) operating environment to provide highly available, high-performance, flexible, and easy-to-use network attached storage (NAS) products that are simple to deploy.

Figure 1. Cisco FS 5500 and 5700 Series Integrated NAS

APPLICATIONS

Enterprises want to centralize distributed file servers and file storage infrastructure into the data centers where IT personnel and centralized data-protection infrastructure is readily available. The Cisco FS Family provides a repository for consolidating file servers, centralizing file storage, and simplifying the data-protection infrastructure. Cisco WAFS software can also be used in conjunction with the Cisco FS Family to overcome WAN challenges associated with extending storage consolidation into the remote offices and branch offices (Figure 2).

Figure 2. Cisco WAFS Deployed with Cisco FS Family of Integrated NAS Devices



KEY FEATURES AND BENEFITS

NAS Optimized For Storage Centralization

Following are the primary factors that make these products the best choice for consolidating campus and remote office file servers and storage:

- **High Availability**—High availability is critical when data from multiple locations is consolidated into a single NAS environment.
- **Low-Cost, ATA Disk Storage**—Cisco WAFS Software provides NAS offload by managing more than 90 percent of requests from the cache. An inexpensive ATA disk provides sufficient performance and availability when managing the majority of the workload in the remote office or branch office using Cisco WAFS Software.
- **Price-to-Performance Ratio**—Cisco FS Family provides superior benchmark performance compared to competitive systems without compromising cost-effectiveness.

Flexible Solution to Meet a Wide Range of Requirements

An integrated NAS device combines all of the necessary NAS components (network interface, storage processing, physical storage) into a single device. Using an integrated NAS offers the lowest acquisition cost, simplified implementation and management, and configuration flexibility:

- Single or dual Data Mover configurations for high availability or scalability
- Fibre Channel and ATA drive support
- Simple upgrade to NAS gateway
- Multiprotocol support for file protocols (NFS, CIFS), block protocols (iSCSI), and backup protocols (Network Data Management Protocol [NDMP])

Start Small and Grow Non-Disruptively to Large Systems

Companies looking for an entry-level storage platform that provides block protocol and file protocol access should choose the Cisco FS Family. The Cisco FS Family offers high-end features at the best price-to-performance ratio in the mid-tier, and multiprotocol access.

The Cisco FS Family can be upgraded non-disruptively from a single Data Mover configuration to a highly available, dual Data Mover configuration. This non-disruptive upgrade enables not only high availability, but also increased system storage capacity and performance. The Cisco FS Family starts at 1 terabyte (TB) of storage capacity and can support a maximum of 32 TB of usable disk storage.

Modular Architecture With Dedicated Purpose-Built Components

Each component of the Cisco FS Family is built for a specific purpose. The modular architecture facilitates enterprise-class availability, performance, and features. The Cisco FS Family is built from the following components:

- **Data Mover Enclosure (DME)**—The DME has two slots for Data Movers, redundant fans, and power supplies. Data Movers provide the interface from which clients access their information. Customers can choose one or two Data Movers per DME. Each Data Mover is powered by two Intel processors and runs EMC's Data Access in Real Time (DART) operating system, designed and optimized for high-performance, multiprotocol storage access.
- **Storage Processor Enclosure (SPE)**—The SPE acts as the controller to the physical storage subsystem. The SPE is built using two storage processors that deliver the same processing power as the front-end DME. The SPE is based on EMC's CLARiiON CX storage array technology.
- **Control Station**—The control station is an out-of-band management appliance that manages, monitors, and controls the components of the Cisco FS Family through a private Ethernet subnet.
- **Battery Backup Modules**—The battery backup modules provide the power necessary to flush the SPE cache to disk in the event of a power failure, to help ensure data integrity.
- **Disk Array Enclosure (DAE)**—The DAE provides the housing for up to 15 physical disk drives. The DAEs are connected to the SPEs, which present the storage from the DAEs to the DMEs. Separate DAEs are available for ATA disk and Fibre Channel disk.

Choice of High Availability or Maximum Performance

The Cisco FS Family can be deployed in one of two operating modes: primary/standby or primary/primary. Primary/standby is designed for environments that cannot tolerate system downtime due to a hardware failure. In primary/standby mode, one of the Data Movers operates as a stateful standby while the other Data Mover manages the movement of user requests between the network and physical storage.

Other environments that value performance over continuous availability can choose to configure the Cisco FS Family in primary/primary mode. Through a simple menu selection, both Data Movers can be made available to manage unusually large loads and user populations that can bring standard file servers to a virtual standstill. Should a Data Mover fail because of a software fault while configured in primary/primary mode, it will execute a fast reboot to come back online, typically in seconds.

Best-In-Class High Availability

With the Cisco FS Family, high availability means nonstop file access achieved through transparent, dynamic failover to a hot standby Data Mover. A Cisco FS Family device can be deployed with no single point of failure to help ensure continuous data access. In the event of a Data Mover failover, DART will leverage its metadata logging facility to recover an entire filesystem within seconds or minutes. Other high-end file servers can take hours to reboot and recover large-capacity file systems. The Cisco FS Family defines mid-tier high availability, delivered with Data Mover failover, hardware RAID protection, many hot-pluggable components, non-disruptive micro-code updates, storage processor battery backup, environmental controls, Auto-Call remote maintenance parameter monitoring, redundant storage and network components, and advanced volume management.

The Cisco FS Family can be configured to tolerate both internal and external failures, such as the failure of a switch or router. Failsafe Networking allows Data Mover network ports to have a dedicated backup port on a separate network card take over in the event of a failure in either the primary adapter or within the network itself.

Applications requiring higher availability and bandwidth than any single network port can deliver are candidates for industry-standard Link Aggregation (IEEE802.3ad) or Cisco Ethernet PortChannel. Multiple network ports can be aggregated and transmitted using a single logical address, providing greater link availability and potentially higher network bandwidth.

Enterprise-Class Information Protection for Mid-Range Systems

For information protection, the Cisco FS Family offers EMC SnapSure software for creating read-only copies of file systems. The snapshot can be used for online backups as well as quick recovery of deleted files. When used in conjunction with Microsoft Volume Shadow Services (VSS), this capability is taken a step further, helping end users to use the capability in their OS to recover deleted files directly from the Windows XP Explorer user interface. Because the snapshot operation is not a mirror, disk space and operational time are saved. SnapSure permits as many snapshots of file systems as the space allocated for the snapshot function allows.

For an even higher degree of information protection, EMC Celerra Replicator creates a point-in-time, read-only copy of a production file system on either a local or geographically remote Celerra system. Celerra Replicator uses standard IP-based networks for maintaining consistent replicas between the two Cisco FS Family Integrated NAS devices.

The Cisco FS Family also provides integration into on-demand anti-virus systems such as Symantec, McAfee, Computer Associates, Trend Micro, and Sophos. This is accomplished through the Celerra Anti-Virus Agent, or CAVA. CAVA allows administrators to ensure that content being accessed (read or written) is virus-free. Administrators can also place file-filtering policies on the Cisco FS Family to define specific types of files that are not allowed to be stored on the Cisco FS Family.

The Cisco FS Family uses the EMC Celerra File Mover API to allow administrators to define external file-management policies that enable policy-based data migration from the Cisco FS Family to secondary storage.

Ease of Management

Management and monitoring of the Cisco FS Family can be accomplished in a variety of ways, each designed to accommodate the skill set and operational preference of the administrator.

- **Celerra Manager Basic Edition**—Celerra Manager Basic Edition supports the most common functions for configuration and management of a single device including configuration wizards, “at-a-glance” statistics, and phone-home capabilities.
- **Celerra Manager Advanced Edition**—This is an extension of Celerra Manager Basic Edition and simplifies the tasks of configuration, reconfiguration, ongoing operation, data migration, and monitoring of multiple Celerra environments.
- **Microsoft Management Console (MMC) Snap-Ins**—These allow administrators to integrate management of the Cisco FS Family into their existing MMC-based management infrastructure, ensuring a familiar management interface for file server administrators.
- **Command-line Interface (CLI)**—A robust CLI is present for administrators preferring to work with UNIX-like commands and scripts.

Flexibility and Speed of Data Backup and Recovery

In addition to supporting NFS, CIFS, and FTP, the Cisco FS Family provides options for standards-based local and network backup through the industry-standard Network Data Management Protocol (NDMP). NDMP allows administrators to enable high-speed, data access protocol-independent backups and restores without impacting the network. The Cisco FS Family supports NDMP versions 1 through 4.

In addition to standard tape-based backup, the Cisco FS Family, through its support for both Fibre Channel and ATA drives, also supports distributed disk-to-disk backup for improved backup speed and manageability.

TECHNICAL SPECIFICATIONS

Tables 1–7 list the technical specifications for the Cisco FS Family.

Table 1. Data Mover Specifications

	Cisco FS 5500 Series	Cisco FS 5700 Series
Configuration Options	• Single and dual Data Mover configurations supported. • Dual Data Mover configurations can be deployed in: – Primary/primary mode for performance-oriented environments – Primary/standby mode for additional hardware-availability protection • Single Data Mover configurations can be upgraded non-disruptively to dual Data Mover configurations.	• Dual Data Mover configurations supported only. Single Data Mover configurations are not supported. • Dual Data Mover configurations can be deployed in: – Primary/primary mode for performance-oriented environments – Primary/standby mode for additional hardware-availability protection
CPU	Dual 1.6 GHz Pentium IV CPUs	Dual 3.0 GHz Pentium IV CPUs
Memory	4 GB double data rate RAM (266 MHz)	4 GB double data rate RAM (266 MHz)
Operating System	Data Access in Real Time (DART)	Data Access in Real Time (DART)
Fibre Channel Connectivity	• Two 2 Gbps Fibre Channel ports for array/switch connectivity • One 2 Gbps Fibre Channel port for tape connectivity	• Two 2 Gbps Fibre Channel ports for array/switch connectivity • Two 2 Gbps Fibre Channel port for tape connectivity
Ethernet Connectivity	• Four 10/100/1000BASE-T ports • One 10/100BASE-T management port	• Six 10/100/1000BASE-T ports (copper) • Two 1000BASE-X Gigabit Ethernet ports (optical) • One 10/100BASE-T management port • One 10/100/1000 management port
Serial Ports	2 serial ports	2 serial ports

Table 2. Storage Processor Specifications

	Cisco FS 5500 Series	Cisco FS 5700 Series
Configuration Options	Cisco FS 5500 Storage Processor Enclosures are preconfigured with two storage processors	Cisco FS 5700 Storage Processor Enclosures are preconfigured with two storage processors
CPU	Dual 1.6 GHz Pentium IV CPUs	Dual 3.0 GHz Pentium IV CPUs
Memory	2 GB double data rate RAM (266 MHz)	4 GB double data rate RAM (266 MHz)
Operating System	FLARE	FLARE
Fibre Channel Connectivity	• Two 2 Gbps Fibre Channel ports for connectivity to Data Movers • Two 2 Gbps Fibre Channel ports for connectivity to Disk Array Enclosures	• Two 2 Gbps Fibre Channel ports for connectivity to Data Movers • Two 2 Gbps Fibre Channel ports for connectivity to Disk Array Enclosures
Ethernet Connectivity	One 10/100BASE-T management port	One 10/100BASE-T management port

Management Control Station

- Platform managed by a control station
- Redundant connection to each Data Mover through serial and 10/100 interface
- Control station manages Data Mover failover
- Manages all file systems through GUI
- SNMP MIB II manageability
- Telnet access option
- HTTP server management interface
- Single control station only supported
- Dual USB, 40 GB ATA, CD, floppy
- 6 serial ports

Disk Options

The following types of disk are sold and supported with the Cisco FS Family:

- Fibre Channel disks: 146 GB or 300 GB (10,000 rpm), 73 GB (15,000 rpm)
- ATA disks: 320 GB (5400 rpm), 250 GB (7200 rpm)

Table 3. Disk Storage Capacity

	Cisco FS 5500 Series	Cisco FS 5500 Series
Usable Fibre Channel Disk Capacity	8 TB	16 TB
Usable ATA Disk Capacity	16 TB	32 TB

Table 4. Dart File Server Capabilities

Protocols Supported	Client Connectivity Facilities	Optional DART Software Facilities
• NFSv2 and v3, CIFS, FTP • Network Lock Manager (NLM) v1–v3 • Routing Information Protocol (RIP) v1–v2 • Simple Network Management Protocol (SNMP) • Network Data Management Protocol (NDMP) v1–v4 • Address Resolution Protocol (ARP) • Internet Control Message Protocol (ICMP) • Network Time Protocol (NTP) client • Simple Network Time Protocol (SNTP) • Kerberos Authentication • Lightweight Directory Access Protocol (LDAP)	• Files can be accessed by NFS and CIFS • File sharing by multiple Data Movers • Virtual Data Movers for Windows clients • Ethernet PortChannel • Link Aggregation (IEEE 802.3ad) • Virtual LAN (IEEE 802.1q) • UNIX archive utilities (tar/cpio) • Network Status Monitor (NSM) v1 • Portmapper v2 • Network Information Service (NIS) Client • Microsoft DFS Root or Leaf Server • NT LAN Manager (NTLM)	• Celerra SnapSure (included) • Celerra Replicator • Celerra Anti-Virus Integration • Celerra Manager Advanced Edition • Celerra FileMover API

Table 5. High-Availability Features

Data Mover Enclosure	DART Software Capabilities	Disk Storage Availability
• Data Mover failover in high-availability configurations • Redundant power supplies for Data Movers and control stations • Hot-swappable power and cooling • Battery backup for data protection during power outage (cache flushing) • Internal environmental status monitoring • Redundant storage and network connectivity	• Cisco EtherChannel • Link Aggregation Control Protocol • Failsafe Networking • Network interface port failover • Data Mover failover • Non-disruptive micro-code updates	• RAID-1 and RAID-5 • Redundant storage processors • Disk scrubbing • Mirrored write cache with de-stage to disk upon AC power loss • Redundant hot-swappable power, bus structures, and I/O subsystems • Auto-call remote monitoring • Online global hot-spare disks • Redundant Data Mover and network connectivity

Table 6. Dimensions

Unit of Measurement	Cisco FS 5500 Series	Cisco FS 5500 Series	Control Station
Height	10.5 in. (26.68 cm)	14.00 in. (57.18 cm)	1.75 in. (4.48 cm)
Width	17.72 in. (45.0 cm)	17.5 in. (44.45 cm)	17.5 in. (44.87 cm)
Depth	23.75 in. (60.33 cm)	• Front door to rear: 27.57 in. (70.02 cm) • Chassis to rear: 26.42 in. (67.1 cm) • Rail front-to-back: 25.24 in. (64.12 cm)	29.5 in. (75.64 cm)
Weight	98.3 lbs (44.5 kg) (includes enclosure with 15 drives)	• SPE (maximum): 230 lbs (104.4 kg) (fully configured) • 14 in. (53.36 cm)	28 lbs (12.73 kg)

Operating Environment

- Ambient temperature: 50 to 104°F (10 to 40°C)
- Temperature gradient: 50°F (10°C) per hour
- Relative humidity: 20 to 80%, non-condensing
- Elevation 8000 feet at 104°F (40°C), 10,000 ft at 9 8°F (37°C)

Table 7. AC Power and Dissipation

Requirement	Cisco FS 5500 Series Integrated NAS	Cisco FS 5700 Series Integrated NAS
AC Line Voltage	100 to 240 VAC + 10%, single phase	100 to 240 VAC + 10%, single phase
Frequency	47 to 63 Hz, full auto-ranging	47 to 63 Hz, full auto-ranging
AC Line Current	5.9A maximum at 100V (fully configured), 2.9A maximum at 200V (fully configured)	5.2A maximum at 100V (fully configured), 2.6A maximum at 200V (fully configured)
Power Consumption	590 VA (578W) maximum (fully configured)	520 VA (510W) maximum (fully configured)
Startup Surge Current	15A peak (10.6 Arms) maximum for 100 ms, at any line voltage	15A peak (10.6 Arms) maximum for 100 ms, at any line voltage
Power Factor	0.98 minimum at full load, 100 VAC	0.98 minimum at full load, 100 VAC
Heat Dissipation	2070 KJ per hour (1975 Btu per hour) maximum estimate	1840 KJ per hour (1740 Btu per hour) maximum estimate
In-Rush Current	5A peak estimate for 1/2 line cycle per power supply at 240 VAC, 15A peak estimate for 1/2 line cycle per power supply at 120 VAC	25A peak estimate for 1/2 line cycle per power supply at 240 VAC, 15A peak estimate for 1/2 line cycle per power supply at 120 VAC
AC Protection	10A internal fuse (non-serviceable)	10A internal fuse (non-serviceable)
AC Inlet Type	IEC320-C14 appliance coupler	IEC320-C14 appliance coupler
Ride-Through	30 ms minimum at full load	30 ms minimum at full load
Current Sharing	60% maximum, 40% minimum between power supplies	60% maximum, 40% minimum between power supplies

ORDERING INFORMATION

Cisco FS Family of Integrated NAS devices can be ordered through Cisco NAS partners in the NAS Advanced Technology Partner Program. Please consult with your Cisco sales representative to identify the configuration that is appropriate for your needs. To place an order, please visit the Cisco Ordering Home Page.

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FOR MORE INFORMATION

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205357.BE_ETMG_JH_10.05

Printed in the USA