



Welcome to Your FAS

Your new NetApp Fabric Attached Storage (FAS) is designed for simplicity of use and maintenance. Like all computer equipment in your environment, a FAS storage controller works best when it receives regular preventive maintenance. This document will introduce you to the best practices for the installation and maintenance of your FAS.

More current and detailed information can be found in the software and hardware documentation, on the Netapp On the Web (NOW) website at <http://now.netapp.com> , and by calling Technical Support at 888-463-8277.

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Best Practices Checklist

Physical Installation

- ☐ Review environmental and site requirements
- ☐ Plan for redundancy
- ☐ Properly ground the filer head and all disk shelves
- ☐ Connect shelves in active-active clusters using Multipath High Availability cabling
- ☐ Segregate Fibre Channel and SATA shelves in active-active cluster configurations
- ☐ Check all cables for proper installation
- ☐ Properly label all cables
- ☐ Route cables to allow easy access when performing hardware maintenance

Initial Configuration

- ☐ Run the setup scripts
- ☐ Enter license codes
- ☐ Layout aggregates and volumes
- ☐ Allocate adequate hot spare disks
- ☐ Verify protocols
- ☐ Test cluster failover (if applicable)
- ☐ Configure Snapshot schedule and retention policies
- ☐ Configure and test AutoSupport
- ☐ Use diagnostics tools
- ☐ Configure RLM or terminal server

- ☐ Create a profile on NOW and add contact information
- ☐ Subscribe to Field Alerts and Bug Notifications
- ☐ Purchase spare parts
- ☐ Purchase a support agreement

Ongoing Maintenance

- ☐ Do not put user data into the root volume.
- ☐ Deal with known issues
- ☐ Remove failed disks quickly
- ☐ Check drive seating regularly
- ☐ Monitor system health regularly
- ☐ Monitor temperature in the FAS area
- ☐ Monitor network statistics
- ☐ Monitor disk space
- ☐ Limit volume size
- ☐ Review autosupport e-mail messages weekly
- ☐ Maintain tape backups
- ☐ Perform spot restores
- ☐ Test cluster failover
- ☐ Balance CPU and disk I/O over both nodes in an active-active cluster configuration
- ☐ Review Snapshot frequency and retention policy
- ☐ Take a snapshot before changing configurations
- ☐ Maintain system security

- ☐ Change root and administrator password every six months
- ☐ Upgrade to a General Deployment release of ONTAP
- ☐ Upgrade to the latest available disk and shelf controller firmware
- ☐ Add disks to aggregates in groups of 7 or more
- ☐ Use the reallocate command to re-stripe volumes and LUNs to improve performance
- ☐ Delete lots of files or large files in phases
- ☐ Read hardware flyers
- ☐ Take training and update training routinely

Best Practices Checklist Task

Explanations

Physical Installation	
Review environmental and site requirements	The Site Requirements Guide describes the requirements NetApp FAS installations must meet to ensure proper operation. http://now.netapp.com/NOW/knowledge/docs/hardware/NetApp/site/pdf/site.pdf
Plan for redundancy	Most FAS controllers provide two or more connections to disk shelves for maximum access to data. Your FAS and disk shelves contain redundant power supplies to ensure continued operation if a power supply fails. To ensure maximum uptime, connect the FAS and shelves to two separate electrical circuits. The circuits should connect to emergency battery or generator power. Make network connections redundant by connecting two or more NICs to separate network switches.
Properly ground the controller and all disk shelves	Whether in a cabinet or telco rack, it is important to electrically ground FAS controllers and disk shelves. Like all electronics, they are sensitive to electrical shocks.
Connect shelves in active-active clusters using Multipath HA cabling	Multipath High Availability (HA) cabling increases storage resiliency by reducing conditions which trigger cluster failover. Performance is increased due to increased bandwidth and load balancing of the storage loops.
Segregate Fibre Channel and SATA shelves in active-active cluster configurations	Disk I/O is shared across the system bus. Connecting SATA disks and Fibre Channel disks to separate storage controllers ensures the Fibre Channel disks operate at maximum throughput.
Check all cables for proper installation	Ensure that all cables are of the right length, properly connected to the shelves and the controller, and are not kinked, twisted, or bent. Improperly installed cables can cause problems. Give them a slight tug to ensure proper seating.
Properly label all cables	Label network and fiber optic shelf connector cables with hostname and port number at both ends. Label power cables to prevent accidents.
Route cables to allow easy access when performing hardware maintenance	Most hardware maintenance is performed on the rear of the controller and disk shelves. Ensure cables are routed around field replaceable components so they may be removed easily.

Initial Configuration	
Run the setup scripts	A new FAS boots into the setup script to configure the basic network settings. You can run the <code>setup</code> command to make changes later. CIFS is configured and modified with the <code>cifs setup</code> command.
Enter license codes	Protocols and additional Snap technology features like SnapRestore and SnapMirror can be turned on by purchasing a license and entering the code with the <code>license</code> command. These features are already in ONTAP and require no downloading of software.
Layout aggregates and volumes	Work with your NetApp Systems and Services Engineers to plan the best way to layout your aggregates and volumes. You can find Best Practices guides with layout recommendations for many major applications like Oracle and Exchange at http://now.netapp.com/NOW/knowledge/docs/docs.shtml
Allocate adequate hot spare disks	It is extremely important you maintain hot spare disks to ensure the FAS can recover from disk failures automatically and to minimize downtime. NetApp recommends a <u>minimum</u> of one hot spare disk of each type of disk for every forty-two disks. One for every twenty-eight disks is standard. Maintain two hot spares for each type of disk drive in the storage system to take advantage of Maintenance Center.
Verify protocols	Verify CIFS, NFS, iSCSI and FCP protocols by creating a CIFS share, NFS export, or LUN and mounting it to a client. Copy files to verify write permissions.
Test cluster failover (if applicable)	Perform a cluster failover and giveback to verify configuration and demonstrate how failover works.
Configure Snapshot schedule and retention policies	Snapshots provide instantaneous online backups for recovery from unwanted changes, corruption, and deletion of files. Snapshots consume disk space as files are changed and deleted so planning the frequency and retention periods for Snapshots is important. Keep the default setting of 20 percent for the first month. This will provide you time to monitor the rate of change within your volumes. http://now.netapp.com/NOW/knowledge/docs/ontap/rel724/html/ontap/onlinebk/2snap.htm
Configure and test AutoSupport	AutoSupport sends information to NetApp Technical Support by e-mail every Sunday morning. System events that affect the FAS or data generate immediate AutoSupport e-mails. NetApp Tech Support monitors AutoSupport e-mail for indications of hardware problems or potential failures. You can configure AutoSupport to e-mail administrators in your organization. Manually generate AutoSupport emails either in FilerView or at the CLI by typing: options autosupport.doit "<message subject>" Find more information at http://now.netapp.com/NOW/knowledge/docs/olio/autosupport/

Use diagnostics tools	These tools ensure all the hardware is working properly. These are run by typing <code>boot_diags</code> at the CFE> or LOADER> prompt.
Configure RLM or terminal server	Configuring the Remote LAN Module (RLM) port or connecting to a terminal server provides network remote console access when you do not have physical access.
Create a profile on NOW and add contact information	NetApp On the Web (NOW) is where you access documentation, software and firmware as well as technical assistance. Obtain your FAS' serial number using the <code>sysconfig</code> command. NetApp uses the serial number to provide tailored assistance for each FAS so keep this number accessible. Create a NOW account at https://now.netapp.com/eservice/public/now.do
Subscribe to Field Alerts	Field Alerts are notifications of urgent information that may affect performance or reliability. You can sign up for email delivered Field Alerts and other services like Tech OnTap, the monthly newsletter for FAS owners, under My Profile on the NOW website.
Subscribe to Bug Notifications	Sometimes software does not behave like we expect. Get information on old and new bugs and their solutions at http://now.netapp.com/NOW/cgi-bin/bol/
Purchase spare parts	Many of the components of a FAS are Field Replaceable Units (FRU) that can easily be swapped out when they break. Having spares allows you to quickly replace broken parts rather than incur degraded performance or downtime waiting for RMA parts to arrive. Contact your sales representative for information and pricing.
Purchase a support agreement	A support agreement is how you maintain access to replacement parts, the latest software and firmware releases, and technical assistance. Contact your sales representative for options and pricing.

Ongoing Maintenance	
Do not put user data into the root volume	The root volume has been specifically sized to accommodate log files and core files. Adding user files opens up the possibility of running out of space and causing performance issues or even a system failure.
Deal with known issues	Subscribing to the Field Alerts and Bug Notifications mailing lists keeps you up-to-date with known issues. When you receive notification that applies to your configuration, take the recommended steps as soon as possible to remedy or work around the problem. Contact Technical Support or Professional Services for assistance.
Remove failed disks quickly	If repairs are not made and no spare disks are available the FAS will go into degraded mode and turn off in 24 hours to protect itself and your data. While operating in degraded mode, additional disk failures may cause the FAS to panic and the failed aggregate/ traditional volume must be reconstructed from offline backups. With AutoSupport turned on and an active support agreement, NetApp

	will send a replacement disk automatically.
Check drive seating regularly	If a drive becomes unseated the FAS may mark the drive as bad or the drive may start causing Fibre Channel loop errors.
Monitor FAS health regularly	FilerView displays basic health indicators. You can also use commercial and open source monitoring applications. To monitor and manage multiple FAS systems contact your sales representative about Operations Manager.
Monitor temperature in FAS area	As new equipment is introduced to your data center you may notice hot spots. Heat also tends to accumulate in the upper third of cabinets. Adjust horizontal and vertical airflow to reduce hot spots.
Monitor network statistics	Monitoring statistics on the network to which your FAS is attached ensures you discover and fix network problems that can affect performance before they become a major problem.
Monitor disk space	Monitoring the disk space on your FAS and managing it proactively enables you to avoid situations where users run out of disk space. When aggregates and traditional volumes exceed 90 percent capacity you may experience performance degradation.
Limit volume size	Volume size affects the time it takes to restore data from tape backups when non-recoverable disk errors occur. Limiting volume size ensures that data can be restored in a timely manner.
Review autosupport e-mail messages weekly	Autosupport e-mails contain information which can alert you to upcoming problems like failed disk drives, failed power supplies, or a lack of disk space. My Autosupport on the NOW site simplifies this task http://now.netapp.com/NOW/asuphome/
Maintain tape backups	To ensure you can recover from a multiple disk failure or physical damage to your FAS, you should maintain tape backups. Your FAS can back up data to locally attached or remote tape drives.
Perform spot restores	Data backups are useful only if the data they contain can be restored. Spot restores verifies backups work in the event of real data loss.
Test cluster failover	Over time physical and configuration changes to your cluster may create conditions that prevent a failover to occur. Regular testing ensures failover succeeds in an emergency.
Balance CPU and disk I/O over both nodes in an active-active cluster configuration	To maintain quality of service during a cluster failover, ensure the percentage of CPU and disk I/O never exceeds a combined total of 100 percent. The surviving cluster partner must be able to do the work of both nodes while in a failover condition.
Review Snapshot frequency and retention policies	The rate of change to volumes can vary over time. Ensure you have adequate space to save enough snapshots to perform recoveries. If there is excess snapshot reserve space you may choose to increase the frequency of snapshots. This will provide more versions of files to select from during recovery. You may also decide to decrease the snapshot reserve to provide more data space in a volume. NetApp has found that most volumes require snapshot reserves of 10 percent and a two week retention policy.
Take a Snapshot before changing configurations	Snapshots enable you to roll back your FAS to a configuration you know worked in the event configuration changes cause problems.

	When used with the licensed feature SnapRestore you can instantly roll back changes to entire volumes.
Maintain system security	Maintaining security is essential to preventing unauthorized changes to your FAS configuration.
Change root and admin password every six months	Protect your FAS and trusted hosts by changing administrative level passwords regularly and following other basic security procedures.
Upgrade to General Deployment (GD) Release of ONTAP	NetApp releases new versions of the Data ONTAP™ software regularly. By running the latest GD release, you ensure your organization benefits from new features and bug fixes. Contact your sales representative if you want Professional Services to perform an ONTAP upgrade.
Upgrade to the latest available disk and shelf controller firmware	New disk and shelf controller firmware is released when a new drive is made available or when bugs with the current firmware are fixed. Keeping your firmware updated reduces your exposure to known problems. Contact Technical Support or Professional Services for assistance.
Add disks to aggregates in groups of 7 or more	Adding too few disks to an aggregate may create a ‘short’ aggregate with only a couple of data disks. All new writes go to these disks which may not be able to meet the I/O load.
Use the reallocate command to re-stripe volumes and LUNs to improve performance	As data is added and removed and new disks are added FlexVols and large files like LUNs become unevenly distributed which affects performance. The reallocate command optimizes data block layout for performance. Refer to the documentation and tech support before using reallocate as there are some tradeoffs to consider.
Delete lots of files or large files in phases	Reclaiming disk space is the highest priority of the WAFL filesystem. Try to delete less than 500GB and/or 10,000 files at any one time to keep system responsiveness high.
Read hardware flyers	New drives and newly supported hardware often require specific software releases and firmware updates into function properly. Read the flyers that come with your hardware to determine the minimum software or firmware requirements for any hardware you receive.
Take training and update training routinely	NetApp training teaches you to maintain and troubleshoot problems with your filers. Updating your training ensures you are equipped to manage the latest FAS models and versions of Data ONTAP. Learn more at the NetApp University website http://www.netapp.com/education/