Sun StorEdge™ Fast Write Cache Release Notes

THE NETWORK IS THE COMPUTER™

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Introduction

Sun StorEdge™ Fast Write Cache is implemented as a UNIX device driver, using nonvolatile memory to cache write requests. As the cache fills, older data is written asynchronously to the real disk. Fast Write Cache works as a layer between other disk drivers and the rest of the UNIX kernel. Stubs replace the original driver's entry points in the device switch tables. Whenever Fast Write Cache performs actual I/O (for example, when its cache must be destaged), it uses the real device driver routines.

Note – Fast Write Cache is implemented using a pair of SBus NVRAM cards installed on your system.

Document Structure

This document contains the following information:

Documentation Conventions

TABLE P-1 Documentation Conventions

Typeface	Meaning	Examples
`AaBbCc123`	The names of commands, files, and directories; on-screen computer output	Edit your `.login` file. Use `ls -a` to list all files. `% You have mail.`
`AaBbCc123`	What you type, when contrasted with on-screen computer output	`% su` `Password:`
AaBbCc123	Book titles, new words or terms, words to be emphasized	Read Chapter 6 in the *User's Guide.* These are called *class* options. You *must* be superuser to do this.
	Command-line variable; replace with a real name or value	To delete a file, type `rm` *filename.*
{ *arg* | *arg*}	In syntax, braces and pipes indicate that one of the arguments must be specified.	In this example, one of the options must be specified with the `fwcadm cache command.` `fwcadm cache {-d|-e}`
`com(`*n*`)`	The form `command(number)`, where the number in parentheses ranges from 1 through 6 and is followed by letters, indicates the presence of an online reference man page.	`fwcadm(1FWC)`

Related Documentation

TABLE P-2 Related Documentation

Application	Title	Part Number
Man Pages	`fwcadm(1FWC)` `svadmn(1SV)`	N/A
Installation and User	*Sun StorEdge Fast Write Cache Installation and User's Guide*	805-7709
Installation	*Solaris 2.6 Handbook for SMCC Peripherals*	802-7295
Installation	*Solaris Handbook for SMCC Peripherals*	805-7404
Installation	*Solaris 2.x Handbook for SMCC Peripherals*	801-5488
Options	*OpenBoot 3.x Command Reference Manual*	802-3242
Diagnostics (Solaris 2.6)	*SunVTS 2.1 User's Guide*	802-7299
Diagnostics (Solaris 2.6)	*SunVTS 2.1.3 Test Reference Manual*	805-4163
Diagnostics (Solaris 2.6)	*SunVTS 2.1 Quick Reference*	802-7301
Diagnostics (Solaris 7)	*SunVTS 3.0 User's Guide*	805-4442
Diagnostics (Solaris 7)	*SunVTS 3.0 Test Reference Manual*	805-4443
Diagnostics (Solaris 7)	*SunVTS 3.0 Programmer's Guide*	805-7338
Diagnostics (Solaris 7)	*SunVTS 3.0 Quick Reference*	805-4444
Diagnostics (Solaris 7)	*SunVTS 3.1 User's Guide*	805-7406
Diagnostics (Solaris 7)	*SunVTS 3.1 Test Reference Manual*	805-7407
Diagnostics (Solaris 7)	*SunVTS 3.1 Quick Reference*	805-7408

Requirements

- The minimum requirements for installing Fast Write Cache are:
  - Solaris™ 2.6 operating environment or a subsequent compatible version
  - Pair of SBus NVRAM cards
  - CD-ROM drive connected to the host server where Fast Write Cache is to be installed
  - Approximately four Mbytes of disk drive space
- `SUNWvtsnp` is the enhanced SunVTS that verifies the SBus NVRAM card for Fast Write Cache. `SUNWvtsnp` is not a stand-alone package. It does not run without the corresponding `SUNWvts` package being installed.
- If you are using the Sun Enterprise Volume Manager™, ensure that you have the appropriate patch for your version.
  - Volume Manager 2.5 – patch 107773-01
  - Volume Manager 2.6 – patch 107735-01

Qualified Platforms

The following platforms are qualified for Fast Write Cache:

- Sun Enterprise™ E3000
- Sun Enterprise E3500
- Sun Enterprise E4000
- Sun Enterprise E4500
- Sun Enterprise E5000
- Sun Enterprise E5500
- Sun Enterprise E6000
- Sun Enterprise E6500

Limitations

Fast Write Cache Revision 1.0 does not support the following:

- Checkpoint/resume
- Dynamic reconfiguration
- Alternate pathing
- Multiple card pairs (that is, cache is limited to the size of one board - 32Mbytes)
- Clusters
- Single NVRAM cards

Unresolved Problems

- Solstice Disk Suite™ 4.1 (SDS) *metatrans* devices cannot be cached.

Product Considerations

- Do not cache underlying volume manager devices (for example, VxVM log devices), as this can result in unpredictable behavior.
- The volume manager must always be below the Fast Write Cache:
  - To allow coalescing stripe width size writes for RAID 5
  - The volume manager partitioning of disks does not necessarily map to the Solaris partitions
- Fast Write Cache can cache Volume Manager volumes. The example for configuring the `/etc/opt/SUNWspsv/sv.cf` file that is shown in the Sun *StorEdge Fast Write Cache Installation and User's Guide* lists linear disks, only. The following example adds a volume manager volume for the Sun Enterprise Volume Manager by including the entry in the `/etc/`opt/SUNWspsv/`sv.cf` file:
  `/dev/vx/rdsk/vol01 cache`
- Install Fast Write Cache only on systems with clean NVRAM cards. If an unclean shutdown of the system occurred, recover or purge the data before installing Fast Write Cache.
- The file systems must always be above the Fast Write Cache so data and metadata can be destaged to the disk after a crash before `fsck(1M)` is run.

- Do not cache the root (/) and /usr file systems (or any file systems that come up before Fast Write Cache) because to recover disk data stored in an NVRAM card after a system crash, the data must be restored to disk before file systems are mounted or applications are written to raw volumes.
- Do not cache the swap partition.
- Avoid multiple paths to data. The following are examples of operations that can access data using alternate cached or noncached paths:
  - mmap(2) I/O
  - caching overlapping slices
  - commands that write to a device using ioctl(2), such as format(1M)
- In general, devices must be Storage Volume (SV) disabled using the fwcadm volume -d command before doing any operations requiring a device to be quiescent. Some procedures (for example, an A5000 firmware download) will not complete successfully unless the appropriate devices are SV disabled.
- Limit any changes in the default /etc/sd.cf file to the following two parameters:
  - cache_mem – The size_in_megabytes for the cache_mem parameter must be greater than 0 and must be at least equal to the amount of memory (in Mbytes) that is available on one NVRAM card (that is, 32Mbytes).
  - threads – This parameter must be at least equal to the number of cached volumes.
- If the NVRAM card contains dirty data, do not reconfigure your disks or move the card to another system until the dirty data is destaged to disk.
- Because SUNWvtsnp is not a stand-alone package, the appropriate SunVTS must be installed. SUNWvtsnp is an enhanced SunVTS test that verifies the SBus NVRAM Card for Fast Write Cache.

Solaris Version	SunVTS version
Solaris 2.6	SUNWvts 2.1.3
Solaris 7	SUNWvts 3.0
Solaris 7	SUNWvts 3.1

The Solaris 2.6 version of the SUNWvtsnp package contains a 32-bit nvtest.

The Solaris 7 versions of the SUNWvtsnp package contains both 32-bit and 64-bit nvtest binaries. Package dependency is checked during installation, and the nvtest binaries are installed in the appropriate directories. The 64-bit nvtest is not installed unless the SUNWvtsx (64-bit SunVTS) package is already installed.