Data ONTAP® 7.3
Software Setup Guide

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About this guide

Here you can learn what this document describes and who it is intended for, what special terminology is used in the document, what command, keyboard, and typographic conventions this document uses to convey information, and other details about finding and using information.

This document describes describes how to set up and configure storage systems that run Data ONTAP software. It covers all supported storage system models.

Note: Setup procedures for V-Series systems, formerly known as gFiler systems, are covered in V-Series documentation.

Next topics

Audience

Here you can learn who this document is written for and the assumptions that were made about the preexisting knowledge and experience you have.

This document is for system administrators who are familiar with operating systems that run on the storage system's clients.

It also assumes that you are familiar with how to configure the storage system and how Network File System (NFS), Common Internet File System (CIFS), and Hypertext Transport Protocol (HTTP) are used for file sharing or transfers. This guide doesn't cover basic system or network administration topics, such as IP addressing, routing, and network topology.

If you are installing new storage systems, this is the correct guide for you. If you are unsure, use the following table to decide which guide to read.

If you are ...	Read ...
Configuring a new storage system	This guide If you are configuring a new storage system in an FCP or iSCSI environment, see also your *Data ONTAP Block Access Management Guide for iSCSI and FCP*.

If you are ...	Read ...
Upgrading an existing storage system to this version of the Data ONTAP software	The *Data ONTAP Upgrade Guide*
Converting existing storage systems to an active/active configuration	The *Data ONTAP Active/Active Configuration Guide*

For a complete listing of Data ONTAP documentation, see the Access & Order Product Documentation page on the NOW (NetApp on the Web) site, or the *Data ONTAP Documentation Roadmap*.

Related information

Access & Order Product Documentation -- now.netapp.com/NOW/knowledge/docs/docs.cgi

Accessing Data ONTAP man pages

You can use the Data ONTAP manual (man) pages to access technical information.

Considerations

Data ONTAP man pages are available for the following types of information. They are grouped into sections according to standard UNIX naming conventions.

Types of information	Man page section
Commands	1
Special files	4
File formats and conventions	5
System management and services	8

Step

1. View man pages in the following ways:
   - By entering the following command at the storage system command line:

     `man` ***`command_or_file_name`***
   - By clicking the manual pages button on the main Data ONTAP navigational page in the FilerView user interface

- By using the *Commands: Manual Page Reference*, Volumes 1 and 2 (which can be downloaded or ordered through the NOW NetApp on the Web site)

Note: All Data ONTAP man pages are stored in the storage system in files whose names are prefixed with the string "na_" to distinguish them from client man pages. The prefixed names are used to distinguish storage system man pages from other man pages and sometimes appear in the NAME field of the man page, but the prefixes are not part of the command, file, or services.

Terminology

To understand the concepts in this document, you might need to know the terms defined here.

General storage system terminology

- Storage systems that run Data ONTAP are sometimes referred to as *filers*, *appliances*, *storage appliances*, or *systems*. The name of the FilerView graphical user interface for Data ONTAP reflects one of these common usages.
- *Controller* or *storage controller* refers to the component of a storage system that runs the Data ONTAP operating system and controls its disk subsystem. Controllers or storage controllers are also sometimes called *storage appliances*, *appliances*, *storage engines*, *heads*, *CPU modules*, or *controller modules*.

Active/active configuration terminology

- An *active/active configuration* is a pair of storage systems configured to serve data for each other if one of the two systems becomes impaired. In Data ONTAP documentation and other information resources, active/active configurations are sometimes also referred to as *clusters* or *active/active pairs*.
- When in an active/active configuration, systems are often called *nodes*. One node is sometimes called the local node, and the other node is called the *partner node* or *remote node*.
- *Standard active/active configuration* refers to a configuration set up so that one node automatically takes over for its partner when the partner node becomes impaired.
- *Mirrored active/active configuration* is similar to the standard active/active configuration, except that there are two copies, or *plexes*, of the data. This is also called *data mirroring*.
- *Fabric-attached MetroCluster* refers to an active/active configuration running the *syncmirror_local* and *cluster_remote* licenses, where the nodes are attached to two pairs of Fibre Channel switches, and they are separated by more than 500 meters.
- *Stretch MetroCluster* refers to an active/active configuration running the syncmirror_local and cluster_remote licenses, where the nodes are separated by up to 500 meters, and no switches are used between the nodes. This configuration is also sometimes called a *nonswitched MetroCluster*.

- *Controller failover*, also referred to as *cluster failover* or *CFO*, refers to the technology that enables two storage systems to take over each other's data, thus improving data availability.
- *Remote storage* refers to the storage that is accessible to the local node, but is at the location of the remote node.

Storage hardware terminology

- *FC HBA for Disk* or *FC HBA* refers to the Fibre Channel host bus adapter that connects the node to the switch or to the disks.
- *Disk shelf* refers to a unit of the disk subsystem component of the storage system.
- *LRC (Loop Resiliency Circuit)* disk shelf module refers to a component that keeps the Fibre Channel-Arbitrated Loop (FC-AL) intact during the addition and removal of disks within a disk shelf. It also contains the enclosure services processor, which communicates the environmental data of the disk shelf.
- *ESH (Embedded Switching Hub)* disk shelf module refers to a component that provides a means of managing an FC-AL loop in an intelligent manner, such that a single drive failure does not take down the loop. It also contains the enclosure services processor, which communicates the environmental data of the disk shelf.
- *ESH2* disk shelf module refers to a second-generation ESH module.
- *ESH4* disk shelf module refers to a third-generation ESH module.
- *AT-FCX* refers to an enhanced FC-AL to Serial ATA (SATA) bridge used in some disk shelves.

General terms

- The term *type* means pressing one or more keys on the keyboard.
- The term *enter* mean pressing one or more keys on the keyboard and then pressing the Enter key, or clicking in a field in a graphical interface and typing information into it.

FilerView as an alternative to the command-line interface

Use the FilerView graphical user interface to perform many common tasks, as well as to view and manage a storage system from a Web browser.

Your tasks as a Data ONTAP administrator can be performed by entering commands at the storage system console, in configuration files, or through a Telnet session or Remote Shell connection.

Another method of performing many common tasks is to use FilerView. FilerView comes with every storage system, is easy to use, and includes Help that explains Data ONTAP features and how to work with them in FilerView.

For more information about accessing a storage system with FilerView, and about FilerView Help, see the *System Administration Guide*.

Command, keyboard, and typographic conventions

This document uses command, keyboard, and typographic conventions that help you enter commands.

Command conventions

In examples that illustrate commands executed on a UNIX workstation, the command syntax and output might differ, depending on your version of UNIX.

Keyboard conventions

- When describing key combinations, this document uses the hyphen (-) to separate individual keys. For example, "Ctrl-D" means pressing the "Control" and "D" keys simultaneously.
- This document uses the term "Enter" to refer to the key that generates a carriage return, although the key is named "Return" on some keyboards.

Typographic conventions

The following table describes typographic conventions used in this document.

Convention	**Type of information**
Italic font	Words or characters that require special attention. Placeholders for information you must supply. For example, if the guide says to enter the `arp -d` *`hostname`* command, you enter the characters "arp -d" followed by the actual name of the host. Book titles in cross-references.
`Monospaced` font	Command names, option names, keywords, and daemon names. Information displayed on the system console or other computer monitors. The contents of files.
`Bold monospaced` font	Words or characters you type. What you type is always shown in lowercase letters, unless you must type it in uppercase letters.

Special messages

This document might contain the following types of messages to alert you to conditions you need to be aware of. Danger notices and caution notices only appear in hardware documentation, where applicable.

Note: A note contains important information that helps you install or operate the system efficiently.

Attention: An attention notice contains instructions that you must follow to avoid a system crash, loss of data, or damage to the equipment.

Danger: A danger notice warns you of conditions or procedures that can result in death or severe personal injury.

Caution: A caution notice warns you of conditions or procedures that can cause personal injury that is neither lethal nor extremely hazardous.

Overview of the software setup process

The software setup process consists of satisfying environmental prerequisites, gathering configuration information, entering configuration information at setup prompts, and verifying initial configuration parameters.

Next topics

Software setup stages on page 17
Default storage system configuration on page 18
About the setup process on page 18

Software setup stages

The software setup process for your new storage system requires several steps after you have completed hardware setup.

Before You Begin

This guide assumes that you have already prepared the physical site for your new storage system and that you have racked and cabled storage system hardware according to the following documents:

- *Site Requirements Guide*
- *Installation and Setup Instructions*
- *Data ONTAP Active/Active Configuration Guide*

Note: The *Data ONTAP Active/Active Configuration Guide* also includes important information about active/active configuration prerequisites and verification procedures that you will need to consult during the software setup process.

Steps

1. Ensure that your network and storage environment meets storage system requirements.
2. Gather system configuration information and record it in the worksheet provided.
3. Power up the new system and enter the information you gathered when the `setup` command begins to run.
4. Verify that basic system functionality has been configured correctly.
5. Configure system features and provision your features as described in relevant documents of the Data ONTAP library.

Related concepts

Prerequisites to initial configuration on page 21

Related tasks

Gathering configuration information on page 29

Setting up your storage system on page 45

Verifying software setup on page 53

Related information

Data ONTAP Information Library -- now.netapp.com/NOW/knowledge/docs/ontap/ontap_index.shtml

Default storage system configuration

Before your storage system was shipped to you, a series of tasks was performed to configure your storage system for use. These tasks simplify the setup process for you and ensure that you can run the setup script on your system.

The following tasks were performed:

- Your storage system was configured with either an aggregate and FlexVol root volume or with a traditional root volume, depending on your needs and the purchase agreement.
- Licenses for protocols and features (CIFS, NFS, HTTP, controller failover, and so on) you have purchased were installed on your system.
- Bootloader files and firmware updates, including primary and secondary BIOS images, were installed on the CompactFlash card that shipped with your system.

About the setup process

The software setup process collects information that enables the storage system to serve data in your environment.

A complete version of Data ONTAP software is installed on your new storage system, with the exception of the following files:

- /etc/rc
- /etc/exports
- /etc/hosts
- /etc/hosts.equiv
- /etc/nsswitch.conf

- /etc/resolv.conf

When you boot your system for the first time, the `setup` command begins to run automatically. It collects information to populate these files and to configure the installed functionality of your system, depending on your system's hardware configuration and licensed features.

After the `setup` command begins to run on the system console, you can choose whether to continue setup at the console or using a Web browser. You might also be prompted to respond to `setup` commands for other system features.

Prerequisites to initial configuration

Before you begin the software setup process, you must ensure that you have prepared your network and storage environment for your new storage system.

Next topics

Requirements for the administration host

You should designate a CIFS or NFS client workstation as an administration host to limit access to the storage system's root file system, to provide a text editor to edit configuration files, or to provide the ability to administer a storage system remotely.

During the setup process, you are prompted to designate a workstation on the network as an administration host. For more information about administration hosts, see the *Data ONTAP System Administration Guide*.

CIFS and NFS client workstations can serve as administration hosts, with these requirements and privileges:

- If you plan to use a CIFS client to manage the storage system, the CIFS client must support the `telnet` and `rsh` commands.
  You can edit configuration files from any CIFS client as long as you connect to the storage system as root or 'Administrator.'
- If you plan to use an NFS client to manage the storage system, the NFS client must meet the following requirements:
  - Supports a text editor that can display and edit text files containing lines ending with the newline character
  - Supports the `telnet` and `rsh` commands
  - Supports the mounting of directories using the NFS protocol

  When connecting from an NFS client, the administrator operates as root.

Attention: If you change the name or IP address of an administration host on a storage system that has already been set up and configured, the /etc/exports files will be overwritten on system reboot.

Active/active configuration requirements

See the *Data ONTAP Active/Active Configuration Guide* for information about preparing your environment for a new active/active pair.

Requirements for Windows domains

If you are joining your system to a Windows domain, the storage system administrator account must have permissions to add the system to an Active Directory domain. It might also be necessary to precreate a domain account for your new system before initial setup.

Permissions for adding a storage system to an Active Directory domain are the same as permissions required for adding any Windows server.

Note: When you run `cifs setup`, a Windows directory account is automatically created, unless you intend to use Windows NT4-style authentication. To use Windows NT4-style authentication, you must create a domain account using Windows tools before you run `cifs setup`. If you do not do this, `cifs setup` will terminate, prompting you to create the domain account.

Next topics

Assigning domain administrator privileges on page 22
Precreating a storage system domain account on page 23

Assigning domain administrator privileges

Before adding a storage system to a Windows Active Directory domain, Organizational Unit (OU), or other Active Directory container object, you need to make sure the storage system administrator account has sufficient privileges and permissions to add a Windows Active Directory server to that domain or object.

Considerations

When the `cifs setup` program adds the storage system to an Active Directory environment, it creates an Active Directory domain and joins the storage system's computer account to that domain. Before this happens, you need to assign permissions on certain domain objects.

Note: The following steps describe the procedure on WIndows 2000 Server. Details of this procedure may vary on other Windows server versions.

Steps

1. In the Active Directory Users and Computers View menu, ensure that the Advanced Features menu item is checked.
2. In the Active Directory tree, select the OU for your storage system.
3. Select the user or group that will add the storage system to the domain.
4. In the Permissions list, ensure that the following check boxes are enabled:
   - Change Password
   - Write Public Information
   - Create Computer Objects

Precreating a storage system domain account

If your security structure does not allow you to assign the setup program the necessary permissions to create the storage system domain account, or if you intend to use Windows NT4-style authentication, you must create the storage system domain account before `cifs setup` is run.

Considerations

If you create the storage system domain account before `cifs setup` is run, follow these guidelines:

- You do not need to assign the Create Computer Objects permission.
- You can assign permissions specifically on the storage system domain account, instead of assigning them on the storage system container.

Steps

1. In the Active Directory Users and Computers View menu, ensure that the Advanced Features menu item is checked.
2. In the Active Directory tree, locate the OU for your storage system, right-click, and choose New > Computer.
3. Enter the storage system (domain account) name.

   Make a note of the storage system name you entered, to ensure that you enter it correctly when you run `cifs setup` later.

4. In the "add this computer to the domain" field, specify the name of the storage system administrator account.
5. Right-click the computer account you just created and choose Properties from the pop-up menu.
6. Click the Security tab.

7. Select the user or group that will add the storage system to the domain.
8. In the Permissions list, ensure that the following check boxes are selected:
   - Change Password
   - Write Public Information

After You Finish

When `cifs setup` is run, you will see the prompt "Please enter the new hostname." Enter the storage system name you specified in Step 3.

Requirements for Active Directory authentication

If you are deploying your new system in an Active Directory domain with Kerberos authentication, you need to ensure that DNS and network infrastructure are configured correctly before initial system setup.

For more information about Active Directory authentication, see the NetApp Technical Report *Unified Windows and UNIX Authentication Using Microsoft Active Directory Kerberos* (TR-3457).

Note: Kerberos 5 authentication is dependent upon the synchronization of time between the clients and the Kerberos Key Distribution Centers (KDCs).

Next topics

DNS requirements for Active Directory on page 24
Network infrastructure requirements for Active Directory on page 25

Related concepts

Time services requirements on page 25

Related tasks

Creating a storage system DNS "A" record for CIFS client access on page 59

Related information

Unified Windows and UNIX Authentication Using Microsoft Active Directory Kerberos -- www.netapp.com/library/tr/3457.pdf

DNS requirements for Active Directory

Active Directory Kerberos requires that a standards-based DNS implementation be configured. The implementation must support service locator records.

Your DNS solution must have the following capabilities:

- The DNS solution must be standards-based.
- Service locator records must be supported.
  Windows 2000/2003 Active Directory requires service locator records for finding the domain controllers, global catalog servers, Kerberos servers, LDAP servers, and the KPASSWD servers.

The following additional capabilities are recommended:

- Support for dynamic updates
- Support for incremental zone transfers

The following DNS solutions meet the requirements:

- Microsoft Server 2000/2003 DNS
  This Active Directory integrated DNS provides the recommended capabilities. Service locator records are configured automatically.
- Berkeley Internet Name Domain (BIND) DNS
  If you use BIND DNS, you need to manually configure the service locator records.

Network infrastructure requirements for Active Directory

Ensure that the infrastructure supports reliable communication between clients, the storage system, DNS servers, time servers, and Active Directory domain controllers.

It is recommended that you verify the following network infrastructure functionality:

- To ensure that clients can find the Active Directory LDAP and Kerberos servers, there must be reliable network connectivity between the clients and DNS servers containing the LDAP and Kerberos service records. If possible, this should be a high-bandwidth connection.
- Clients must have reliable connections to domain controllers which host both the LDAP and Kerberos services. If possible this should be a high-bandwidth connection.
- When the enterprise contains more than one domain or utilizes universal groups, there must be adequate connectivity from domain controllers to a global catalog server. If possible, this should be a high-bandwidth connection.
- If the enterprise is located in multiple locations that have low-bandwidth connectivity, configure Active Directory sites. These sites group resources within a local high-bandwidth zone.
- If clients from other domains access resources on the storage system, there should be reliable connectivity between the storage system and all domain controllers with users who access resources on the storage system.

Time services requirements

It is recommended that the storage system be configured for time service synchronization. Many services and applications depend on accurate time synchronization.

During CIFS setup, if the storage system is to be joined to an Active Directory domain, Kerberos authentication is used. Kerberos authentication requires the storage system's time and the domain controller's time to match (within 5 minutes). If the times do not match, setup and authentication attempts fail.

By default, within Active Directory domains, all domain controllers synchronize to the domain controller that is configured as the PDC Emulator Master. Therefore, one of the following configurations is required:

- All storage systems configured to synchronize to one of the domain controllers
- Both the storage systems and the controller configured to synchronize to a central time server.

For more information about time services supported by Data ONTAP, see the *Data ONTAP System Administration Guide*.

Switch configuration requirements for vifs

If you use virtual network interfaces (vifs), you must ensure that your switches support the vif type required for your storage system before powering up for the first time.

If you plan to use this type of vif ...	Your switch must support ...
Dynamic multimode	Link Aggregation Control Protocol (LACP)
Static multimode	Aggregates (but must not have control packet exchange for configuring an aggregate)
Single-mode	No special switch requirements

For more information about vifs, see the *Data ONTAP Network Management Guide*.

DHCP requirements for remote access

If you want to complete the setup process from a web browser interface (Setup Wizard) rather than the console, you must configure DHCP.

When you enable Dynamic Host Configuration Protocol (DHCP) to assign a static IP address to an onboard network interface during first-time setup, you can connect to the storage system through a Telnet client and complete the first-time configuration remotely.

If your system includes an e0M interface, the system broadcasts a DHCP request through it. If a DHCP server responds, it will assign an IP address to the e0M interface. If your system does not have an e0M interface, the system uses the first onboard network interface (e0a, or e0 when there is only one onboard interface) for the DHCP broadcast.

When you use DHCP to assign an IP address to the onboard interface, the storage system performs the following operations:

- Obtains the address from the DHCP server when the storage system is turned on
- Configures the onboard interface with the IP address
- Becomes accessible to a Telnet client or the Setup Wizard

You need to configure the following information into your DHCP server prior to running the Setup Wizard:

- Storage system MAC address
- Storage system fixed IP address
- Any of the following optional information:
  - Routers
  - Default route
  - DNS domain name
  - DNS servers
  - NIS domain name
  - NIS servers
  - WINS servers
  - SMTP server

Attention: When you use DHCP with a storage system, you must ensure the DHCP server is configured to return a static IP address for the interface. If the server returns a dynamic IP address, the storage system displays an error message and continues to use the IP address permanently—which can result in an IP address conflict if the DHCP server assigns the IP address dynamically to other clients from time to time.

DHCPv6 servers are not currently supported.

Gathering configuration information

Before powering on your storage system for the first time, you should use the configuration worksheet to gather the information that the software setup process requires.

Considerations

If you are configuring a storage system as part of an active/active configuration, some information types must be unique for each storage system in the configuration, and some information types must be identical on both storage systems. In the tables in the following sections, the description column indicates whether the information type must be unique for each storage system or identical on both storage systems.

Next topics

Configuration worksheet

Use the configuration worksheet to record values you will use during the setup process.

Note: The alternate names used by the Setup Wizard for the term used in the `setup` command appear in parentheses.

Types of information		**Your values**
Storage system	Host name	
	Password	
	Time zone	
	Storage system location	
	Language used for multiprotocol storage systems	
Administration host	Host name	
	IP address	
Virtual interfaces	Link Names (physical interfaces names such as e0, e0a, e5a, or e9b)	
	Number of links (number of physical interfaces to include in the vif)	
	Name of virtual interface (Name of vif, such as vif0)	
Ethernet interfaces	Interface name	
	IP address	
	Subnet mask	
	Partner IP address	
	Media type (network type)	
	Are jumbo frames supported?	
	MTU size for jumbo frames	
	Flow control	
e0M interface (if available)	IP address	
	Network mask	
	Partner IP address	
	Flow control	
Router (if used)	Gateway name	
	IP address	
Location of HTTP directory		

Types of information		**Your values**
DNS	Domain name	
	Server address 1	
	Server address 2	
	Server address 3	
NIS	Domain name	
	Server address 1	
	Server address 2	
	Server address 3	

Types of information			**Your values**
CIFS	Windows domain		
	WINS servers	1	
		2	
		3	
	Multiprotocol or NTFS-only filer?		
	Should CIFS create default /etc/passwd and /etc/group files?		
	NIS group caching	Enable?	
		Hours to update the cache	
	CIFS server name (if different from default)		
	User authentication style: (1) Active Directory domain authentication (Active Directory domains only) (2) Windows NT 4 domain authentication (Windows NT or Active Directory domains) (3) Windows Workgroup authentication using the filer's local user accounts (4) /etc/passwd and/or NIS/LDAP authentication		
	Windows Active Directory domain	Domain name	
		Time server name(s) or IP address(es)	
		Windows user name	
		Windows user password	
		local administrator name	
		local administrator password	
	CIFS administrator or group		
	Active Directory container (command-line setup only)		

Types of information		**Your values**
BMC	MAC address	
	IP address	
	Network mask (subnet mask)	
	Gateway	
	Mailhost	
RLM	MAC address	
	IP address	
	Network mask (subnet mask)	
	Gateway	
	AutoSupport mailhost	
	AutoSupport recipient(s)	

Required storage system information

A basic set of information about the storage system is required regardless of licensed features and usage.

Information type	**Description**
Host name (Hostname or Storage System Name)	The name by which the storage system is known on the network. If the storage system is licensed for the NFS protocol, the name can be no longer than 32 characters. If the storage system is licensed for the CIFS protocol, the name can be no longer than 15 characters. The host name must be unique for each storage system in an active/active configuration.
Password (Administrative Password)	A password that the storage system requires before granting administrative access at the console, through a Telnet client, or through the Remote Shell protocol.
Time zone (Timezone)	The time zone in which the storage system resides. See *Time zones* on page 65 for a list of valid time zones. The time zone must be identical on both storage systems in an active/active configuration.

Information type	Description
Storage system location (Location)	A description of the physical location of the storage system. The text you enter during storage system setup process is recorded in the SNMP location information. Use a description that identifies where to find your storage system (for example, 'Lab 5, Row 7, Rack B').
Language	The language used for multiprotocol storage systems if both the CIFS and NFS protocols are licensed. See *Supported languages* on page 73 for a list of supported languages and their abbreviations. The language must be identical on both storage systems in an active/active configuration.
Administration host (Administrative Host)	A client computer that is allowed to access the storage system through a Telnet client or through the Remote Shell protocol.

Virtual network interface information

If you want to use vifs, it is recommended that you plan for them before installation and create them during the software setup process.

Information type	Description
Virtual network interfaces	For each vif, record the following information: • Name of each vif • Number of links for each vif • Link names for each link The virtual network interface information must be identical on both storage systems in an active/active pair.

Network information

A basic set of information about the storage systems network connections is required regardless of licensed features and usage.

Information type	Description
Network Interface name	The name of the Ethernet (or GbE) interface, depending on what port the Ethernet card is installed in. Examples include e0 (for Ethernet single); e1 (for GbE); and e3a, e3b, e3c, e3d (for Ethernet quad-port). Network interface names are automatically assigned by Data ONTAP as it discovers them.
e0M interface (if available)	The network interface of the management port (if included in your system). You can use the e0M interface to access the storage system with protocols such as `telnet`, `rsh`, and `snmp`, as well as monitoring tools such as Operations Manager. This allows you to separate management traffic from data traffic on your storage system. **Note:** The e0M interface cannot be included in vif or VLAN configurations. See the *Data ONTAP System Administration Guide* for more information about the e0M interface.
IP address	A unique address for each network interface.
Subnet mask (Network Mask)	The subnet mask for the network to which each network interface is attached. Example 255.255.255.0
Partner IP address (Interface to Take Over)	If your storage system is licensed for controller takeover, record the interface name or IP address belonging to the partner that this interface should take over during an active/active configuration takeover. Examples: e0 or 10.10.10.2 When using vifs, you must specify the vif name in the ifconfig statement rather than the interface IP address.
Media type (Network Type)	The type of interface: • 1000fx (Gigabit Ethernet Controller; 1000Base-SX, full-duplex, autonegotiation disabled) • auto-1000fx (Gigabit Ethernet Controller; autonegotiate speed, duplex, and flow control) • 100tx-fd (100Base-TX, full-duplex) • tp-fd (10Base-T, full-duplex) • 100tx (100Base-TX, half-duplex) • tp (10Base-T, half-duplex) • auto (autonegotiate speed and duplex)

Information type	Description
Flow control	The management of the flow of frames between two directly connected link-partners. Options: • **`none`** (No flow control) • **`receive`** (Ability to receive flow control frames) • **`send`** (Ability to send flow control frames) • **`full`** (Ability to send and receive flow control frames)
Router (Routing Gateway)	Record the following information for the primary gateway to use for routing outbound network traffic: • Gateway name • IP address of the router

HTTP protocol information

If your storage system is licensed for the HTTP protocol, you must designate a directory from which Web files and directories are served or accept the default.

Information type	Description
Location of the HTTP directory	The directory where the Web files and directories are stored. The default directory is /home/http in the storage system's root volume.

DNS services information

To configure your storage system to use Domain Name Service (DNS), you must provide DNS domain and server names.

Information type	Description	
DNS domain	The name of your network's DNS domain. The DNS domain name must be identical on both storage systems in an active/active configuration. **Note:** The domain name cannot contain an underscore (_) and must consist of alphanumeric characters. If you use an underscore, you receive a "bad domain name" message.	
DNS servers	The IP addresses of your DNS servers.	
	If...	You need the IP addresses of...
	Your storage system will not use Active Directory services	One or more DNS servers that provide host name lookup services to the storage system.
	You want to make Active Directory services available to CIFS	DNS servers that support your Windows Active Directory domain.

NIS services information

If your network uses Network Information Service (NIS), you must provide NIS domain and server names.

Information type	Description	
NIS domain	The name of your NIS domain. The storage system can use an NIS domain to authenticate users and client computers. The NIS domain name must be identical on both storage systems in an active/active configuration. If multiprotocol access is enabled on the storage system, group caching is beneficial for CIFS access as well as NFS access. With multiprotocol access, user mapping of CIFS user to NFS user is performed. When a Windows user requests access to data with UNIX security style, the Windows user is first mapped to the corresponding UNIX user. The UNIX users' groups must then be ascertained before the storage system can determine appropriate access. Failure to enable these two options together could lead to slow CIFS access to resources due to time spent on NIS group lookups.	
NIS servers	The host names of your preferred NIS servers.	
	If...	You need...
	Your site uses NIS	The host names of your NIS servers.
	You want NIS to broadcast to find a server	To enter an asterisk (*) when asked for the NIS server names.

CIFS protocol information

If your storage system is licensed for the CIFS protocol, the `cifs setup` command runs automatically when basic setup has completed. You must provide information about the Windows domain, WINS servers, the Active Directory service, and your configuration preferences.

Information type	Description
Windows domain	The name of your Windows domain. If your site uses Windows domains and the storage system belongs to one of these domains, record the name of the domain to which the storage system should belong. **Note:** The Windows domain name value does not need to be identical on both storage systems in an active/active configuration. Each storage system in an active/active configuration can exist in a different domain and/or workgroup from its partner. If you have a multiprotocol environment and use UID to Secure ID (SID) mapping, the UNIX security information must be compatible between the two domains.
WINS servers	The servers that handle Windows Internet Name Service (WINS) name registrations, queries, and releases. If you choose to make the storage system visible through WINS, you can record up to four WINS IP addresses. **Note:** The WINS server value does not need to be identical on both storage systems in an active/active configuration. Each storage system in an active/active configuration can exist in a different domain and/or workgroup from its partner.
Multiprotocol or NTFS-only	The setup utility determines if your system includes licenses for multiple file access protocols (to serve data to NFS, Windows, HTTP, and other clients) or for NTFS only (to serve data to Windows clients only).
Should CIFS create default /etc/passwd and /etc/group files?	Enter **y** here if you have a multiprotocol environment. Default UNIX accounts are created which are used when performing user mapping. As an alternative to storing this information in local file, the generic user accounts may be stored in the NIS or LDAP databases; however, when generic accounts are stored in the local passwd file, mapping of a Windows user to a generic UNIX user and mapping of a generic UNIX user to a Windows user work better than when generic accounts are stored in NIS or LDAP. If generic accounts are configured, storage administrators should be mindful to not grant these generic accounts undue access to data. Additionally, creation of the local passwd and group file may be desirable if you select "/etc/passwd and/or NIS/LDAP authentication". If you choose this option, the storage system may use either the local files or NIS/LDAP for storing user information used for CIFS authentication. In this scenario, choosing to store the information in local files allows authentication to continue even during times where NIS and /or LDAP are configured and these services are unavailable.

Information type	Description
Would you like to enable NIS group caching?	NIS group caching is used when access is requested to data with UNIX security style. UNIX file and directory style permissions of `rwxrwxrwx` are used to determine access for both Windows and UNIX clients. This security style uses UNIX group information. **Note:** If NIS is enabled but NIS group caching is disabled, there can be a severe impact on CIFS authentication if the NIS servers are slow to respond or unavailable. It is highly recommended that you enable NIS group caching. By default, the NIS group cache is updated once a day at midnight. You can update the cache more often or at different times, depending on your preferences.
CIFS server name	By default, the CIFS server is the same as the system host name. You can select a different name for the CIFS server, although the name can be no longer than 15 characters.
User authentication for CIFS services	Data ONTAP CIFS services support four styles of user authentication: **1.** Active Directory domain authentication (Active Directory domains only) Users are authenticated with the domain controller in an Active Directory domain using Kerberos authentication. If you select this option, you are also prompted for other Active Directory configuration parameters. **2.** Windows NT 4 domain authentication (Windows NT or Active Directory domains) Users are authenticated with the domain controller in an Active Directory or an NT domain using NT-style NTLM authentication only. **3.** Windows Workgroup authentication using the filer's local user accounts Users are authenticated with the storage system's local user database using NT-style NTLM authentication. A maximum of 97 local users are supported, and local users can be members of the local groups (local user and group SIDS are used). Local users and groups are managed with the `useradmin` command. **4.** /etc/passwd and/or NIS/LDAP authentication Users are authenticated on the basis of user names and passwords that are stored in the UNIX directory stores. Even if local Windows users are created on the storage system using the `useradmin` command, they are not used for session authentication. All authentication is done based on UNIX user information stored in the UNIX identity stores. You should select an authentication style appropriate to the storage system's environment and to the clients requesting the authenticated session. For more information about CIFS authentication, see the *Data ONTAP File Access and Protocols Management Guide*.
Active Directory domain name	Enter the fully qualified domain name of the domain; for example, your_company.com.

Information type	Description
Active Directory time services	In Active Directory-based domains, it is essential that the storage system's time match the domain controller's time so Kerberos-based authentication system works correctly. If the time difference between the storage system and the domain controllers is more than 5 minutes, CIFS authentication fails. When you configure Active Directory time services, you are prompted for the host name and IP address of the time server you wish to use, as well as for additional backup servers if desired.
Windows domain administrator user name (Windows user name)	The user name of a Windows domain administrator with sufficient privileges to add this storage system to the Windows domain. Joining a domain requires an administrator user and password. This also applies to NT4 domains. **Note:** This is only required if you are using a Windows domain.
Windows domain administrator password (Windows 2000 administrator password)	The password for the domain administrator user account. Joining a domain requires an administrator user and password. This requirement also applies to NT4 domains. **Attention:** Before you enter the password, be sure to create a secure connection (HTTPS); otherwise, the password is sent to the storage system unencrypted.
CIFS administrator	You can specify an additional user or group to be added to the storage system's local "BUILTIN\Administrators" group, thus giving them administrative privileges as well.

Information type	Description

Active Directory container	The Windows Active Directory container in which to place storage system accounts. This can be either the default Computers container or a previously created organizational unit (OU) on which you have the necessary permission to join the storage system to the domain. All OUs for which you have appropriate permissions will be displayed; the desired OU may be chosen from this list. If the person running `setup` does not have appropriate rights to the OU which will hold the storage system object, another user who does have the necessary permissions may be designated during the 'join' step.
	Example:
	CIFS - Logged in as administrator@EXAMPLE.COM.
	The user that you specified has permission to create the storage system's machine account in several (7) containers. Please choose where you would like this account to be created.
	`(1) CN=computers`
	`(2) OU=java_users`
	`(3) OU=Engineer,OU=java_users`
	`(4) OU=Market,OU=java_users`
	`(5) OU=Filers`
	`(6) OU=Domain Controllers`
	`(7) None of the above`
	Choose 7:
	`Selection (1-7)? [1]: 7`
	`The user you specified,`
	`'Administrator@EXAMPLE.COM', may create the`
	`filer's machine account in the container(s)`
	`listed above. To use another container, you`
	`must specify a user with the appropriate`
	`privileges.`
	`Enter the name of the Windows user []:'`

Baseboard Management Controller information

If your storage system has a Baseboard Management Controller (BMC), the `bmc setup` command runs automatically when basic setup has completed. You must provide information about the BMCs network interface and network connections.

Note: You can also configure the BMC by using one of the following methods after the initial setup process:

- Running the Data ONTAP setup script
  The setup script ends by initiating the `bmc setup` command.
- Running the Data ONTAP `bmc setup` command

For more information about the BMC, see the *Data ONTAP System Administration Guide*.

Information type	Description
Media Access Control (MAC) address	If you are using DHCP addressing, you need the MAC address of the BMC. You can obtain the address by using by using the `bmc status` command (if you configure the BMC after initial system setup) or from the MAC address label on the BMC. **Attention:** DHCPv6 servers are not currently supported.
IP address	If you are not using DHCP service, record an available IP address for the BMC.
Network mask	If you are not using DHCP service, record the network mask of your network.
Gateway	If you are not using DHCP service, record the IP address for the gateway of your network.
Mail host	The name or IP address of the preferred mail host. The BMC uses the same mailhost information that Data ONTAP uses for AutoSupport.

Remote LAN module information

If your storage system has a remote LAN module (RLM), you must provide information about the RLM's network interface and network connections.

Information type	Description
Media Access Control (MAC) address	If you are using Dynamic Host Configuration Protocol (DHCP) service, record the MAC address for the RLM. Locate the MAC address by entering `sysconfig -v` at the storage system prompt and looking at the output for the RLM in slot 1. **Attention:** DHCPv6 servers are not currently supported.
IP address	If you are not using DHCP service, record an available IP address for the RLM.

Information type	Description
Network mask	If you are not using DHCP service, record the network mask of your network.
Gateway	If you are not using DHCP service, record the IP address for the gateway of your network.
Mail host	The name or IP address of the preferred mail host. The mail host delivers RLM alerts to the same destination as AutoSupport e-mail.

Setting up your storage system

When you power on a storage system for the first time, the `setup` command begins to run automatically and prompts you for configuration information.

Before You Begin

If your system does not boot when you power it on for the first time, you must troubleshoot your hardware configuration before proceeding to software setup.

Attention: It is recommended that you carefully review the setup procedures and gather configuration information *before* powering on your system for the first time. Once the setup script begins to run, you do not have the option of returning to previous steps to make corrections. If you make a mistake, you must complete the setup process and reboot your system, then begin the setup process again by entering `setup` at the command line.

Considerations

After responding to prompts to designate an administration host machine, you can continue setting up your storage system using either the `setup` command (responding to prompts from the command line interface) or the Setup Wizard (responding to further prompts from a Web browser).

If CIFS is licensed for your storage system, you will also be prompted for CIFS configuration information.

Next topics

Responding to setup command prompts on page 45
Responding to Setup Wizard prompts on page 49
Responding to cifs setup prompts on page 50

Related tasks

Troubleshooting if the system does not boot when powered on on page 75

Responding to setup command prompts

The `setup` command begins running at the storage system command prompt, where you must enter the information you gathered.

Before You Begin

Power up your storage system components and external switches following the instructions in the *Installation and Setup Instructions* for your hardware platform.

After the storage system boots, Data ONTAP begins discovering devices, interfaces, and licenses installed in the system. Data ONTAP displays messages on the console and starts the setup process, prompting you to enter setup information.

Note: Storage system components and external switches must be powered up in the correct order. This is especially important the first time you boot your system to ensure that initial configuration is completed correctly.

Considerations

Each step displays the `setup` command prompt. Supply an appropriate response from the configuration worksheet.

Steps

1. `Please enter the new hostname.`

   You can name this host whatever you wish (for example, host1).

2. `Do you want to configure virtual network interfaces?`

   You can type either type or **n** at this prompt.

If you type ...	Then ...
y	You are prompted to enter additional configuration information for the virtual interface. These prompts are: • `Number of virtual interfaces to configure.` • `Name of virtual interface.` • `Is vif1 a single [s], multi [m] or a lacp [l] virtual interface?` • `Number of links for (virtual interface).` • `Name of link for (virtual interface).`
n	You are directed to the next prompt.

3. `Please enter the IP address for Network Interface e0a`

   Enter the correct IP address for the network interface that connects the storage system to your network (for example, 192.168.1.1)

4. `Please enter the netmask for Network Interface e0a.`

   After entering the IP address, you need to enter the netmask for your network (for example, 255.255.255.0).

5. `Should interface e0a take over a partner IP address during failover`

   If you type **y**, you must already have purchased a license for controller failover to enable this function.

6. `Please enter media type for e0a (100tx-fd, tp-fd, 100tx, tp, auto (10/100/1000))`

   Enter the media type that this interface should use.

7. `Please enter flow control for e0a {none, receive, send, full} [full]`

   Enter the flow control that this interface should use.

8. `Do you want e0a to support jumbo frames? [n]:`

   Specify whether you want this interface to support jumbo frames.

9. Continue to enter network parameter values for each network interface when prompted.

10. `Would you like to continue setup through the Web interface?`

If you want to ...	Enter ...
Continue setup with the Setup Wizard in a Web browser.	**y** Go to *Responding to Setup Wizard prompts* on page 49
Continue to use the command line interface.	**n** Proceed to step 11.

11. `Please enter the name or IP address of the default gateway.`

    Enter the primary gateway that is used to route outbound network traffic.

12. `Please enter the name or IP address for administrative host.`
    `The administration host is given root access to the storage system's /etc files for system administration.`
    `To allow /etc root access to all NFS clients enter RETURN below.`

    Attention: If you change the name or IP address of an admin host on a storage system that has already been set up and configured, the /etc/exports files will be overwritten on system reboot.

13. `Please enter the IP address for (name of admin host).`
    Enter the IP address of the admin host you specified earlier (for example, 192.175.4.1).

    Note: The name listed here is the name of the host entered in the previous step.

14. `Please enter timezone`
    GMT is the default setting. Select a valid value for your time zone and enter it here.

    See *Time zones* on page 65 for a list of supported values.

15. `Where is the filer located?`

    This is the actual physical location where the storage system resides (i.e. Bldg. 4, Floor 2, Room 216) .

16. `What language will be used for multiprotocol files?`
    Enter the language.

    See *Supported languages* on page 73 for a list of supported values.

17. `Enter the root directory for HTTP files`

    This is the root directory for the files that the storage system will serve through HTTP.

18. `Do you want to run DNS resolver?`

    If you type **y** at this prompt, you need the DNS domain name and associated IP address.

19. `Do you want to run NIS client?`

    If you type **y** at this prompt, you will be prompted to enter the name of the NIS domain and the NIS servers.

20. `Would you like to configure the BMC LAN interface ?`
    If you have an BMC installed in your system and you want to use it, type **y** at the prompt and enter the BMC values you collected.

21. `Would you like to configure the RLM LAN interface ?`
    If you have an RLM installed in your system and you want to use it, type **y** at the prompt and enter the RLM values you collected.

22. When setup is complete, to transfer the information you've entered to the storage system, enter the following command, as directed by the prompt on the screen.

    `reboot`

    Note: If you do not enter reboot, the information you entered does not take effect.

23. If you are configuring a pair of storage systems in an active/active configuration and have not configured the other storage system, repeat these instructions to set up the other storage system in the configuration.

Responding to Setup Wizard prompts

The setup utility begins running at the storage system command prompt, but if you decide to use the web interface when prompted, you must enter the remaining information you gathered in the Setup Wizard interface.

Before You Begin

You must configure a DHCP server as described in "DHCP requirements for remote access" in order to use the Setup Wizard.

Note: If you do not configure this information into your DHCP server, the corresponding fields in the Setup Wizard will be empty, and you will need to enter the information manually into the Setup Wizard fields.

Considerations

If you select **y** at the Web interface prompt (Step 9 of *Responding to setup command prompts* on page 45), a message is displayed with the name and IP address where you can use a Web browser and the FilerView application to properly configure your storage system. A system status screen is then displayed with system information displayed in the center frame, while configuration options are listed in the left frame.

Steps

1. From a storage system client's Web browser, enter the following URL:

   `http://`*`ip_address`*`/api`

   `ip_address` is the IP address for your storage system.

   Example
   If the IP address of the onboard Ethernet interface (named e0a) is 10.14.26.99, enter the following:

   `http://10.14.26.99/api`

   The browser displays the Setup Wizard startup page.

2. Fill in the Setup Wizard fields using the information you gathered earlier.
3. After you verify that the configuration information is correct as shown on the last screen, click Finish.
4. If you are configuring a pair of storage systems in an active/active configuration and have not configured the other storage system, repeat these instructions to set up the other storage system in the configuration.

Related concepts

DHCP requirements for remote access on page 26

Responding to cifs setup prompts

If you have a valid CIFS license, `cifs setup` starts automatically upon completion of the Setup Wizard or the `setup` command (unless `cifs setup` was run previously).

Considerations

Each step displays the `cifs setup` command prompt. Supply an appropriate response from the configuration worksheet.

Steps

1. `Do you want to make the system visible via WINS?`
   The system first determines if WINS should be configured. If you want to configure WINS, enter **y**.
2. `(1) Multiprotocol filer`
   `(2) NTFS-only filer`
   You are asked if you wish to configure the storage system for multiple protocols or for NTFS only. If you have purchased multiprotocol licenses (NFS, CIFS, HTTP, etc), enter **1**.
3. `Should CIFS create default /etc/passwd and /etc/group files?`

   Enter **y** here if you have a multiprotocol environment.
4. `Would you like to enable NIS group caching?`

   It is highly recommended that you enable NIS group caching.

   If you enable NIS group caching, you also see the following prompts:
   ```
   Enter the hour(s) when NIS should update the group cache [24].
   Would you like to specify additional hours?
   ```

   Enter the hours you prefer or accept the default.
5. When the default name of the CIFS server is listed, you see the following prompt:
   `Would you like to change this name?`
   If you wish to specify a different name, you can enter it here.
6. Select the style of user authentication appropriate to your environment:
   `(1) Active Directory domain authentication (Active Directory domains only) (2) Windows NT 4 domain authentication (Windows NT or Active Directory domains) (3) Windows Workgroup authentication using the filer's local user accounts (4) /etc/passwd and/or NIS/LDAP authentication`

If you selected ...	Then ...
1	Go to step 7.
2, 3, or 4	Go to step 10, then see the *Data ONTAP File Access and Protocols Management Guide* for more information about CIFS setup for these authentication options.

7. `What is the name of the Active Directory domain?`
   Enter the fully qualified domain name.
8. `Would you like to configure time services?`
   It is recommended that time services be available to storage systems in an Active Directory domain.

   If you answer **y** , respond to the following prompts:

   `Enter the time server host(s) and/or addresses? Would you like to specify additional time servers?`
9. `Enter the name of the Windows user. Enter the password for the domain.`
   Enter the name and password of a Windows account with sufficient privileges to add computers to the Active Directory domain.
10. `Do you want to create the (name of filer) administrator account?`
    It is recommended that you create a local administrator account.

    If you answer **y** , respond to the following prompts:

    `Enter the new password for (storage system name). Retype the password.`
11. `Would you like to specify a user or group that can administer CIFS?`

    If you answer **y** , respond to the following prompt:

    `Enter the name of a user or group that will administer CIFS on the filer.`

After this is completed, CIFS is configured and the name registrations are complete. You see the following message:
`CIFS local server is running.`

Verifying software setup

As soon as hardware and software setup is complete, it is recommended that you verify network connections and licensed functionality.

Next topics

Verifying network connectivity

You use the `ping` command to verify that your network is connected to IP addresses you configured during setup.

Considerations

You must perform these tasks from a network client system.

For your information, see your *Network Management Guide*.

Steps

1. To verify network connectivity to an IP address, enter the following command:

   `ping` ***`IP_address`***

   `IP_address` is the IP address that the storage system assigned to that interface during `setup`.

   Example

   The following command tests the network connections for a storage system with an interface named e0a installed at 172.25.50.10.

   ```
   ping 172.25.50.10
   ```

2. Repeat the test once for each interface configured on the storage system.

You should be able to reach your new storage system from clients on your network. If you cannot, use the recommended troubleshooting procedures.

Troubleshooting connections to new network interfaces

Use this procedure to identify a problem when new network interfaces do not respond to a `ping` command.

Steps

1. Check to make sure that the interface is securely attached to the network.
2. Check to make sure that the media type is set up correctly if the interface is using a multiport Ethernet card with different port speeds.
3. Check to make sure that the routers function properly with correct routing information if the `ping` command is issued from a network not directly attached to the interface.

Verifying host-name resolution

Use this procedure to ensure that host names you configured during `setup` are resolved into IP addresses.

Considerations

When you ran `setup`, the storage system generated a host name for each interface by appending the number of the interface to the storage system host name. You need to make sure that these automatically generated host names are resolved into IP addresses.

For example, the interface name for the first interface on a storage system named 'toaster' might be toaster-e0a; the second interface might be toaster-e0b.

For more information about host name resolution, see your *Data ONTAP Network Management Guide*.

Steps

1. Take one of the following actions from a client system:

If you use ...	Then add an entry in ...

DNS or NIS for name resolution	Your DNS or NIS databases for each of the storage system interfaces.
	The following example shows how the entries might look for a storage system with four interfaces:
	`192.16.3.145 toaster-e0a`
	`192.16.3.146 toaster-e0b`
	`192.16.3.147 toaster-f0`
	`192.16.3.148 toaster-a5`

/etc/hosts files for name resolution	Each host's /etc/hosts file for each of the storage system interfaces.

2. To verify host name resolution for a network interface, enter the following command:

   `ping` ***`hostname-interface`***

   `hostname` is the host name that you assigned to the storage system when you ran setup.

   `interface` is one of the interface names that the storage system assigned when you ran setup.

   Example

   The following command tests the network connections for a storage system that has the host name 'toaster' with an interface named e0a installed.

   ```
   ping toaster-e0a
   ```

3. Repeat the test once for each interface that is installed in the storage system.

If you received a response from the IP address ping but not the host name ping, there may be a problem with name resolution.

Verifying that the storage system is available

Use the `exportfs` command to verify that the root path and root directory are available to clients.

Considerations

After setup is complete, the storage system is online, and the following entities should exist on the storage system:

- /vol/vol0 (a virtual root path)
- /vol/vol0/home (a directory)

Note:

/vol is not a directory--it is a special virtual root path under which the storage system mounts its volumes. You cannot mount /vol to view all the volumes on the storage system; you must mount each storage system volume separately. NFS and CIFS protocols provide the following access characteristics for the /vol virtual root path:

- For NFS
  /vol/vol0 is exported to the administration host for root access; /vol0/home is exported to the administration host for root access and to all clients for general access.
- For CIFS
  By default, /vol/vol0 is shared as C$ and /vol/vol0/etc/ is shared as $ETC. These two shares are created with 'Full Control' given to the Builtin Administrators group and with no access given to any other users or groups. By default, the Builtin Administrators group members are the local administrator account, the Domain Administrator's group (if the storage system belongs to a domain), and any user or group that you configured with Administrative access during CIFS setup. The /vol/vol0/home directory is shared as HOME with 'Full Control' access granted to the group Everyone.

Step

1. To verify that the /vol/vol0 path and /vol/vol0/home directory entities exist on your storage system, enter the following command at the storage system command line:

   `exportfs`

   You should see a listing that includes lines similar to the following:

   ```
   /vol/vol0 -sec=sys,rw=admin_host,root=admin_host,nosuid
   /vol/vol0/home -sec=sys,rw,root=admin_host,nosuid
   ```

Verifying licensing

Use the `license` command at the storage system command line to verify that the appropriate protocol and service licenses are installed on your system, or configure additional licenses.

Considerations

For more information about storage system licensing, see your *Data ONTAP System Administration Guide* and the license(1) man page.

Step

1. Enter the appropriate `license` command to manage your licenses.

If you want to ...	Enter this command at the storage system prompt...
View existing licenses	`license` Result: You see a list of licenses and license codes.
Add a license	`license add` ***`license_code`*** Result: The new protocol or service is enabled and added to the list of licenses.
Remove a license	`license delete` ***`service`*** Result: The protocol or service is disabled and removed from the list of licenses.

Preparing NFS clients to access the storage system

To make storage system data available to NFS clients, you need to export the storage system's file system. You must also mount the file system on your NFS clients.

For more information about NFS configuration, see your *Data ONTAP File Access and Protocols Management Guide* and your NFS client documentation.

Exporting file systems to NFS clients

Before NFS clients can mount file systems, you need to export them by adding them to the storage system's /etc/exports file.

Considerations

All security styles of file systems – UNIX, NTFS, and Mixed – are available for exporting and can be mounted by NFS clients. However, when accessing a volume with NTFS effective security style (NTFS volume or mixed volume with NTFS effective security style), file access is granted based on NTFS permissions. In order to properly ascertain file permissions, UNIX user names are mapped to corresponding Windows user names, and access is granted based on NTFS permissions granted to the mapped Windows user.

Steps

1. Determine valid path names for directories by entering the following command at the storage system prompt:

   `qtree status`

Example
The following display shows sample output from the `qtree status` command:

```
Volume          Tree      Style    Oplocks    Status
------          ----      -----    -------    -------
vol0            home      unix     enabled    normal
vol1snap        qtree1    unix     enabled    normal
vol2eng         team1     mixed    enabled    normal
vol2mkt         nt        ntfs     enabled    normal
```

2. From the `qtree` command output, convert the first two entries into valid path names. To do so, use this format:

   /Volume/Tree

   Example

   ```
   /vol0/home
   /vol1snap/qtree1
   /vol2eng/team1
   ```

3. Use a text editor from an NFS client to open the /etc/exports file on the storage system.
4. Add the storage system directories to the /etc/exports file.

   Example

   ```
   /vol/vol0/home -sec=sys, rw, root=admin_host
   /vol/vol1snap/qtree1 -sec=sys, rw, root=admin_host
   /vol/vol2eng/team1 -sec=sys, rw=10.0.0.0/24:172.17.0.0/16, root=admin_host
   /vol/vol2mkt/nt -sec=sys, rw=netgroup1:netgroup2, root=admin_host:10.0.0.100
   ```

   For information about specifying entries and access permissions in the /etc/exports file, see the chapter about file access using NFS in your *Data ONTAP File Access and Protocols Management Guide*.

5. Save the file and exit the text editor.
6. To make your changes to the /etc/exports file effective immediately, issue the `exportfs` command with the reload option:

   `exportfs -r`

Preparing CIFS clients to access the storage system

If you are in an Active Directory domain, you must ensure that DNS is correctly configured to ensure CIFS client access.

Once setup is complete, the storage system establishes CIFS client connectivity by automatically registering with the master browser. If cross-subnet browsing is configured correctly, the storage system is now visible to all CIFS clients. For more information about cross-subnet browsing, refer to Microsoft networking documentation.

Note: Although CIFS visibility has been established, you need to configure shares with CIFS access permissions before any storage system data can become accessible to CIFS clients. For information about how to make a test share available to CIFS clients, see the *Data ONTAP File Access and Protocols Management Guide*.

You will also need to provide information to Windows client users about how to access data on the storage system depending on their Windows version.

Creating a storage system DNS "A" record for CIFS client access

In Active Directory domains, a storage system DNS "A" record must be created on the DNS server prior to CIFS client access.

Considerations

This can be done manually or the storage system's DNS "A" record can be registered dynamically.

Step

1. To enable dynamic DNS, set one of the following options:

   `dns.update.enable on`

   `dns.update.enable secure`

   Use `secure` if your DNS supports secure updates.

   To disable dynamic DNS, set the `dns.update.enable` option to `off`.

Verifying the configuration for active/active storage systems

There are two ways you can check your active/active configuration before placing the pair online: running the Cluster Configuration Checker script, or using the command line interface.

When you configure an active/active configuration, the following configuration information need to be the same on both systems:

- Parameters
- Network interfaces
- Configuration files

- Licenses and option settings

  Note: The values for domain controllers and WINS servers no longer need to be identical on both storage systems in an active/active configuration. You can have each storage system exist in a different domain or a different workgroup, or both. However, if you have a multiprotocol environment and use UID-to-SID mapping, the UNIX security information must be compatible between the two domains. For example, if you have a UID of 119, it must map to the same Windows account for both storage systems.

For more information about verifying your configuration and managing storage systems in an active/active configuration, see your *Data ONTAP Active/Active Configuration Guide*.

Verifying BMC connections

Use this procedure to verify that the Baseboard Management Controller (BMC) is set up correctly and connected to the network.

Considerations

The BMC network interface is not used for serving data, so it does not show up in the output for the `ifconfig` command.

For more information about using the BMC to manage remote storage systems, see your *Data ONTAP System Administration Guide*.

Steps

1. To verify that AutoSupport is enabled and AutoSupport options are valid, enter the following command:

   `options autosupport`

   The AutoSupport options should be set as follows:

   ```
   autosupport.enable on
   autosupport.support.enable on
   autosupport.mailhost name or IP address of mailhost
   autosupport.content complete
   ```

   Note: The BMC does not rely on the storage system's autosupport.support.transport option to send notifications. The BMC uses the Simple Mail Transport Protocol (SMTP)

2. Enter the following command to verify that the BMC's network configuration is correct or to display the MAC address of the BMC:

   `bmc status`

Example

If you used the static IP address in Step 1, the following output is displayed:

```
Baseboard Management Controller:
  Firmware Version: 1.0
  IPMI version: 2.0
  DHCP: off
  BMC MAC address: ff:ff:ff:ff:ff:ff
  IP address: 10.98.148.61
  IP mask: 255.255.255.0
  Gateway IP address: 10.98.148.1
  BMC ARP interval: 10 seconds
  BMC has (1) user: naroot
  ASUP enabled: on
  ASUP mailhost: mailhost@companyname.com
  ASUP from: postmaster@companyname.com
  ASUP recipients: recipient@companyname.com
  Uptime: 0 Days, 04:47:45
```

3. Enter the following command to verify that the BMC AutoSupport function is working properly:

   `bmc test autosupport`

   Note: The BMC uses the same mailhost information that Data ONTAP uses for AutoSupport. You must ensure that the autosupport.to option has been set properly before issuing this command.

   You have successfully set up the BMC AutoSupport function when the following output is displayed:
   `Please check ASUP message on your recipient mailbox`

Verifying RLM connections

Use this procedure to verify that the remote LAN module (RLM) is set up correctly and connected to the network.

Considerations

The RLM network interface is not used for serving data, so it does not show up in the output for the `ifconfig` command.

For more information about using the RLM to manage remote storage systems, see your *Data ONTAP System Administration Guide*.

Steps

1. To verify that AutoSupport is enabled and AutoSupport options are valid, enter the following command:

   `options autosupport`

The AutoSupport options should be set as follows:

```
autosupport.enable on
autosupport.support.enable on
autosupport.mailhost name or IP address of mailhost
autosupport.support.to name or email address of alert recipients
autosupport.content complete
```

2. Enter the following command:

   `rlm setup`

   Note: It might take a few minutes for the new network settings for the RLM to take effect .

3. Enter the following command to verify the configuration of the RLM interface:

   `rlm status`

4. To test RLM mail delivery, enter the following command:

   `rlm test autosupport`

   The RLM should send e-mail within a few minutes. If the test fails, you should verify storage system connectivity, and check whether the mailhost and recipients are valid.

Where to go from here

Product documentation for the storage system is available online and in printed format.

Documentation is available on the NOW site. You can also order printed copies from this Web site. See the *Release Notes* for information about this Data ONTAP release.

For information about...	**Go to the NOW site for the...**
New features, enhancements, known issues, and late-breaking news for your version of Data ONTAP software	*Data ONTAP Release Notes* for your version of Data ONTAP
Setting up and verifying software configuration	*Data ONTAP Software Setup Guide*
Managing all aspects of your system	Documentation for your version of Data ONTAP. See the *Data ONTAP Documentation Roadmap* for an overview.
Cabling, configuring, and disk ownership	*Data ONTAP Active/Active Configuration Guide* *Data ONTAP System Administration Guide* *Data ONTAP Data Protection Online Backup and Recovery Guide* *Data ONTAP Storage Management Guide*
Setting up and managing network configurations of storage systems	*Data ONTAP Network Management Guide*
Configuring and managing the FCP protocol, and creating and managing LUNs and initiator groups with the FCP service	*Data ONTAP Block Access Management Guide for iSCSI and FCP*
The most current information about your system hardware	*Hardware Information Library* page
Hardware configuration options available for your system	*System Configuration Guide*
Troubleshooting your system	*Platform Monitoring Guide*
Testing field-replaceable units and diagnosing and correcting system hardware problems	*Diagnostics Guide*
Configuring Remote Management after initial setup	*Data ONTAP System Administration Guide*
Managing your disk shelves	*DiskShelf14mk2 AT Hardware Guide* *DiskShelf14mk2 and DS14mk4 FC Hardware Guide*

Related information

Data ONTAP Information Library -- now.netapp.com/NOW/knowledge/docs/ontap/ontap_index.shtml

Hardware Information Library -- now.netapp.com/NOW/knowledge/docs/hardware/hardware_index.shtml

Time zones

You must select a valid time zone or alias from the lists provided, record it in the configuration worksheet, and enter the value at the `setup` prompt.

If you need to change your selected time zone after setup is complete, see the timezone(1) man page.

You can enter a geographic region, or you can use one of the following aliases to represent its corresponding time zone descriptions:

- GMT — Greenwich Mean Time, UCT, UTC, Universal, Zulu
- CET — MET (Middle European Time)
- US/Eastern — Jamaica
- US/Mountain — Navajo

Next topics

Time zones by geographical region on page 65
GMT offset and miscellaneous time zones on page 70

Time zones by geographical region

Tables in these sections list valid time zones grouped by geographical region, in alphabetical order.

Africa

Africa/Abidjan	Africa/Djibouti	Africa/Maputo
Africa/Accra	Africa/Douala	Africa/Maseru
Africa/Addis_Ababa	Africa/Freetown	Africa/Mbabane
Africa/Algiers	Africa/Gaborone	Africa/Mogadishu
Africa/Asmera	Africa/Harare	Africa/Monrovia
Africa/Bamako	Africa/Johannesburg	Africa/Nairobi
Africa/Bangui	Africa/Kampala	Africa/Ndjamena
Africa/Banjul	Africa/Khartoum	Africa/Niamey
Africa/Bissau	Africa/Kigali	Africa/Nouakchott
Africa/Blantyre	Africa/Kinshasa	Africa/Ouagadougou

Africa/Brazzaville	Africa/Lagos	Africa/Porto-Novo
Africa/Bujumbura	Africa/Libreville	Africa/Sao_Tome
Africa/Cairo	Africa/Lome	Africa/Timbuktu
Africa/Casablanca	Africa/Luanda	Africa/Tripoli
Africa/Conakry	Africa/Lumumbashi	Africa/Tunis
Africa/Dakar	Africa/Lusaka	Africa/Windhoek
Africa/Dar_es_Salaam	Africa/Malabo	

America

America/Adak	America/Grenada	America/Noronha
America/Anchorage	America/Guadeloupe	America/Panama
America/Anguilla	America/Guatemala	America/Pangnirtung
America/Antigua	America/Guayaquil	America/Paramaribo
America/Aruba	America/Guyana	America/Phoenix
America/Asuncion	America/Halifax	America/Port_of_Spain
America/Atka	America/Havana	America/Port-au-Prince
America/Barbados	America/Indiana	America/Porto_Acre
America/Belize	America/Indianapolis	America/Puerto_Rico
America/Bogota	America/Inuvik	America/Rainy_River
America/Boise	America/Iqaluit	America/Rankin_Inlet
America/Buenos_Aires	America/Jamaica	America/Regina
America/Caracas	America/Jujuy	America/Rosario
America/Catamarca	America/Juneau	America/Santiago
America/Cayenne	America/Knox_IN	America/Santo_Domingo
America/Cayman	America/La_Paz	America/Sao_Paulo
America/Chicago	America/Lima	America/Scoresbysund
America/Cordoba	America/Los_Angeles	America/Shiprock
America/Costa_Rica	America/Louisville	America/St_Johns
America/Cuiaba	America/Maceio	America/St_Kitts

America/Curacao	America/Managua	America/St_Lucia
America/Dawson	America/Manaus	America/St_Thomas
America/Dawson_Creek	America/Martinique	America/St_Vincent
America/Denver	America/Mazatlan	America/Swift_Current
America/Detroit	America/Mendoza	America/Tegucigalpa
America/Dominica	America/Menominee	America/Thule
America/Edmonton	America/Mexico_City	America/Thunder_Bay
America/El_Salvador	America/Miquelon	America/Tijuana
America/Ensenada	America/Montevideo	America/Tortola
America/Fort_Wayne	America/Montreal	America/Vancouver
America/Fortaleza	America/Montserrat	America/Virgin
America/Glace_Bay	America/Nassau	America/Whitehorse
America/Godthab	America/New_York	America/Winnipeg
America/Goose_Bay	America/Nipigon	America/Yakutat
America/Grand_Turk	America/Nome	America/Yellowknife

Antarctica

Antarctica/Casey	Antarctica/Mawson	Antarctica/Palmer
Antarctica/DumontDUrville	Antarctica/McMurdo	Antarctica/South_Pole

Asia

Asia/Aden	Asia/Irkutsk	Asia/Qatar
Asia/Alma-Ata	Asia/Ishigaki	Asia/Rangoon
Asia/Amman	Asia/Istanbul	Asia/Riyadh
Asia/Anadyr	Asia/Jakarta	Asia/Saigon
Asia/Aqtau	Asia/Jayapura	Asia/Seoul
Asia/Aqtobe	Asia/Jerusalem	Asia/Shanghai
Asia/Ashkhabad	Asia/Kabul	Asia/Singapore
Asia/Baghdad	Asia/Kamchatka	Asia/Taipei
Asia/Bahrain	Asia/Karachi	Asia/Tashkent

Asia/Baku	Asia/Kashgar	Asia/Tbilisi
Asia/Bangkok	Asia/Katmandu	Asia/Tehran
Asia/Beirut	Asia/Krasnoyarsk	Asia/Tel_Aviv
Asia/Bishkek	Asia/Kuala_Lumpur	Asia/Thimbu
Asia/Brunei	Asia/Kuching	Asia/Tokyo
Asia/Calcutta	Asia/Kuwait	Asia/Ujung_Pandang
Asia/Chungking	Asia/Macao	Asia/Ulan_Bator
Asia/Colombo	Asia/Magadan	Asia/Urumqi
Asia/Dacca	Asia/Manila	Asia/Vientiane
Asia/Damascus	Asia/Muscat	Asia/Vladivostok
Asia/Dubai	Asia/Nicosia	Asia/Yakutsk
Asia/Dushanbe	Asia/Novosibirsk	Asia/Yekaterinburg
Asia/Gaza	Asia/Omsk	Asia/Yerevan
Asia/Harbin	Asia/Phnom_Penh	
Asia/Hong_Kong	Asia/Pyongyang	

Atlantic

Atlantic/Azores	Atlantic/Faeroe	Atlantic/South_Georgia
Atlantic/Bermuda	Atlantic/Jan_Mayen	Atlantic/St_Helena
Atlantic/Canary	Atlantic/Madeira	Atlantic/Stanley
Atlantic/Cape_Verde	Atlantic/Reykjavik	

Australia

Australia/ACT	Australia/LHI	Australia/Queensland
Australia/Adelaide	Australia/Lindeman	Australia/South
Australia/Brisbane	Australia/Lord Howe	Australia/Sydney
Australia/Broken_Hill	Australia/Melbourne	Australia/Tasmania
Australia/Canberra	Australia/NSW	Australia/Victoria
Australia/Darwin	Australia/North	Australia/West
Australia/Hobart	Australia/Perth	Australia/Yancowinna

Brazil

Brazil/Acre	Brazil/East
Brazil/DeNoronha	Brazil/West

Canada

Canada/Atlantic	Canada/Eastern	Canada/Pacific
Canada/Central	Canada/Mountain	Canada/Saskatchewan
Canada/East- Saskatchewan	Canada/Newfoundland	Canada/Yukon

Chile

Chile/Continental	Chile/EasterIsland

Europe

Europe/Amsterdam	Europe/Kiev	Europe/San_Marino
Europe/Andorra	Europe/Kuybyshev	Europe/Sarajevo
Europe/Athens	Europe/Lisbon	Europe/Simferopol
Europe/Belfast	Europe/Ljubljana	Europe/Skopje
Europe/Belgrade	Europe/London (BST)	Europe/Sofia
Europe/Berlin	Europe/Luxembourg	Europe/Stockholm
Europe/Bratislava	Europe/Madrid	Europe/Tallinn
Europe/Brussels	Europe/Malta	Europe/Tirane
Europe/Bucharest	Europe/Minsk	Europe/Vaduz
Europe/Budapest	Europe/Monaco	Europe/Vatican
Europe/Chisinau	Europe/Moscow	Europe/Vienna
Europe/Copenhagen	Europe/Oslo	Europe/Vilnius
Europe/Dublin	Europe/Paris	Europe/Warsaw
Europe/Gibraltar	Europe/Prague	Europe/Zagreb
Europe/Helsinki	Europe/Riga	Europe/Zurich
Europe/Istanbul	Europe/Rome	

Indian (Indian Ocean)

Indian/Antananarivo	Indian/Comoro	Indian/Mauritius
Indian/Chagos	Indian/Kerguelen	Indian/Mayotte
Indian/Christmas	Indian/Mahe	Indian/Reunion
Indian/Cocos	Indian/Maldives	

Mexico

Mexico/BajaNorte	Mexico/BajaSur	Mexico/General

Pacific

Pacific/Apia	Pacific/Johnston	Pacific/Ponape
Pacific/Auckland	Pacific/Kiritimati	Pacific/Port_Moresby
Pacific/Chatham	Pacific/Kosrae	Pacific/Rarotonga
Pacific/Easter	Pacific/Kwajalein	Pacific/Saipan
Pacific/Efate	Pacific/Majuro	Pacific/Samoa
Pacific/Enderbury	Pacific/Marquesas	Pacific/Tahiti
Pacific/Fakaofo	Pacific/Midway	Pacific/Tarawa
Pacific/Fiji	Pacific/Nauru	Pacific/Tongatapu
Pacific/Funafuti	Pacific/Niue	Pacific/Truk
Pacific/Galapagos	Pacific/Norfolk	Pacific/Wake
Pacific/Gambier	Pacific/Noumea	Pacific/Wallis
Pacific/Guadalcanal	Pacific/Pago_Pago	Pacific/Yap
Pacific/Guam	Pacific/Palau	
Pacific/Honolulu	Pacific/Pitcairn	

GMT offset and miscellaneous time zones

Tables in this section contain the following valid Data ONTAP time zones:

- Time zones defined by offset from Greenwich Mean Time (GMT)

- Time zones that are not associated with a geographical region
- Regional time zones that are not grouped by major land mass

GMT

GMT	GMT+9	GMT-5
GMT+1	GMT+10	GMT-6
GMT+2	GMT+11	GMT-7
GMT+3	GMT+12	GMT-8
GMT+4	GMT+13	GMT-9
GMT+5	GMT-1	GMT-10
GMT+6	GMT-2	GMT-11
GMT+7	GMT-3	GMT-12
GMT+8	GMT-4	

Etc

Etc/GMT	Etc/GMT+11	Etc/GMT-9
Etc/GMT+0	Etc/GMT+12	Etc/GMT-10
Etc/GMT+1	Etc/GMT0	Etc/GMT-11
Etc/GMT+2	Etc/GMT-0	Etc/GMT-12
Etc/GMT+3	Etc/GMT-1	Etc/GMT-13
Etc/GMT+4	Etc/GMT-2	Etc/GMT-14
Etc/GMT+5	Etc/GMT-3	Etc/Greenwich
Etc/GMT+6	Etc/GMT-4	Etc/UCT
Etc/GMT+7	Etc/GMT-5	Etc/Universal
Etc/GMT+8	Etc/GMT-6	Etc/UTC
Etc/GMT+9	Etc/GMT-7	Etc/Zulu
Etc/GMT+10	Etc/GMT-8	

Miscellaneous

Arctic/Longyearbyen	HST	Portugal

CET	Iceland	PRC
CST6CDT	Iran	PST8PDT
Cuba	Israel	ROC
EET	Japan	ROK
Egypt	Kwajalein	Singapore
Eire	Libya	Turkey
EST	MET	UCT
EST5EDT	MST	Universal
Factory	MST7MDT	UTC
GB	Navajo	WET
GB-Eire	NZ	W-SU
Greenwich	NZ-CHAT	Zulu
Hongkong	Poland	

System V

SystemV/AST4	SystemV/EST5EDT	SystemV/PST8PDT
SystemV/AST4ADT	SystemV/HST10	SystemV/YST9
SystemV/CST6	SystemV/MST7	SystemV/YST9YDT
SystemV/CST6CDT	SystemV/MST7MDT	
SystemV/EST5	SystemV/PST8	

Supported languages

You must select a supported language from the list provided and record its abbreviation in the configuration worksheet.

Next topics

Specifying the language code on page 73
Language choices on page 73

Specifying the language code

When you enter language codes during setup, you might need to specify a suffix, such as UTF-8.

Step

1. When prompted during setup, enter the code that corresponds to the appropriate language. To use UTF-8 as the NFS character set, append UTF-8 to the abbreviation.

   Example

   `ko.UTF-8`

Language choices

When you respond to the setup prompt for language, you need to enter the language code (abbreviation).

Note: You can also view supported languages and their abbreviations by entering `vol lang` at the storage system prompt.

Language	Abbreviation	Language	Abbreviation
Arabic	ar	Norwegian	no
Croatian	hr	Polish	pl
Czech	cs	Portugese	pt
Danish	da	POSIX	C
Dutch	nl	Romanian	ro
English	en	Russian	ru

Language	Abbreviation	Language	Abbreviation
English (U.S.)	en_US	Simplified Chinese	zh
Finnish	fi	Simplified Chinese (GBK)	zh.GBK
French	fr	Slovak	sk
German	de	Slovenian	sl
Hebrew	he	Spanish	es
Hungarian	hu	Swedish	sv
Italian	it	Traditional Chinese euc-tw	zh_TW
Japanese euc-j	ja	Traditional Chinese Big 5	zh_TW.BIG5
Japanese PCK (sjis)	ja_JP.PCK	Turkish	tr
Korean	ko		

Troubleshooting if the system does not boot when powered on

If your system does not boot when you power it on for the first time, you can troubleshoot the problem by following a series of steps.

Considerations

For FAS2000 series and FAS3140/FAS3170 systems, use the procedure provided in this guide.

For the following systems, use the procedure provided with the *Installation and Setup Instructions* that shipped with your system hardware.

- FAS200 series
- FAS900 series
- FAS30xx series
- FAS6000 series
- NearStore R200
- SA300 and SA600

Next topics

Troubleshooting if the FAS2000 series or SA200 system does not boot on page 75
Troubleshooting if the FAS3140/FAS3170 system does not boot on page 77

Troubleshooting if the FAS2000 series or SA200 system does not boot

If your FAS2000 series or SA200 system does not boot when you power it on, you can troubleshoot the problem by following a series of steps.

Steps

1. Look for a description of the problem on the console.

   Follow the instructions, if provided, on the console.

2. Check all cables and connections, making sure that they are secure.
3. Ensure that power is supplied and is reaching your system from the power source.
4. Make sure that the power supplies on your controller and disk shelves are working.

If the LEDs on a power supply are...	Then...
Illuminated	Proceed to the next step.
Not illuminated	Remove the power supply and reinstall it, making sure that it connects with the backplane.

5. Verify disk shelf compatibility and check the disk shelf IDs.
6. Ensure that the Fibre Channel disk shelf speed is correct.

   If you have DS14mk2 FC and DS14mk4 FC shelves mixed in the same loop, set the shelf speed to 2 Gb, regardless of module type.

7. Check disk ownership to ensure that the disks are assigned to the system:
   a) Verify that disks are assigned to the system by entering `disk show`.
   b) Validate that storage is attached to the system, and verify any changes you made, by entering `disk show -v`.
8. Turn off your controller and disk shelves, and then turn on the disk shelves.

   Check the quick reference card that came with the disk shelf for information about LED responses.

9. Use the onboard diagnostics to check that Fibre Channel disks in the storage system are operating properly.
   a) Turn on your system and press Ctrl-C. Enter `boot_diags` at the boot loader prompt.
   b) Enter `fcal` in the Diagnostic Monitor program that starts at boot.
   c) Enter `73` at the prompt to show all disk drives.
10. Use the onboard diagnostics to check that SAS disks in the storage system are operating properly.
    a) Enter `mb` in the Diagnostic Monitor program.
    b) Enter `6` to select the SAS test menu.
    c) Enter `42` to scan and show disks on the selected SAS.

       This displays the number of SAS disks.

    d) Enter `72` to show the attached SAS devices.
    e) Exit the Diagnostic Monitor by entering `99` at the prompt, as needed.
    f) Enter the `exit` command to return to LOADER.
    g) Start Data ONTAP by entering `autoboot` at the prompt.
11. Try booting your system again.

If your system...	Then...
Boots successfully	Proceed to setup the software.

If your system...	Then...
Does not boot successfully	Call NetApp technical support at +1(888)4-NETAPP. The system might not have the boot image downloaded on the CompactFlash card.

Troubleshooting if the FAS3140/FAS3170 system does not boot

If your FAS3140/FAS3170 system does not boot when you power it on, you can troubleshoot the problem by following a series of steps.

Steps

1. Look for a description of the problem on the console.

   Follow the instructions, if provided, on the console.

2. Check all cables and connections, making sure that they are secure.
3. Ensure that power is supplied and is reaching your system from the power source.
4. Make sure that the power supplies on your controller and disk shelves are working.

If the LEDs on a power supply are...	Then...
Illuminated	Proceed to the next step.
Not illuminated	Remove the power supply and reinstall it, making sure that it connects with the backplane.

5. Verify disk shelf compatibility and check the disk shelf IDs.
6. Ensure that the Fibre Channel disk shelf speed is correct.

   If you have DS14mk2 FC and DS14mk4 FC shelves mixed in the same loop, set the shelf speed to 2 Gb, regardless of module type.

7. Check disk ownership to ensure that the disks are assigned to the system:

   a) Verify that disks are assigned to the system by entering `disk show`.
   b) Validate that storage is attached to the system, and verify any changes you made, by entering `disk show -v`.

8. Turn off your controller and disk shelves, and then turn on the disk shelves.

For information about LED responses, check the quick reference card that came with the disk shelf or the hardware guide for your disk shelf.

9. Use the onboard diagnostics to check that Fibre Channel disks in the storage system are operating properly.

a) Turn on your system and press Ctrl-C. Enter `boot_diags` at the LOADER> prompt.
b) Enter `fcal` in the Diagnostic Monitor program that starts at boot.
c) Enter `73` at the prompt to show all disk drives.
d) Exit the Diagnostic Monitor by entering `99` at the prompt, as needed.
e) Enter the `exit` command to return to LOADER.
f) Start Data ONTAP by entering `autoboot` at the prompt.

10. Try booting your system again.

If your system...	Then...
Boots successfully	Proceed to setup the software.
Does not boot successfully	Call NetApp technical support at +1(888)4-NETAPP. The system might not have the boot image downloaded on the CompactFlash card.

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