NETAPP TECHNICAL FAQ

FAS2000 Technical FAQ

Chris Lueth, NetApp
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TABLE OF CONTENTS

1 FAS2000 OVERVIEW / FAS2040 INTRODUCTION

The FAS2040 is the latest addition to NetApp's award-winning FAS2000 product family, which previously featured the FAS2020 and FAS2050 models. Leveraging the NetApp® unified storage architecture and inherent storage efficiency features, FAS2040 provides midsized enterprises or departments/remote offices of a distributed enterprise double the performance of any existing FAS2000 storage system and a 30% increase in storage capacity. The FAS2040 can be used as primary or secondary storage. The FAS2040 comes in a 2U form factor with room for 12 internal SAS or SATA drives, dual independent hot-swappable controllers, and dual hot-swappable power supplies. Additional expansion options include FC, SAS, or SATA shelves, connected through SAS or Fibre Channel interfaces that are built into the two controllers for a total maximum capacity of 136 drives.

1.1 WHAT IS THE FAS2000 SERIES PLATFORM?

The FAS2000 series is NetApp's entry-level platform offering targeted toward distributed enterprises (ROBO) and the midsize enterprise (MSE) market.

1.2 HOW IS THE FAS2000 SERIES DIFFERENT FROM OTHER FAS PLATFORMS?

The FAS2000 series integrates the controller and storage into a single 2U and 4U rack-mountable chassis. In the FAS2000 series, the processor controller module is shrunk in order to fit into the shelf module slot to convert the shelf into a standalone storage system.

Moreover, FAS2000 series is the only NetApp platform to support Serial Attached SCSI (SAS) storage technology for internal storage.

1.3 WHAT ARE THE KEY FEATURES PROVIDED BY THE FAS2040 REFRESH?

- Twice the performance of FAS2050
  - More memory, more processing cores
- 30% more capacity and disk drives than FAS2050
- Double the number of onboard GbE ports
- Integrated SAS port for DS4243 shelf connectivity
- Same chassis as FAS2020
- Same internal disk drives as FAS2020 and FAS2050
- Data ONTAP® 8.0 ready
  - Target Data ONTAP 8.0 support in GA release (RC2)
- Initial support on Data ONTAP 7.3.2+
- Announcement and general availability in September 2009

1.4 HOW ARE THE FAS2000 MODELS POSITIONED?

FAS2050

Meets specialized storage deployment requirements:

- Compact single-system: one or two controllers and 20 drives in 4U
- Advanced I/O connectivity: 10GbE, FCoE, more GbE, FC, or SAS
- Deployments needing DC power or NEBS 3 (Vector Data Vault 2050)

FAS2040

Flagship FAS2000 model:

- Best performance; highest capacity and disk drive count
- Onboard SAS port for DS4243 expansion shelf
- Support for Data ONTAP 8
- Upsell/upgrade sales opportunity

FAS2020

Most affordable model, ideal for remote office/local storage:

- Value-oriented deployments needing low system acquisition cost
- Excellent for Windows® applications and file serving
- Additional functionality through affordable software packages

2 FAS2000 ACTIVE-ACTIVE AND STANDALONE CONFIGURATIONS

2.1 ARE STANDALONE FAS2000 CONFIGURATIONS SUPPORTED?

Yes, the FAS2000 can be configured as a standalone or in the recommended active-active configuration.

2.2 WHICH CONTROLLER BAY IS OCCUPIED IN STANDALONE CONFIGURATIONS?

In standalone FAS2000 configurations, the bottom controller bay is populated and the top controller bay is left empty. In this configuration, a blank plate covers the top controller bay.

2.3 DOES HARDWARE-ASSISTED TAKEOVER WORK ON THE FAS2000?

No. Hardware-assisted take-over requires the RLM used in FAS3000, FAS3100, and FAS6000 controller families. The FAS2000 series features the BMC interface for remote management.

There is more information about the BMC management interface in sections 3.8 and 3.9.

2.4 WHAT IS THE INTERCONNECT IN FAS2000 SERIES HA CONFIGURATIONS?

The FAS2000 series support high availability (HA) failover in a box. FAS2000 HA configurations use a passive InfiniBand (IB) cluster interconnect that is routed over the chassis backplane.

2.5 ARE THERE ANY SINGLE POINTS OF FAILURE IN THE FAS2000?

While the chassis backplane is not fault tolerant, there are no active components on the backplane that controllers rely on to remain in a running state. This passive backplane is a highly reliable component that is very unlikely to cause an outage on a FAS2000 series. Reliable passive backplanes are used in almost all modular storage systems with two controllers in a single chassis as well as network switches. Also, NetApp has been shipping systems and subsystems with shared backplanes for quite some time (DS14-class disk shelves, the FAS200 series, FAS2000, and more recently FAS3100 series) that have demonstrated very high reliabilities of the chassis with backplane.

2.6 IS METROCLUSTER AVAILABLE ON THE FAS2000 SERIES?

MetroCluster is not available on the FAS2000 series.

2.7 IS THE FAS2000 SERIES ALSO AVAILABLE AS V-SERIES?

No, FAS2000 systems are not available as V-Series platforms.

2.8 WILL SINGLE-CONTROLLER FAS2050 CONFIGURATIONS BE AVAILABLE AFTER SEPTEMBER?

New quotes for FAS2050 systems will only be available in dual-controller configurations after September 15. Customers requiring a single-controller system should be transitioned to FAS2040. We will support "existing" quotes for single-controller FAS2050s until November.

3 FAS2000 SYSTEM FEATURES

3.1 HOW MUCH MEMORY DOES THE FAS2000 HAVE?

Table 1) System memory for active-active configurations.

Active-Active	Total Memory
FAS2020	2GB (4x 512MB DIMM DDR2-400)
FAS2040	8GB (4x 2GB DIMM DDR2-400)
FAS2050	4GB (4x 1GB DIMM DDR2-400)

3.2 HOW MANY PROCESSING CORES DOES THE FAS2000 HAVE?

Table 2) Processing cores for active-active configurations.

Active-Active	Processors	Processing Cores	Processor Speed
FAS2020	2 x 32-bit Single-core	2	2.2 GHz
FAS2040	4 x 32-bit Dual-core	4	1.66 GHz
FAS2050	2 x 32-bit Single-core	2	2.2 GHz

3.3 WHAT ARE THE BIOS LEVELS ON THE FAS2000?

The FAS2020 and FAS2050 were released with BIOS level 3.0, and this is still the latest version for these two models.

The FAS2040 ships with BIOS level 6.0, and this version is not backward compatible with the FAS2020 and FAS2050 models.

3.4 WHICH DATA ONTAP RELEASES ARE REQUIRED FOR THE FAS2000?

The FAS2020 and FAS2050 require Data ONTAP 7.2.2 L1 or later or Data ONTAP 7.3 or later. There is no Data ONTAP 8.0 support for the FAS2020 and FAS2050.

The FAS2040 requires Data ONTAP 7.3.2 or later, including support with Data ONTAP 8.0 and later.

Table 3) Supported Data ONTAP releases.

Controller	Data ONTAP Release
FAS2020	Data ONTAP 7.2.2L1+ No Data ONTAP 8.0 support
FAS2040	Data ONTAP 7.3.2+ Data ONTAP 8.0 support
FAS2050	Data ONTAP 7.2.2L1+ No Data ONTAP 8.0 support

3.5 HOW ARE NVLOG CONTENTS PROTECTED ON THE FAS2000 UPON DIRTY SHUTDOWN?

The FAS2000 series systems use battery backed-up system memory called NVMEM, and it provides functionality similar to that provided by NVRAM on other FAS platforms. Unlike NVRAM, which uses separate battery backed-up memory, NVMEM uses space carved out of battery backed-up main system memory to provide NVMEM functionality.

3.6 HOW LONG WILL NVMEM BATTERY BACKUP LAST, AND HOW LONG DOES IT TAKE TO RECHARGE A COMPLETELY DISCHARGED NVMEM BATTERY?

The NVMEM battery will last up to 72 hours, and takes 15 hours to charge a totally discharged NVMEM battery.

3.7 DOES THE FAS2000 HAVE AN LCD DISPLAY?

No, the FAS2000 does not have an LCD display. However, LEDs are provided on the chassis front to help determine the state of the controller. Remote management has proven to be the primary source for monitoring system information.

3.8 DOES THE FAS2000 SERIES SUPPORT REMOTE MANAGEMENT?

The FAS2000 series support remote management functionality using the baseboard management controller (BMC) port on each storage controller. The BMC supports the same remote management functionality as the RLM on FAS3000, FAS3100, and FAS6000 platforms.

3.9 IS THERE A NEW COMMAND TO ADMINISTER BMC?

Yes, Data ONTAP has added a new command to administer BMC port. The new command is "*bmc*".

4 FAS2000 I/O

4.1 WHAT KIND OF EXPANSION SLOTS DOES THE FAS2000 HAVE?

The FAS2050 has one 8x PCIe slot per controller and two in an HA configuration.

The FAS2020 and FAS2040 do not have expansion slots.

4.2 WHAT ONBOARD I/O PORTS DOES THE FAS2000 HAVE FOR DATA ACCESS?

The FAS2040 doubles the number of onboard GbE ports and adds an integrated SAS port to support connectivity to the new DS4243 storage shelf.

Table 4) Onboard I/O ports.

Active-Active	GbE	FC	SAS
FAS2020	4	4	-
FAS2040	8	4	2
FAS2050	4	4	-

4.3 WHAT MANAGEMENT INTERFACES DOES THE FAS2000 HAVE?

The SAS ACP port shown in the following table is covered further in section 4.4.

Table 5) Onboard management interfaces.

Active-Active	Console	BMC	SAS ACP
FAS2020	2	2	-
FAS2040	2	2	2
FAS2050	2	2	-

4.4 WHAT IS THE SAS ACP PORT?

The SAS ACP port stands for alternative control path and is a mechanism for providing out-of-band management to the new SAS DS4243 shelves. For more information on the ACP port, review section 8 in the DS4243 Technical FAQ.

4.5 WHAT IS THE MAXIMUM NUMBER OF SAN HOSTS THE FAS2000 SUPPORTS?

The FAS2020 supports up to 24 SAN attached hosts, while the FAS2040 and FAS2050 each support up to 32 SAN attached hosts.

5 FAS2000 STORAGE

5.1 WHAT ARE THE MAXIMUM SPINDLE COUNT AND CAPACITY SUPPORTED ON THE FAS2000 SERIES?

Table 6) Maximum spindle count and capacity.

Standalone and Active-Active	Maximum Spindles	Maximum Capacity
FAS2020	68	68TB
FAS2040	136	136TB
FAS2050	104	104TB

5.2 WHAT ARE THE FAS2040 STORAGE PROVISIONING LIMITS?

The FAS2040 is the only FAS2000 series model that will be supported in Data ONTAP 8.0. As such, there are some provisioning differences between Data ONTAP 7.3.2+ and Data ONTAP 8.0 on the FAS2040 to highlight:

- 200 maximum FlexVol® volumes in both Data ONTAP 7.3.2 and Data ONTAP 8.0
- Maximum aggregate size
  - 16TB in Data ONTAP 7.3.2
  - 30TB in Data ONTAP 8.0 (64-bit aggregate)
- 300TB maximum provisioned capacity in Data ONTAP 8.0
  - Including when using thin provisioning
- vFiler™ limits
  - 64 in Data ONTAP 7.3.2
  - 16 in Data ONTAP 8.0 (7-mode)
- 136 maximum spindles and 136TB maximum capacity

5.3 WHAT IS THE MAXIMUM AGGREGATE SIZE ON THE FAS2020?

In the original FAS2020 release on Data ONTAP 7.2.2 L1 aggregate sizes of up to 16TB were supported. In Data ONTAP 7.4.1 maximum aggregate size was lowered to 7TB to facilitate recoverability if WAFL® check was required. Starting in Data ONTAP 7.3.1 the maximum aggregate size on a FAS2020 has been increased back to 16TB but requires either a dedicated standalone root volume with no user data or two available hot spare disks for each controller.

5.4 WHAT IS THE FAS2000 SERIES DISK OWNERSHIP MODEL?

FAS2000 series uses software disk ownership (SANOWN).

5.5 WHAT KIND OF INTERNAL STORAGE IS SUPPORTED IN THE FAS2000 SERIES?

FAS2000 series uses SAS storage architecture for internal storage. FAS2000 series SAS architecture enables support for both high-performance SAS drives and high-capacity SATA drives in the same enclosure.

5.6 CAN FC BE USED FOR INTERNAL FAS2000 DRIVES, AND, IF NOT, WHY?

No. Since SAS and FC disks are mechanically the same disks and provide the same performance and reliability, there is no need for internal FC disks with the FAS2000.

5.7 DOES THE FAS2000 SERIES SUPPORT MIXED SAS AND SATA INTERNAL DRIVES?

No, the FAS2000 series do not support mixed SAS and SATA drives in the same controller. Both FAS2000 series models only support all SAS or all SATA internal drives in the base enclosure.

5.8 WHAT INTERNAL DISKS ARE SUPPORTED ON FAS2000 SERIES SYSTEMS?

FAS2000 series supports the following SAS and SATA disks for internal storage:

SAS:

144GB 15K SAS

300GB 15K SAS

450GB 15K SAS

SATA:

250GB 7.2K SATA

500GB 7.2K SATA

750GB 7.2K SATA

1TB 7.2K SATA

5.9 DOES THE FAS2000 SERIES SUPPORT MIXED EXTERNAL FC AND SATA STORAGE ON THE SYSTEM?

Yes, with Data ONTAP 7.2.4L1 and later the FAS2000 series supports mixed external FC and SATA storage on the system. Like other FAS platforms, the FAS2000 series only supports homogenous external storage in the same FC-AL (that is, all FC expansion shelves or all SATA expansion shelves in one FC-AL loop). With Data ONTAP 7.2.4 FAS2000 series now supports two FC-AL loops in the system, which enables mixing FC and SATA storage in the same system.

5.10 DOES DATA ONTAP ALLOW MIXING OF INTERNAL SAS DRIVES WITH EXTERNAL FC OR SATA DRIVES IN AN AGGREGATE OR TRADITIONAL VOLUME?

Yes, Data ONTAP 7.2.4L1 and later enables mixing of SAS and FC drives in the same aggregate, traditional volume, or RAID group on FAS2000 series systems.

The FAS2000 series supports mixing of 15K SAS drives with both 10K and 15K FC drives in an aggregate or RAID group. However, 10K FC drive and 15K SAS drive are not equivalent in performance, so it is not a recommended configuration.

5.11 ARE THERE ANY SPECIAL CONSIDERATIONS ON MIXING FC AND SATA EXPANSION STORAGE ON FAS2000 SERIES SYSTEMS?

The FAS2050 requires quad-port FC initiator to support multipath HA in mixed FC and SATA expansion shelves configuration systems. However, the FAS2020 and FAS2040 can only support dual-path mixed FC and SATA expansion in active-active configuration.

In addition, DS14mk2 or DS14mk4 disk shelves with ESH2 or ESH4 controllers can be mixed in the same FC-AL loop, but the loop will operate at 2Gb speed.

5.12 WHAT EXPANSION SHELVES, I/O MODULES, AND DISKS ARE SUPPORTED ON FAS2000 SERIES SYSTEMS?

FAS2000 series supports the following storage options:

Shelves:

DS4243

DS14mk4 FC

DS14mk2 FC

DS14mk2 AT

Modules:

IOM3

ESH4

ESH2

AT-FCX

DS4243 disks:

300GB 15K RPM SAS

450GB 15K RPM SAS

500GB 7200 RPM SATA

1TB 7200 RPM SATA

DS14 disks:

144GB 10K RPM FC

144GB 15K RPM FC

300GB 10K RPM FC

300GB 15K RPM FC

450GB 15K RPM FC

250GB 7200 RPM SATA

500GB 7200 RPM SATA

750GB 7200 RPM SATA

1TB 7200 RPM SATA

Legacy DS14mk2 shelf:

36GB 10K RPM FCAL

72GB 10K RPM FCAL

36GB 10K RPM FCAL

72GB 15K RPM FCAL

5.13 WILL THERE BE ZERO DRIVE CONFIGURATIONS AVAILABLE FOR THE FAS2040?

No. Due to lack of overall demand for zero drive configurations, they will no longer be offered for the FAS2000 family, including the FAS2040 after September 15, 2009.

5.14 WHAT IS THE LAST SHIPMENT DAY FOR FAS2000 SERIES WITH 750GB SATA DRIVES?

The last shipment date for FAS2000 systems with 750GB drives will be November 2, 2009. The last shipment date for add-on 750GB parts will be December 6, 2009.

5.15 IS MULTIPATH HA STORAGE SUPPORTED ON THE FAS2000 SERIES?

Yes, FAS2000 systems support multipath HA storage connectivity. The expansion FC or SATA shelves can be connected using multipath on dual-controller active-active configuration.

However, due to limited FC and SAS ports on the FAS2020 and FAS2040, dual-path standalone and multipath HA cannot always be implemented, especially in some FC SAN deployments, mixed FC and SATA external storage, or when using DS4243 on the FAS2040. Supported storage configurations for the FAS2000 are available in the Supported Configurations for the FAS2000 Storage System.

5.16 IS FC SAN TAPE SUPPORTED ON THE FAS2000 SERIES?

Yes, FC SAN tape is supported on the FAS2000 series. Any onboard FC port in initiator mode or dual-port FC tape initiator adapter (FAS2050 only) can be used to connect FC SAN tape devices; see www.netapp.com/solutions/data_protection_devices.html for supported FC SAN tape devices.

5.17 ARE SCSI TAPE DRIVES SUPPORTED ON THE FAS2000 SERIES?

The FAS2000 series supports NetApp qualified SCSI tape drives that are employed in selected Fibre Channel tape libraries. See www.netapp.com/osn/info/config.html for Fibre Channel fabric TapeSAN backup solutions and www.netapp.com/solutions/data_protection_devices.html for supported data protection devices pages.

In addition, with the Data ONTAP 7.2.4L1 release, FAS2050 also supports Ultra SCSI tape for direct SCSI tape drive connectivity.

5.18 DOES THE FAS2000 SERIES SUPPORT SEPARATE SAS AND FC/SATA DISK OWNERSHIPS IN DUAL-CONTROLLER FAS2000 SYSTEMS?

Yes, the dual-controller FAS2000 can be configured to separate the disk ownership between SAS and FC/SATA disks. In a dual-controller configuration, one controller can own SAS disks in the base shelf, and a second controller can own FC or SATA disks in the expansion shelves. Additionally, depending on the disk ownership a controller's root volume can reside in expansion disk shelf.

5.19 IS ADVANCED SINGLE INSTANCE STORAGE (A-SIS) SUPPORTED ON THE FAS2000 SERIES?

Yes, the FAS2000 series supports A-SIS on FAS2000 platform.

6 FAS2000 CHASSIS POWER SUPPLIES, WEIGHT, AND THERMALS

6.1 WHAT ARE THE FAS2000 CHASSIS DIMENSIONS?

Table 7) FAS2000 physical chassis dimensions.

Standalone and Active-Active	FAS2020	FAS2040	FAS2050
Rack U	2U	2U	4U
Width	19”	19”	19”
Height	3.45”	3.45”	6.9”
Depth	24”	24”	24”
Weight (fully loaded)	66 lbs	66 lbs	110 lbs

6.2 WHAT ARE THE FAS2000 POWER SUPPLY AMP AND WATTAGE RATINGS?

Table 8) FAS2000 power supply wattage.

Active-Active	Wattage	Amperage
FAS2020	675W	4.5A @ 230VAC 9A @115VAC
FAS2040	675W	4.5A @ 230VAC 9A @115VAC
FAS2050	855W	6A @ 230VAC 11A @115VAC

6.3 ARE THE FAS2000 POWER SUPPLIES ASSIGNED TO A PARTICULAR CONTROLLER?

No, the two power supplies are assigned to the FAS2000 chassis.

6.4 WHAT ARE THE FAS2000 POWER AND THERMAL REQUIREMENTS?

Using 12 internal 300GB 15K SAS disks, an active-active FAS2020 with both PSUs typically consumes 465W and 488W worst case. Thermal dissipation in these cases for a FAS2020 is typically 1587 BTU/hr and 1665 BTU/hr worst case.

Using 12 internal 300GB 15K SAS disks, an active-active FAS2040 with both PSUs typically consumes 457W and 480W worst case. Thermal dissipation in these cases for a FAS2040 is typically 1558 BTU/hr and 1636 BTU/hr worst case.

Using 20 internal 300GB 15K SAS disks, an active-active FAS2050 with both PSUs typically consumes 659W and 747W worst case. Thermal dissipation in these cases for a FAS2050 is typically 2247 BTU/hr and 2547 BTU/hr worst case.

6.5 ARE DC POWER SUPPLIES AVAILABLE FOR THE FAS2000?

DC power supplies are available for the FAS2050 through Vector Data. This site on the Field Portal has more information on DC power supplies via Vector Data: Vector Data NEBS Level 3 DC FAS2050s.

The FAS2020 and FAS2040 do not support DC power supplies.

www.netapp.com