



מה-סרת-סונדא
Network Attached Storage Server Operating System

Installation and Administration Guide

UPNP, DAAP, SMB/CIFS, AFP, NFS, FTP, RSYNC and HTTP

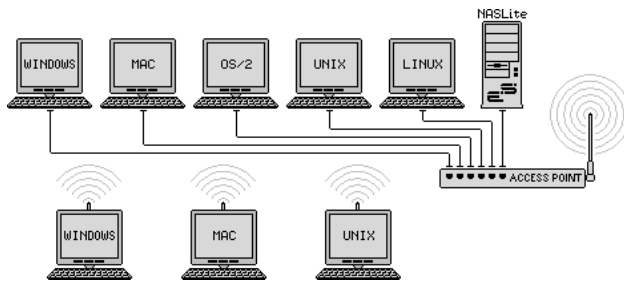
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What is NASLite-M2

NASLite-M2 is a Network Attached Storage (NAS) Server Operating System designed to transform a basic computer into a dedicated UPNP, DAAP, SMB/CIFS, AFP, NFS, FTP, HTTP and RSYNC file server. NASLite-M2 boots from a variety of IDE, SATA SCSI, USB, FireWire or Hardware RAID devices and is intended for use in any application that requires the simultaneous availability of large amounts of fast and inexpensive networked storage. A single NASLite-M2 server is capable of exporting terabytes of networked storage and can handle hundreds of networked users easily and efficiently, even when running on modest hardware.



Typical Multi-OS Network Configuration

NASLite-M2 offers unsurpassed versatility allowing full access to all its storage resources. Content can be accessed simultaneously using any of the supported protocols. Fully automated monitoring and intelligent resource management make NASLite-M2 an excellent performer in high-traffic storage applications. Daily mirror backups between local or remote drives ensure data safety. High performance and low maintenance have established NASLite-M2 as one of the best investments in networked storage. Using NASLite-M2 is simple and a perfect solution for both home and business.

By design, NASLite-M2 is a community workgroup server and does not support features such as user management, disk quotas or the ability to join domains. However, it is very easy to set-up, to administer and to use.

Why Use NASLite-M2

NASLite-M2 is optimized to perform at maximum efficiency with minimum of hardware requirements. Designed with simplicity in mind, NASLite-M2 is compact, stable and very reliable. NASLite-M2 boots directly into RAM where it runs in a modestly sized 16MB RAM-Disk. This approach ensures consistent and reliable OS operation. NASLite-M2 offers the following features and benefits:

- Easy to operate and to administer
- Inexpensive to run and maintain
- Boots directly into RAM
- Remote administration through TELNET
- Simple configuration menus
- Stable and reliable
- UPNP, DAAP, SMB/CIFS, AFP, NFS, FTP, HTTP and RSYNC exported file systems
- BIOS independent fixed disk drive support
- Support for IDE, SATA, SCSI, USB and FireWire connected fixed disk drives
- Support for multiple IDE, SATA, SCSI, USB and FireWire interfaces
- Dependable hardware RAID support
- Remote NFS volumes re-export
- HTML-based status report pages
- Limited ACPI support
- S.M.A.R.T. support
- Large partition and file support
- Extremely compact in size (Runs in an 16MB RAM Disk)
- Low hardware requirements
- Wide range of PCI hardware support (ISA and EISA not supported)

NASLite-M2 is designed to operate on commodity x86 computers. It is also well suited for re-using older PCs that are still operational but are too limited or slow for use as desktop computers. In addition, NASLite-M2 enables older computers with BIOS limitations to use contemporary, large-capacity IDE fixed disk drives without the need for additional hardware.

As a network file server, NASLite-M2 may very well offer the highest possible storage capacity for the money. NASLite-M2 servers of a terabyte or more in storage space can be built for only a few hundred US dollars.

For example, with NASLite-M2 you can easily take a retired Pentium 200MHz computer, install a couple of 500GB fixed disk drives and have a fast, reliable

1000GB NASLite-M2 file server for a few dollars above the cost of the fixed disk drives.

Reusing an older computer is not the only approach one can take in building a NASLite-M2 server. Servers built using newer hardware provide unmatched performance and can easily handle 12 or more storage disk drives. Such servers can be used to centralize many terabytes of storage into a single, low-cost package that is simple to administer and to use.

NOTE: *NASLite-M2 is fully compatible with storage media from other NASLite file server versions.*

Getting NASLite-M2

Downloadable versions of the NASLite-M2 CD-ROM ISO image is available for purchase directly from the Server Elements (www.serverelements.com) website.

NOTE: *NASLite-M2 is a commercial product and is not freely distributable. Please do not make or distribute illegal copies. Doing so is not only illegal, but undermines our efforts and further impedes our ability to develop the product.*

Basic Computer Requirements

NASLite-M2 is a network file server, so a fast computer is usually not necessary. Basic requirements are:

- Pentium or better processor
- PCI bus
- 64M or more of RAM
- 1 or more fixed disk drives
- Appropriate bootable media
- Conventional floppy disk drive (Optional)
- PCI or on-board network interface adapter

NOTE: *It is possible to boot NASLite-M2 CDD using a SCSI, USB, FireWire or other CD-ROM drive provided the BIOS supports booting from such a device. The CD-ROM drive is used only to boot NASLite-M2 CDD. CD-ROM content cannot be exported to the network.*

In dedicated file servers, the performance is most often limited by the network speed. Although fast processors will usually not improve performance,

there are cases where low-quality network cards may generate large amount of interrupt request traffic, thus drastically increasing the CPU workload. In most cases however, that should not be a problem and therefore fast processor may not be required.

A 200 MHz Pentium with 64M of RAM will be more than capable of servicing a typical small office. Additional RAM may be necessary if large-capacity fixed disks are used. For example, if 250GB fixed disks are used, 128M or more of RAM may be necessary for optimum performance.

Hardware Setup

If you are preparing a computer for conversion to a NASLite-M2 file server and wish to replace or add fixed disk drives, do this now and be sure the computer will boot with the new fixed disk drives installed. If you are adding new PCI-to-IDE, PCI-to-SATA, etc. interfaces, ensure that system IRQs are properly assigned and no conflicts exist. In addition, since different versions of NASLite-M2 boot from a CD-ROM, fixed disk or USB device, it is necessary to verify and set the BIOS and the associated device to boot accordingly.

NOTE: *On older computers, it's recommended that you set the BIOS IDE fixed disk drive configuration for all large IDE fixed disk drives to "NOT INSTALLED" in order to avoid boot problems. NASLite-M2 does not use the BIOS to identify the available fixed disk drives. Computers with older BIOS may refuse to boot if unable to properly identify the installed fixed disk drives.*

Unlike its predecessors, NASLite-M2 supports a wide variety of storage media. IDE, SATA, USB, FireWire and SCSI attached fixed disks can be used, in any combination. Additional PCI-to-IDE, PCI-to-SATA, etc. interfaces can also be used in order to increase the total number of storage disks.

SCSI interface support in NASLite-M2 is limited to the commonly available Adaptec, Future Domain and Qlogic interfaces. Drivers for more obscure SCSI interfaces are excluded in favor of a more complete set of SATA drivers.

IDE, SATA and SCSI storage interface drivers included with NASLite-M2 are as follows:

- **IDE**

- ADMA100 IDE Driver
- ALi 15x3 IDE Driver
- AMD PCI IDE Driver
- ARTOP AEC62xx IDE Driver
- ATI IXP IDE Driver
- CMD64x IDE
- Compaq Triflex IDE
- Cypress CY82C693 IDE
- Cyrix/NS 5530 IDE
- Highpoint 34x IDE
- Highpoint HPT366 IDE
- Intel PIIX IDE
- NS SC1200 IDE
- NS87415 IDE
- Older Promise IDE
- Opti621 IDE
- Promise PDC20268 and higher
- RZ1000 IDE
- Serverworks OSB4/CSB5/CSB6 IDE
- Sil IDE
- SIS IDE
- SLC90E66 IDE
- Tekram TRM290 IDE
- VIA IDE
- Generic IDE (Without DMA Support)

- **SATA**

- Promise SATA Controller Driver
- Vitesse VSC7174 SATA Controller Driver
- VIA SATA Controller Driver
- ULi Electronics SATA Controller Driver
- AHCI SATA Controller Driver
- Intel PIIX/ICH ATA Controller Driver
- K2 SATA Controller Driver
- Silicon Integratad Systems SATA Controller Driver
- Silicon Image SATA Controller Driver
- Pacific Digital Corporation QStor SATA Controller Driver
- Promise ATA TX2/TX4/TX4000 Controller Driver
- NVIDIA nForce SATA Controller Driver

- **SCSI**

- Adaptec AIC-7xxx Series SCSI Controller Driver
- BusLogic MultiMaster and FlashPoint SCSI Host Controller Driver
- Future Domain TMC-3260 SCSI Controller Driver
- Qlogic ISP1020 Intelligent SCSI Controller Driver

- Qlogic ISP2x00 SCSI-FCP Driver
- Qlogic QLA1280 (Ultra2) and QLA12160 (Ultra3) SCSI Controller Driver

For a complete list of IDE, SATA and SCSI storage interface devices supported by the above drivers, refer to the NASLite-M2 Hardware Reference Guide. NASLite-M2 utilizes RAID via a number of supported SCSI and SATA hardware RAID devices. Hardware RAID presents the available disks array as a single volume, so NASLite-M2 can access the RAID storage in the same way as it would a single disk. A general list of included hardware RAID drivers is as follows:

- Adaptec AAC Series RAID Controller Driver
- Adaptec I2O RAID Controller Driver
- GDT Disk Array Controller Driver
- IBM ServeRAID Controller Driver
- 3ware Storage Controller Driver
- LSI Logic MegaRAID Controller Driver

For a complete list of hardware RAID devices supported by the above drivers, refer to the NASLite-M2 Hardware Reference Guide.

Many of the supported hardware RAID devices are capable of handling a disk change while powered. Commonly known as hot-swapping, this capability can be very handy in production environments where taking down a sever for maintenance is not an option. If your target application requires hot-swapping, an appropriate hardware RAID card will be necessary.

To connect the NASLite-M2 server to the network, a PCI network interface is required. Many computers utilize a motherboard with a built-in or on-board PCI network interface and therefore will work fine. A general list of included PCI network interface adapters drivers as follows:

- 3Com 3c59x/3c9xx Ethernet Driver
- 3Com Typhoon Family Ethernet Driver
- 8390 Ethernet Driver
- Adaptec Starfire Ethernet Driver
- AMD8111 based 10/100 Ethernet Driver
- Broadcom 4400 10/100 Ethernet Driver
- Davicom DM910X Ethernet Driver
- DE4x5 Ethernet Driver
- Digi Ethernet Driver
- Digital 21*4* Tulip Ethernet Driver
- HP CASCADE Ethernet Driver
- Intel(R) PRO/100 Ethernet Driver

- MII Ethernet Driver
- Myson MTD-8xx Ethernet Driver
- National Semiconductor DP8381x Ethernet Driver
- NE2000 Ethernet Driver
- PCnet32 and PCnetPCI Ethernet Driver
- RealTek RTL-8139 Ethernet Driver
- RealTek RTL-8139C+ Ethernet Driver
- Reverse Engineered nForce Ethernet Driver
- SiS 900 PCI Ethernet Driver
- SMC 83c170 EPIC Ethernet Driver
- Sundance Alta Ethernet Driver
- TI ThunderLAN Ethernet Driver
- VIA Rhine Ethernet Driver
- Winbond W89c840 Ethernet Driver

For a complete list of PCI network interface devices supported by the above drivers, refer to the NASLite-M2 Hardware Reference Guide

NASLite-M2 provides built-in support for a number of common gigabit network interfaces. NASLite-M2 includes the following gigabit network interface drivers:

- 3Com 3c59x/3c9xx Ethernet Driver
- AceNIC/3C985/GA620 Gigabit Ethernet Driver
- Broadcom Tigon3 Gigabit Ethernet Driver
- D-Link DL2000-based Gigabit Ethernet Driver
- Intel(R) PRO/1000 Gigabit Ethernet Driver
- National Semiconductor DP83820 10/100/1000 Gigabit Ethernet Driver
- Packet Engines 'Hamachi' GNIC-II Gigabit Ethernet Driver
- Packet Engines Yellowfin G-NIC Gigabit Ethernet Driver
- RealTek RTL-8169 Gigabit Ethernet Driver
- SysKonnnect SK-NET SK-98xx Gigabit Ethernet Driver

For a complete list of PCI gigabit network interface devices supported by the above drivers, refer to the NASLite-M2 Hardware Reference Guide

NASLite-M2 also provides limited support for a number of ACPI (Advanced Configuration and Power Interface) features. Most notably, NASLite-M2 will allow for proper shutdown of supported ACPI-enabled motherboards using the associated front panel power button. That capability is extremely convenient when NASLite-M2 is operated as an appliance without an attached keyboard and

monitor. In other words, depressing the power button will have the same effect as shutting the server down via the Administration Utility.

NASLite-M2 also exports some selected ACPI status values via the Status information pages. ACPI-specific information can be viewed in the ACPI section at the bottom of the System Status page (See Status Information Pages Section).

A Few Words About RAID

RAID stands for Redundant Array of Independent (or, originally: Inexpensive) Disks. RAID is used to get fault tolerance and/or high performance by combining multiple hard disks. There are several levels of RAID, not all of which are fully redundant or fault tolerant. Below is a list of common RAID levels:

- RAID 0 - Bit striping
- RAID 1 - Mirroring
- RAID 3 - Bit striping with parity
- RAID 4 - Block striping with parity
- RAID 5 - Block striping with distributed parity

For server systems, RAID has been common for years. But also for home computers, RAID can be very useful. Hard disks crash after a certain period of time and the manufacturer's 5 year warranty will not help in recovering lost data files.

RAID implementations contain components such as RAID tables defining the configuration of RAID arrays, data structures to store the descriptors for cached data, engine(s) for calculating parity and the logic for handling I/Os to and from RAID arrays. These components may be implemented in software, typically in kernel-mode, or embedded in the controller for the secondary storage devices using which the RAID arrays are created.

There are many arguments one can present regarding which alternative is better. Generally, software RAID solutions are less expensive, but do place a higher workload onto the system processor as well as require specialized operating system configuration and maintenance. On the other hand, hardware RAID handles all RAID-specific tasks independently of the operating system and requires little or no specialized configuration.

In the event of failure, RAID arrays must be rebuilt. The first step is the exchange of the faulty disk with a new and fully operational replacement. The

second stage is the actual rebuilding of the array. Often, poorly configured hardware and lack of administrator proficiency result in data loss. That can be especially true with software RAID.

Hardware RAID is considerably more robust and simpler to configure, maintain and operate. Hardware RAID is a superior solution to software RAID in a networked environment as is typical for servers. Its benefits are even more significant when running applications with high CPU utilization or when operating servers with marginal or low CPU/RAM resources.

NOTE: RAID of any kind is not a substitute for a good backup. The purpose of RAID is to provide performance improvement or media redundancy and not backup facilities. Deleting files from a RAID array, for all intent and purposes, is irreversible.

Initial NASLite-M2 Installation

For the initial NASLite-M2 installation, you'll need to have a monitor and a keyboard connected to the computer. NASLite-M2 can be installed on a variety of boot media such as IDE, SATA, SCSI, USB and FireWire fixed disks, bootable hardware RAID volumes and USB or IDE Disk-On-Module (DOM) flash devices. NASLite-M2 can also boot live directly from the distribution CD-ROM.



Initial NASLite-M2 CD-ROM Boot Screen

Once you determine how you wish to install the OS onto your hardware you need to prepare the hardware by ensuring the computer BIOS is properly set for the attached devices and intended boot order. When ready, boot the NASLite-M2 distribution CD-ROM.

The initial boot screen provides the option to boot directly from the CD-ROM and configure to a floppy disk, launch the Installation Utility and install NASLite-M2 on a fixed disk or flash, or launch Memtest86+ to help diagnose hardware problems.

Running Directly From CD-ROM

NASLite-M2 does not need to be installed on a fixed disk like most operating systems. It can directly from the CD-ROM. A clean, formatted floppy disk is required and will be used to store the NASLite-M2 configuration settings.

If no keys are pressed at the initial boot screen, NASLite-M2 will automatically boot from the CD-ROM after a delay or approximately 10 seconds. After the boot sequence is complete, the initial login screen will be displayed.

Installing To Fixed Disk or Flash

This is very much a conventional installation so a fixed disk, a RAID volume, a flash drive or equivalent are necessary as a destination for the install. NASLite-M2 boot files take up very little space and using a 16MB or larger device should be sufficient. If a larger device is used, it is possible to configure and use the remaining capacity of the fixed disk as storage.

Selecting Option "i" at the initial CD-ROM boot screen will launch the NASLite-M2 Installation Utility. The Installation Utility will examine the available hardware for target devices and allow access to the installation menu only if all necessary criteria have been met.

At the Installation Menu, change the target (Option 1) to the device on which you wish to install. Details of the currently selected device are displayed above the menu options. With the intended target selected, install NASLite-M2 (Option 2). When complete, eject the CD-ROM and reboot. After the boot sequence is complete, the initial login screen will be displayed.

NOTE: Installing NASLite-M2 will reformat the destination device in its entirety. Any existing data on the device will be lost and should be backed up prior to installation.

1. Initial Login to NASLite-M2
2. Provide License ID
3. Configure Network Settings
4. Change Administration Password
5. Save Configuration Settings
6. Reboot to Apply Configuration
7. Unlock NASLite-M2
8. Configure storage disks
9. Save Configuration Settings
10. Reboot to unlock and mount storage disks

```
[ NASLite-M2 ] - Installation Utility CD-ROM

INITIALIZING

Starting environment configuration:

[ DONE ] - Filesystem configuration complete.
[ DONE ] - CD-ROM mounted.
[ DONE ] - Target device found.

Press ENTER to activate the NASLite-M2 Installer.  _
```

NASLite-M2 Installation Utility Initialization

Detailed explanation of each configuration step follows:

Step 1 - Initial Login to NASLite-M2 - At this stage of the configuration, NASLite-M2 is in Default Administration Mode. Synonymous to Factory Settings, Default Administration Mode is intended primarily to allow the administrator to configure the NASLite-M2 network settings, supply a valid License ID and change the default administration password. During Default Administration Mode, services are not started and fixed disk drives are not checked or mounted.

```
[ NASLite-M2 ] - Installation Utility CD-ROM

MAIN OPTIONS MENU

This utility facilitates the installation of NASLite-M2 to a suitable target device. The current target device is as follows:

TARGET: DISK-1 CAPACITY: 1,073,741,024 bytes
DEVICE: VMware Virtual IDE Hard Drive, SN# 01000000000000000001, v.00000001
INTERFACE: IDE, HOST-0, BUS-0, TARGET-1, LUN-0

1 - Change Target
2 - Install NASLite-M2 to Disk-1
* - Update Installation on Disk-1
* - Reset Configuration on Disk-1
* - Deactivate Configuration on Disk-1
A - About NASLite-M2
L - NASLite-M2 Licensing

E - Exit

Select: > _
```

NASLite-M2 Installation Utility Main Options Menu

```
NASLite-2 USB Network Attached Storage Server Operating System v2.0b 05a2006

Checking resources !=> ..... [ DONE ]
Detecting configuration device ( Disk-1 ) ..... [ DONE ]
Retrieving configuration settings ..... [ FAIL ]
Verifying license ID ( ) ..... [ FAIL ]
Setting default administration mode ( admin / nas ) ( * ) ..... [ DONE ]

NASLite-2 login: _
```

Typical Console Login Screen Default Administration Mode

Initial NASLite-M2 Configuration

After NASLite-M2 setup is completed, the new server must be configured for use. Initial configuration is summarized as follows:

The administrative login name is always **admin** (in lower case letters). During Default Administration Mode, the admin password is always **nas** (also in lower case letters). When you have successfully logged in, the NASLite-M2 Administration Utility Main Options Menu will be displayed. Detailed description of the NASLite-M2 Administration Utility menus and options is provided in the Administration

Utility section. All configuration settings are done using this menu.

Step 2 - Supply License ID – NASLite-M2 requires a valid License ID in order to enable NAS functionality. A typical License ID consists of 5 sets of 5 alphanumeric characters and should be unique for each running copy of NASLite-M2. A unique license ID is supplied with each copy of NASLite-M2 at the time of purchase. You can enter a valid License ID by using License (Option L) of the Administration Utility Main Options Menu.

Step 3 - Configure Network Settings – Basic NASLite-M2 network configuration consists of setting the IP Address, Server Name and Workgroup Name. That can be achieved in the Network Configuration Menu (Option 1). Make sure that the IP address is unique and is in the same subnet as the rest of the local workgroup computers. The server name is what you will see when you browse the workgroup or network from your computer and should also be unique. When all network settings are entered and satisfactory, return to the Main Options Menu (Option R).

NOTE: *Setting a valid default gateway may make the server contents world-visible. Take particular care with your network setup especially if a broadband Internet connection is available via the same gateway.*

Step 4 - Change Administration Password – It is recommended that the default NASLite-M2 password be changed to something more effective than the Default Administration Mode password. Change the admin password (Option 5) at this time.

Step 5 - Save Configuration Settings - The network settings, licensing info as well as the administration password are stored on the NASLite-M2 configuration media, so when you have set the new network settings, licensing information and the administration password, the new settings must be saved (Option 9).

Step 6 - Reboot to Apply Configuration - To apply the new configuration settings the NASLite-M2 server must be rebooted (Option 7). At this stage, booting NASLite-M2 with the new configuration settings will launch only TELNET and HTTP services.

Now it is good to ensure that the network interface was detected and properly initialized. The **Detecting Network Device** line should indicate the current

status. If the network device is initialized and ready, the READY audible prompt will be generated (see NASLite-M2 as an Appliance).

If NASLite-M2 fails to detect and initialize the network interface, NASLite-M2 generates the CHECK NETWORK audible prompt. In this case, the network interface may be damaged or not supported. A compatible, working network interface must be installed.

NOTE: *Previously configured storage drives or storage drives configured with other versions of NASLite will be mounted and exported accordingly at this time.*

```


NASLite-2 USB Network Attached Storage Server Operating System v2.0b 05a2006
Checking resources !==> ..... [ DONE ]
Detecting configuration device ( Disk-1 ) ..... [ DONE ]
Retrieving configuration settings ..... [ DONE ]
Verifying license ID ( ..... ) ..... [ DONE ]
Detecting network device ( eth0 set to 192.168.1.251 ) ..... [ DONE ]
Generating System ID ( SE-6B4B0D3255BFEF95681890A ) ..... [ DONE ]
Verifying Unlock Code ( 00000 ) ..... [ FAIL ]
Checking storage filesystem ( Disk-0 ) ..... [ FAIL ]
Checking storage filesystem ( Disk-1 ) ( Boot/Config Device ) ..... [ PASS ]
Setting normal administration mode ..... [ DONE ]


NASLite-2 login: _
    
```

**Typical Console Login Screen
Normal Administration Mode - Locked**

Step 7 - Unlock NASLite-M2 – Currently, NASLite-M2 is locked with only TELNET and HTTP available for access via the network. Use another networked computer with a web browser to access the NASLite-M2 Status pages via HTTP.

Once you have access to the Status pages, navigate to the Unlock page. Here you'll be presented with directions and basic facilities that will allow you to easily retrieve an appropriate unlock code for your NASLite-M2 server. You must have internet access for that to take place.

| PARAMETER | VALUE |
|------------|---|
| PRODUCT | NASLite-M2 |
| LICENSE ID |  |
| SYSTEM ID | SE-6B4B0D3255BFEF95601890A |

 **NOTE:** Click on this link button to submit the above information and request an Unlock Code from Server Elements.

NASLite-M2 Unlock Screen Detail

A typical unlock code consists of 5 alphanumeric characters and is unique to your particular NASLite-M2 installation.

Once you have the unlock code, continue by returning to the Administration Utility. Use Unlock (Option U) to enter the unlock code.

The unlock code is network hardware-specific and will not work on other installations. Adding or removing storage disks will not affect unlock code requirements.

Step 8 - Configure Storage Disks – NASLite-M2 fixed disk drives need to be set up next (Option 3). The Storage Configuration Menu screen will list all available storage disks and the associated interface details. It is important to note that SATA, SCSI, USB, FireWire and RAID attached storage drives will all appear as SCSI disks.

From the Storage Configuration Menu, select the storage disk you wish to configure. That will display the associated Disk-N Configuration Menu. Use Format Disk-N (Option 8) to partition and format the disk. Allow a few minutes for larger drives to complete the initialization process.

NOTE: During storage disk configuration, all data currently on the fixed disk will be lost. If you wish to preserve the data, make sure it's properly backed up before configuring the fixed disk for use as NASLite-M2 storage.

With format complete, at the Disk-N Configuration Menu, select the appropriate settings for Export Disk-N (Option 1), Set Disk-N Capacity Alarm (Option 2) and Set Disk-N S.M.A.R.T. (Option 3) options. Refer to the Administration Utility section for complete details on all options.

When all Disk-N configuration settings are complete and satisfactory, return to the Storage Configuration Menu (Option R). Repeat Disk-N configuration for each available disk as necessary.

Step 9 - Save Configuration Settings - The new configuration settings, containing the unlock code must be stored on the NASLite-M2 configuration media, so when you have completed the configuration the new settings must once again be saved (Option 9).

Step 10 – Reboot to unlock and mount storage disks - To finalize the NASLite-M2 configuration, mount all newly configured storage disks and launch all NAS services, a final reboot is necessary. Reboot the NASLite-M2 server (Option 7). Assuming all configuration settings are correct, the NASLite-M2 server should now be online and ready for use.

```
NASLite-M2 Network Attached Storage Server Operating System v2.10 12-2008
Checking resources !=> ..... [ DONE ]
Detecting configuration device ( Disk-0 ) ..... [ DONE ]
Retrieving configuration settings ..... [ DONE ]
Verifying license ID ( ..... ) ..... [ DONE ]
Detecting network device ( eth0 set to 192.168.2.200 ) ..... [ DONE ]
Generating System ID ( SE-E0A0AE303E0E5156A18D58F ) ..... [ DONE ]
Verifying Unlock Code ( 1E211 ) ..... [ DONE ]
Checking storage filesystem ( Disk-0 ) ( Clean ) ..... [ DONE ]
Checking storage filesystem ( Disk-1 ) ( Clean ) ..... [ DONE ]
Mounting storage ( Disk-0-1 ) ..... [ DONE ]
Starting servers ( TELNET HTTP RSYNC FTP CIFS NFS AFP DAAP UPNP ) ... [ DONE ]
Setting normal administration mode ..... [ DONE ]

naslite-m2 login: _
```

Typical Console Login Screen Normal Administration Mode - Unlocked

Remote Administration

NASLite-M2 can be administered remotely via TELNET. All administration options available via the console are also available remotely via TELNET. To confirm remote access, it is a good idea to log in to the NASLite-M2 server using TELNET from any computer on your network at this point. For example,

to login via TELNET from Windows, follow these steps:

1. Click Start, then click Run.
2. Open a TELNET session by Typing telnet and a space and then type the IP address of the NASLite-M2 server. For example: telnet 192.168.1.251, then click OK
3. You should get the NASLite-M2 login prompt. Login and you should see the NASLite-M2 Administration Utility Options Menu.
4. Log out (Option E).
5. Your TELNET window will close.

NOTE: While in Default Administration Mode, the NASLite-M2 Administration Utility will not be accessible remotely via TELNET.

Remotely-Hosted Storage

NASLite-M2 incorporates the ability to export remotely hosted volumes made available to the network via NFS. In other words, if there are additional NASLite servers visible to NASLite-M2, it is possible to share all of their storage disks as if all of those disks were physically mounted on the NASLite-M2 computer. That functionality can be very useful in many different scenarios.

To illustrate how remotely-hosted storage can be utilized, it can be assumed that two NASLite-M2 servers are available on a 192.168.1.0 network. The server addresses are 192.168.1.250 and 192.168.1.251 where the latter will be sharing all available storage. Begin by ensuring that both servers are properly configured, fully operational and available for access. The steps are as follows:

1. Access the Administration Utility of the master server. In this scenario, the master server's address is 192.168.1.251.
2. Once logged in, at the Main Options Menu access the Storage Configuration Menu (Option 3).
3. At the Storage Configuration Menu, access the General Storage Options Menu (Option G).

4. At the General Storage Options Menu, select Set Remote Storage Hosts (Option 4).
5. At the Remote Hosts prompt, enter the IP address of the remote host and press ENTER. In this scenario the remote host IP address is 192.168.1.250.

```
[ NASLite-2 ] - Administration Utility - NASLite-2 USB v2.0b 05a2006
SET REMOTE STORAGE HOSTS

NASLite-2 USB is capable of mounting and exporting remotely-hosted storage
volumes that are made available via NFS. To export remote storage volumes,
NASLite-2 USB will automatically query the specified remote hosts and process
all available NFS storage volumes accordingly. To add or to remove remote
hosts, simply provide the associated remote host IP address. New IP addresses
will be added, while IP addresses that are listed will be removed.

Currently, the following hosts will be processed: None Specified

Example: > 192.168.1.1

Remote Host IP: > _
```

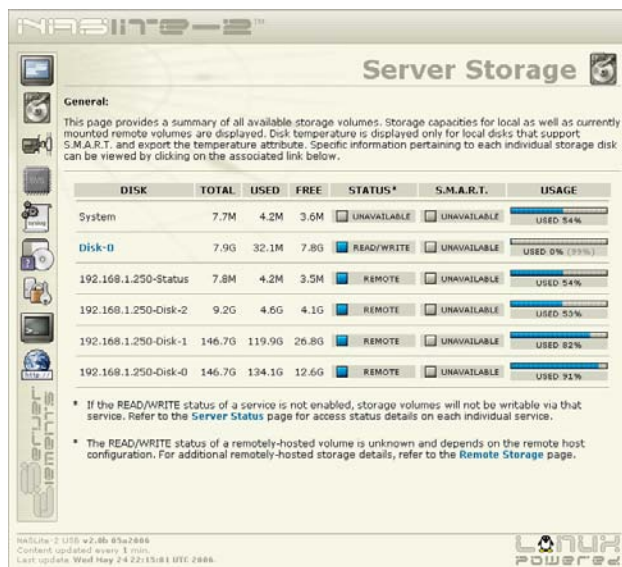
NASLite-M2 Administration Utility Set Remote Storage Hosts Screen

6. Return to the Storage Configuration Menu (Option R) and then to the Main Options Menu (Option R).
7. Select Save Configuration (Option 9) to save the new settings. Ensure the remote host is on and available, and reboot the master server (Option 7).

listing: /Remote/

| access | user | group | date | size | name |
|------------|-------|-------|--------------|-------|----------------------|
| drwxr-xr-x | admin | admin | May 24 20:53 | <DIR> | .. |
| drwxrwxrwx | admin | admin | May 10 11:11 | <DIR> | 192.168.1.250-Disk-0 |
| drwxrwxrwx | admin | admin | Jan 30 01:19 | <DIR> | 192.168.1.250-Disk-1 |
| drwxrwxrwx | admin | admin | May 18 09:28 | <DIR> | 192.168.1.250-Disk-2 |
| drwxr-xr-x | admin | admin | May 25 07:40 | <DIR> | 192.168.1.250-Status |

Typical Remote Share Content



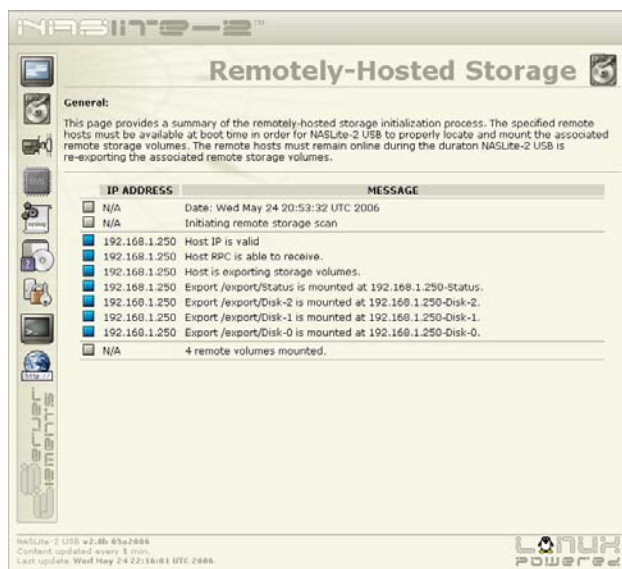
**NASLite-M2 Status Page
Typical Server Storage Showing
Remotely-Hosted Storage Volumes**

convention for remotely-hosted storage volumes is **X.X.X.X-DISK**, where **X.X.X.X** is the IP address of the remote host and **DISK** is the name of the associated storage disk.

Remotely-hosted storage volumes are not shared individually as are local storage disks but are made available via the **Remote** share. The Remote share will contain all remotely-hosted volumes from one or more remote hosts.

Detailed information about the remotely-hosted storage volumes is available via the Server Storage status page. Information about the physical hardware as well as associated access rights are not available and are not shown.

Additional information pertaining to the remote hosts is available via the Remotely-Hosted Storage status page. The Remotely-Hosted Storage status page can be used to troubleshoot most common remotely-hosted storage initialization problems.



**NASLite-M2 Status Page
Typical Remotely-Hosted Storage**

NASLite-M2 Security

The storage made available by NASLite-M2 can be set as Read/Write or as Read-Only. The same is also true for the individual export services. Other than that, storage is not restricted in any way. As a community file server, any user capable of accessing the NASLite-M2 server via SMB/CIFS, NFS, FTP RSYNC or HTTP can read and write openly. Only the NASLite-M2 Administration Utility is password protected in order to restrict unauthorized access to the Options Menu.

Data stored on a NASLite-M2 server can easily be secured using a number of client-side applications. One such solution is TrueCrypt. TrueCrypt is a freely available disk encryption software for Windows XP/2000/2003 and Linux and can be downloaded from the TrueCrypt website (<http://www.truecrypt.org/>)

If everything is properly configured, once the master server reboots, all NFS exported storage on the remote host is now available on the master server. The total number of available remotely-hosted volumes is shown on the Mounting Remote Storage line on the console login screen. The naming







Using The SMB/CIFS Server

NASLite-M2 exports all available storage disks to the local network via SMB/CIFS (Server Message Block)/ (Common Internet File System), commonly known as Microsoft Windows Networking. NASLite-M2 will export all installed and configured fixed disk drives available on the server computer as **Disk-0** through **Disk-N** in consecutive order where N will be

based on the total number of installed disks. These names are fixed and cannot be changed. All **Disk-N** folders are accessible by all users. NASLite-M2 also exports three additional shares as follows:

1. **Shares** – Exports all available storage volumes via a single share.
2. **Remote** – Exports all remotely hosted storage volumes.
3. **Status** – Exports NASLite-M2 status information pages.

NASLite-M2 will appear as a member of the local workgroup when the Network Neighborhood is browsed. Accessing the NASLite-M2 storage drives is exactly the same as accessing remote windows shares. In addition to Windows, NASLite-M2 SMB/CIFS shares can be accessed by most operating systems including OS X and Linux.

| Name ▲ | Comments |
|--|---------------------------|
|  Disk-0 | Share Disk-0 (Read/Write) |
|  Disk-1 | Share Disk-1 (Read/Write) |
|  Disk-2 | Share Disk-2 (Read/Write) |
|  Remote | Share Remote (Read/Write) |
|  Shares | All Shares (Read/Write) |
|  Status | Share Status (Read/Write) |

Typical NASLite-M2 Workgroup Shares

Using The NFS Server.

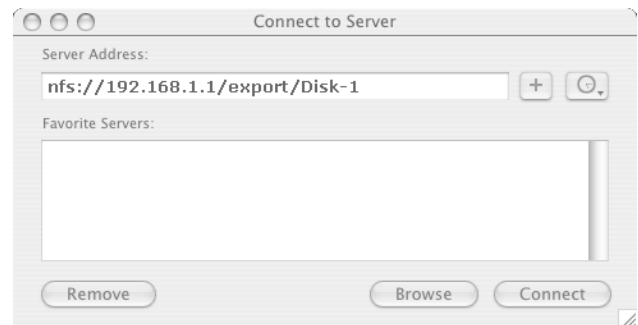
NASLite-M2 exports all storage disks to the local network via NFS (Network File System). NASLite-M2 will name all installed and configured fixed disk drives available on the server computer as **/export/Disk-0** through **/export/Disk-N** in consecutive order where N will be based on the total number of installed disks. These names are fixed and cannot be changed. All **Disk-N** folders are accessible by all users. The **/export/Status** export is made available by default, and is read-only.

To connect to a NASLite-M2 export via UNIX, the **mount** command can be used. Connections from OS X or KDE however are more convenient using

the available GUI facilities. All that is required is the appropriate server export address as illustrated in the OS X example shown below:

Most UNIX operating systems should readily support mounting of remote NFS exports. **Windows Services for UNIX** is required for Windows NT/2K/XP to mount NASLite-M2 NFS exports.

To determine which drives are available and exported by NASLite-M2, one can examine the information available on the Status pages.



Connecting to NASLite-M2 NFS exports via OS X

Using The AFP Server

NASLite-M2 exports all storage disks to the local network via AFP (Apple Filing Protocol). NASLite-M2 will name all installed and configured fixed disk drives available on the server computer as **Disk-0** through **Disk-N** in consecutive order where N will be based on the total number of installed disks. These names are fixed and cannot be changed. All **Disk-N** folders are accessible by all users. NASLite-M2 also exports two additional folders as follows:

1. **Remote** – Exports all remotely hosted storage volumes.
2. **Status** – Exports NASLite-M2 status information pages.

You will be able to connect to the NASLite-M2 server via any AFP client as illustrated in the OS X example shown below:



Connecting to NASLite-M2 AFP exports via OS X

When connecting to NASLite-M2 via AFP, make sure to select "Connect As: Guest" as apposed to a Registered User. When the AFP service is enabled NASLite-M2 will also advertise all available resources via Bonjour. A typical example of an OS X finder listing available resources is shown below:



Typical Bonjour-advertised resources made available by NASLite-M2

Using The DAAP Server

NASLite-M2 will automatically place a MEDIA folder located at the root of each storage drive. Media files placed inside the MEDIA folder of each share will be indexed by the DAAP service and made available as a shared iTunes library to all clients supporting the DAAP protocol.



Typical NASLite-M2 Shared Content as displayed by iTunes

Using The UPNP Server

The NASLite-M2 will automatically place a MEDIA folder located at the root of each storage drive. Media files placed inside the MEDIA folder of each share will be indexed by the UPNP service and made available for streaming to all clients supporting the UPNP proto. It is also important that the UPNP profile most appropriate for your target is selected. Determining which profile works best depends on the UPNP client and on the type of media you wish to stream. Using trial-and-error may be helpful.

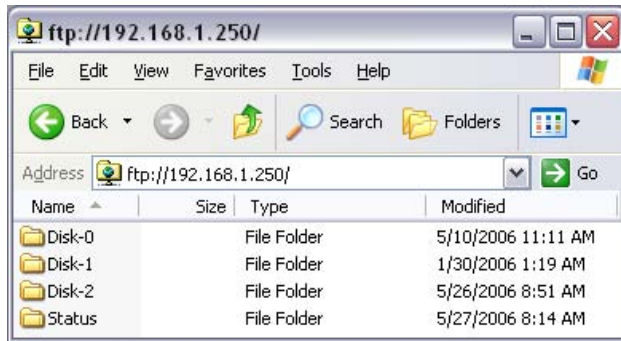
Using The FTP Server

NASLite-M2 exports all storage disks to the local network via FTP (File Transfer Protocol). NASLite-M2 will name all installed and configured fixed disk drives available on the server computer as **Disk-0** through **Disk-N** in consecutive order where N will be based on the total number of installed disks. These names are fixed and cannot be changed. All **Disk-N** folders are accessible by all users. NASLite-M2 also exports two additional folders as follows:

1. **Remote** – Exports all remotely hosted storage volumes.
2. **Status** – Exports NASLite-M2 status information pages.

You will be able to connect to the NASLite-M2 server via any FTP client. For example if your NASLite-M2 server IP address is set to 192.168.1.251, entering `ftp://192.168.1.251` in

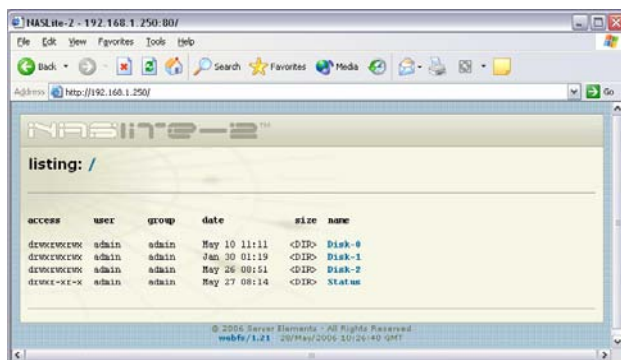
the Windows Explorer's address bar will access the server contents. Here files and folders may be dragged-and-dropped to and from the NASLite-M2 server window.



Typical NASLite-M2 FTP Shared Folders

Using The HTTP Server

The NASLite-M2 storage contents can be accessed using any web browser via HTTP (Hypertext Transfer Protocol). For example assuming that your NASLite-M2 server IP address is 192.168.1.251. Entering `http://192.168.1.251` in the browser's address bar can then access the server content inside the browser window. All NASLite-M2 storage contents are made available via HTTP as read only regardless of the storage drive access setting.



Typical NASLite-M2 HTTP Content

The NASLite-M2 HTTP server supports a complete set of mime types, making it the perfect solution for serving music files, digital images, scanned forms and documents, HTML files, PDF documents, movie files or any other content suitable for read-only intranet web distribution.

Using The RSYNC Server

The NASLite-M2 storage contents can be accessed via an rsync client for low-bandwidth file transfers. Best suited for syncing folder content, rsync can be very effective as an integrated backup solution. Rsync is available for a wide range of posix-compliant platforms as well as Windows variants with the aide of cygwin. Refer to the rsync website (<http://rsync.samba.org/>) for complete details on this powerful incremental file transfer utility.

Content Backup Mirroring

NASLite-M2 storage disks can be set to act as mirror copies of other storage disks for the purpose of content replication or backup. Both local and remote disks can be mirrored. Mirrors can be set to sync once per day at any given hour. In order to designate a storage disk as a mirror, NASLite-M2 requires three parameters as follows:

1. Remote IP address (example: 192.168.1.3).
2. Source disk name (example: Disk-2).
3. Mirror sync hour (example: 04)

The three necessary parameters are input on a single line and are separated with a slash (example: 192.168.1.3/Disk-2/04). If the mirror source is local, then the remote server IP address is omitted and a leading slash is used (example: /Disk-2/04). If the hour parameter is omitted, then 00 is assumed and the mirror will sync at the beginning of each new day.

The NASLite-M2 rsync service must always be enabled on a remote source. However it is not required for local mirroring or on a server hosting the destination mirror disk.

Mirroring parameters are saved in a file named MIRROR at the root of the mirror drive. Seeing that file at the root of a storage drive is an indication that the disk is a mirror and that the content is a copy.


```
[ NASLite-2 ] - Administration Utility - NASLite-2 USB v2.03 11-2006

MIRROR TO DISK-0

Disk-0 can be set as a daily mirror of a local or remote storage disk.
Mirroring accepts a maximum of three parameters as follows:

1. Optional remote NASLite-2 server IP address (Example: 192.168.1.1).
2. Mandatory NASLite-2 source disk (Example: Disk-1).
3. Optional mirror time UTC (Example: 21).

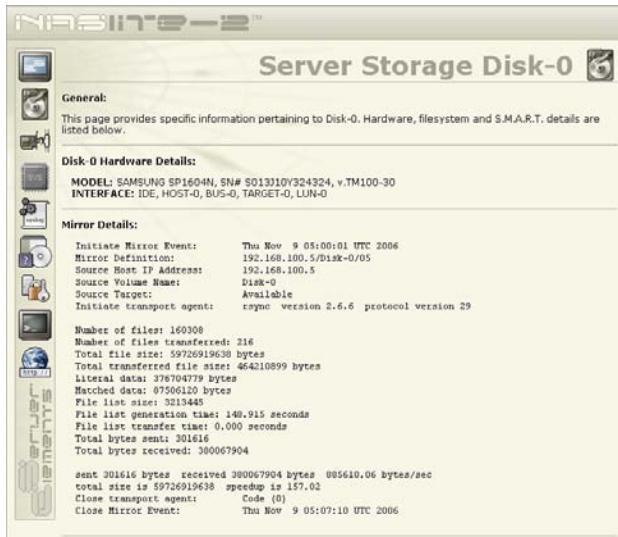
Parameters must be separated by a slash (Example: 192.168.1.1/Disk-1/21).
Refer to the Installation and Administration Guide for details.

Mirror parameter settings:

Remote: [ 192.168.100.5 ]
Source: [ Disk-0 ]
Mirror: [ 05 ]

Mirror: > _
```

**NASLite-M2 Administration Utility
Typical Mirror to Disk-N Screen**



**NASLite-M2 Status Page
Typical Server Storage Disk Page
Showing Mirror Details**

Mirroring is performed with the aide of rsync, so the process is both CPU and memory intensive. During syncing, data about the source and/or the destination files are stored in memory. A good average to observe is 100 bytes per file, so the process of mirroring 800,000 files will consume approximately 80 megabytes or RAM. When setting multiple mirrors on a given NASLite-M2 server, it is important to stagger the sync times in order to avoid

unnecessary CPU load or insufficient memory problems.

The NASLite-M2 disk backup mirroring can be very useful when properly implemented. It can be utilized within a VPN for cross-office filesystem replication, daily disk-to-disk local snapshot backups or to mirror between two redundant NASLite-M2 servers. External USB or FireWire disks are perfectly suited for use as mirrors and can be very flexible for that purpose.

NASLite-M2 as an Appliance

NASLite-M2 is well suited for operation as a network appliance, remotely administered and without an attached monitor and keyboard. Remote administration can be performed from any computer on the same network via TELNET.

To compensate for the lack of visible indicators on the physical server, NASLite-M2 employs a number of audible prompts that indicate states and or conditions. The audible prompts are generated via the PC speaker, so no additional sound hardware is necessary.

NOTE: *In reference to the NASLite-M2 Audible Prompts table, the information provided in the AUDIBLE PROMPT column represents the number of beeps and their pitch. For example, when the NASLite-M2 server is ready for use, it will generate a READY prompt by sounding two 300Hz beeps followed by a single 700Hz beep.*

| AUDIBLE PROMPT | STATE |
|------------------------|---|
| 2 x 300Hz 1 x 700Hz | READY - Server is online and ready for use. |
| 2 x 700Hz 1 x 300Hz | SHUTDOWN - Power may be shut down manually in 5 seconds. |
| 5 x 200Hz | CHECK NETWORK - Unable to detect or initialize network interface card. |
| 3 x 700Hz 3 x 300Hz | CHECK DISK - Fixed disk drive fails overall SMART self-assessment. |
| 2 x 700Hz 5 x 300Hz | CHECK RAID - Hardware RAID degradation alert |

| AUDIBLE PROMPT | STATE |
|------------------------|--|
| 1 x 700Hz 1 x 300Hz | CHECK DISK MIRROR - Error detected during disk mirror event |
| 3 x 700Hz | CHECK DISK CAPACITY - Fixed disk drive usage at or above capacity alarm monitor. |
| 5 x 700Hz | DEFAULT ADMINISTRATION MODE – Server started without a configuration floppy disk. |

NASLite-M2 Audible Prompts

Disk Health and Monitoring

When the NASLite-M2 server boots, each fixed disk drive filesystem is identified and checked. If a filesystem is identified and maintenance is scheduled, NASLite-M2 automatically analyzes and attempts to fix any existing filesystem problems before storage is made available for use.

NOTE: *When a fixed disk drive filesystem is being checked, NASLite-M2 storage will not be available for use. The pending check may take anywhere from 1 to 20 or more minutes depending on the fixed disk drive size and contents. A pending check can be identified by observing the associated fixed disk drive activity LED shortly after booting NASLite-M2. The associated fixed disk drive activity LED will be continuously on for the duration of the check. Current initialization status can also be observed by examining the console screen if an attached monitor is present.*

NASLite-M2 also monitors the health of the storage fixed disk drives using Self-Monitoring, Analysis and Reporting Technology (S.M.A.R.T.) built into most modern fixed disk drives. In many cases, NASLite-M2 will provide advanced warning of fixed disk drive degradation and failure. The S.M.A.R.T. status of the configured storage fixed disk drives may be checked every time the status pages are updated. The fixed disk drives S.M.A.R.T. status can be viewed using the NASLite-M2 Status pages made available through the **Status** share.

In the event of approaching failure, if S.M.A.R.T. support is available, NASLite-M2 will begin generating a 5-beep audible CHECK DISK alarm

every time the status pages are updated. At that time it is best to take the necessary precautions to remove important data from the affected disk.

In cases where the storage volume is provided by hardware RAID, the S.M.A.R.T. status of the individual fixed disk drives in the RAID array will not be available. NASLite-M2 will monitor the kernel messages for RAID alerts and sound a CHECK RAID audible prompt in the event of a problem.

Administration Utility

The NASLite-M2 Administration Utility is a console-based menu-driven utility that can be accessed at the server computer via a locally connected monitor and keyboard, or remotely through TELNET. The NASLite-M2 Administration Utility presents all available configuration options via an easy to use multi-level menu structure. Available option menus and associated configuration options are covered in detail below.

Main Options Menu

The Main Options Menu is the first level configuration menu displayed by the NASLite-M2 Administration Utility. All secondary menus and options can be accessed from this location. The Main Options Menu provides access to the following:

- **Network Configuration** (Option 1) - Provides access to the Network Configuration Menu covered in detail below.
- **Services Configuration** (Option 2) - Provides access to the Services Configuration Options Menu covered in detail below.
- **Storage Configuration** (Option 3) - Provides access to the Storage Configuration Options Menu covered in detail below.
- **Set Administrative Password** (Option 5) - Changes the **admin** user password. During Default Administration Mode, the admin user password is always **nas**.
- **Set System Date and Time** (Option 6) - Sets the NASLite-M2 computer date and

time. Provided values must be in GMT time.

```
[ NASLite-2 ] - Administration Utility - NASLite-2 USB v2.0b 05a2006

MAIN OPTIONS MENU

1 - Network Configuration
2 - Services Configuration
3 - Storage Configuration
* - Reserved
5 - Set Administrative Password
6 - Set System Date and Time
7 - Reboot
8 - Shutdown
9 - Save Configuration

A - About NASLite-2 USB
L - License - ( ##### )
U - Unlock - ( 57E3D )
T - Tools and Utilities
E - Exit

Select: >
```

NASLite-M2 Administration Utility Main Options Menu

- **Reboot** (Option 7) - Reboots the NASLite-M2 server.
- **Shutdown** (Option 8) - Shuts down the NASLite-M2 server.
- **Save Configuration** (Option 9) - Saves NASLite-M2 configuration settings to the associated configuration media.
- **About** (Option A) - Displays a basic description of NASLite-M2.
- **License** (Option L) – Sets a valid License ID.
- **Unlock** (Option U) - Sets a valid system unlock code.
- **Tools and Utilities** (Option T) - Provides access to the Tools and Utilities Menu covered in detail below.
- **Exit** (Option E) - Exits the NASLite-M2 Administration Utility and returns to the login prompt.

NOTE: While in Default Administration Mode, the NASLite-M2 Administration Utility will not be accessible remotely via TELNET.

Network Configuration Menu

The Network Configuration Menu allows access to all NASLite-M2 network configuration options. Each configuration option screen provides sufficient instructional assistance and feedback to help ensure a properly configured server. The Network Configuration Menu provides access to the following:

```
[ naslite-m2 ] - Administration Utility - NASLite-M2 v2.10 12-2008

NETWORK CONFIGURATION MENU

The options in this menu determine which network NASLite-M2 will be a part of, and how it will appear to clients on the associated network. For security reasons, it is recommended that NASLite-M2 is placed on a non-routable network such as 10.X.X.X or 192.168.X.X.

1 - Change IP Address [ 192.168.2.200 ]
2 - Change Netmask [ 255.255.255.0 ]
3 - Change Gateway [ 0.0.0.0 ]

4 - Change Name [ naslite-m2 ]
5 - Change Comment [ Network Storage ]
6 - Change Workgroup [ acme ]
7 - Change Time Server [ 0.0.0.0 ]

8 - Select Interface [ LAST ]

R - Return To Main Option Menu

Select: > _
```

NASLite-M2 Administration Utility Network Configuration Menu

- **Change IP Address** (Option 1) – Sets the NASLite-M2 network IP address. Calculates and sets the appropriate netmask and broadcast based on the supplied network IP address.
- **Change Netmask** (Option 2) – Sets the NASLite-M2 netmask. Calculates and sets the appropriate broadcast value based on the supplied network IP address and netmask.
- **Change Gateway** (Option 3) – Sets the default network gateway IP address.

NOTE: Setting a valid default gateway may make the server contents world visible. Take particular care with your network setup especially if a broadband Internet connection is available via the same gateway.

- **Change Name** (Option 4) – Sets the NASLite-M2 name. This value is especially important if NASLite-M2 is a part of a Microsoft network workgroup. The supplied name should be unique on the associated network.
- **Change Comment** (Option 5) – Sets a generic short comment that is used by select export services for share and export identification.
- **Change Workgroup** (Option 6) – Sets the NASLite-M2 workgroup. This value is especially important if NASLite-M2 is a part of a Microsoft network workgroup. The supplied name should match the associated network workgroup.
- **Change Time Server** (Option 7) – Sets a remote timeserver to be used for automatic synchronization of the NASLite-M2 system clock. The provided value must be a valid IP address and not an URL. Synchronization occurs once per day. If an Internet timeserver is used, then NASLite-M2 must also have access to a valid gateway as set by Option 3 above.
- **Select Interface** (Option 8) – Sets the network interface that will be used. In cases where more than one network interface is present, NASLite-M2 can be configured to use the first or last found.
- **Return To Main Option Menu** (Option R) – Exits the Network Configuration Menu and returns to the Main Options Menu.

```
[ naslite-m2 ] - Administration Utility - NASLite-M2 v2.10 12-2008

SERVICE CONFIGURATION MENU

Currently Active ( TELNET HTTP RSYNC FTP SMB/CIFS NFS AFP DAAP/UPNP )

1 - TELNET          [ ON ] (ON, --)
2 - HTTP           [ ON ] (ON, --)
3 - RSYNC          [ RW ] (RW, RO, --)
4 - FTP            [ RW ] (RW, RO, --)
5 - SMB/CIFS       [ RW ] (RW, RO, --)
6 - NFS            [ RW ] (RW, RO, --)
7 - AFP            [ RW ] (RW, RO, --)
8 - DAAP           [ ON ] (ON, --)
9 - UPNP           [ ON ] (ON, --)
M - DAAP/UPNP OPTIONS
S - Status Update  [ 01 ] (01, 05, 10, 15, 30, 45, 1h, 4h, 8h, --)

R - Return To Main Option Menu

Select: > _
```

NASLite-M2 Administration Utility Service Configuration Menu

- **TELNET** (Option 1) – Sets the TELNET service as ON or disabled. If the TELNET service is set to disabled, remote access to the Administration Utility will be disabled.
- **HTTP** (Option 2) – Sets the HTTP service as ON or disabled.
- **RSYNC** (Option 3) – Sets the RSYNC service as Read-Only, Read/Write or disabled.
- **FTP** (Option 4) – Sets the FTP service as Read-Only, Read/Write or disabled.
- **SMB/CIFS** (Option 5) – Sets the SMB/ CIFS service as Read-Only, Read/Write or disabled.
- **NFS** (Option 6) – Sets the NFS service as Read-Only, Read/Write or disabled.
- **AFP** (Option 7) – Sets the AFP service as Read-Only, Read/Write or disabled.
- **DAAP** (Option 8) – Sets the DAAP (iTunes) service as ON or disabled.
- **UPNP** (Option 9) – Sets the UPNP service as ON or disabled.
- **DAAP/UPNP OPTIONS** (Option M) – Provides access to the DAAP/UPNP

Service Configuration Menu

The Service Configuration Menu provides the means to make pertinent adjustments to all NASLite-M2 services. Currently active and running services are also displayed. All available options are designed to behave as rotating selectors, meaning that selecting the option will simply change it's status to the next available state. For example selecting Option 1 will change the state of the TELNET service from [ON] to [--](disabled) and back again. The Service Configuration Menu provides the following options:

Options Menu.

- **Status Update** (Option S) – Sets the Status Pages update time interval. An interval of 1, 5, 10, 15, 30, and 45 minutes as well as 1, 4 and 8 hours can be set.
- **Return To Main Option Menu** (Option R) – Exits the Service Configuration Menu and returns to the Main Options Menu.

DAAP/UPNP Options Menu

The DAAP/UPNP Options Menu provides DAAP and UPNP specific configuration options as follows:

```
[ naslite-m2 ] - Administration Utility - NASLite-M2 v2.10 12-2008

DAAP/UPNP OPTIONS MENU

 1 - Swap Area Target           [ Disk-1 ]
 2 - DAAP Background Media Indexing [ ON ]
 3 - DAAP Media Indexing Type   [ FAST ]
 4 - DAAP Reindex Content

 5 - UPNP Compliance Profile    [ GENERIC ]
 6 - UPNP Reindex Content

 R - Return To Service Configuration Menu

Select: > _
```

NASLite-M2 Administration Utility DAAP/UPNP Options Menu

- **Swap Area Target** (Options 1) – Sets the storage area that will be used as scratch space by the DAAP and UPNP services. The Swap Area Target must be a local write-enabled, storage drive.
- **DAAP Background Media Indexing** (Options 2) – Sets DAAP background indexing to ON or disabled.
- **DAAP Media Indexing Type** (Options 3) – Sets DAAP media indexing to FAST, NORMAL or AGGRESSIVE.

- **DAAP Reindex Content** (Options 4) – Cause the DAAP service to reindex available media files.
- **UPNP Compliance Profile** (Options 5) – Sets the UPNP compliance profile to GENERIC, XBOX, PS3 and DLNA.
- **UPNP Reindex Content** (Options 6) – Cause the UPNP service to reindex available media files.
- **Return To Service Configuration Menu** (Option R) – Exits the DAAP/UPNP Options Menu and returns to the Service Configuration Menu.

Storage Configuration Menu

The Storage Configuration Menu provides the means to configure and maintain all NASLite-M2 storage. The Storage Configuration Menu provides access to the following:

```
[ NASLite-2 ] - Administration Utility - NASLite-2 USB v2.0b 05a2006

STORAGE CONFIGURATION MENU

 0 - Disk-0, IDE-0-0-0-0
 1 - Disk-1, IDE-0-1-0-0
 2 - Disk-2, SCSI-0-0-0-0
 * - Disk-3, SCSI-1-0-0-0

 G - General Storage Option Menu
 R - Return To Main Option Menu

Select: > _
```

NASLite-M2 Administration Utility Storage Configuration Menu

- **Disk-N** (Options 0 through N) - Provides access to the Disk-N Configuration Menu covered in detail below.
- **General Storage Options** (Option G) - Provides access to the General Storage

Options Menu covered in detail below

- **Return To Main Option Menu** (Option R) – Exits the Storage Configuration Menu and returns to the Main Options Menu.

Disk-N Configuration Menu

The Disk-N Configuration Menu provides all necessary options required for individual storage disk configuration and maintenance. Hardware-specific information as well as disk usage are displayed for proper device identification. The Disk-N Configuration Menu provides the following options:

```
[ NASLite-M2 ] - Administration Utility - NASLite-M2 USB v2.03 11-2006

DISK-0 CONFIGURATION MENU

Disk Model: SAMSUNG SP1604N, SN# S013J10V324324, v.TM100-30
Interface: IDE, HOST-0, BUS-0, TARGET-0, LUN-0
Status:     DISK IS MOUNTED!
Usage:      146.7G / 55.3G / 91.4G / 38% - ( Size / Used / Free / Used% )

1 - Export Disk-0 [ RW ] (RW, RO, --)
2 - Set Disk-0 Capacity Alarm [ 95 ] (75, 80, 85, 90, 95, 99, --)
3 - Set Disk-0 S.M.A.R.T. [ ON ] (ON, --)
4 - Run Disk-0 Extended S.M.A.R.T. Self-Test
5 - Check Disk-0 Filesystem
* - Check and Repair Disk-0 Filesystem
7 - Apply Journal to Disk-0 Filesystem
8 - Format Disk-0
9 - Mirror to Disk-0 [ NONE ]

R - Return to Storage Configuration Menu

Select: >
```

NASLite-M2 Administration Utility Disk-N Configuration Menu

- **Export Disk-N** (Option 1) - Sets the Disk-N export as Read/Write, Read-Only or parked (Idle).
- **Set Disk-N Capacity Alarm** (Option 2) – Sets Disk-N capacity alarm. If Disk-N capacity exceeds the capacity alarm setting, NASLite-M2 will sound the CHECK DISK CAPACITY audible prompt on Status update. Capacity alarm values of 75, 80, 85, 90, 95 and 99 percent can be set. The capacity alarm can also be disabled.
- **Set Disk-N S.M.A.R.T.** (Option 3) – Sets Disk-N periodic S.M.A.R.T. status check. If

Disk-N S.M.A.R.T. status fails, NASLite-M2 will sound the CHECK DISK audible prompt on Status update.

- **Run Disk-N Extended S.M.A.R.T. Self-Test** (Option 4) – Executes Disk-N extended S.M.A.R.T. self-test.
- **Check Disk-N Filesystem** (Option 5) – Executes a read-only Disk-N filesystem check. This is a diagnostic only test and will not modify disk contents in any way.
- **Check and Repair Disk-N Filesystem** (Option 6) – Executes a complete Disk-N filesystem check and repair. Disk will be temporarily unmounted. This option will detect and repairs filesystem anomalies.
- **Apply Journal to Disk-N Filesystem** (Option 7) – Applies a filesystem journal to an existing filesystem, effectively converting ext2 filesystems to ext3. It is generally a good idea to use a journal with every NASLite-M2 storage disk filesystem.
- **Format Disk-N** (Option 8) – Formats Disk-N. In order to prevent data loss, Only unformatted or parked (See Export Disk-N) disks can be formatted. Formatting will be denied on disks that are currently mounted and exported by NASLite-M2.
- **Mirror to Disk-N** (Option 9) – Sets Disk-N to act as a daily backup mirror of a local or remotely hosted storage disk. For complete details refer to the Content Backup Mirroring section.
- **Return To Storage Configuration Menu** (Option R) – Exits the Disk-N Configuration Menu and returns to the Storage Configuration Menu.

General Storage Options Menu

The General Storage Options Menu provides access to general NASLite-M2 storage configuration options. Available are the following options:

- **Export Disk-N** (Option 1) - Sets the default disk export as Read/Write, Read-Only or parked. The Disk-N specific setting of the

same name overwrites this setting.

- **Set Disk-N Capacity Alarm** (Option 2) - Sets default disk capacity alarm. The Disk-N specific setting of the same name overwrites this setting.

```
[ NASLite-2 ] - Administration Utility - NASLite-2 USB v2.04 01-2007

GENERAL STORAGE OPTION MENU

1 - Export Disks Default      [ RW ] <RW, RO, -->
2 - Set Default Capacity Alarm [ 95 ] <75, 80, 85, 90, 95, 99, -->
3 - Set Disks S.M.A.R.T.     [ ON ] <ON, -->

4 - Set Remote Storage Hosts
5 - Clear Disk Mirror Status Details

R - Return To Storage Configuration Menu

Select: >
```

NASLite-M2 Administration Utility General Storage Options Menu

- **Set Disk-N S.M.A.R.T.** (Option 3) - Sets default periodic S.M.A.R.T. status check. The Disk-N specific setting of the same name overwrites this setting.
- **Set Remote Storage Hosts** (Option 4) - Provides access to the Set Remote Storage Hosts configuration screen. Refer to the Remotely-Hosted Storage section for details.
- **Clear Disk Mirror Status Details** (Option 5) - Clears disk mirror status details and resets any currently active CHECK DISK MIRROR audible prompts.
- **Return To Storage Configuration Menu** (Option R) - Exits the General Storage Options Menu and returns to the Storage Configuration Menu.

Tools and Utilities Menu

The Tools and Utilities menu provides a number of useful diagnostic and monitoring tools that can be invaluable for server maintenance and troubleshooting. The Tools and Utilities Menu provides the following options:

```
[ NASLite-2 ] - Administration Utility - NASLite-2 USB v2.0b 05a2006

TOOLS AND UTILITIES MENU

1 - Network Status
2 - Network Status ( Weekly )
3 - Network Status ( Monthly )
4 - Network Status ( Top 10 Days )
5 - Sample Current Network Traffic
6 - Show Kernel Route Table
7 - Ping Remote Computer
8 - Show Remote NFS Exports
9 - Show Network Configuration

D - Reset Configuration to Factory Defaults

R - Return To Main Menu

Select: >
```

NASLite-M2 Administration Utility Tools and Utilities Menu

- **Network Status** (Option 1) - Displays a general summary of network interface usage since last reboot.
- **Network Status (Weekly)** (Option 2) - Displays a weekly summary of network interface usage since last reboot.
- **Network Status (Monthly)** (Option 3) - Displays a monthly summary of network interface usage since last reboot.
- **Network Status (Top 10 Days)** (Option 4) - Displays a summary of the top 10 days of network interface usage since last reboot.
- **Sample Current Network Traffic** (Option 5) - Samples the network interface traffic for 5 seconds and displays the results.
- **Show Kernel Route Table** (Option 6) - Displays the current kernel route table.

- **Ping Remote Computer** (Option 7) - Pings a remote IP address and displays the results.
- **Show Remote NFS Exports** (Option 8) - Queries a remote IP address for available NFS exports and displays the results.
- **Show Network Configuration** (Option 9) - Displays hardware details and configuration settings of the current network interface.
- **Reset Configuration to Factory Defaults** (Option D) - Resets configuration to defaults. This option has the same general effect as booting NASLite-M2 for the first time where all unique configuration parameters are reset including License ID and Unlock Code. Disk-specific options are saved on the associated storage disks and are therefore preserved.
- **Return To Main Options Menu** (Option R) - Exits the Tools and Utilities Menu and returns to the Main Options Menu.

Status Information Pages

NASLite-M2 exports a special **Status** share for the purpose of providing server status information. The status information is made available via a number of HTML pages that are automatically updated periodically per the Status Update setting (See Service Configuration Menu). To access the server status pages, click on the `index.htm` page located immediately inside of the Status folder. Your default HTML browser will open and display the initial Status page. At that time you can navigate between the individual status pages by using the provided links.

The initial Status page shows only very basic information about the associated NASLite-M2 server. It's intended to provide a quick overview and is useful to quickly identify the current device in networks with multiple NASLite-M2 servers. From this point, by clicking on the provided link button, the browser will display additional server information with various details regarding server hardware, settings and status.

Navigation between the Status pages is done via the link buttons to the left of each page. The following status pages are available:



Server Status - The Server Status page displays general server configuration settings including network and services.



Server Storage - The Server Storage page displays capacity and usage information for all currently shared storage volumes. Additional filesystem and S.M.A.R.T. information for locally-mounted disks is available via the **Disk-N** links provided on each line. In addition, remote storage details can be obtained using the **Remote Storage** link at the bottom of the page.



Network Status - The Network Status page provides detailed network usage information accumulated since last reboot. Currently connected clients, hourly, daily, weekly and monthly usage details as well as other network-specific information is displayed.



System Status - The System Status page displays system information and status details. Kernel version, system load, RAM usage, CPU type, active process details as well as a number of ACPI-specific monitored values are displayed.



Server Message Log - The Server Message Log page provides a viewable copy of the current system message log. The system message log contains valuable information that can help in troubleshooting as well as aid in general system administration and maintenance.



About NASLite-M2 - The About NASLite-M2 page provides general product description, copyright and licensing information pertaining to NASLite-M2.



Unlock - The Unlock page is used to help unlock the NASLite-M2 server during initial setup. When the server is unlocked, this page displays Unlock Code details.



Administer NASLite-M2 - This is not really a status page but rather a preformatted link to remotely launch the NASLite-M2 Administration Utility via TELNET. If your browser is properly configured, clicking on this link will open the local TELNET client and display the associated NASLite-M2 login.



Server Elements Online - This is not really a status page but a web link to the Server Elements website. The server Elements website will always provide information on the latest NASLite-M2 releases and well as details on related products and updates.

Since status pages are not rendered in real time, it is important to keep in mind that the displayed data is a status snapshot of the system state and not current information. Details about update frequency and last update can be found at the bottom-left of each page.

Update frequency can be set to various intervals, from 1 minute to 8 hours. It should be noted that generating the status pages can become a workload burden if set to update every minute, that being especially true on servers with a slower processor or servers that are under constant load.

A number of typical NASLite-M2 Status pages illustrating some of the more notable features are shown below:

General:
This page provides information about the current NASLite-M2 server settings, available services and their associated states.

| PARAMETER | VALUE | DESCRIPTION |
|-------------|---------------|--------------------------------------|
| IP | 192.168.2.200 | Network Address |
| NETMASK | 255.255.255.0 | Subnet Mask |
| GATEWAY | 0.0.0.0 | Network Gateway or Router |
| TIME SERVER | 0.0.0.0 | Remote RFC 868 Compliant Time Server |
| NAME | naslite-m2 | NASLite-M2 Server Name |
| WORKGROUP | acme | Windows Workgroup |
| PRODUCT | NASLite-M2 | Operating System Type |
| VERSION | v2.10.12-2008 | Operating System Version |
| UNLOCK* | VALID | Operating System Unlock Status. |

| SERVICE | STATUS* | DESCRIPTION |
|----------|--|---|
| TELNET | <input checked="" type="checkbox"/> ENABLED | Remote administration server |
| HTTP | <input checked="" type="checkbox"/> ENABLED | HyperText Transfer Protocol (HTTP) |
| RSYNC | <input checked="" type="checkbox"/> READ/WRITE | Directories and files synchronization server |
| FTP | <input checked="" type="checkbox"/> READ/WRITE | File Transfer Protocol (FTP) |
| SMB/CIFS | <input checked="" type="checkbox"/> READ/WRITE | Server Message Block (SMB) / Common Internet File System (CIFS) |
| NFS | <input checked="" type="checkbox"/> READ/WRITE | Network File System (NFS) |
| AFP | <input checked="" type="checkbox"/> READ/WRITE | Apple Filing Protocol (AFP) |
| DAAP | <input checked="" type="checkbox"/> ENABLED | Digital Audio Access Protocol (DAAP) |
| UPNP | <input checked="" type="checkbox"/> ENABLED | Universal Plug and Play (UPNP) |
| MDNS | <input checked="" type="checkbox"/> ENABLED | Multicast DNS (MDNS) |

* For full NAS functionality, naslite-m2 must be unlocked. Refer to the [Unlock](#) page for details.
* If the READ/WRITE status of a storage volume is not enabled, that storage volume will not be writable. Refer to the [Server Storage](#) page for access status details on each individual volume.

NASLite-M2 v2.10.12-2008
Content updated every 1 min.
Last update: Sun Dec 14 21:37:33 UTC 2008.

Typical Server Status Page

server elements

Name: naslite-m2

Workgroup: acme

Address: 192.168.2.200

OS Version: v2.10.12-2008

Typical Status Entry Page

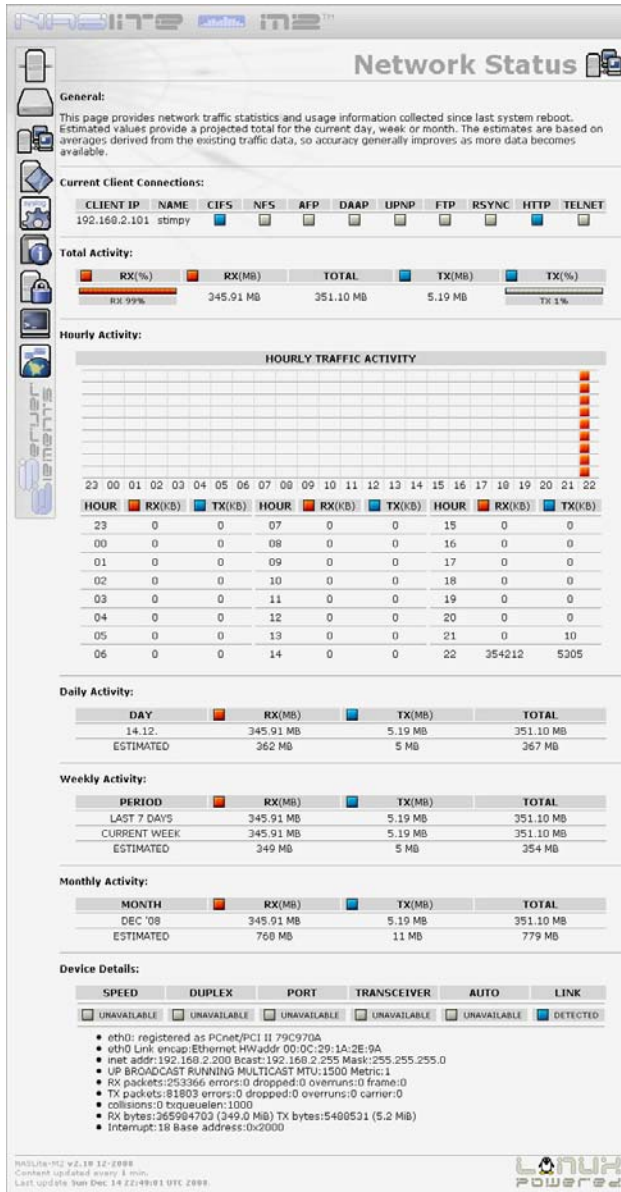
General:
This page provides a summary of all available storage volumes. Storage capacities for local as well as currently mounted remote volumes are displayed. Disk temperature is displayed only for local disks that support S.M.A.R.T. and export the temperature attribute. Specific information pertaining to each individual storage disk can be viewed by clicking on the associated link below.

| DISK | TOTAL | USED | FREE | STATUS* | S.M.A.R.T. | USAGE |
|--------|---------|--------|--------|--|--------------------------------------|-----------------|
| System | 15.5M | 8.9M | 6.6M | <input type="checkbox"/> UNAVAILABLE | <input type="checkbox"/> UNAVAILABLE | USED: 57% |
| Disk-0 | 998.0M | 40.0k | 997.9M | <input checked="" type="checkbox"/> READ/WRITE | <input type="checkbox"/> UNAVAILABLE | USED: 0% (0.0%) |
| Disk-1 | 1005.7M | 229.3M | 776.4M | <input checked="" type="checkbox"/> READ/WRITE | <input type="checkbox"/> UNAVAILABLE | USED: 23% (23%) |

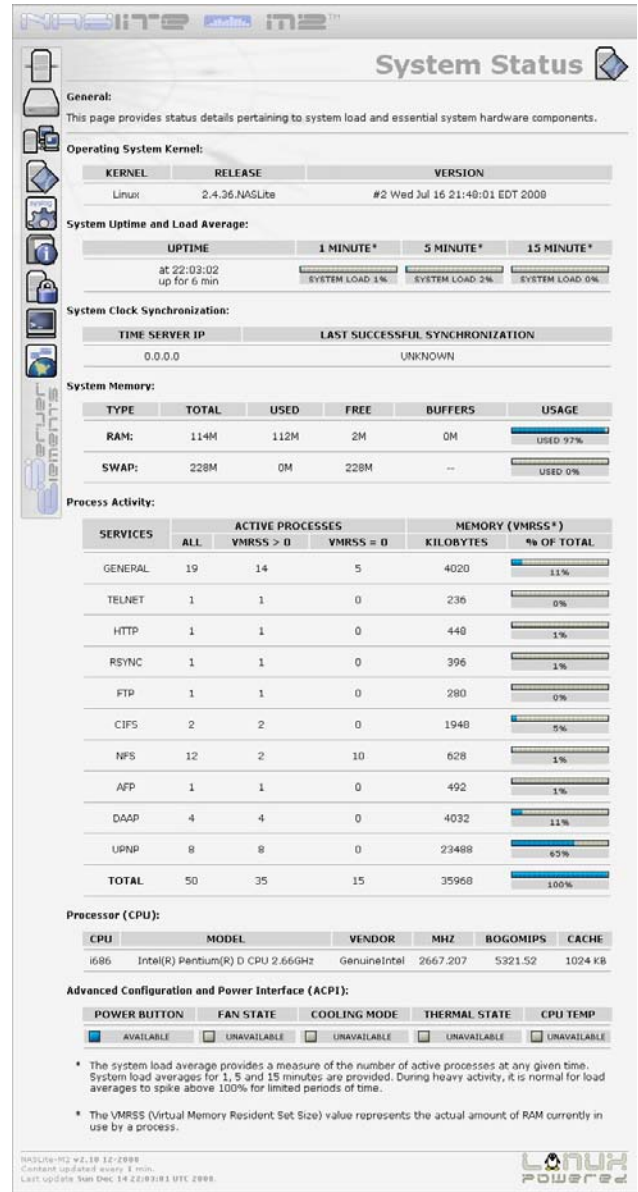
* If the READ/WRITE status of a service is not enabled, storage volumes will not be writable via that service. Refer to the [Server Status](#) page for access status details on each individual service.

NASLite-M2 v2.10.12-2008
Content updated every 1 min.
Last update: Sun Dec 14 22:09:01 UTC 2008.

Typical Server Storage Page



Typical Network Status Page



Typical System Status Page

Upgrading from Previous Versions of NASLite

Aside from the obvious differences between previous version of NASLite and NASLite-M2, there are a number of subtle changes that may cause some confusion when upgrading an existing NASLite server to a NASLite-M2 server.

The most important difference to note is the storage disk naming convention. Due to increased hardware support and storage disk capabilities of NASLite-M2, the naming convention for locally mounted storage disks is no longer statically associated with the corresponding hardware port. Disks are now consecutively numbered in order starting from 0 to N where N is based on the total number of disks involved. This difference should be taken into consideration if client machines with pre-mapped network drives will be connecting to the upgraded server. In most cases, without the necessary changes, the results will be less than desirable. To eliminate confusion, ensure that all clients are properly mapped to the correct disks as exported by NASLite-M2.

Another note of importance is that disk names may change as storage disks are added or subtracted from the NASLite-M2 server. For example, if a NASLite-M2 server has 4 IDE storage disks numbered 0 through 3, and the primary slave is removed, on reboot, the server will display available disks 0 through 2. The disks previously named Disk-2 and Disk-3 will now appear as Disk-1 and Disk-2 respectively.

NASLite v1.x configuration settings are not compatible with NASLite-M2 configuration settings. NASLite-M2 servers have to be configured manually during initial setup.

Source Components

NASLite-M2 is built using a number of proprietary Server Elements components as well as one or more components of the following:

- **Linux Kernel**
(www.kernel.org) - POSIX compliant Unix clone
- **Samba**
(www.samba.org) - SMB/CIFS file services
- **Netatalk**
(netatalk.sourceforge.net) – AFP file services
- **MT-DAAPD**
(www.fireflymediaserver.org) – DAAP services

- **Ushare**
(ushare.geebox.org) – UPnP services
- **Rsync**
(rsync.samba.org) - Fast, incremental file transfer utility
- **nfs-utils**
(<http://sourceforge.net/projects/nfs/>) - NFS utilities
- **vsftpd**
(vsftpd.beasts.org) - FTP services
- **uClibc**
(www.uclibc.org) - Compact C library
- **BusyBox**
(www.busybox.net) - Compact Unix utilities
- **e2fsprogs**
(e2fsprogs.sourceforge.net) - Second extended file system utilities
- **webfs**
(www.bytesex.org) - Simple HTTP Server
- **smartmontools**
(smartmontools.sourceforge.net) - S.M.A.R.T. utility toolset.
- **Vnstat**
(www.humdi.net/vnstat/) - Compact network traffic monitor

Source code for the GPL portions of NASLite-M2 can be found as a torrent or on the Server Elements website (www.serverelements.com).

Internet Resources

Additional information, the latest releases, as well as well-mediated user forums covering NASLite-M2 and related OS products can be found on the Server Elements (www.serverelements.com) website. In addition to this manual, the user forums are the best place for information regarding the use, administration and maintenance of your NASLite-M2 file server.

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