Ahsay Universal Backup System v2.23.0.0

Administrator's Guide

Ahsay Systems Corporation Limited

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Ahsay Universal Backup System Administrator's Guide

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1. Release Announcement

1.1 Notes

1. AhsayUBS v2.23.0.0 is bundled with AhsayOBSR v6.23.0.0.
2. AhsayUBS v2.9.0.0 is based on a new FreeBSD 8.3 release.
3. AhsayUBS v2.7.0.0 supports backup/restore of user home data to tape drive.
4. AhsayUBS v2.7.0.0 supports the migration of additional user storage volumes.
5. The maximum total number of supported processor cores has been increased from 16 to 32. Please refer to Chapter 4.1.1 for more details.
6. **The minimum memory requirement for AhsayUBS v2.5.2.0 or above is 2GB RAM, if the AhsayUBS installer detects the machine has less than 2GB RAM it will not proceed with the installation or upgrade**.
7. For machines installed with 64bit CPU, AhsayUBS will now only run in 64 bit mode. The option to switch to 32bit mode has been removed from the AhsayUBS "System Management Console (64bit)" menu.
8. For machines installed with 32bit CPU. The option to switch to 64bit mode has been removed from the AhsayUBS "System Management Console (32bit)" menu.
9. Existing AhsayUBS installations on 64bit machines, which were running in 32bit mode prior to upgrade. Will automatically boot up in 64bit mode after upgrading to AhsayUBS v2.5.2.0 or above.
10. AhsayUBS is not supported running as a guest O/S under Microsoft Hyper-V as FreeBSD 8.2-stable release is not a supported Hyper-V guest O/S.
11. Supports the upgrade of AhsayUBS installations from v1.1.0.0 onwards.
12. The upgrade of AhsayUBS installations running on both the UFS storage model and the previous ZFS storage model.
13. Supports both iSCSI and Additional Storage features.
14. Branding of AhsayUBS is supported on the Ahsay Customization Portal. Please refer to the Chapter 8.8 and the Ahsay Customization Portal User's Guide for details.

1.2 The UFS storage model

For backwards compatibility with older AhsayUBS versions, the UFS storage model is also supported. After upgrading, the 'geom_concat.ko', 'geom_stripe.ko', and 'geom_raid5.ko' module will be loaded by the FreeBSD to support the UFS storage model. To check if these kernel modules have been loaded correctly you can run the "kldstat" command, which will return the following output.

```
ahsayubs:~# kldstat
Id Refs Address    Size     Name
 1   12 0x80400000 a25a60   kernel
 2    1 0x80e26000 5594     vesa.ko
 3    1 0x80eec000 6124     geom_concat.ko
 4    1 0x80ef3000 163c0    geom_mirror.ko
 5    1 0x80f0a000 776c     geom_stripe.ko
 6    1 0x85f12000 17204    geom_raid5.ko
 7    1 0x8981e000 123000   zfs.ko
 8    1 0x89941000 3000     opensolaris.ko
 9    1 0x8a8ab000 11000    iscsi_initiator.ko
10    1 0x8a89c000 3000     splash_bmp.ko
```

The 'Master Storage Device' on AhsayUBS v2.3.0.0 is preserved in UFS format which is mounted on '/ubs/mnt/eslsfw' upon system boot time. The following example shows a UFS filesystem mount as '/ubs/mnt/eslsfw'.

```
ahsayubs:~# df -h
Filesystem                  Size    Used   Avail Capacity  Mounted on
/dev/md0                     77M     63M     15M     81%    /
devfs                       1.0K    1.0K      0B    100%    /dev
/dev/mirror/40CF97AFxesfmfw 739M    219M    461M     32%    /ubs/mnt/esfmfw
/dev/raid5/40CF97AFxeslsfw  5.6G    1.3G    3.9G     25%    /ubs/mnt/eslsfw
/dev/mirror/40CF97AFxesosfw 186M     64M    107M     38%    /ubs/mnt/esosfw
```

The Optional Labelled Device in the old AhsayUBS will migrated in this version of AhsayUBS which is one of the storage types called "Optional Storage" inside the "Additional Storage". Volume status and UFS filesystem integrity checking (fsck) are also available in this AhsayUBS version. For details, please refer to the section [Storage].

1.3 The ZFS storage model

AhsayUBS v2.5.2.0 is implemented with ZFS v5 and ZPOOL v28. The existing ZPOOL(s) will not be upgraded and only newly created ZPOOL will be applied with the ZIL. As the ZFS storage model is based on a GMIRROR and ZFS design, therefore the 'geom_mirror.ko', 'opensolaris.ko', and 'zfs.ko' kernel modules will be loaded by the FreeBSD. The GEOM kernel modules used previously for UFS support 'geom_concat.ko', 'geom_stripe.ko', and 'geom_raid5.ko' will also be loaded. To check if these kernel modules have been loaded correctly you can run the "kldstat" command, which will return the following output.

```
ahsayubs:~# kldstat
Id Refs Address    Size     Name
 1   12 0x80400000 a25a60   kernel
 2    1 0x80e26000 5594     vesa.ko
 3    1 0x80eec000 6124     geom_concat.ko
 4    1 0x80ef3000 163c0    geom_mirror.ko
 5    1 0x80f0a000 776c     geom_stripe.ko
 6    1 0x85f12000 17204    geom_raid5.ko
 7    1 0x8981e000 123000   zfs.ko
 8    1 0x89941000 3000     opensolaris.ko
 9    1 0x8a8ab000 11000    iscsi_initiator.ko
10    1 0x8a89c000 3000     splash_bmp.ko
```

The 'Master Storage Device' on AhsayUBS is configured as a ZPOOL with the following pool name 'eslsfwx{UID}' format. The ZFS pool will be mounted on '/ubs/mnt/eslsfw' upon system boot time. The following example shows a zpool volume of size 191GB "eslsfwx839830C2" mount as '/ubs/mnt/eslsfw'

```
ahsayubs:~# df -h
Filesystem                    Size    Used   Avail Capacity  Mounted on
/dev/md0                       77M     65M     12M    84%    /
devfs                         1.0K    1.0K      0B   100%    /dev
/dev/mirror/839830C2xesfmfw   739M    638M     42M    94%    /ubs/mnt/esfmfw
eslsfwx839830C2               191G    276M    191G     0%    /ubs/mnt/eslsfw
/dev/mirror/839830C2xesosfw   186M     61M    110M    36%    /ubs/mnt/esosfw
ahsayubs:~#
```

For volume status and ZFS filesystem integrity checking, please refer to the section [Storage] for details

```
ahsayubs:~# zpool status
  pool: eslsfwx839830C2
 state: ONLINE
 scrub: scrub completed after 0h0m with 0 errors on Sun Apr  3 00:00:15 2011
config:

        NAME                      STATE     READ WRITE CKSUM
        eslsfwx839830C2           ONLINE       0     0     0
          label/839830C2xd00p04   ONLINE       0     0     0

errors: No known data errors
ahsayubs:~#
```

The other "esgpbt", "esosfw", and "esfmfw" System Firmware Devices are still mounted from the /etc/fstab file.

```
ahsayubs:~# cat /etc/fstab
/dev/md0        /       ufs     rw      0       0
/dev/mirror/839830C2xesosfw /ubs/mnt/esosfw ufs ro 1 1
/dev/mirror/839830C2xesfmfw /ubs/mnt/esfmfw ufs ro 1 1
ahsayubs:~#
```

The ZFS storage model is used for the following AhsayOBSR locations:

i. %USER_HOME%
ii. %SYSTEM_HOME%
iii. %POLICY_HOME%
iv. %CONF_HOME%
v. %WEBAPPS_HOME%
vi. %RECEIVER_HOME%

The other "System Firmware Devices" such as "esgpbt", "esosfw", and "esfmfw" will remain unchanged as GEOM MIRROR based UFS volumes. The GEOM device names are in the following formats:

i. GPT Boot - {UID}xesgpbt
ii. Operating System Framework - {UID}xesosfw
iii. Firmware Module Framework - {UID}xesfmfw

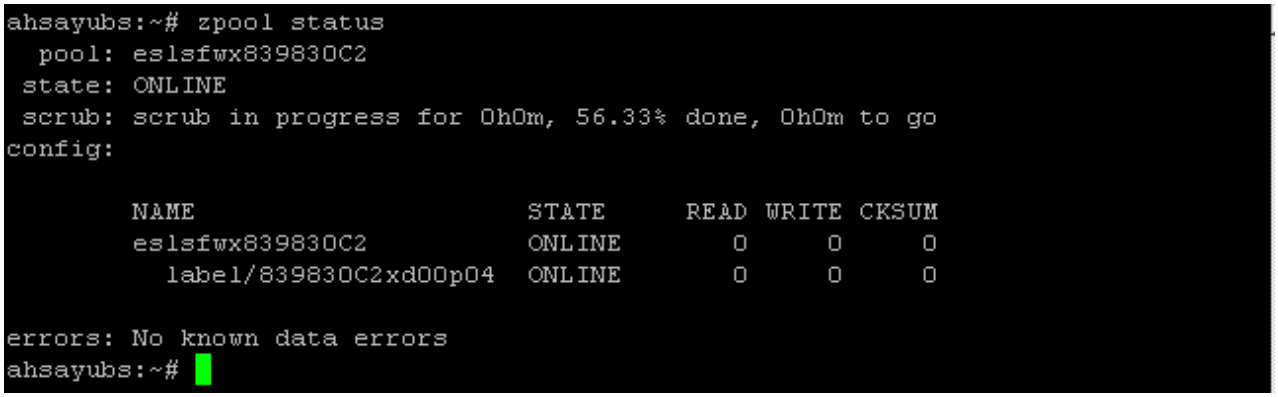
Note:

For production AhsayUBS servers configured with ZFS volume(s). It is strongly recommended to install at least 4 GB RAM, as ZFS volumes require relatively large amount of memory to run. The amount of memory required is dependent on the size of the ZFS volume and the amount of I/O activity.

1.4 ZFS Integrity Checking

In order to safeguard the data integrity of the files on the ZFS volume, a weekly "zpool scrub" (zpool volume data integrity check) is performed starting at 00:00 every Sunday morning. To verify the checksums of all the data in the specified ZFS pools are correct. The scheduled started time of the "zpool scrub" is currently not user configurable and it cannot be disabled in this version of AhsayUBS. Once the "zpool scrub" job has started it is not possible to stop it.

To check the status of the "zpool scrub", you can use the "zpool status" command which will return the following output. For the following example the "zpool scrub" has checked 56.33% of the pool: eslsfwx839830C2



If an additional data integrity check is required in between the scheduled weekly checks. It is possible to initiate a manual "zpool scrub" using the "zpool scrub {% POOL_NAME%}" command. As with the weekly "zpool scrub", the AhsayOBSR service and backup/restore operations can continue to run as normal.

Note:

There may be some performance overhead associated with a "zpool scrub", i.e. CPU utilization, memory, and increased I/O activity. The performance overhead is proportional to the amount of data on the ZFS volume.

1.5 FreeBSD and ZFS Implementation

The ZFS version 5 and ZPOOL v28 on AhsayUBS has undergone an extended period of intensive performance and load testing, which has consistently delivered superior performance and data integrity results in comparison to UFS.

1.6 Storage Model Migration

For existing AhsayUBS customers who wish to migrate from UFS to ZFS storage model, only a manual migration method is available.

The migration process will involve:

i. Copying the existing user data from AhsayUBS server to another storage device.
ii. Use the latest AhsayUBS installer to install a new version of AhsayUBS on the existing machine, **which will overwrite all existing data**.
iii. Copy the user data from the storage device back to the AhsayUBS server.

2. Overview

The process to setup Ahsay Universal Backup System (AhsayUBS) firmware on a machine is divided into 4 stages:

1. Installer Image Deployment
Deploys Ahsay Universal Backup System Installer image on removable storage devices / CD-ROM / DVD-ROM

2. Firmware Installation/Upgrade
Install / upgrade Ahsay Universal Backup System Firmware into a machine.

3. Ahsay Universal Backup System Configuration
Configures the Ahsay Universal Backup System Firmware.

4. Backup Server Configuration
Configures the Backup Server and Replication Server (AhsayOBS and AhsayRPS)

There are different software/hardware requirements for each stage. Please ensure that all the requirements are met before deploying the Ahsay™ Universal Backup System to the machine. For information on the software/hardware requirements, please refer to Chapter 4 System Requirements of this document.

2.1 Ahsay Universal Backup System Firmware

AhsayUBS Firmware is a customized FreeNAS firmware with AhsayOBS & AhsayRPS bundled and it is optimized to run AhsayOBS & AhsayRPS. Apart from AhsayOBS & AhsayRPS, it also contains some basic features that system administrator require, e.g. SSH and system monitor.

2.1.1 AhsayUBS Storage Concepts

The AhsayUBS installer will automatically detect all available local hard disk(s) during the installation progress. The selected hard disk(s) will be partitioned to form "Systsem Storage". Several RAID devices will be created on the "System Storage":

i. GPT Boot (GPBT)
ii. Operating System Framework (OSFW)
iii. Firmware Module Framework (FMFW)
iv. Logical Storage Framework (LSFW)

The GPBT, OSFW and FMFW volume are configured as RAID1 in UFS file system to form the core system. The LSFW RAID device:
- Supports JBOD, RAID0, RAID1 and RAID5 in UFS format for old version of AhsayUBS.

- Supports RAID0, RAID1 and RAIDZ in ZFS format for the new version of AhsayUBS (The raid type depends on the number of hard disks installed and selected during AhsayUBS installation, for RAID0 the minimum number of disks is required is 1, for RAID1 and RAIDZ the minimum number of disks required is 2).

These volumes are named "System Storage". The OSFW, FMFW devices will be created on the Unix File System (UFS). The firmware configuration files will be stored on OSFW and the AhsayOBS & AhsayRPS configuration files and backup data will be stored on LSFW.

If the LSFW file system runs out of disk space, extra storage can be added to the system by either:

i. Adding a new block device to the system hardware.
ii. Creating an iSCSI connection to a remote storage server.

The added block devices will be partitioned and formatted to form "Modular Storage (ZFS + ZIL)". The previously suported additional storage 'Modular Storage (ZFS)', 'Expandable Storage (ZFS)' and 'Optional Storage (UFS)' will also be listed in the summary page. However, only removal of those additional storage is allowed. Expandable Storage volumes (ZFS) can no longer be created.

There are three types of Additional Storage:

i. Modular Storage (ZFS / ZFS+ZIL)
   - can be created by one or more local block device to form a volume either in RAID0, RAID1 or RAIDZ (is dependent on the number of hard disks used to form the volume). Since this AhsayUBS version, the underlying ZPOOL will be added with a ZIL layer.

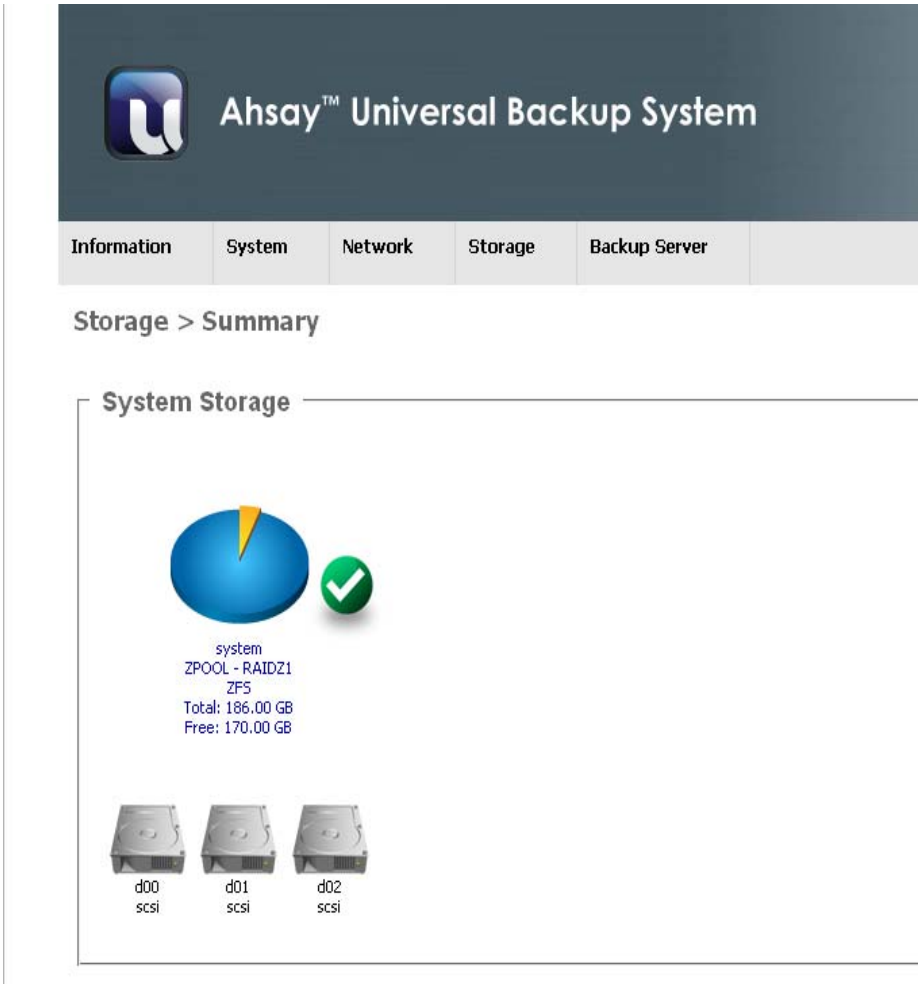
ii. Expandable Storage (ZFS)
   - created in the former AhsayUBS versions with a hardware raid volume or an iSCSI initiator session connected to this AhsayUBS machine. A RAID0 ZFS filesystem will be formed for each of the Expandable Storage. It is for supporting the old migrated AhsayUBS only and cannot be created in this version of AhsayUBS.

iii. Optional Storage (UFS)
   - called "Optional Labelled Device" on earlier AhsayUBS versions. It is for supporting the older migrated AhsayUBS installations only and cannot be created in this version of AhsayUBS.

By configuring the AhsayOBS & AhsayRPS, the "Additional Storage" can be used as additional storage for storing server configuration files and backup data.
Note:

Minimum size 100GB is required for the AhsayUBS Backup System block devices (i.e. System Storage and Additional Storage). Otherwise, the added block device will not be allowed for fail disk replacement and additional storage.

The AhsayUBS WebAdmin page, under [Storage] > [Summary] will show the overview of the volumes created on AhsayUBS.



3. Important Notice

The Ahsay™ Universal Backup System provides console access to the "System Management Console" by connecting a keyboard and a VGA monitor to the machine. To prevent unauthorized access to the AhsayUBS System Management Console, it is advised to change the AhsayUBS administrator password.

4. System Requirements

This chapter describes the system requirements for the Installer Image Deployment, Backup System firmware Installation/ Upgrade, Backup System and Backup Server Configuration.

4.1 Backup System Requirements

The selected machine must meet the following requirements:

- CPU: At least 1 CPU that is FreeBSD i386 / amd64 compatible.
- Memory Size: 2 GB minimum
- Disk Storage Space: 100GB per disk minimum
- Network interface card (NIC): At least 1 NIC that is FreeBSD i386/amd64 compatible.

If an AhsayUBS server motherboard supports Unified Extensible Firmware Interface (UEFI) standard. The boot mode must set to BIOS boot manager and the AhsayUBS installed hard disk specified as the first the boot device.

If the AhsayUBS installer detects that the machine is installed with less then 2GB RAM the installation or upgrade process will be aborted.

AhsayUBS is not supported running as a guest O/S under Microsoft Hyper-V, as FreeBSD 8.2-stable release is not a supported Hyper-V guest O/S.

For production AhsayUBS servers configured with ZFS volume(s). It is strongly recommended to:

i. Install AhsayUBS on a 64bit machine.

ii. Install at least 4 GB RAM, as ZFS volumes require relatively large amount of memory to run. The amount of memory required is dependent on the size of the ZFS volume and the amount of I/O activity.

For the list of FreeBSD i386/amd64 compatible processors, please refer to Appendix A.

WARNING:

For 32bit production AhsayUBS servers configured with ZFS volumes. Due to FreeBSD kernel memory limitations on 32bit CPU's, combined with the relatively high memory usage requirements of ZFS volumes. AhsayUBS servers hosting large amounts of data can become unstable and even crash, which could result in data corruption on AhsayOBS.

4.1.1 AhsayUBS Processor Configuration

From AhsayUBS v2.5.2.0 onwards AhsayUBS supports up to a maximum of 32 virtual processors for both i386/amd64 compatible CPU's.

In order to comply with the maximum supported virtual processors limit on FreeBSD, the system administrator should verify the number of virtual processors enabled on the AhsayUBS machine and apply the correct processor setup on the machines BIOS before proceeding with AhsayUBS installation or upgrade.

The maximum number of virtual processors is calculated as:

(No. of sockets) * (No. of cores per processor) * (Hyper Threading).

The following are examples of processor configurations.

Supported Processor Configurations

1. One Socket, Dual-Core Intel CPU, Hyper Threading Enabled
   (1) * (2) * (2) = 4 virtual processors

2. Two Sockets, 6-Core Intel CPU, Hyper Threading Enabled
   (2) * (6) * (2) = 24 virtual processors

3. Two Sockets, 8-Core Intel CPU, Hyper Threading Enabled
   (2) * (8) * (2) = 32 virtual processors

4. Four Sockets, 4-Core Intel CPU, Hyper Threading Enabled
   (4) * (4) * (2) = 32 virtual processors

Non-supported Processor Configurations and workarounds

1. Two Sockets, 12-Core AMD CPU, Hyper Threading Enabled
   (2) * (12) * (2) = 48 virtual processors

It is recommended the number of cores per CPU be set at 8 on the machine BIOS:
   (2) * (8) * (2) = 32 virtual processors

2. Four Sockets, 8-Core Intel CPU, Hyper Threading Enabled
   (4) * (8) * (2) = 64 virtual processors

It is recommended that Hyper Threading is disabled on both CPU's on the machine BIOS:
   (4) * (8) * (1) = 32 virtual processors

3. Four Sockets, 10-Core Intel CPU, Hyper Threading Enabled
   (4) * (10) * (2) = 80 virtual processors

It is recommended that Hyper Threading is disabled on both CPU's and the number of cores per CPU be set at 8 on the machine BIOS:

(4) * (8) * (1) = 32 virtual processors

WARNING:

If AhsayUBS is installed on a machine where the number of virtual processors configured exceeds the maximum supported value of 32. This will cause FreeBSD to become unstable and crash, which could result in data corruption on AhsayOBS.

4.2 Installer Media Requirements

AhsayUBS installer is available in three different media formats. Please choose one of the methods to deploy the installer image to a machine:

1. USB Flash Drive: 1GB minimum
2. Compact Flash Card (CF Card): 1GB minimum
3. CD-ROM/DVD-ROM, depending on the installer ISO image size.

4.3 Installer Deployment

Please ensure the following requirements are met before deploying Ahsay™ Universal Backup System image to a USB flash drive.

- The USB flash drive is listed in our supported hardware list. Please refer to Chapter 4.2 for more information on the supported USB flash drives.
- The USB flash drive should meet the minimum 1GB storage size requirements.
- Previous data stored on the USB flash drive should be backed up properly. **Once the deployment process begins, all data on the USB flash drive will be OVERWRITTEN.**
- The AhsayUBS Deployment Utility **must be run on a Windows XP computer**.
- To avoid selecting the incorrect drive for deployment, it is advised to remove all other USB storage devices such as USB portable hard disk and other USB flash drive.

Note: When you reinstall AhsayUBS, please refer to the following link to perform user storage migration.

AhsayUBS Firmware Installation / Upgrade

Please ensure the following requirements are met before installing / upgrading AhsayUBS Firmware:

- Connect a VGA Monitor and a keyboard to the target machine.
- Make sure that there are local block devices (e.g. "ide", "scsi") installed in the machine.
- The installation process will destroy all the data in the local block devices installed in the machine. To protect the data in some of the local block devices, it is recommended to remove them before the installation of AhsayUBS Firmware.
- The upgrade process requires the existing RAID storage configuration to be healthy. The upgrade process will not be able to continue on system configuration with one or more DEGRADED RAID devices.

4.4 AhsayUBS and Backup Server Configuration

The following requirements must be met before setting up the network in the AhsayUBS console:

- Configure the firewall of your computer to enable traffic for the following ports:
  a. Port 22 (For SSH and SFTP)
  b. Port 8080 (For accessing AhsayUBS WebAdmin).
  c. Port 80 and 443 (For accessing AhsayOBS/AhsayRPS web console)

5. Installer Image Deployment

This chapter describes how to prepare the installer source to deploy AhsayUBS.

5.1 Removable Storage Device

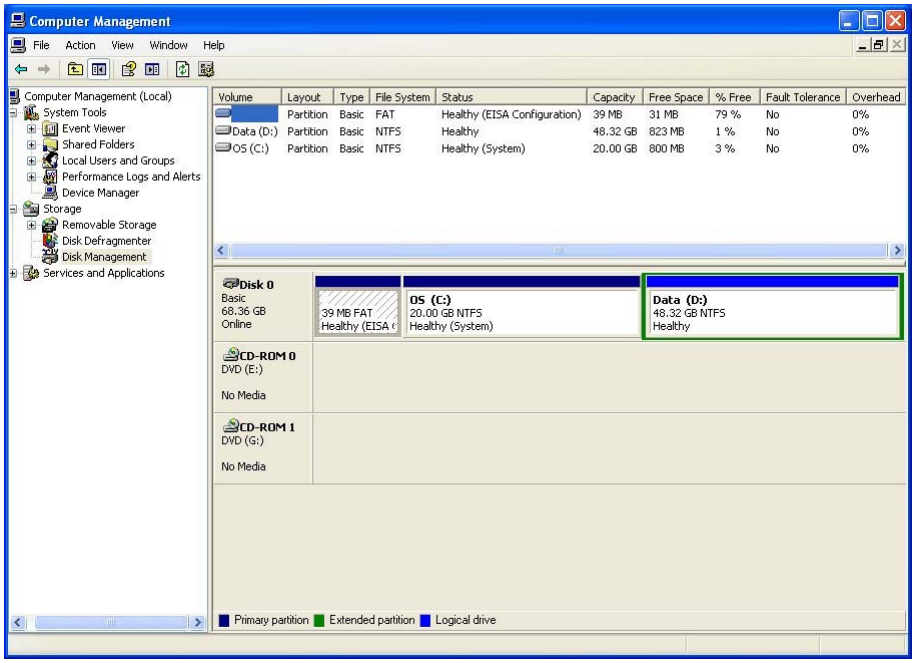
WARNING: Please backup any data stored in the removable storage device before deploying the Ahsay UBS Installer image to it. Otherwise, all the data in the storage device will be DESTROYED.

5.1.1 Step 1 Preparation

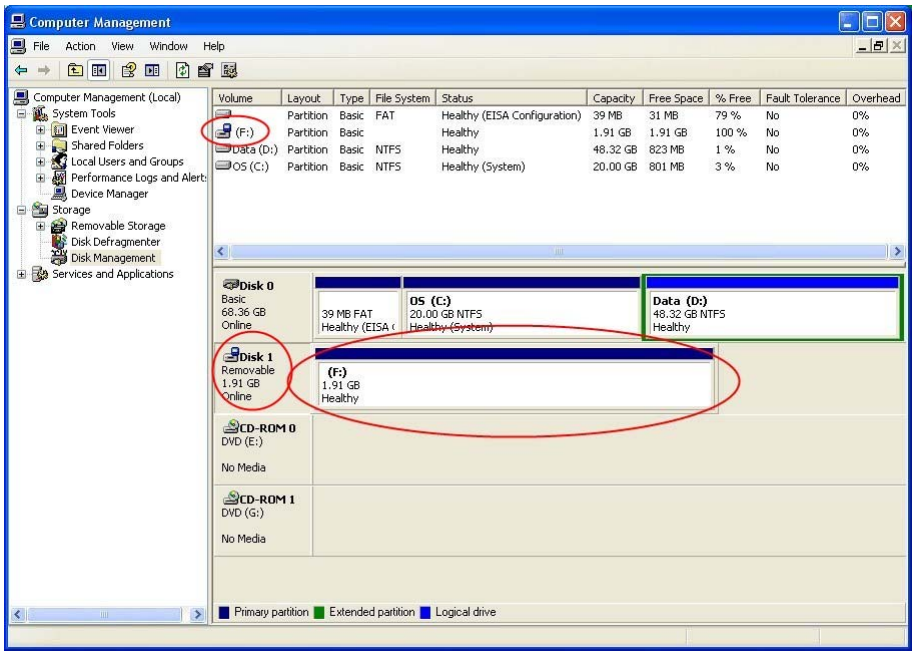
Please follow the instructions below to view the current disk configuration from [Computer Management] Console:

Right click on [My Computer] on desktop and select [Manage].

Click on [Disk Management] from the [Computer Management] MMC console. All connected storage device(s) will be listed and marked as [Disk *].

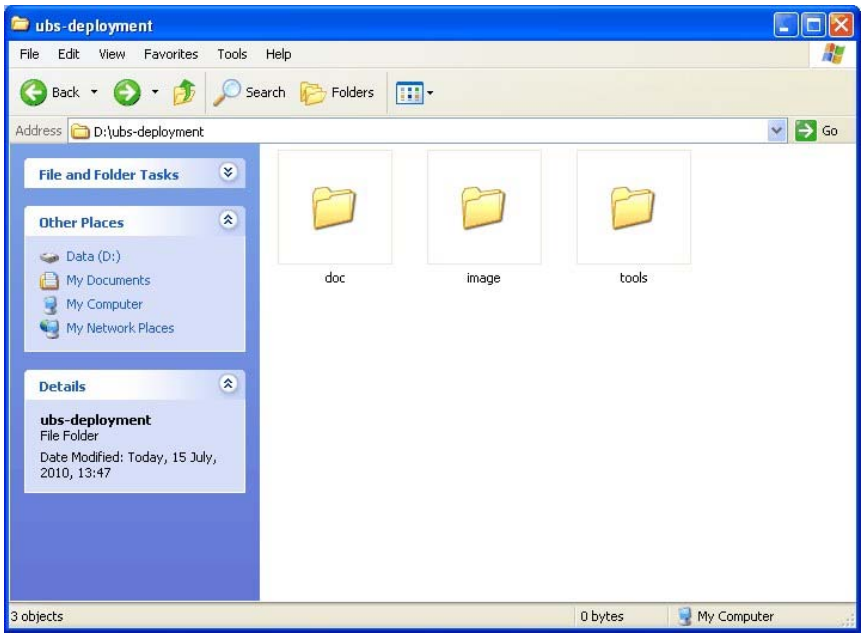


Attach the removable device to your computer and refresh the [Disk Management] console. This can be done by pressing the [F5] button on your keyboard. The new disk should be shown in the [Computer Management] console. In our example. It is shown as [Disk 1] with a drive letter "F".

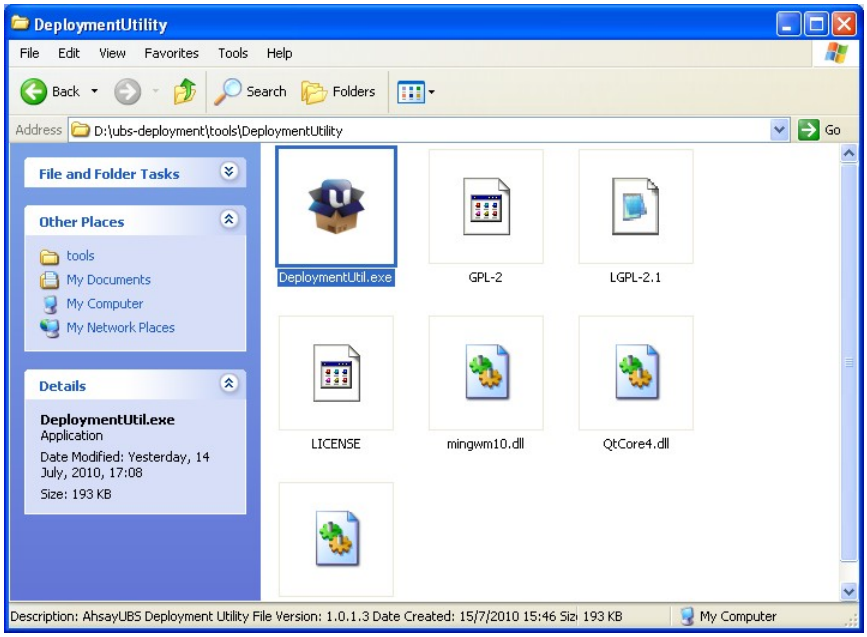


5.1.2 Step 2 Deploy the Installer image with "AhsayUBS Deployment Utility"

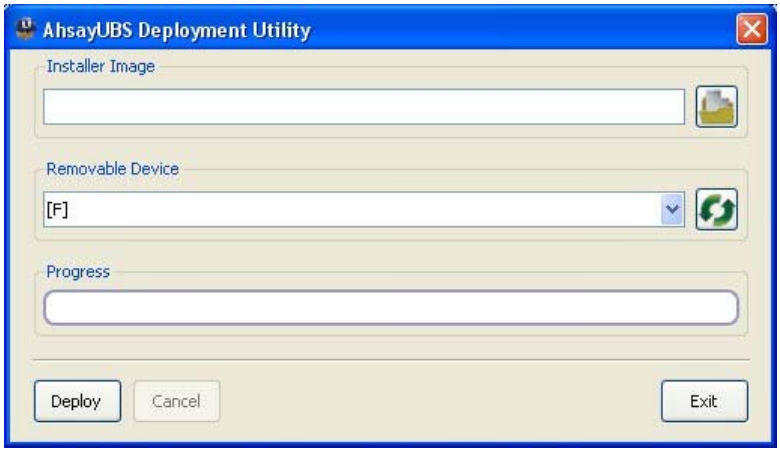
Download the AhsayUBS deployment bundle from our website. Extract all files from the bundle to a temporary directory. In this example, it is d:\ubs-deployment.



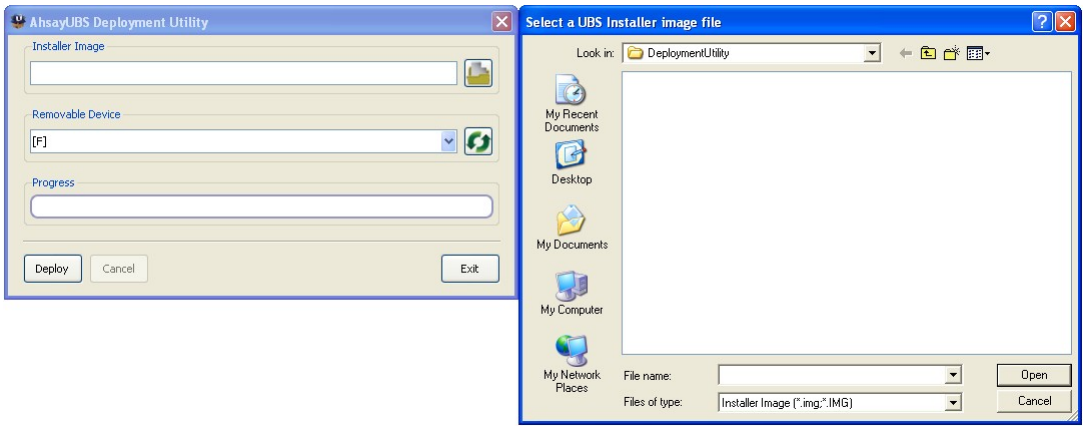
The deployment program is stored in DeploymentUtility folder under %UBS_DEPLOYMENT_DIR%\tools\. In this example, the path for the deployment utility is d:\ubs-deployment\tools\DeploymentUtility. Double click the "DeploymentUtil.exe" icon to launch the utility.



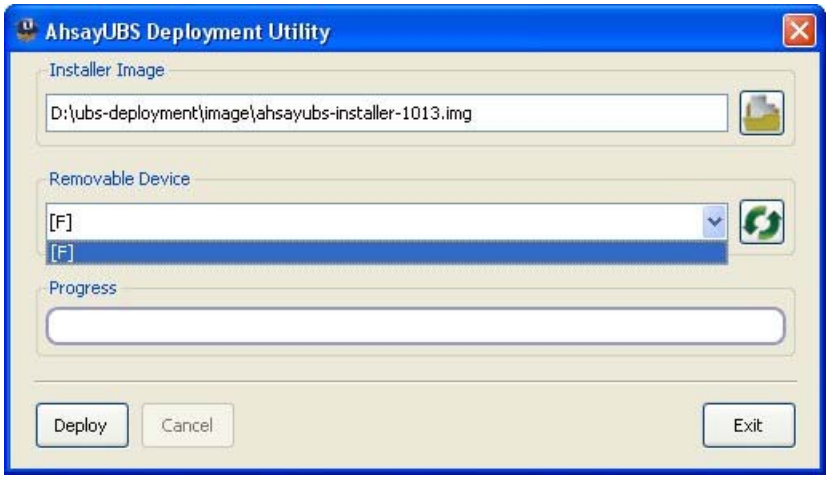
After launching the DeploymentUtil software, click on the ' ' from the [Image File] to select the image file to copy.



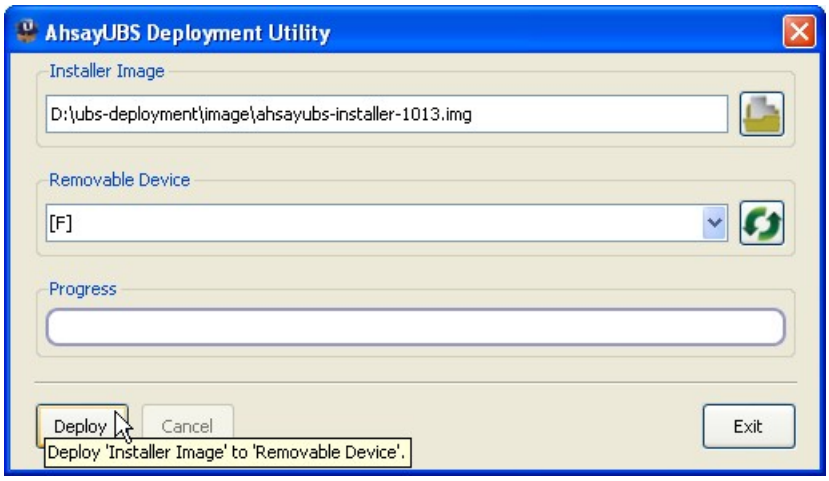
In the popup windows, select the AhsayUBS installer image, ahsayubs-installer-*.img from %UBS_DEPLOYMENT_DIR%\image, i.e. d:\ubs-deployment\image.



Select the target drive in the [Removable Device] drop down panel (i.e. drive F in our case).

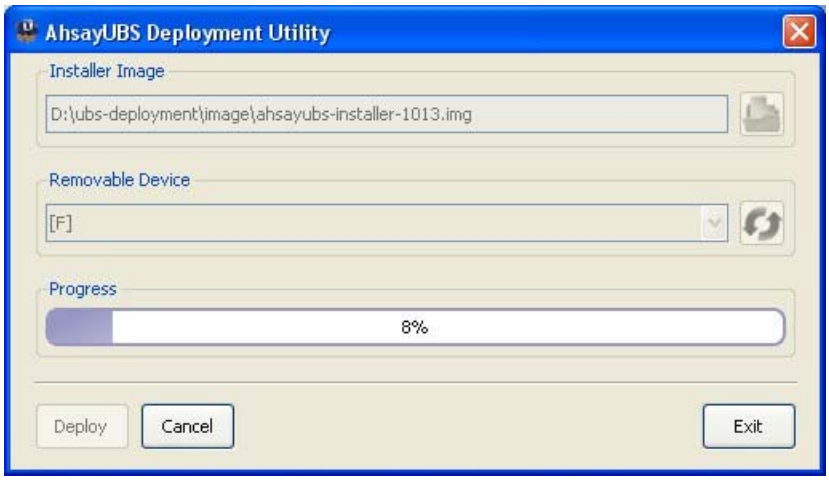


Click on the [Write] button to write the AhsayUBS installer image to the selected device.



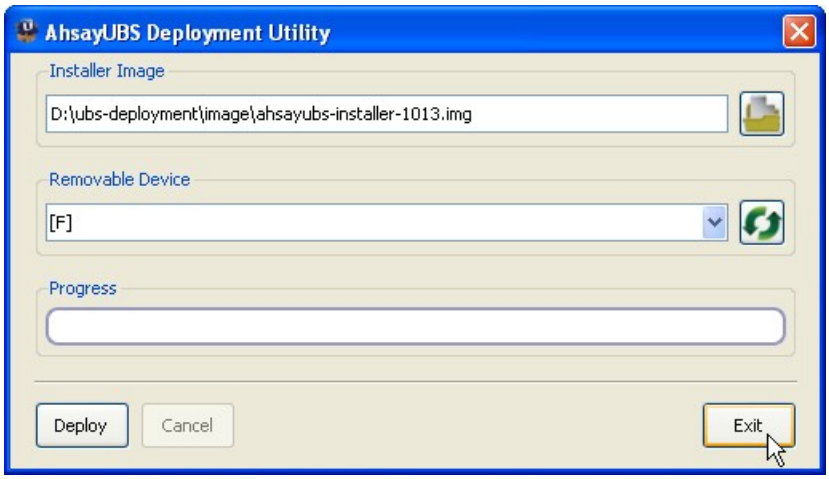
After clicking the [Deploy] button, a warning dialog window will be displayed on the screen. Click the [Yes] button to continue. However, if you have chosen wrong image file/drive, please click the [No] button to abort the process and repeat step 1-7 again.

If you click the [Yes] button in step 8, the software will start writing the AhsayUBS image to your removable storage device. The write progress percentage will be shown in the Progress Bar. Please wait until all bytes are written to the selected removable storage device.

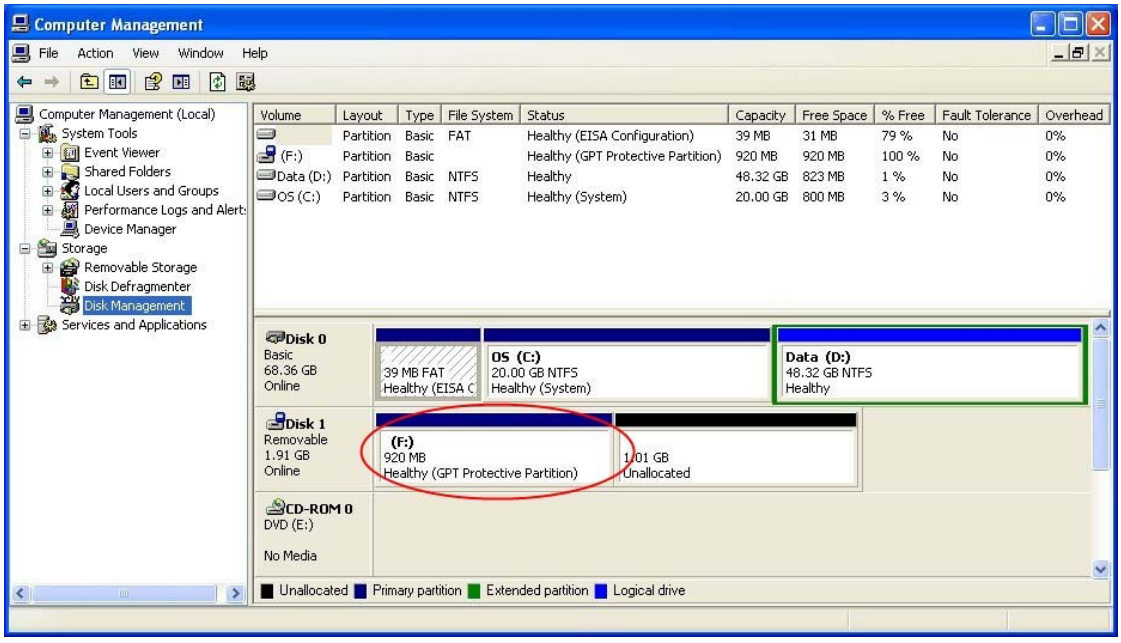


When it has completed the writing process, the following message will be shown on the screen.

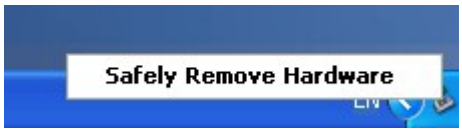
The deployment process is now completed. You may close the software by clicking the [Exit] button.



To verify the results, please go to [Computer Management] Console and select [Action] -> [Refresh] from the menu. The selected removable storage device should contain a GPT partition.



Then remove the hardware safely by, click on the [Safely Remove Hardware] icon in the system tray (i.e. It is located in the bottom-right hand corner of Windows). If there are multiple removable devices, please select the one which has been used in the deployment (i.e. drive F in our case).



The AhsayUBS installer image has been deployed to the removable device.

5.2 CD-ROM / DVD-ROM

1. Download the AhsayUBS deployment bundle from our website.
2. Extract all files from the bundle to a temporary directory. In this example, it is d:\ubs-deployment.
3. Use a CD burning software to burn the ISO image located in ahsayubs-installer-*.iso.

6. Installing AhsayUBS Firmware

After the installer deployment, the AhsayUBS Installer is ready for deploying the firmware to the designated AhsayUBS machine. This chapter provides instructions on how to install AhsayUBS.

6.1 Pre-Installation

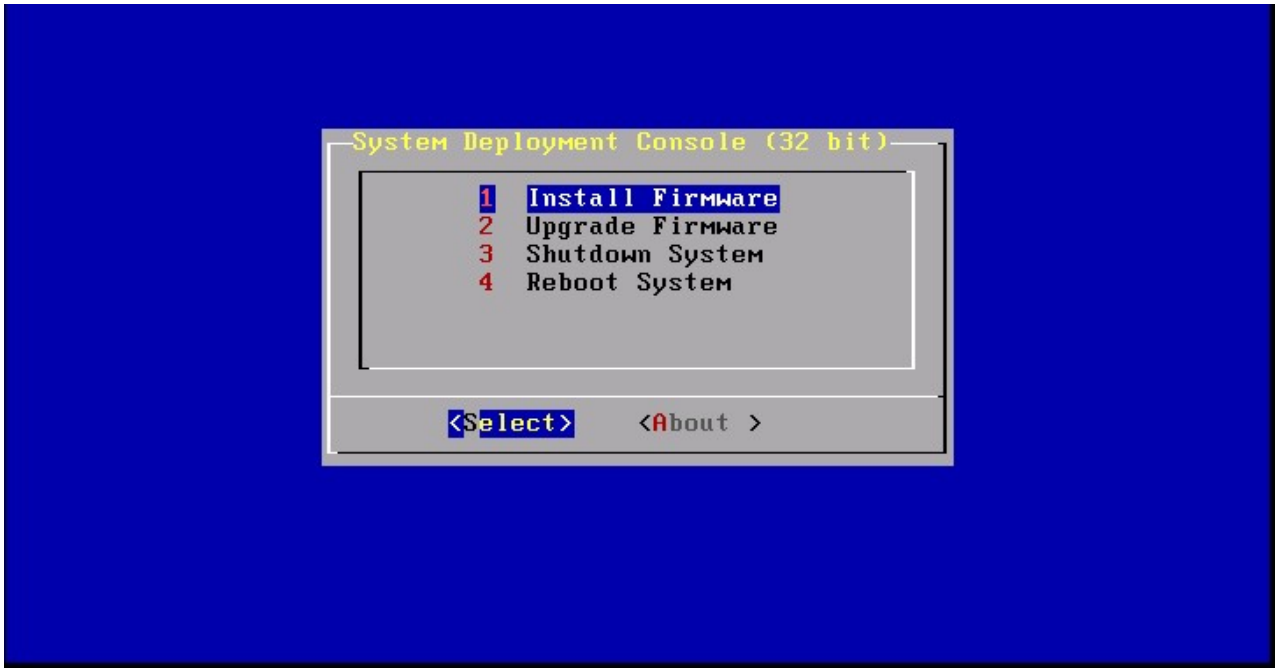
Before installing AhsayUBS on a machine, please verify if the followings tasks have been done:

1. Deploy the AhsayUBS image to one of the following media:
   a. CD / DVD
   b. USB removable storage devices
   c. CF Card
2. The install media is connected to the target machine.
3. Shutdown the target machine.
4. Power on the machine and enter the BIOS settings page. (Please refer to the motherboard manual for the instruction to enter BIOS settings page.)
5. Configure the boot priority of the AhsayUBS machine to boot from the selected installer device, i.e. CD-ROM, DVD-ROM, or USB removable storage device.
6. Save the settings and exit the BIOS.
7. Reboot the machine and boot up from the installer device.

Note: When you reinstall AhsayUBS, please refer to the following link to perform user storage migration.

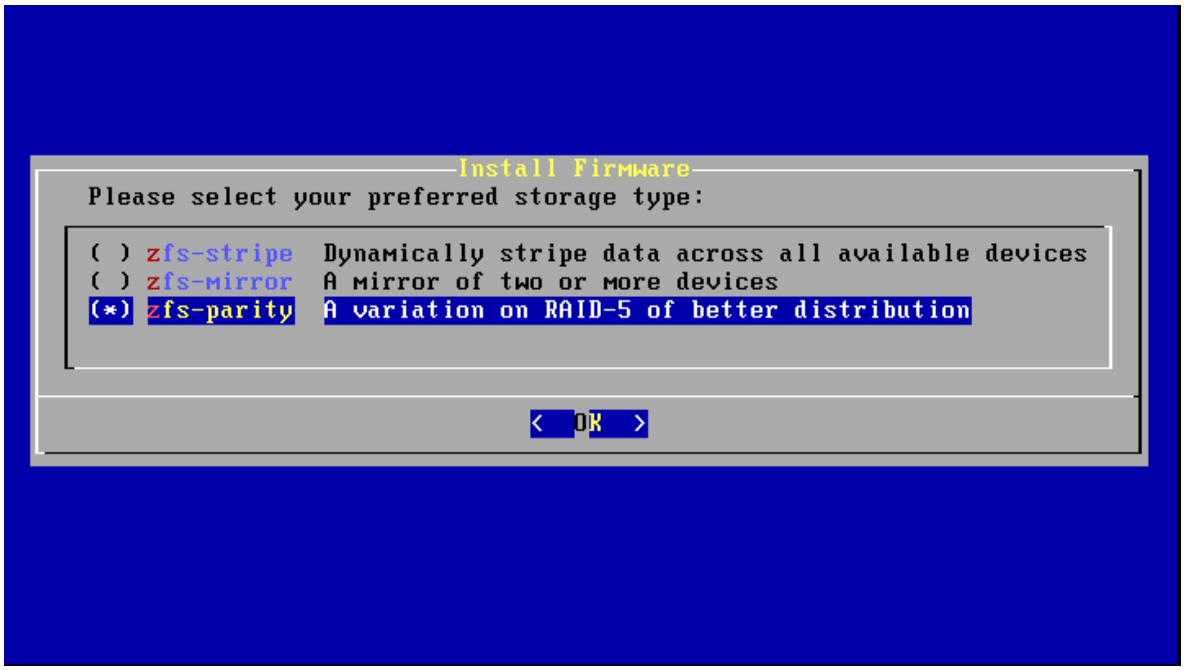
6.2 Installing AhsayUBS Firmware

1. After booting up from the installer device, the main menu will be shown. Select [1] to start the installation of the AhsayUBS firmware.



2. A warning message will be shown on the screen. Select [Yes] if there is no data on the disk(s) or the data can be destroyed. Otherwise, select [No] to abort the installation process.

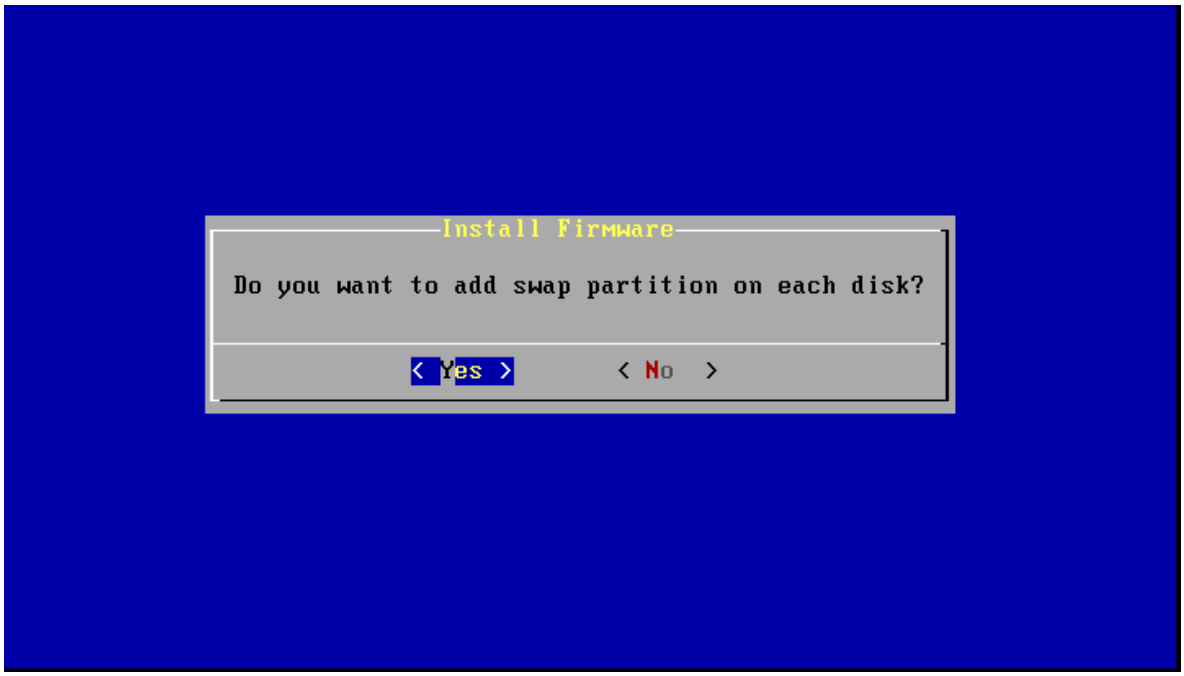
3. Select the file system type for the file system LSFW and press the [Enter] key to continue.



The file system LSFW will store the user data and the backup snapshots of AhsayOBS & AhsayRPS. For data redundancy purposes, it is highly recommended to configure this partition as a zfs-parity volume.

4. Select [Yes] to add swap partition(s) or choose [No] to skip this step. Swap Partitions act as the virtual memory in the system. If there is not enough

physical memory in the machine, the data will be swapped to the swap partition to store it temporary.

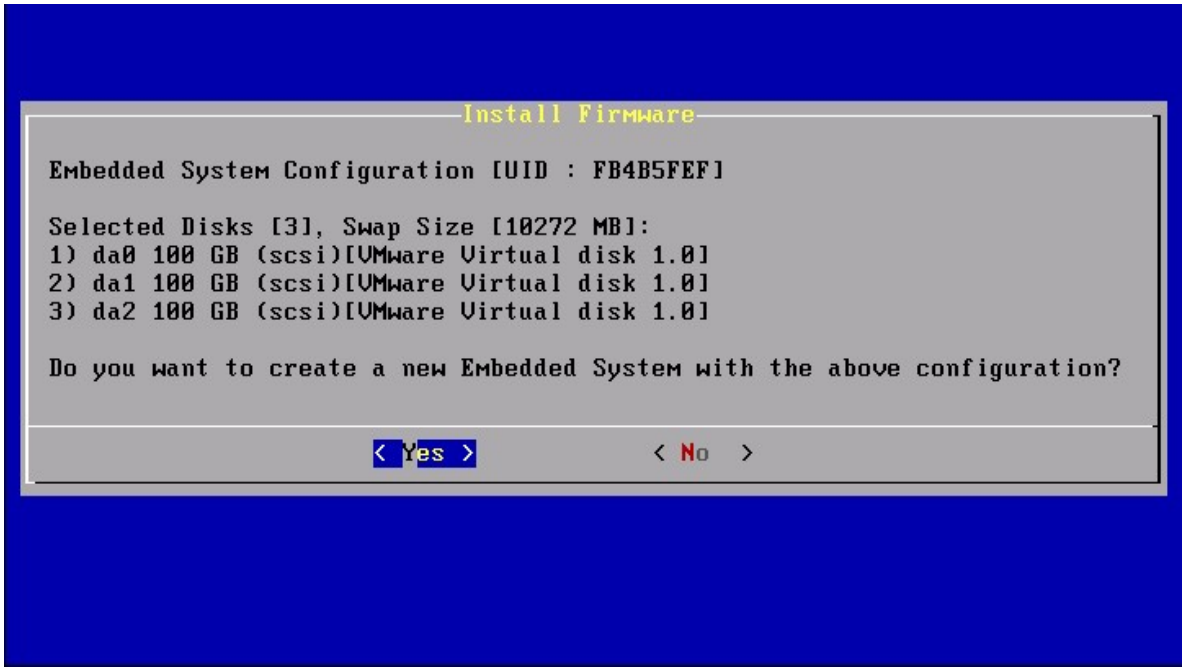


It is strongly recommended to create a swap partition for AhsayUBS.

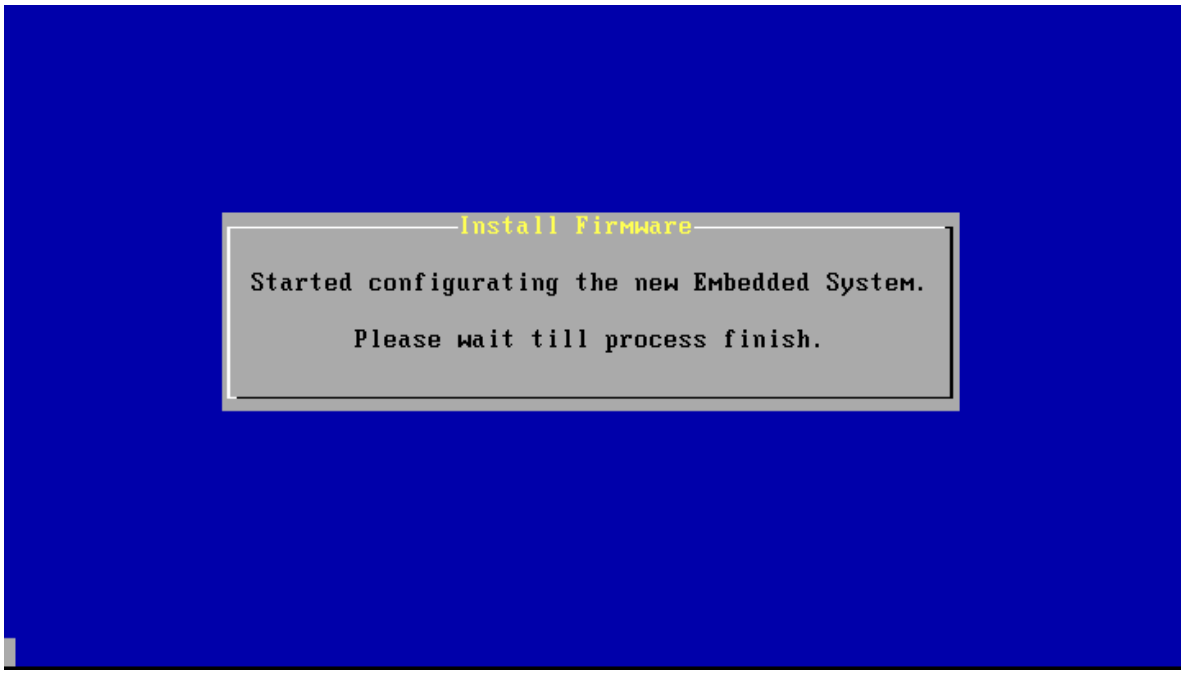
5. If you choose to create a swap partition in step 4, you will be asked to enter the size of the swap partition.

Note: The total swap file size should be at least double the size of the physical memory installed on the AhsayUBS machine.

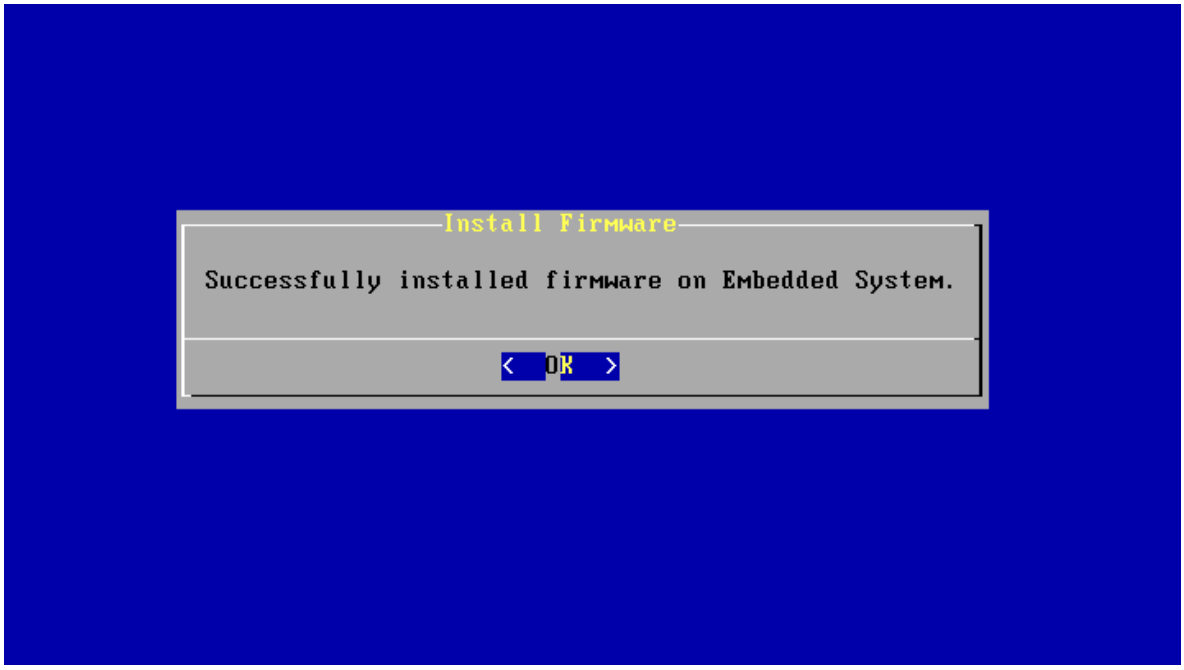
6. After inputting the swap file size, a summary of the settings for the storage configuration will be shown. Select [Yes] to accept these settings and continue with the installation, select [No] if you would like to make any changes to the current configuration.



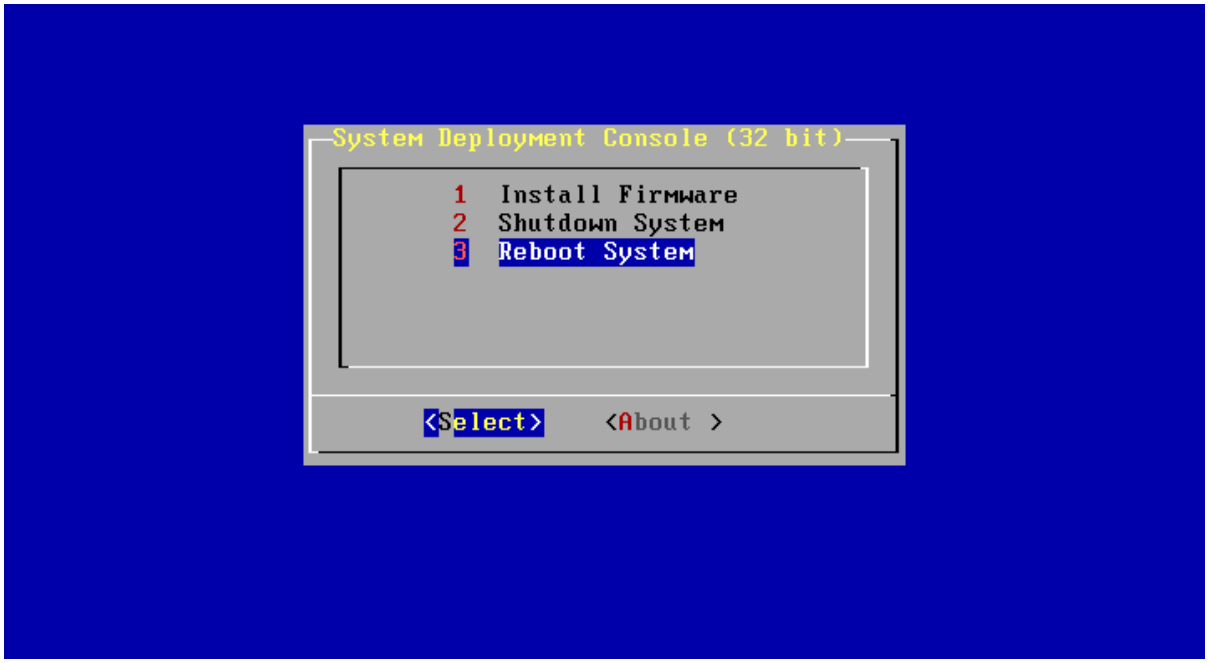
7. Once the settings have been confirmed the file system will be configured.



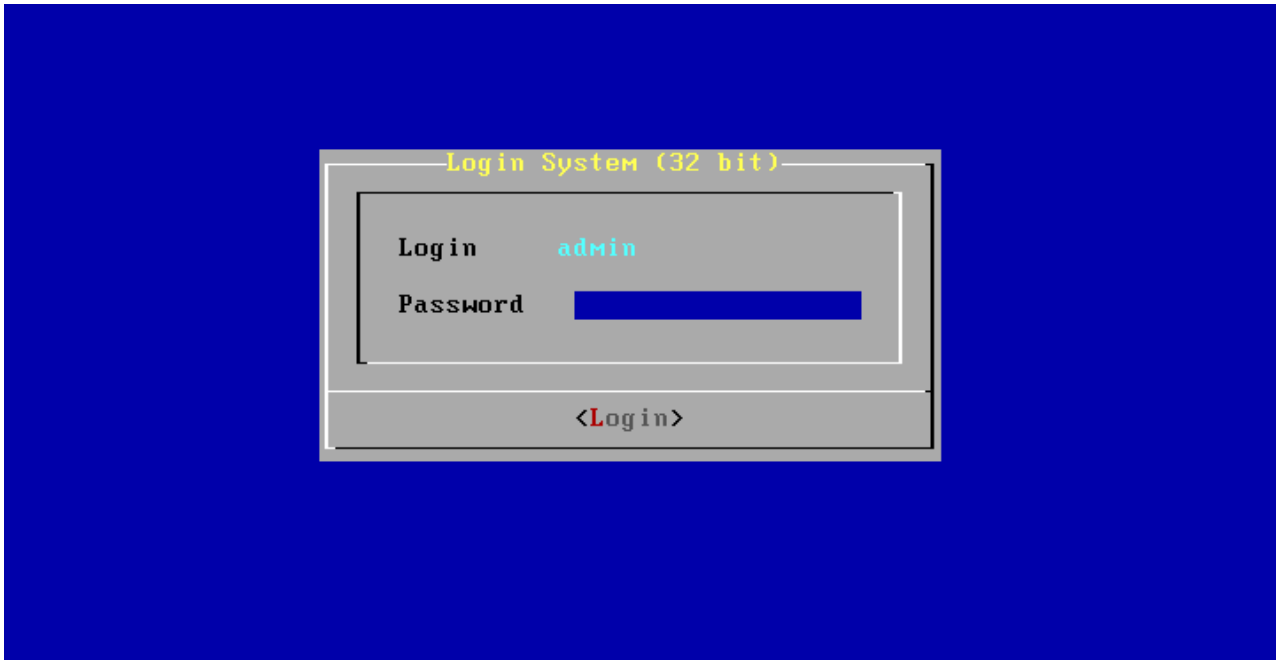
8. AhsayUBS Firmware is now installed on the target machine.



9. Remove the installation media and press [OK]. Then select option [3] to restart AhsayUBS.



10. After the system has restarted, logon to AhsayUBS using the default credentials; user id:admin and password:ahsayubs



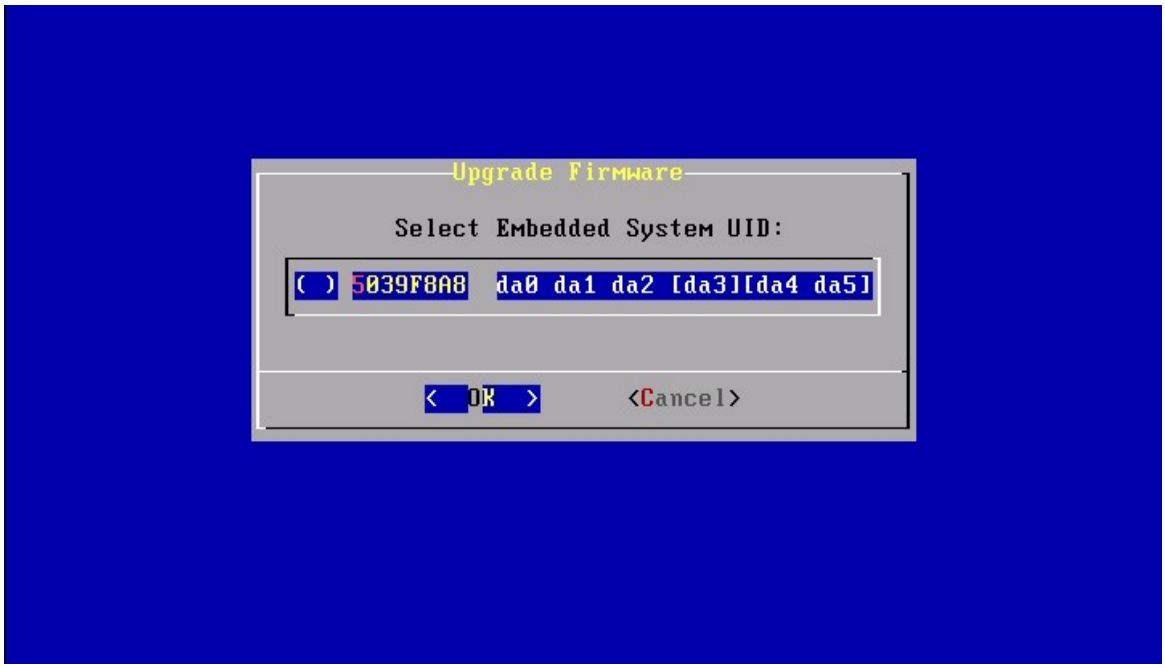
11.Please refer to chapter 6.4 post-installation to complete the installation.

6.3 Upgrading AhsayUBS Firmware

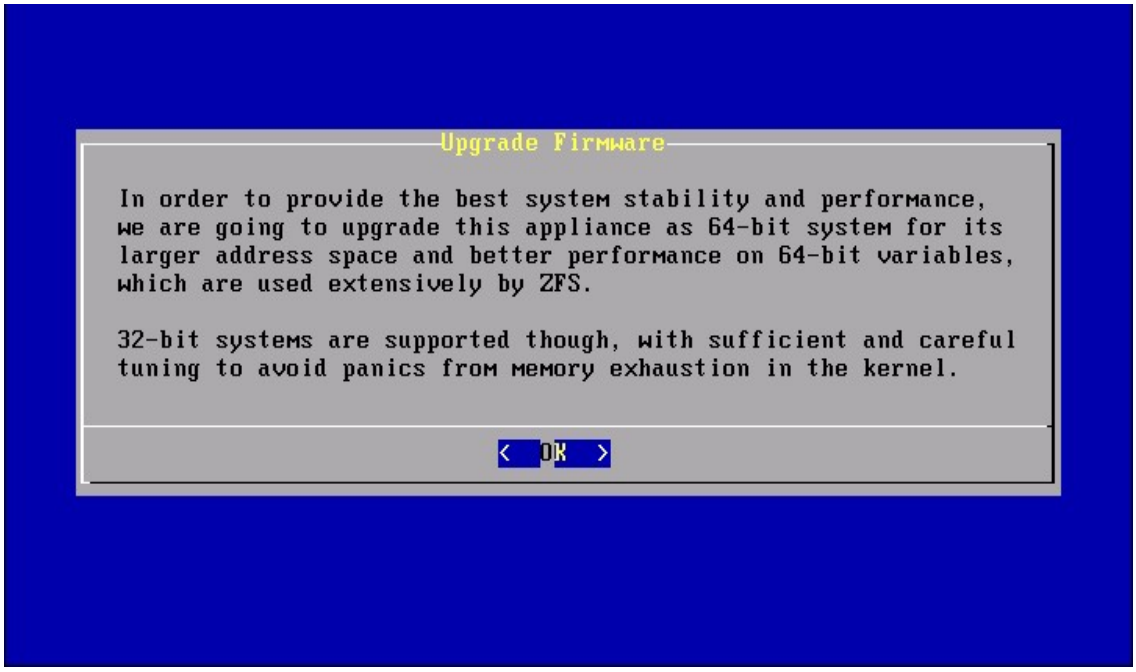
Please use the upgrade option if AhsayUBS is previously installed on the machine:

1. After booting, the main menu will appear on the screen. Select option [2] to start upgrading the AhsayUBS.

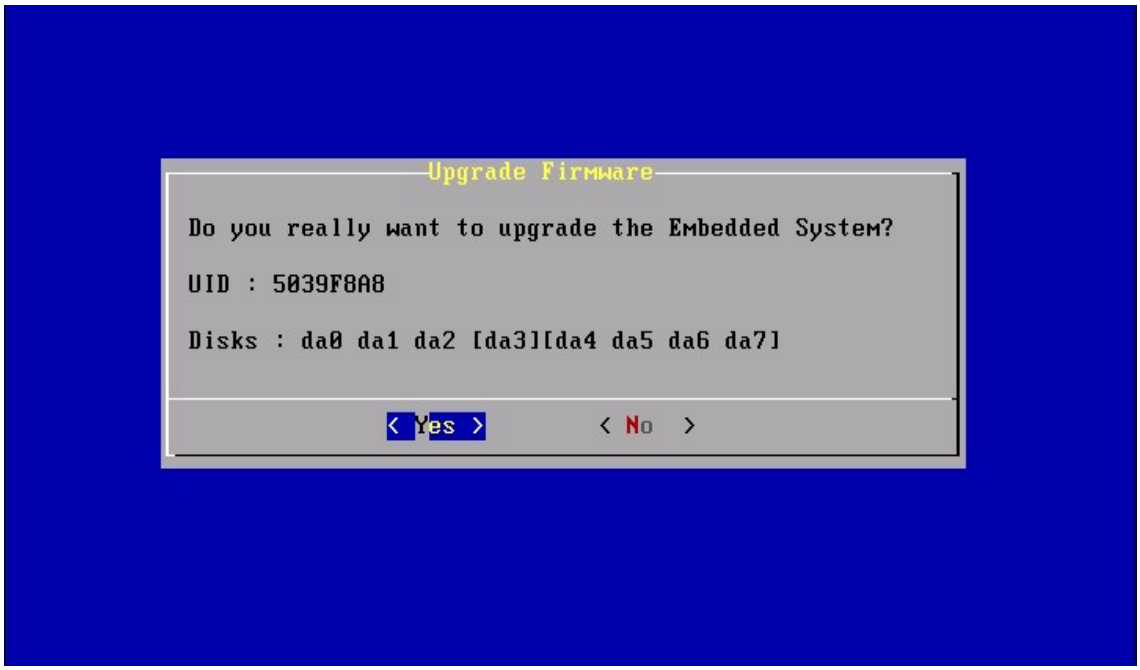
2. Select the system UID by pressing [Space] bar. Choose [OK] to continue.



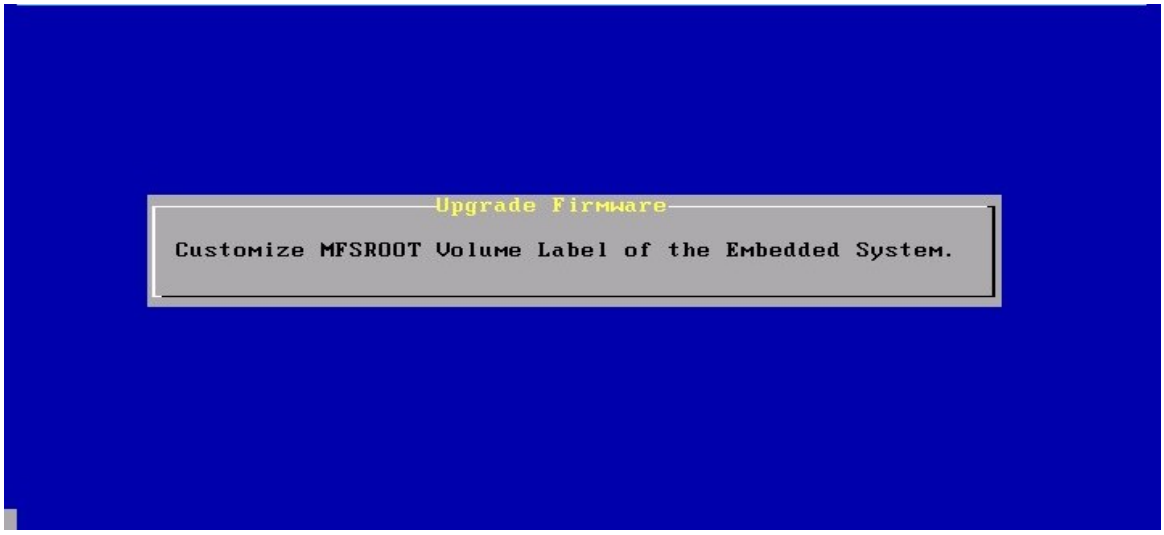
3. If your system is running in 32bit mode. AhsayUBS will automatically switch the system to 64 bit mode if your platform supports 'Long Mode' after an upgrade.



4. When the following message is shown, choose [Yes] to start the upgrade and [No] to abort.



5. Wait until the upgrade is completed.



6. The message "Successfully upgraded the Embedded System" is shown when the upgrade is completed successfully. Please choose [OK] to go back to the main menu.

Important notes on AhsayOBS upgrade:

Since we have disabled the default https connection protocol SSLv3 in AhsayOBS version 6.21.2.0 which is bundled with AhsayUBS 2.12.2.0, to allow all your existing pre-6.21.2.0 clients to be able to connect to your new AhsayOBS, you need to ensure the https connection settings in /ubs/module/obsr/system/conf/server.xml is set to "sslProtocol="TLS"". After you have auto-upgrade all your clients to the latest version (6.21.2.0 or later), you can change the default https connection protocol to

"**sslProtocols="TLSv1"**". The default https connection protocol "TLSv1" is important and required to update as soon as possible, for further information, please refer to our forum post.

7. Refer to Chapter 6.4 Post-Installation to complete the upgrade process.

Note: If there are no embedded systems found inside the machine, please use the option [Install] instead of [Upgrade]. For the detailed steps to install the AhsayUBS, please refer to Chapter 6.2 Installing AhsayUBS Firmware.

6.4 Post-installation

Please perform the following actions after the AhsayUBS is successfully installed / updated on the machine:

1. In the main menu, choose [3] to shutdown the system.

2. Choose [Yes] to confirm the shutdown.

3. Eject the installation media.
4. Power on the machine and enter BIOS settings.
5. Choose to boot from the local block devices.
6. Save and exit BIOS.
7. Login the System Management Console with the administrator password.
8. Configure AhsayUBS with your preferred network settings.

(For RAID Configuration Only)

9. Login the AhsayUBS Web Administration Interface with the administrator password.
10. Go to page [Storage] > [Summary] and wait the status of the System Storage changes from rebuilding icon to the healthy icon .
11. The Logical Storage Framework volume is healthy and the mount point is ready for use.
12. Go to [Backup Server] to enable the AhsayOBSR service.

The installation/upgrade is now completed.

WARNING:

Please make sure the RAID build process is completed before AhsayOBS & AhsayRPS is put into production as a backup server.

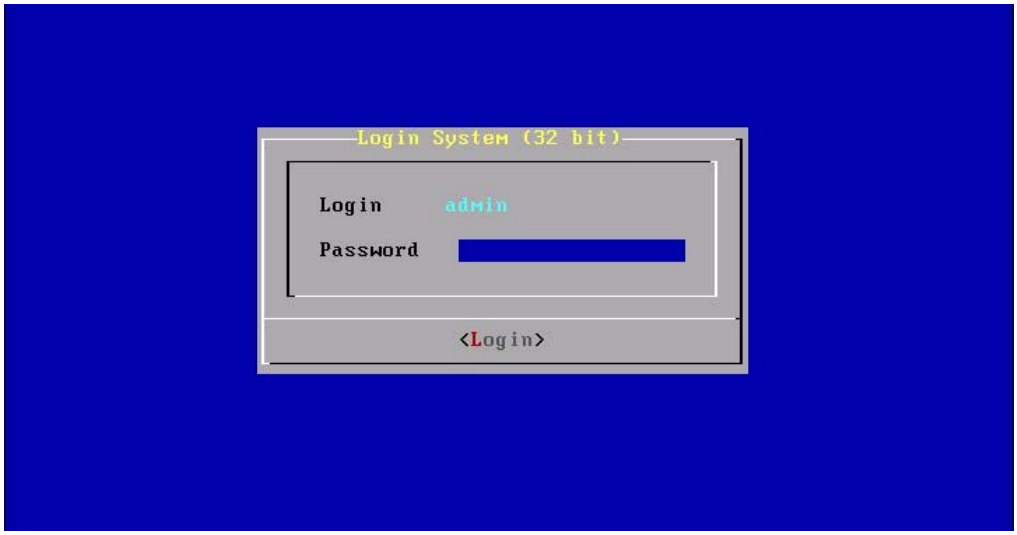
7. Basic AhsayUBS Firmware Configuration

The AhsayUBS provides WebAdmin and console access. This chapter describes the basic configuration of the AhsayUBS through the console and the WebAdmin.

7.1 System Console

7.1.1 Login to System Console

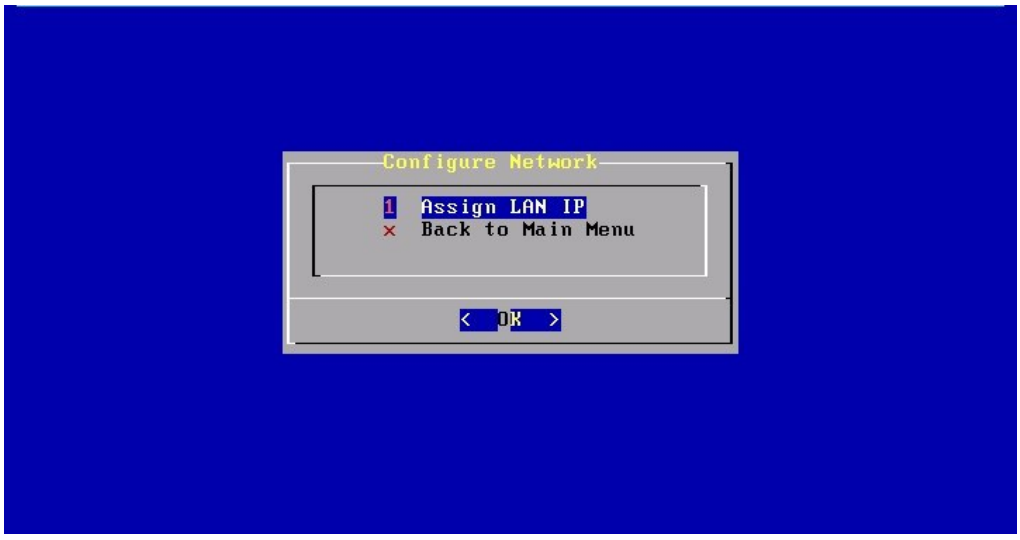
Before using the functions of AhsayUBS System Console, please login using the administration username and password.



7.1.2 Configure Network Settings

In the main menu, choose [1] to configure the network.

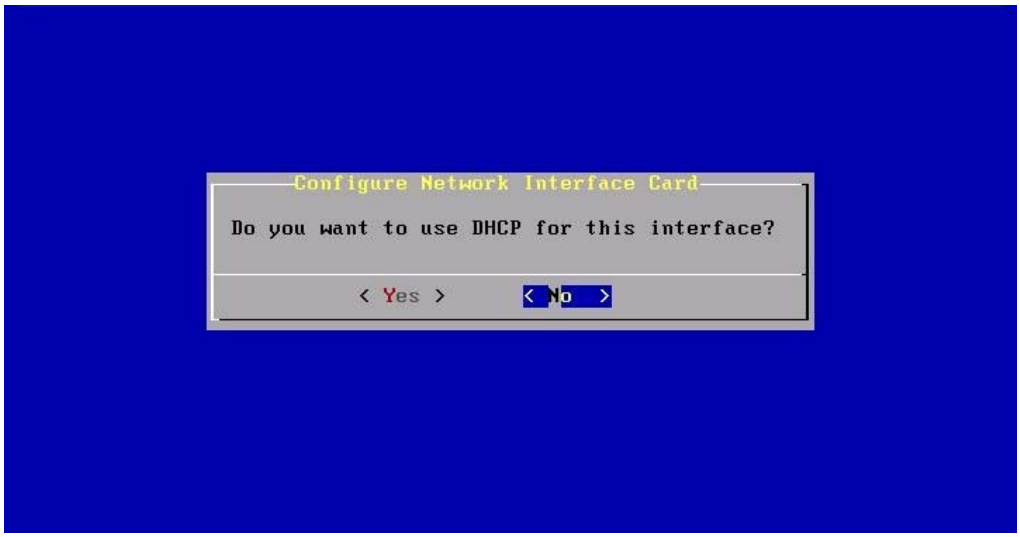
Choose [1] to assign a LAN IP to the device.



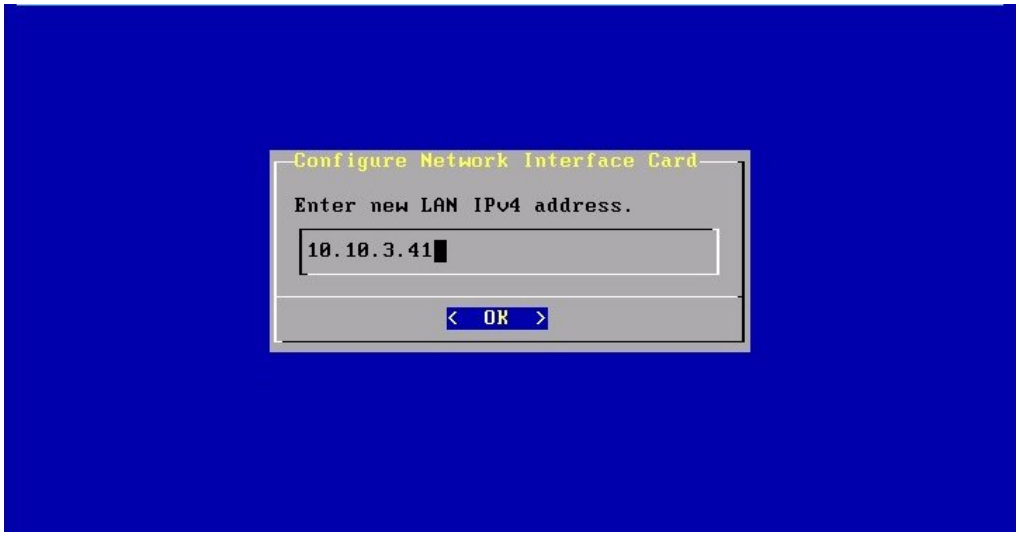
Select the method for setting up the IP Address on the device. There are two methods:
DHCP – stands for automatic setup. It will send a request to your DHCP server to get an IP Address. You must have a DHCP server in your network to use this option.
Static – stands for manual setup. You need to enter the network settings manually.

Note: You can press the [Esc] key to go back to the main menu if you selected the wrong option.

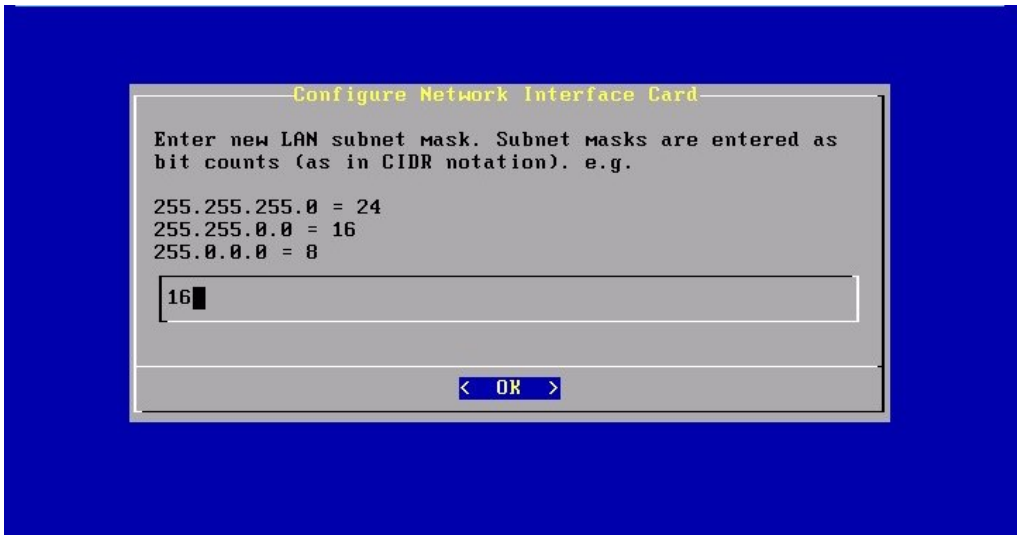
In this step, choose [Yes] for using DHCP or [No] to configure the network manually.



(Only shown when [No] is chosen in step 3) Enter the IPv4 IP address and choose [OK] to continue.



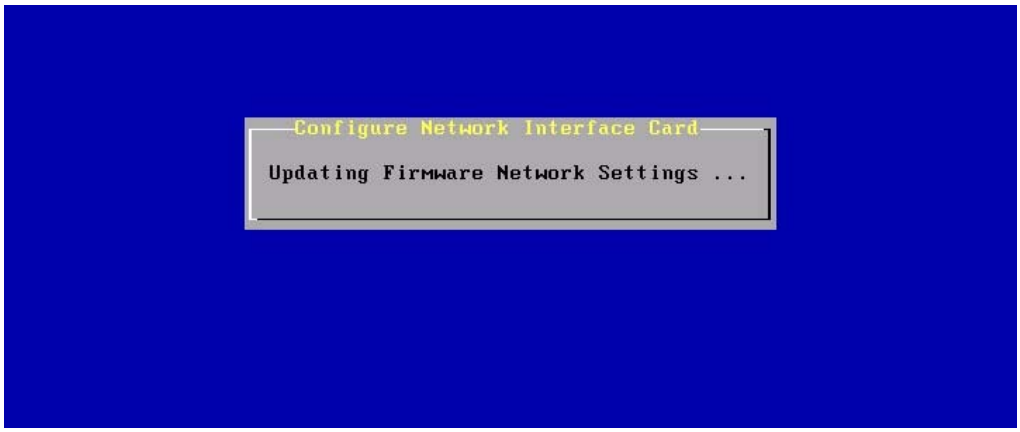
(Only shown when [No] is chosen in step 3) Enter the subnet and choose [OK] to continue.



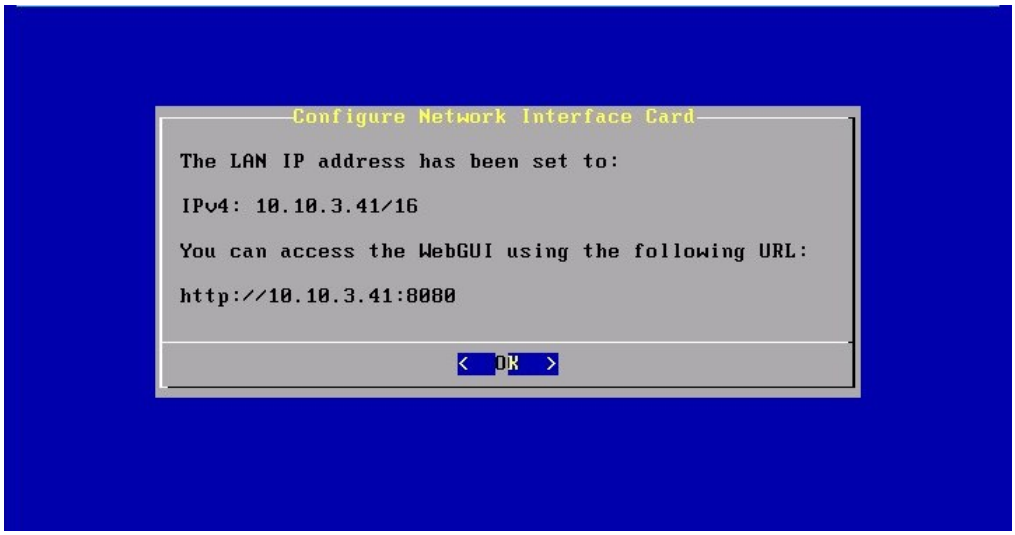
(Only shown when [No] is chosen in step 3) Enter the default gateway address and choose [OK] to continue.

(Only shown when [No] is chosen in step 3) Enter the DNS address and choose [OK] to continue.

Wait for AhsayUBS Firmware to finish updating the network configuration.



Try to access the AhsayUBS WebAdmin by the following URL to verify the network settings.



If the verification, choose [OK] to back to the main console menu.

7.2 WebAdmin

7.2.1 Login System

Launch your browser and type the AhsayUBS WebAdmin's IP address and AhsayUBS WebAdmin service port to the address bar. The default IP address is 192.168.1.250 and the default WebAdmin server port is 8080. The default URL address to access the AhsayUBS Web Admin would be:

http://192.168.1.250:8080

After you have connected to the WebAdmin Login page, login to the AhsayUBS Webadmin with the correct username and password.

The default login credentials for AhsayUBS WebAdmin are:

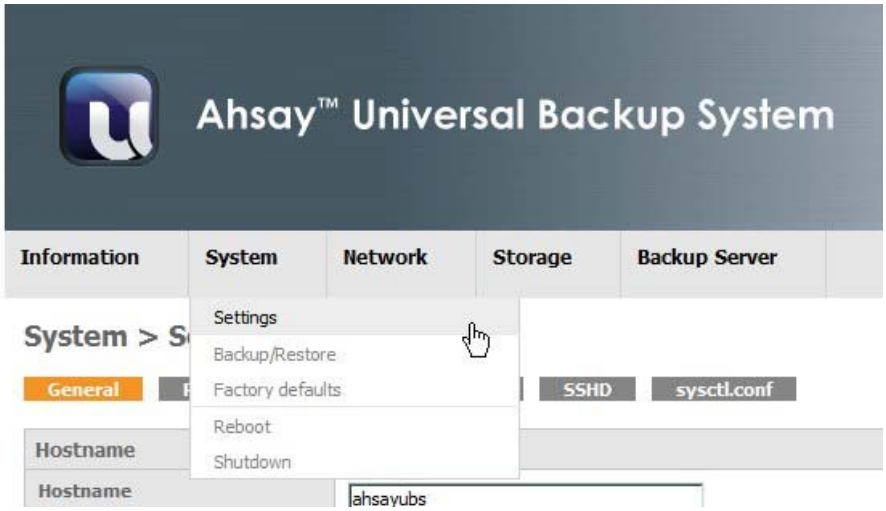
User: admin
Password: ahsayubs

Note: AhsayUBS WebAdmin console will automatically logout after 10 minutes of inactivity.

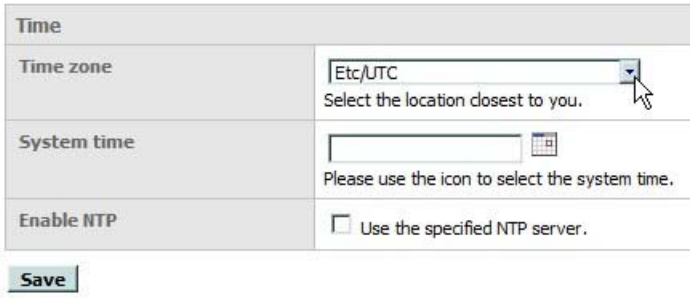
7.2.2 System Time and Time Zone Setup

Please do the following the instructions below to configure the date and time settings of AhsayUBS:

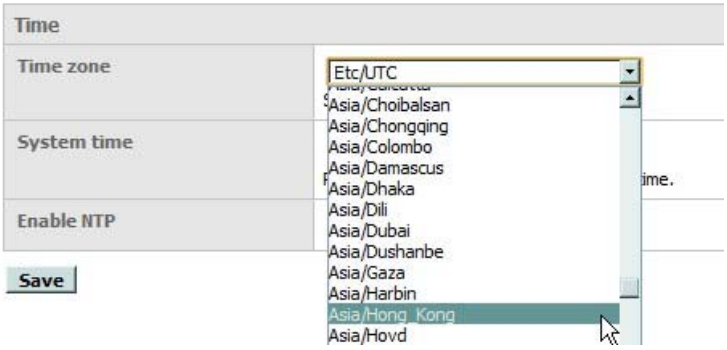
Login to the AhsayUBS WebAdmin and go to [System] > [Settings] > [General].



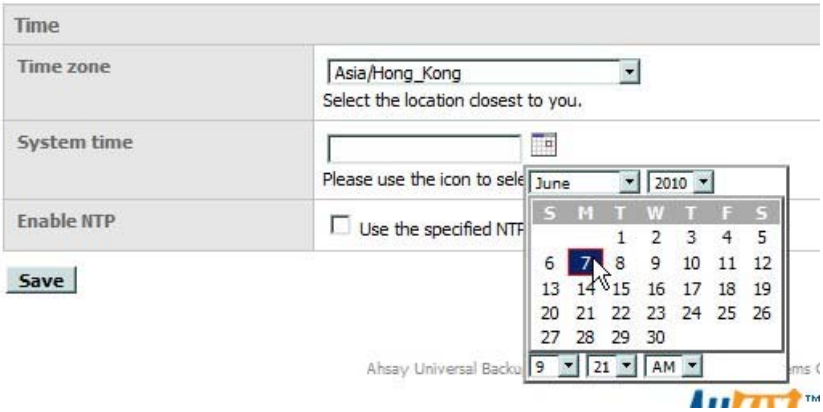
You can find the [Time] settings at the bottom of the page.

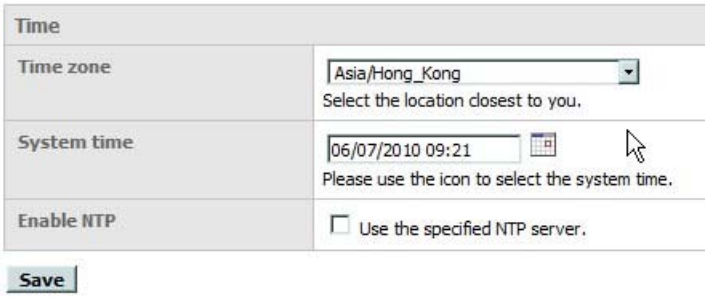


Select the appropriate time zone from the [Time zone] drop down menu.

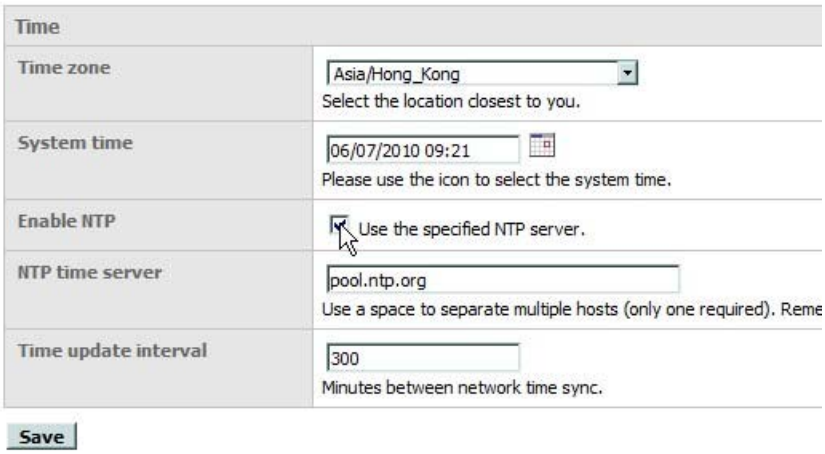


You have selected the appropriate time zone. Click on the [Calendar] Icon and a small calendar will pop up. Select the current date and specify the current time.

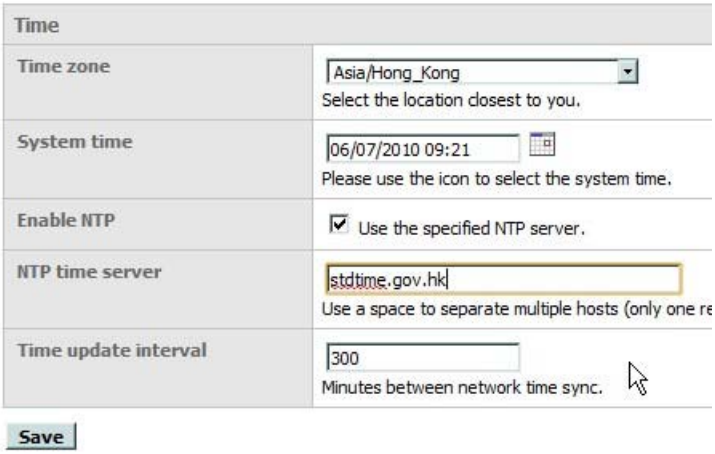




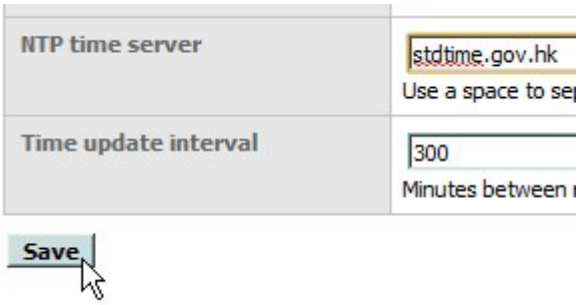
You have provided the appropriate time. If you prefer NTP synchronization, please checked the [Use the specified NTP Server] checkbox.



Additional options will appear.
Specify your preferred NTP URL in the [NTP time server] text field.
Specify the preferred update interval in unit of minutes in the [Time update Interval] text field.



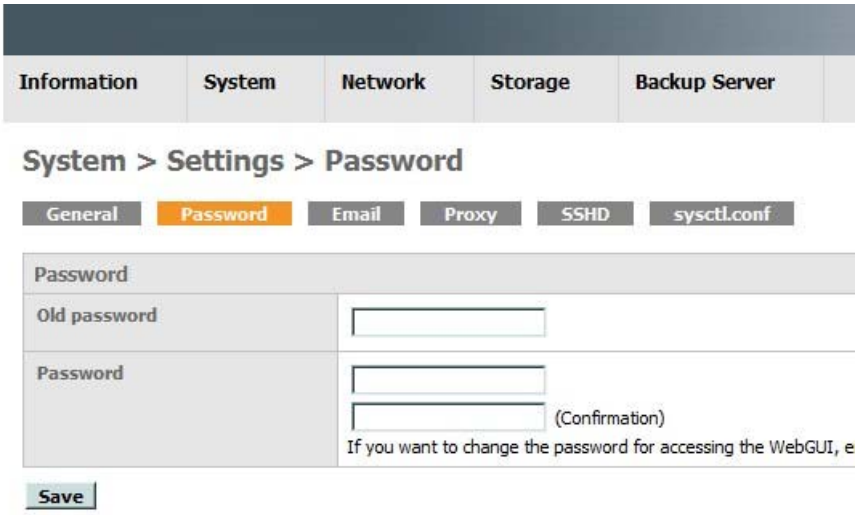
Finally, click the [Save] button to apply the changes.



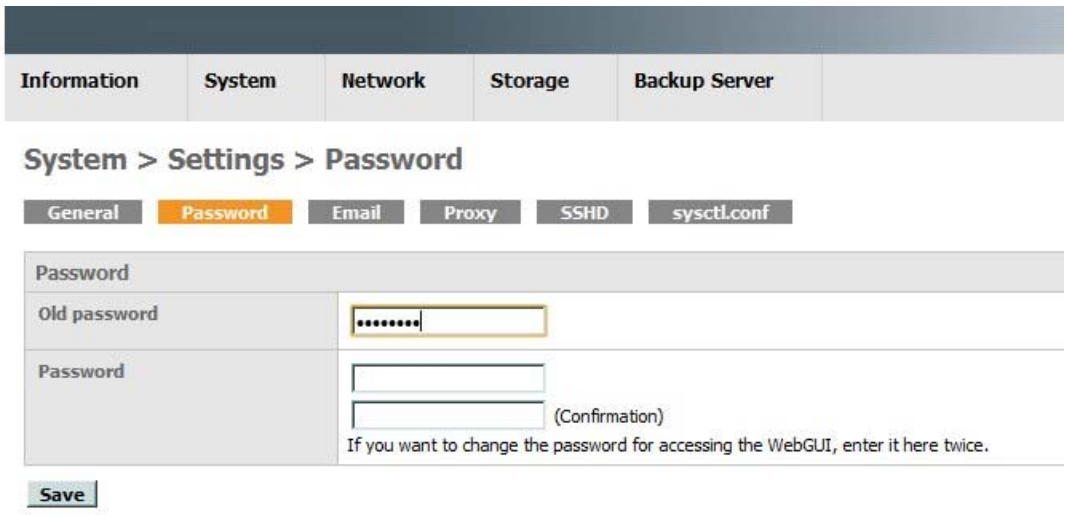
7.2.3 Change WebAdmin Password:

For security reasons, changing the default AhsayUBS WebAdmin password is recommended during the first time setup of the AhsayUBS WebAdmin.

Please follow the instructions below to change the AhsayUBS WebAdmin password:



Login to the AhsayUBS WebAdmin and go to [System] > [Settings] > [Password].



Fill in the correct values in the appropriate fields.

Click the [Save] button to update the new password.

You can try to logout the AhsayUBS WebAdmin and re-login again using the password.

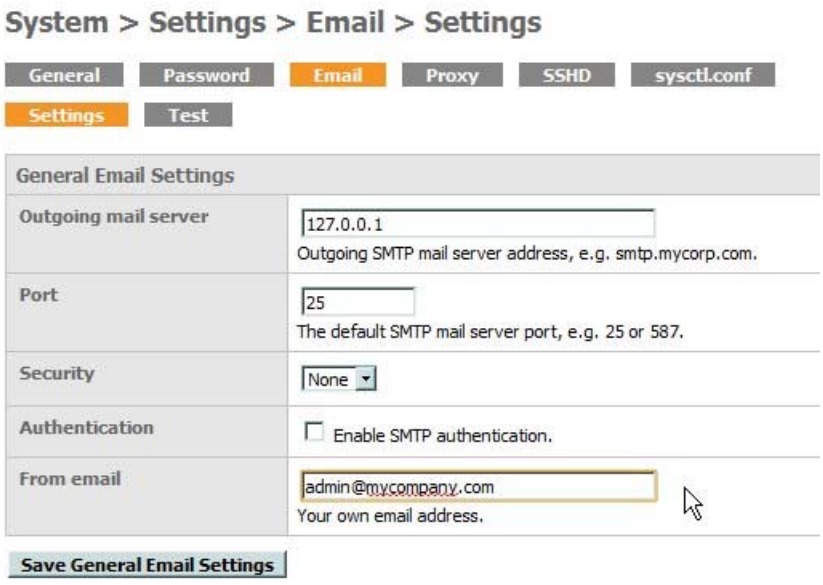
7.2.4 Email Setup

The AhsayUBS is bundled with a sendmail SMTP server. It is designed for users who do not have their own mail server.

To configure the SMTP server, please do the followings:

Click [System] > [Settings] > [Email] -> [Settings] to go to the email settings page.

Enter "127.0.0.1" in the [Outgoing mail server] field if you want to use the local sendmail SMTP server. Otherwise, specify the domain name of your preferred SMTP Server in the [Outgoing mail server]. To use an external mail server, please ensure that the DNS server setting is entered correctly.



Enter the sender's email address for sending system status reports in the [From email] field, e.g. admin@mycompany.com

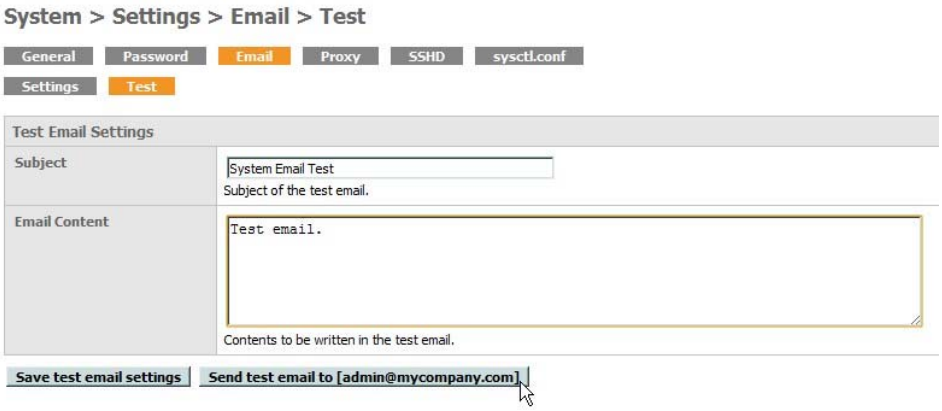
Click [Save General Email Settings] buttons to save the settings.

After you have completed the email setup, you are advised to verify it by sending a test email:

Go to [System] > [Settings] > [Email] > [Test].

Fill in the all the fields shown in the screen.

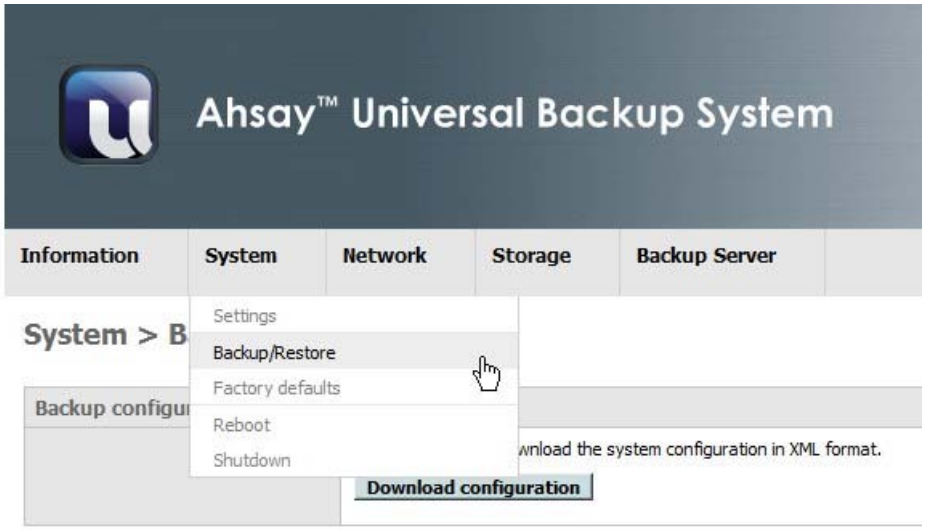
Click the [Send test email to[admin@mycompany.com]] button to send a test email. The email subject and contents will be saved in the system.



7.2.5 Backup System Configuration

Once you have completed the system configuration on the AhsayUBS WebAdmin. It is recommended to backup the AhsayUBS system configuration settings. AhsayUBS provides a feature to export the system settings to an XML file.

Click [System] > [Backup/Restore]



Click the [Download configuration] button to save the current settings as a XML file on your machine. This configuration file is useful for system upgrade and system recovery.

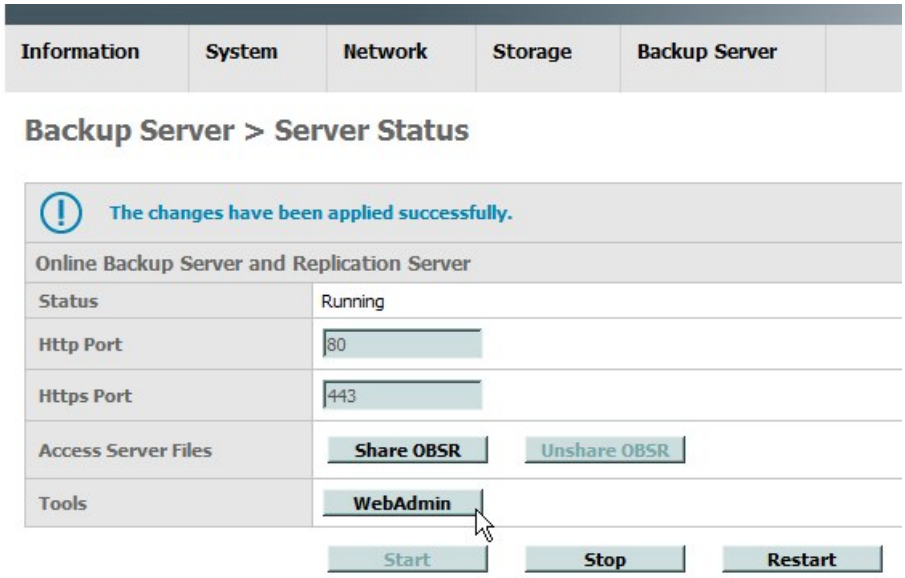
7.3 Backup Server Configuration

Ahsay Offsite Backup Server & Ahsay Replication Server is bundled with Ahsay UBS Firmware. However, it must be configured properly before use.

7.3.1 Startup/Stop

Please follow the instructions to startup/stop the backup server:

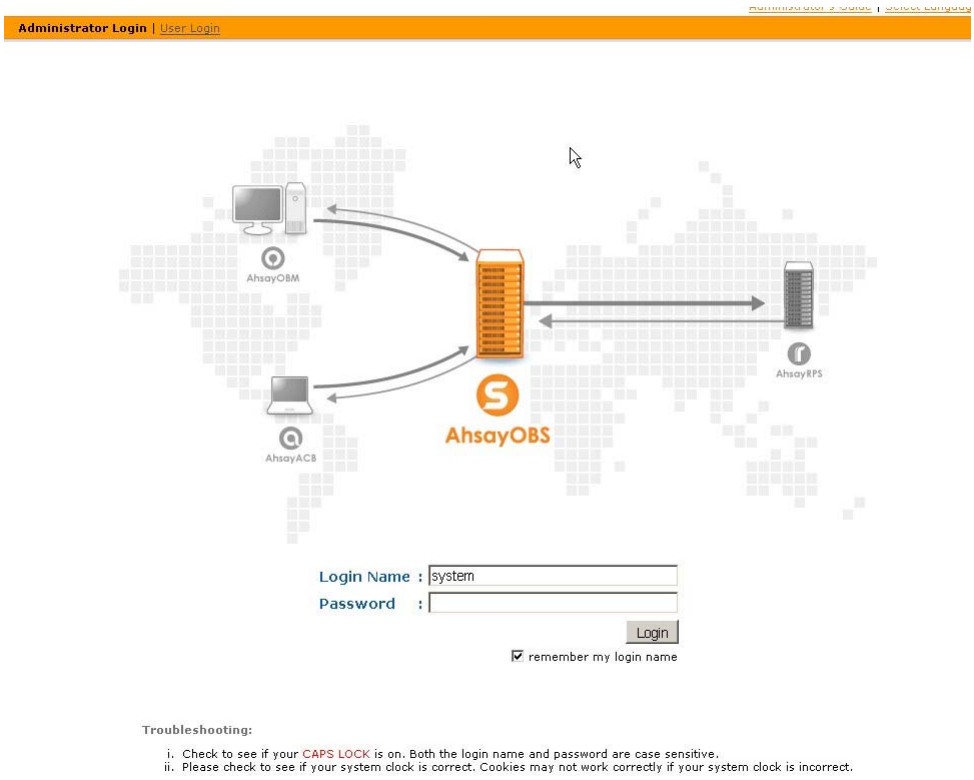
Login to AhsayUBS WebAdmin.
Go to [Backup Server] > [Server Status].
Click the [Start] button to startup the backup server and [Stop] button to stop it.
Once the backup server has started, you may click the [WebAdmin] button to go to the login page of it. The default IP address of the backup server is the same as the UBS system and the default server port is 80.



e.g. http://192.168.1.250

7.3.2 Login to AhsayOBS Backup Server

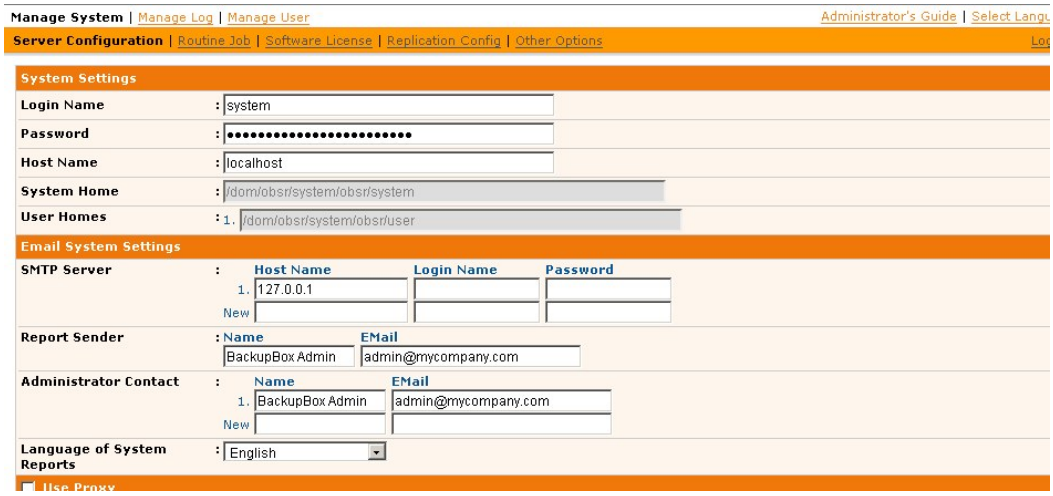
At the AhsayOBS backup server login page, you can login with correct username and password. The default username is system and the password is also system.



7.3.3 Configure Backup Server Email Settings

To configure the email settings of the backup server, please do the following:

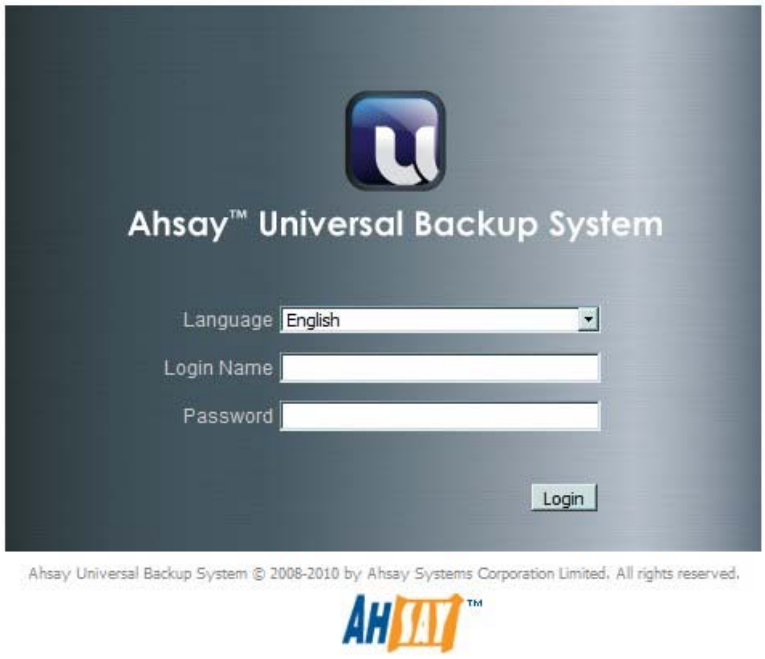
1. Logon to the backup server via the backup server administration page.
2. Go to the page [Manage System] > [Server Configuration].
Specify the same SMTP server setting as the AhsayUBS. E.g. "127.0.0.1" for local server or an external mail server address.
You may use the same email account for [Report Sender] and [Administrator Contact].



Please refer to the AhsayOBS Administrator's Guide for further information on configuring AhsayOBS.

8. Advanced Configuration for AhsayUBS Firmware

This chapter describes how to use the all the features of AhsayUBS Firmware via AhsayUBS WebAdmin.



8.1 Information

All pages under this section provide useful information about the AhsayUBS Firmware.

When the mouse is pointed over the [Information] tag in the menu bar, the following menu will be shown:

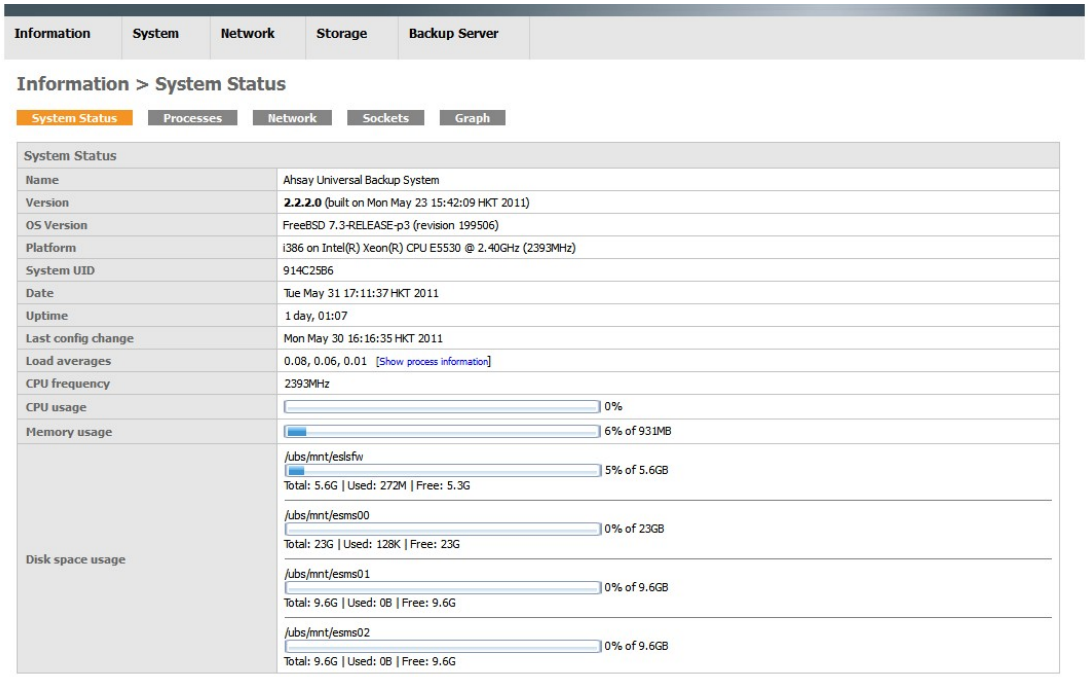
The [Information] menu has been further divided in to the following sections:

- System Status (Current system status)
- System Logs (The cached system logs)
- Help (Other help resources for use)
- About (Information about this firmware)

8.1.1 System Status

This section provides information about the current system status in AhsayUBS.

8.1.1.1 System Status



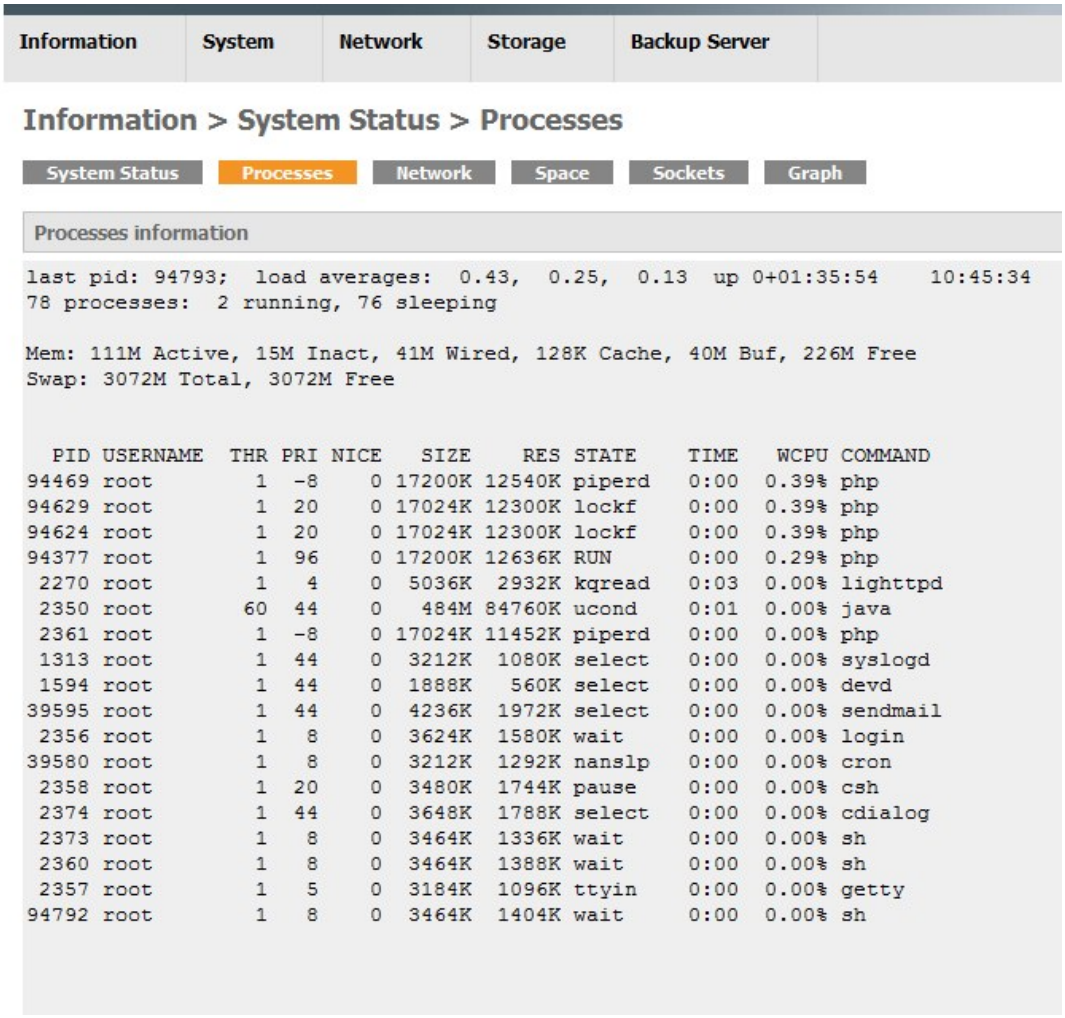
The [System Information] table provides a summary about the system status. The table includes:

- **Name:** The name of this product. i.e. AhsayUBS
- **Version:** The version number and built time of this AhsayUBS Firmware.
- **OS Version:** The OS name and its version in this AhsayUBS
- **Platform:** Type of CPU and its speed in this AhsayUBS
- **System UID:** The ID for this AhsayUBS. The ID will be different with each installation of AhsayUBS.
- **Date: System** time and time zone on AhsayUBS. You can edit them in [System] > [Settings] > [General]
- **Uptime:** The time since last system boot.
- **Last config change:** The last time when you save your settings in this AhsayUBS System WebAdmin.
- **Load averages:** The three numbers show the average number of processes ready to run during the last 1, 5 and 15 minutes. If the load averages remain high in your production environment, it is advised to consider an upgrade in your hardware configuration or reduce the load in this AhsayUBS.
- **CPU frequency:** Actual CPU working in this AhsayUBS.
- **CPU usage:** Actual CPU usage now in percentage in this AhsayUBS.

- **Memory usage:** The percentage of memory in use with respect to the physical memory in this AhsayUBS.
- **Swap usage:** Provided swap path and its usage information in each of the swap partitions in this AhsayUBS. The swap space acts as the virtual memory, it allows this AhsayUBS to store extra data in the swap space if there are not enough physical memory exists. If the swap usage is always high, this indicates your AhsayUBS server is installed with insufficient RAM. Therefore, more RAM may be needed to improve the performance of this AhsayUBS. For more information about the usage of the swap partition, please refer to the FreeBSD Documentation.
- **Disk space usage:** Shows the disk space usage of the LSFW storage and the additional storages. For details, please refer to [Storage] section.

Processes

The table [Process information] shows the "top" command output in your AhsayUBS. It shows current running processes in your AhsayUBS. For more information about "top" command, please refer to the FreeBSD Documentation.

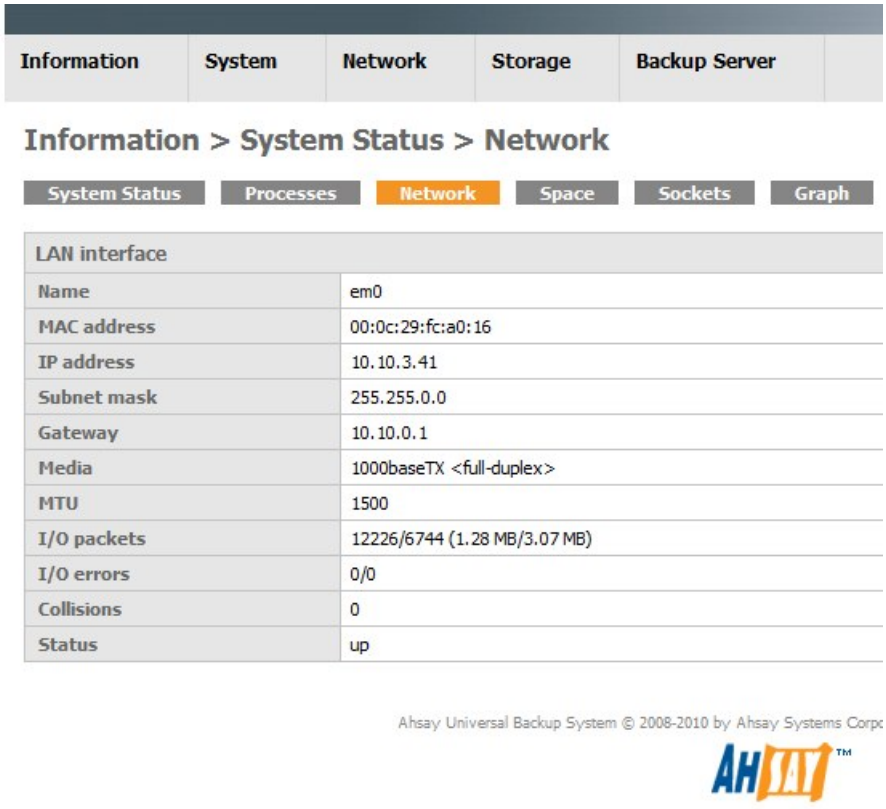


8.1.1.2 Network

This page shows the [Network Information] in the AhsayUBS. Each network interfaces' information stores in each of the table. In this example, the title of the network interface refers to the network interface "LAN". If any modification of this network interface is needed, please go to [Network] > [LAN].

The following describes the information in the table:

- **Name:** The real name of the interface stated in the OS.
- **MAC address:** The physical address for this interface.
- **IP address:** The IP address currently set for this interface.
- **Subnet mask:** The subnet mask currently set for this interface.
- **MTU:** The maximum transfer unit currently set for this interface.
- **I/O packets:** The number of input/output packets and the size of data transferred through the interface from system uptime.
- **I/O errors:** Number of input/output errors in this interface from system uptime.
- **Collisions:** Number of collisions from system uptime.
- **Status:** State of this interface. Up or Down.

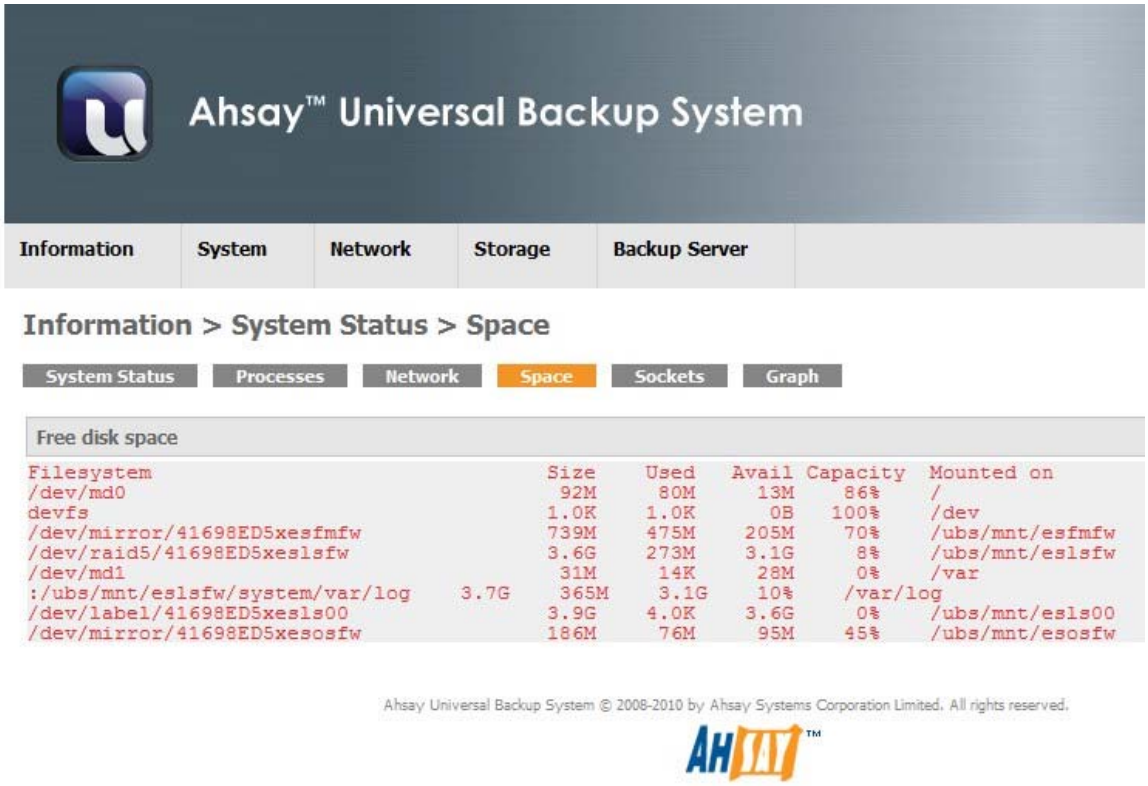


8.1.1.3 Space

This page provides the storage capacity for all mount points in the system. The information includes:

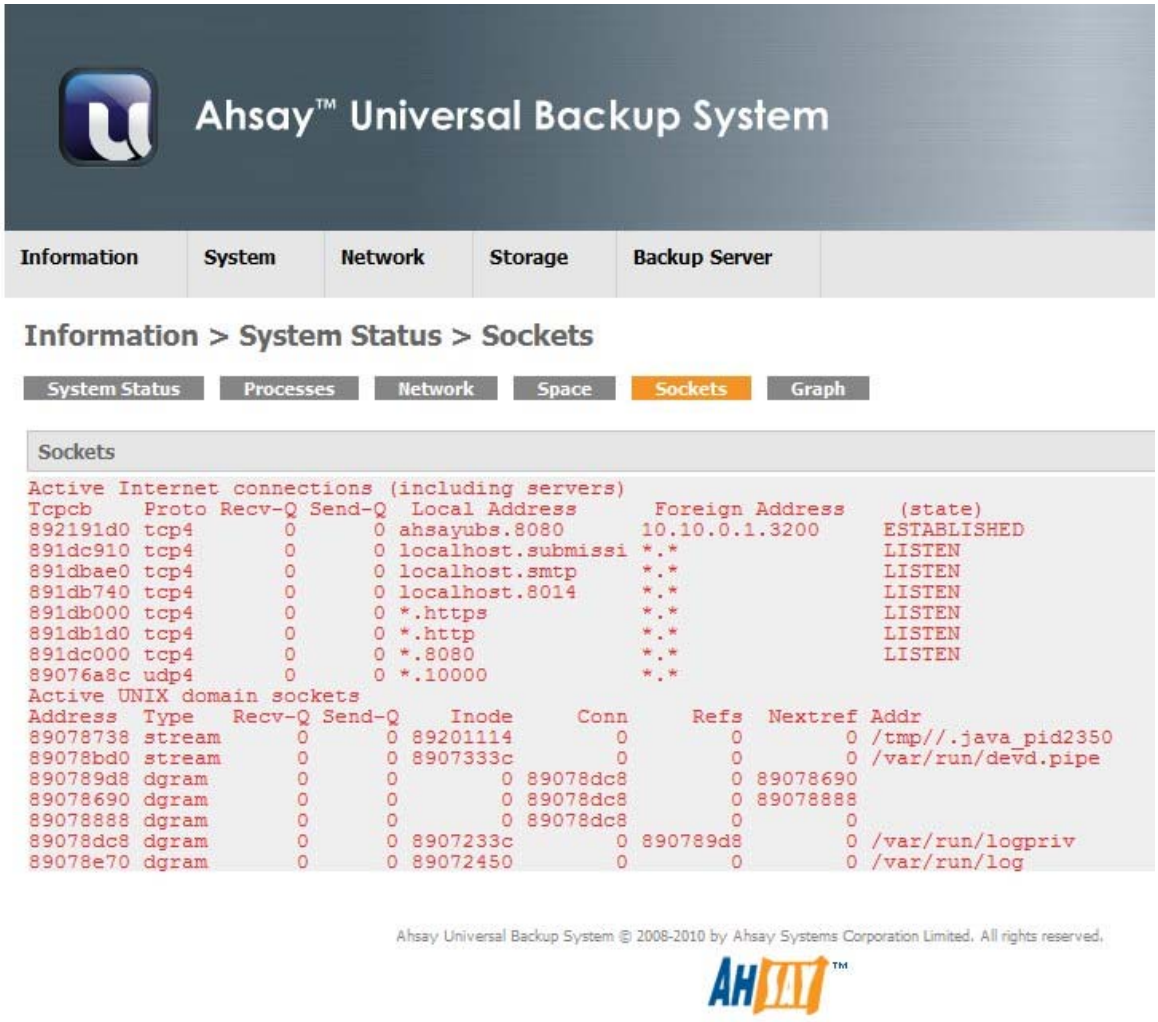
- Total Size of Corresponding File System
- Used Size of Corresponding File System
- Available Size of Corresponding File System
- Capacity Occupied in Corresponding File System

In the example below, a device name "/dev/md0" has been mounted at the root directory. It has 92MB in total and 80MB in use. The used capacity is 86% (80MB/92MB) and 13MB remains available for use.



8.1.1.4 Sockets

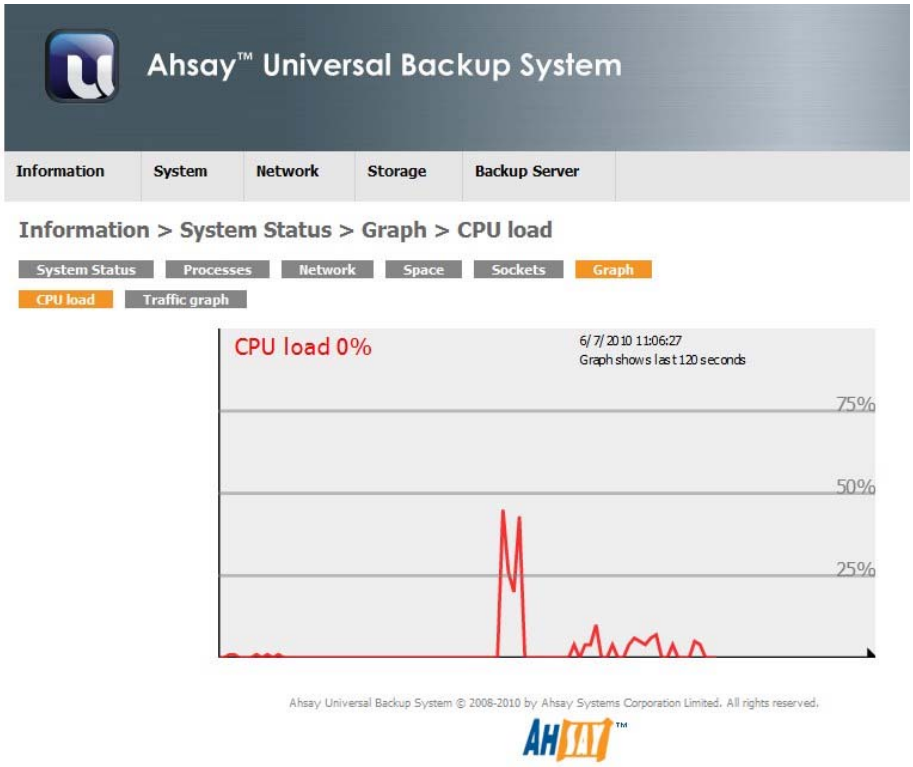
This page provides the information of the [Active Internet connections] and [Active UNIX domain sockets].



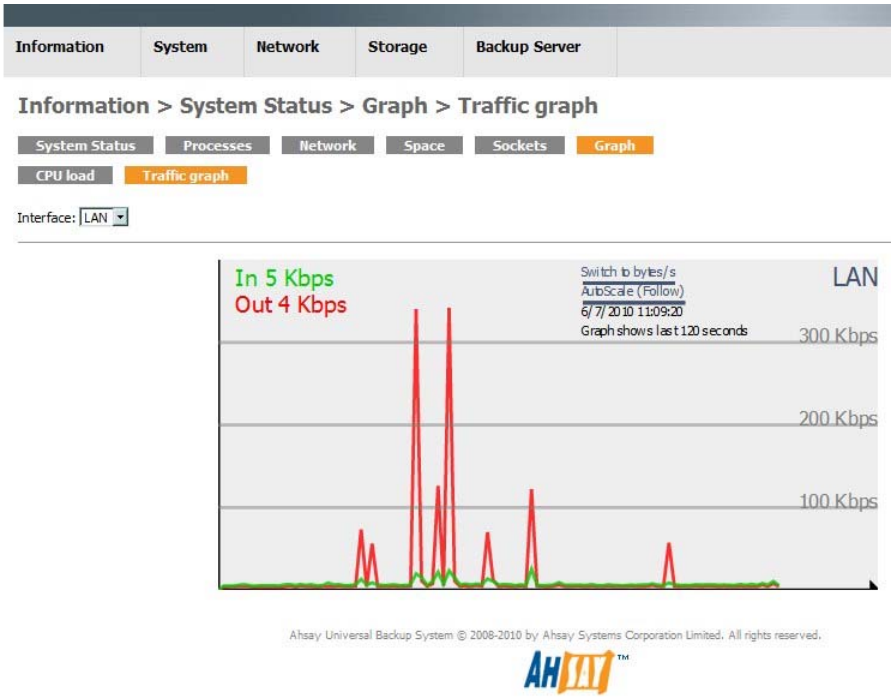
8.1.1.5 Graph

This page provides graphical information for the CPU loading and the traffic of the network interface.

- **CPU load:** This current CPU load graph will be shown. The graph will be refreshed automatically.



- **Traffic graph:** Select a network interface from the top-left drop down list and the graph of input /output via the interface will be shown. The graph will be refreshed automatically.

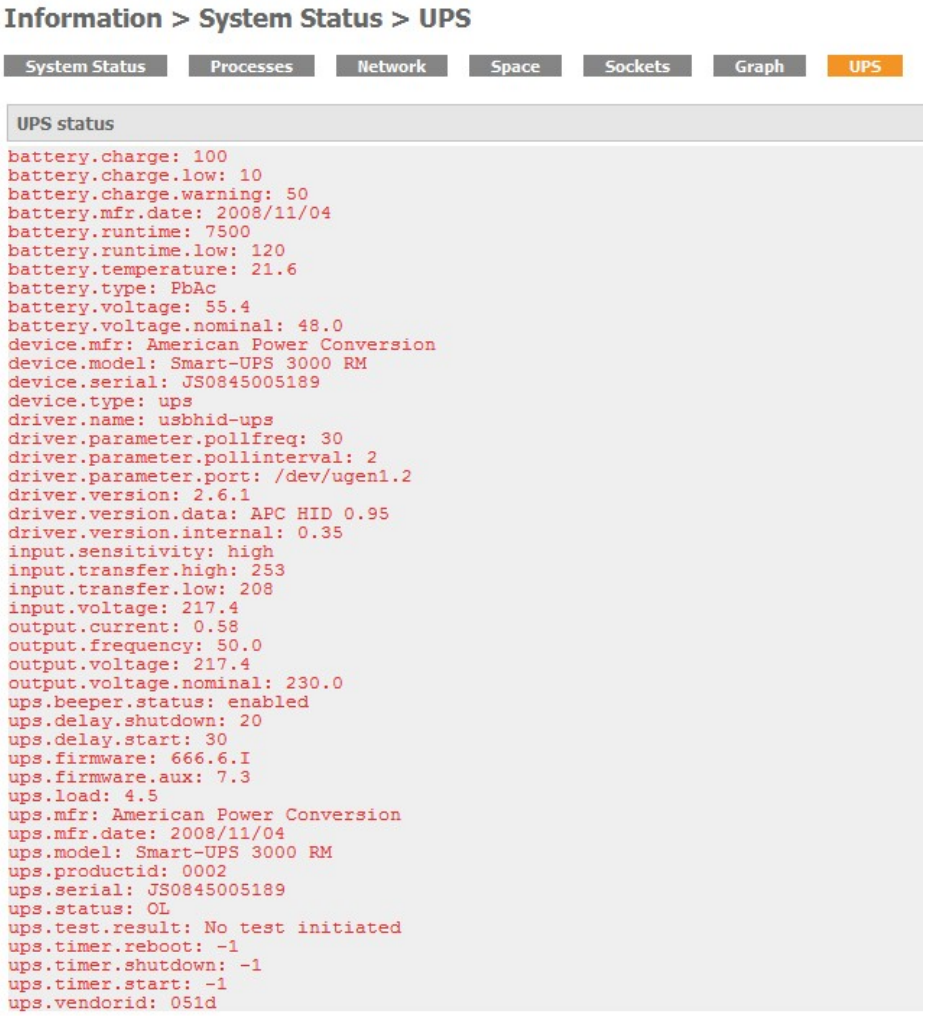


8.1.1.6 UPS Status

When NUT (Network UPS Tools) service is enabled successfully, the UPS status will be shown here as soon as the UPS' driver established connection with the UPS. For instance,

- UPS status [Running On Line Power / On Battery]
- Battery Charging Level
- UPS current temperature
- UPS machine manufacturing information

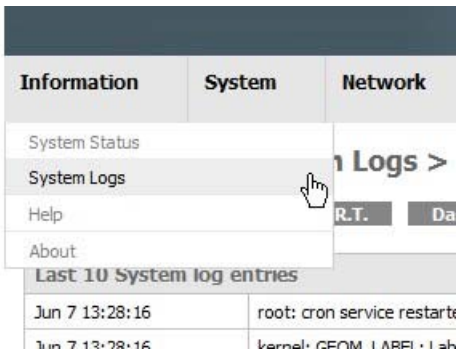
For more information about how to configure a connected UPS, please refer to the section related to UPS settings.



8.1.2 System Logs

These pages contain logs and the display settings of the logs.

You may go to this page by the menu [Information] > [System Logs].

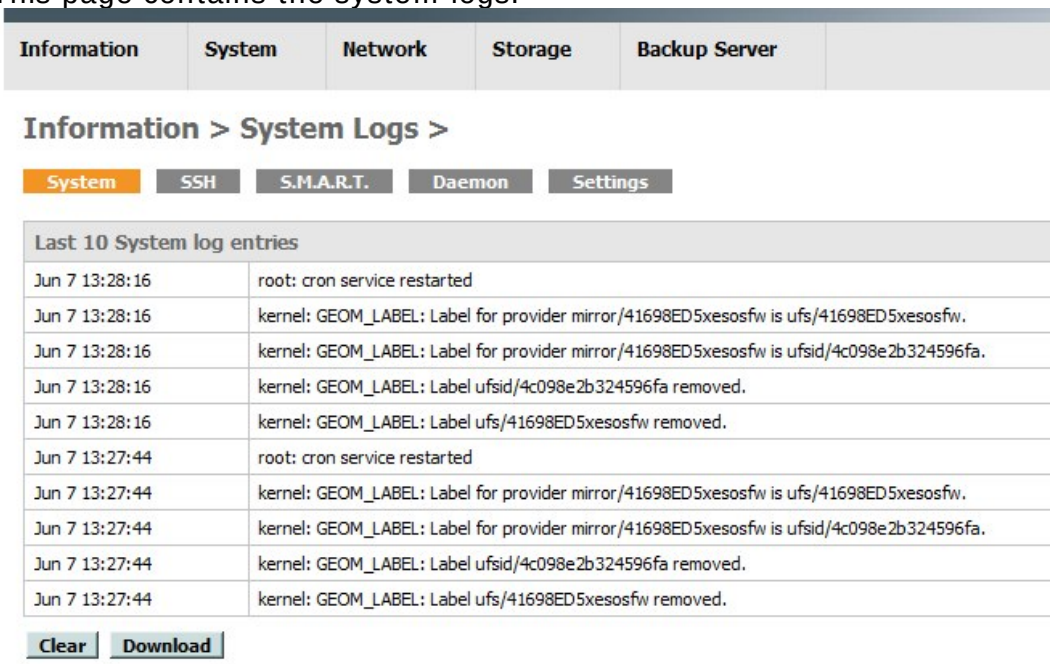


All the logs can be cleared by clicking the [Clear] button. Apart from this, the logs can be downloaded to your local computer by clicking the [Download] button.

WARNING: The logs CANNOT BE RECOVERED after clicking the [Clear] button.

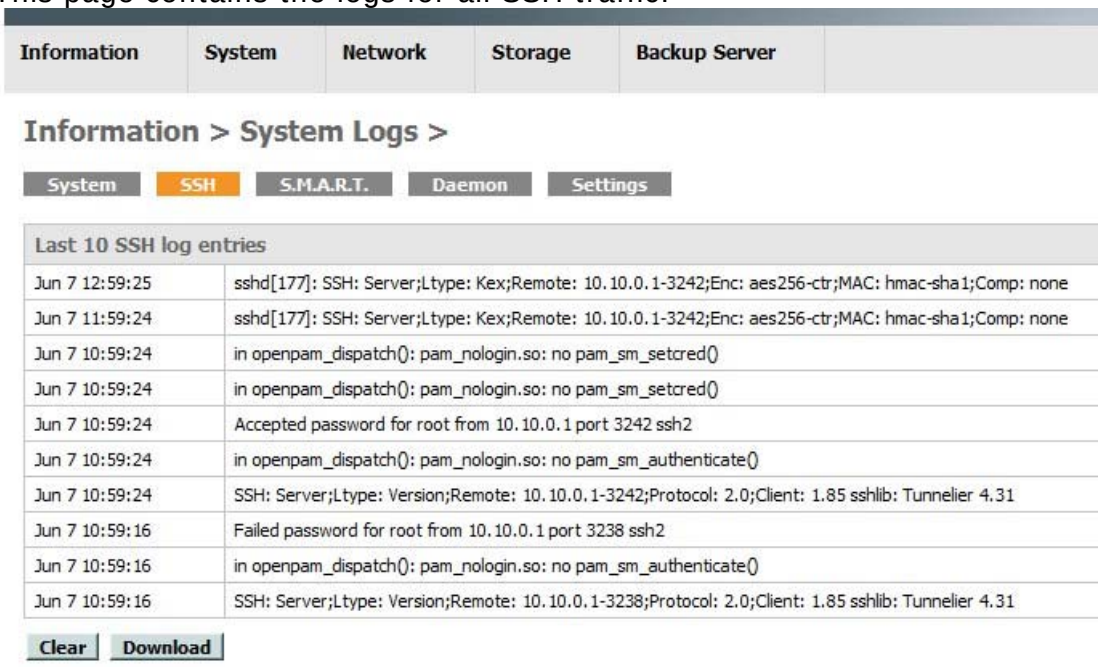
8.1.2.1 System

This page contains the system logs.



8.1.2.2 SSH

This page contains the logs for all SSH traffic.

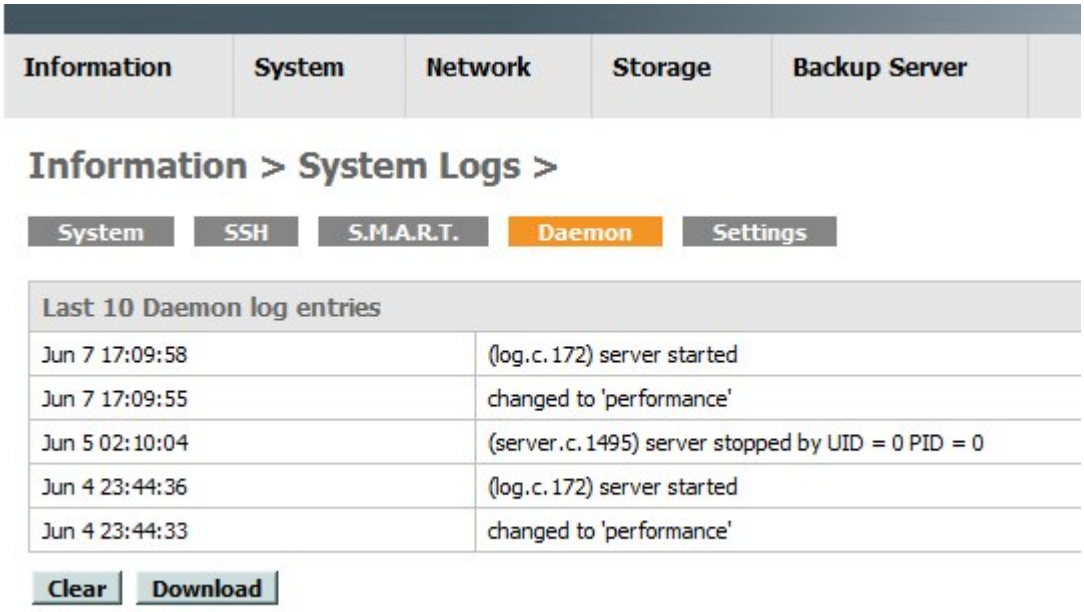


8.1.2.3 S.M.A.R.T.

This page contains logs from S.M.A.R.T.

8.1.2.4 Daemon

This page contains logs related to daemons.

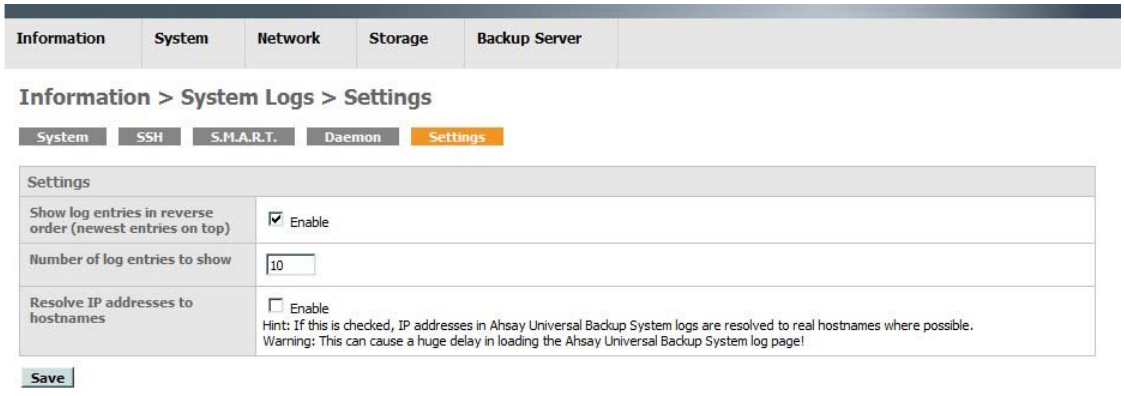


8.1.2.5 Settings

Modify these settings for the log showing in the log pages described above:

- **Show log entries in reverse order (newest entries on top)**
- **Number of log entries to show:** Enter a number for a maximum number of the log entries to show or email.
- **Resolve IP addresses to hostnames**

The save your settings, click the [Save] button, click the menus above to view the logs again and to verify for the change of the settings.



8.1.3 Help

You can find other help information about AhsayUBS in this page.

8.1.4 About

About page for the AhsayUBS.

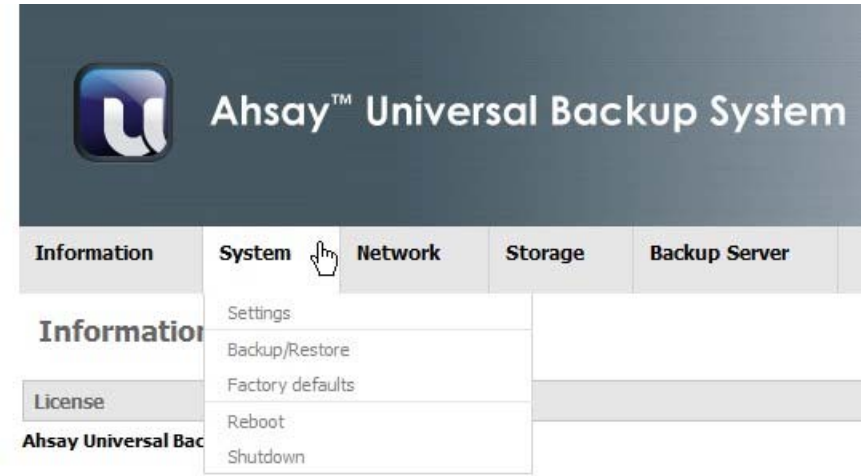
8.2 System

This section describes how to configure the AhsayUBS settings through the AhsayUBS WebAdmin.

When the mouse cursor is pointed over the word [System] in the menu bar, the menu will be shown as below:

The [System] menu has been further divided into the following sections:

- Settings (Edit system settings)
- Backup/Restore (Backup or restore system settings as a file)
- Factory default (Restore system settings to factory defaults)
- Reboot (Reboot system now or in a schedule time)
- Shutdown (Shutdown system now or in a schedule time)



8.2.1 Settings

The general system settings can be set here.

8.2.1.1 General

Hostname Table:

- **Hostname:** Sets the hostname of this AhsayUBS. It is advised to name in order to identify AhsayUBS System in the network.
- **Domain:** Sets the domain of this AhsayUBS.

DNS Settings:

- **IPv4 DNS servers:** Specify a maximum of 2 different IP addresses of DNS server for the AhsayUBS.

WebGUI:

- **Protocol:** Select WebAdmin protocol for this AhsayUBS WebAdmin. The supported protocols are HTTP/HTTPS and the default protocol is HTTP.
- **Port:** Change the WebAdmin port for this AhsayUBS WebAdmin.

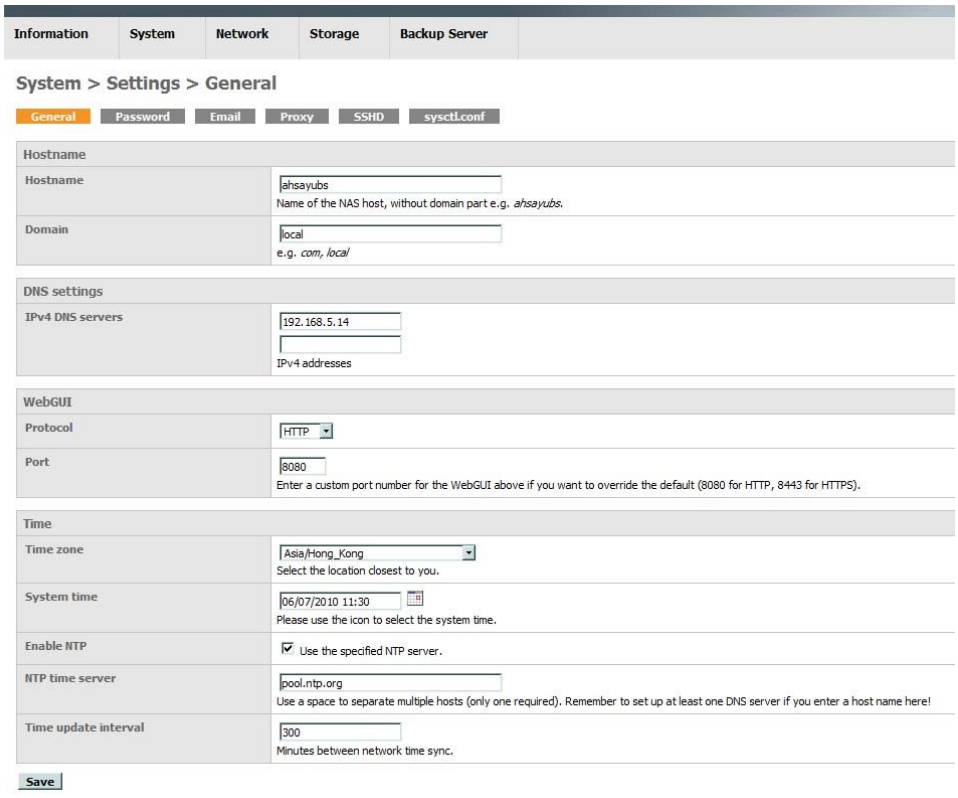
  Note: It is advised not to use the system service port 0-1023 for the WebAdmin port. Also, port 80 and port 443 has been reserved for the

backup server. Please refer to the Prerequisites section for the default port configuration.

- **Certificate (for HTTPS only):** Paste a signed certificate in X.509PEM format to the textbox provided for this AhsayUBS.
- **Private key (for HTTPS only):** Paste a private key in PEM format to the textbox provided for this AhsayUBS.

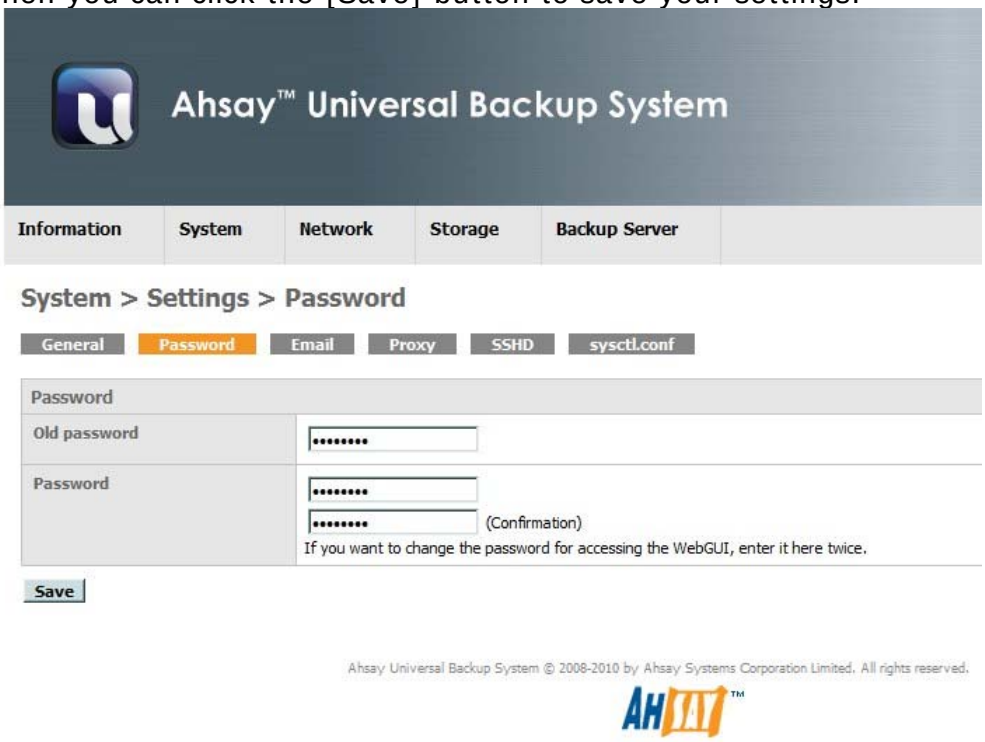
Time:

- **Timezone:** Set the time zone for this AhsayUBS.
- **System time:** Set the system time for this AhsayUBS.
- **Enable NTP:** NTP standard for Network Time Protocol. If you have a time server for synchronization of the time, it is better to enable this service for keeping the time in your AhsayUBS.
- **NTP time server (Shows only when NTP is enabled):** Enter the IP address of time server(s) for time synchronization.
- **Time update interval (Shows only when NTP is enabled):** Enter the interval in minutes for synchronization from the AhsayUBS to the server.



8.2.1.2 Password

This page allows you to set the password for the default administrator account of the AhsayUBS (i.e. **admin**). You need to provide old password to authenticate the change in password. It is required type the new password. Then you can click the [Save] button to save your settings.



8.2.1.3 Email

8.2.1.3.1 Settings

A status report helps you to check the AhsayUBS status. If you want to check the AhsayUBS regularly, please setup the [Email status report settings]. Then, you may receive the status report in HTML format through email attachment regularly.

To setup the [Email status report settings], you need to setup the [General Email Settings] first.

Here are the fields that you need to enter inside the [General Email Settings] table:

Here are the fields that you need to enter inside the [General Email Settings] table:

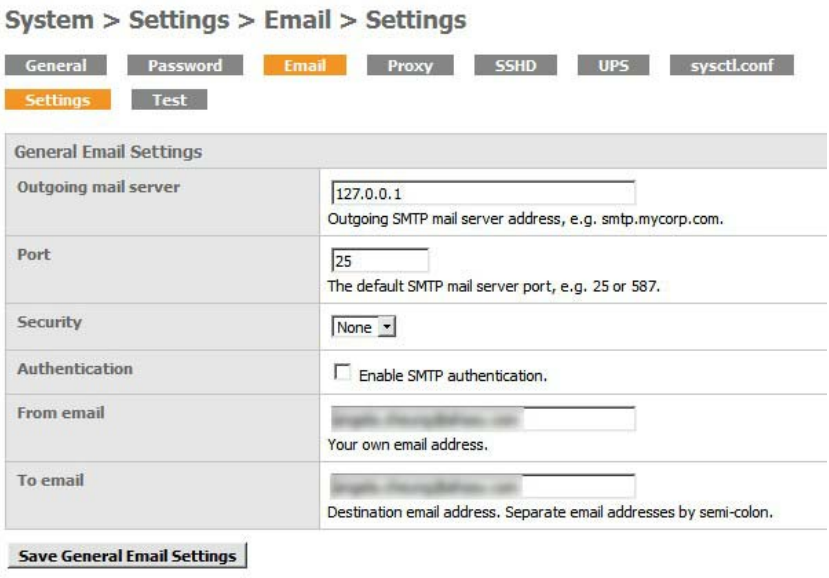
- **Outgoing mail server:** Please enter the outgoing SMTP mail server address e.g. "smtp.mycompany.com".
- **Port:** Please enter the SMTP mail server port. The default port number for SMTP server is port **25.**
- **Security:** Please select the security protocol. You can choose **None**, **SSL** or **TLS**.

- **Authentication:** Click the checkbox for enabling the SMTP authentication.
- **Login Name (for Enabling Authentication only):** The login name for the SMTP name server.
- **Password (for Enabling Authentication only):** The password for the SMTP mail server.
- **Authentication Method (for Enabling Authentication only):** The authentication method for login the SMTP mail server. Here are the choices for the login methods:
  - Plain
  - Cram-MD5
  - Digest-MD5
  - GSSAPI
  - External
  - Login NTLM
  - NTLM
  - Best available

- **From email:** Set the sender's email.
- **To email:** Destination email address. Multiple email address can be set. Separate email address by semi-colon.

Please click the [Save] button to save the above settings if necessary. For verifying the email settings, please refer to the below section which describes how to send a test email by using the send test email feature included in AhsayUBS firmware (i.e. [System] > [Settings] > [Email] > [Test]).

Note 1: Setup DNS Server in the page [System] > [Settings] > [General] is required to resolve the SMTP server address.



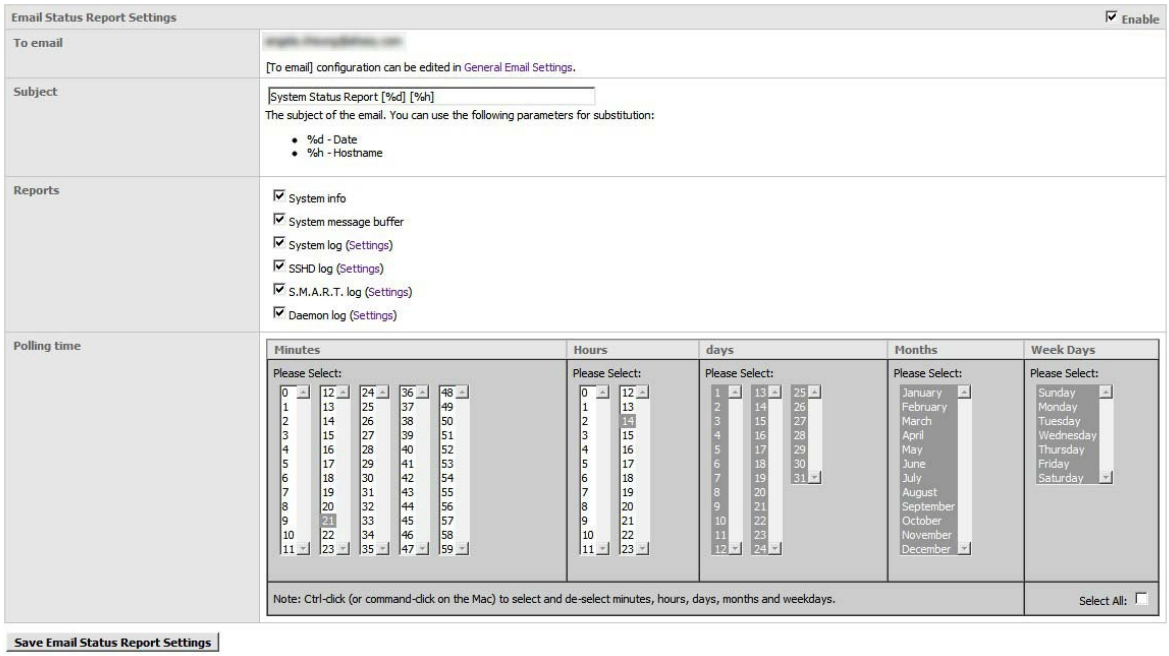
After settings up the [General Email Settings], you may setup the [Email Status Report Settings] now. Please check the [Enable] checkbox on the top-right hand corner to enable this function.

The following fields can be set in the table [Email Status Report Settings]:

- **To email:** Show the status report recipients. The 'To email' settings can be set in the [General Email Settings].

- **Subject:** The email subject.
- **Report:** Select the reports you want to receive in the email.
- **Polling time:** Set the sending time of the email.

Please click the [Save Email Status Report Settings] button for saving the settings. Please refer to the page [System] > [Settings] > [Email] > [Test] for details to verify the settings.



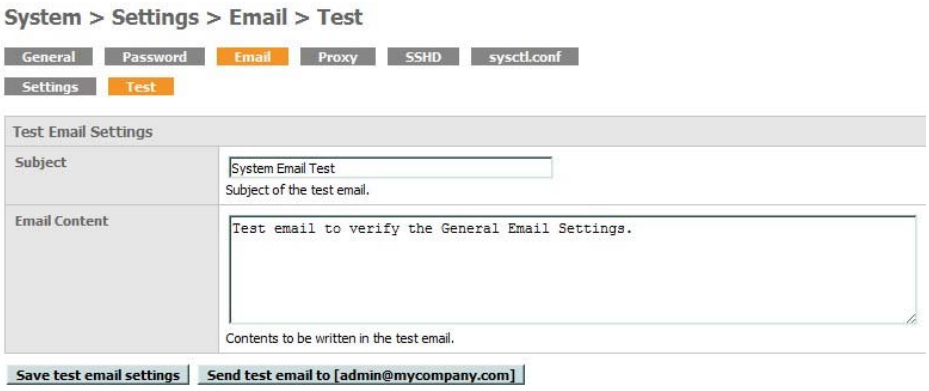
8.2.1.3.2 Test

This page is for verifying the settings inside the page [System] > [Settings] > [Email] > [Settings].

The [Test Email Settings] table is for you to verify the settings inside the table [General Email Settings] in the page [System]> [Settings] > [Email] > [Settings]. To verify the settings, you can now send a test email to the [From email] inside the [General Email Settings] table by:

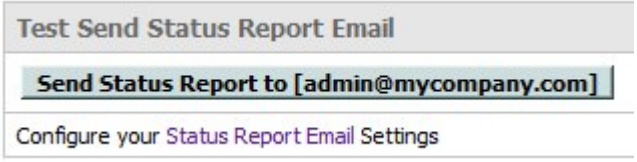
1. Entering the test email subject inside the [Subject] field.
2. Entering the test email contents inside the [Email Content] field.
3. Click the [Send test email to…] button to save the settings and send the test email to the email address entered in the [From email].

You may save the test email subject and contents by clicking [Save test email settings] WITHOUT sending any test email.



You may also verify the settings inside the [Email Status Report Settings] by sending a test email to the email entered inside the [To email] field in the [Email Status Report Settings] table (i.e. [System] > [Settings] > [Email] > [Settings]).

To send a test status report email, you may click the [Send Status Report to ...] in the table [Test Send Status Report Email]. You may also click the [Status Report Email] link inside the table to set the settings.



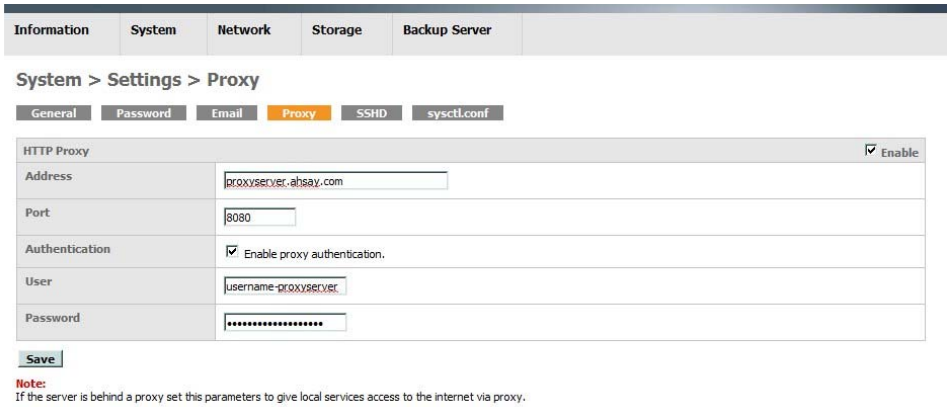
8.2.1.4 Proxy

You may use this page to configure the HTTP proxy server if your AhsayUBS requires an outgoing proxy server. Please check the [Enable] checkbox on the top-right hand corner to enable the proxy server.

- **Address:** The address to the proxy server.
- **Port:** The port to access the proxy server.
- **Authentication:** If the proxy server is needed to login, please tick this checkbox.
- **Username (for Enabling Authentication only):** Enter the username for login to the proxy server.
- **Password (for Enabling Authentication only):** Enter the password for login to the proxy server.

Please click the [Save] button to save the above settings.

Note 1: Remember to configure the DNS server settings for resolving the address in the page [System] > [Settings] > [General].



8.2.1.5 SSHD

SSHD daemon provides remote console access to the AhsayUBS. This feature is designed for troubleshooting purpose only. The root access and SSL tunneling feature will be enabled by default.

The default login account for SSH:

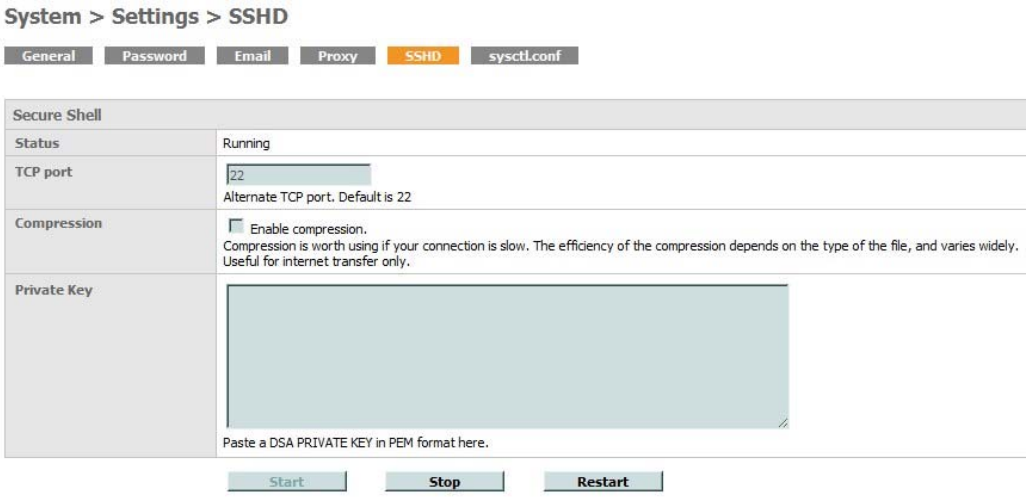
Username	**root**
Password	<The password of the admin account of AhsayUBS WebAdmin>

Here are the options that will be shown or can be configured in the [Secure Shell] table:

- **Status:**
  i. Running: SSHD is enabled.
  ii. Stopped: SSHD is stopped.
- **TCP Port:** The port for the SSHD. Default is port 22.
- **Compression:** If the file is larger or the network is slow, the transfer of the files will be faster when enabling this option.
- **Private Key:** Paste a DSA PRIVATE KEY in PEM format.

If you want to Start/Stop/Restart SSHD in the AhsayUBS, please click the buttons under the table [Secure Shell].

When the SSHD service has been started, the options inside the [Secure Shell] table will be disabled. You need to [Stop] the SSHD in order to modify the settings.



8.2.1.6 UPS

UPS (Uninterrupted Power Supply) is an electrical apparatus which provides emergency power to a server when the main power source fails. UPS prevents power interruptions by supplying energy stored in its batteries. The UPS device can be connected to AhsayUBS machine through serial port or USB port. The UPS will notify the AhsayUBS machine in case of power failure events.

NUT (Network UPS Tools) is the system service which conducts communication between the AhsayUBS and the UPS device. It can:

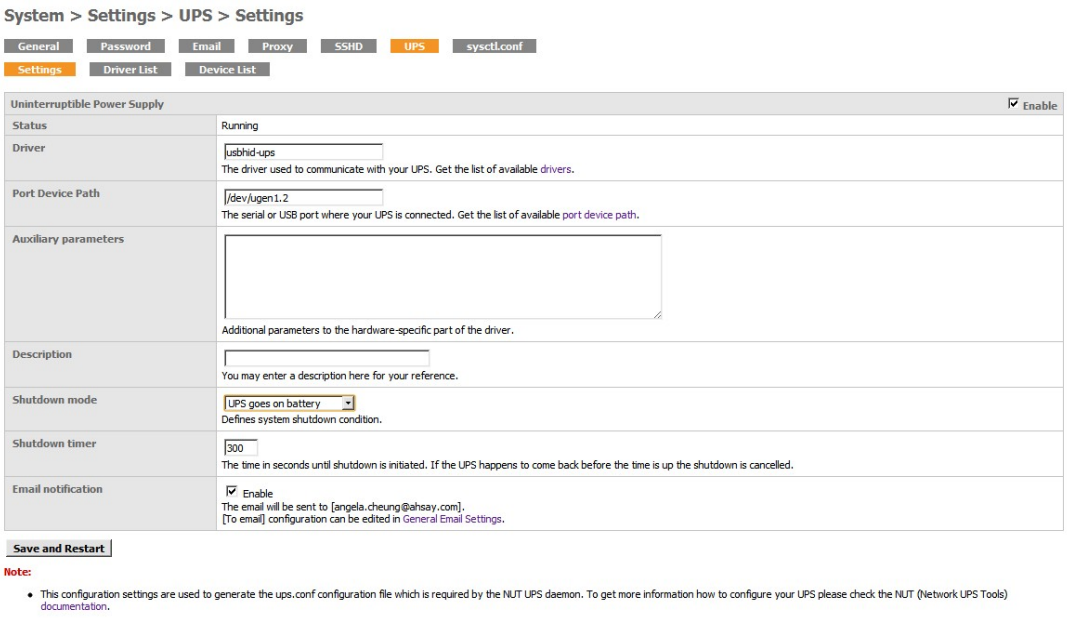
- Initiate AhsayUBS shutdown sequence upon defined UPS power events.
- Monitoring and Log the UPS status [On Line Power / On Battery].

The port used by the NUT daemon is '3493'.

The daemon will be started once the UPS settings are saved in the page [System] > [Settings] > [UPS] > [Settings]. UPS status can be checked in the page [Information] > [System status] > [UPS status]. NUT daemon will also log the UPS triggered event in the AhsayUBS system log. The system log can be checked in the page [Information] > [System Logs].

8.2.1.6.1 UPS Settings

This is the main page for configure the connected UPS device.



Remarks:

- DO NOT connect the serial port and USB port between UPS device and AhsayUBS at the same time.

- Make sure A.C. power supply is connected to the UPS device when configuration in the AhsayUBS WebAdmin page. Otherwise, the AhsayUBS shutdown sequence will be initiated immediately once the UPS settings are saved (Shutdown mode: UPS goes on battery, Shutdown timeout: 0).

The NUT daemon can be configured by the following options:

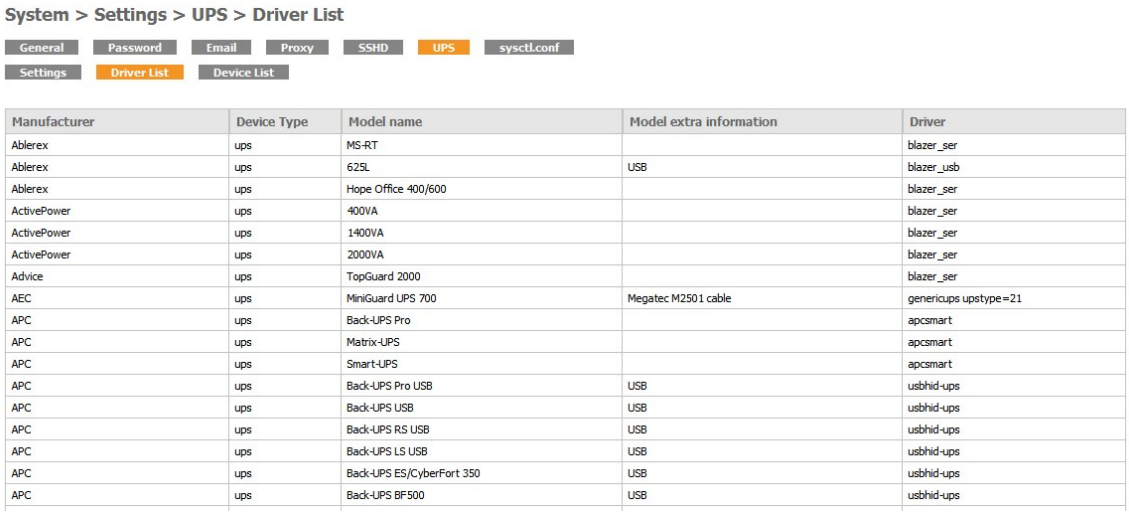
- Enable 'checkbox': Enable / Disable the NUT daemon.
- Status: NUT daemon current status [Running / Cannot be enabled / Stopped].
- Driver: The UPS device driver name. The available driver name can be found from the [Driver List] according to the UPS manufacturer, model name and connecting port type.
- Port Device Path: The serial / USB port device path. The available serial / USB device can be found from the [Device List]. Please choose the appropriate device path by the UPS connection type.
- Auxiliary parameters (Optional): Additional hardware-specific parameters for the UPS driver which will be applied to the 'ups.conf' file. Please refer to the NUT official website (http://www.networkupstools.org) for more information.
- Description (Optional): Your customized message to describe the UPS connection.
- Shutdown mode: The AhsayUBS shutdown sequence will be trigged by one of the following UPS power events:
  - UPS reaches low battery: UPS runs on battery and the battery level is low. The low battery alert percentage is defined by the UPS driver.
  - UPS goes on battery: UPS runs on battery (i.e. A.C. power supply is disconnected in UPS) and shutdown sequence will be started after the countdown defined in 'Shutdown timeout'.
- Shutdown timeout: The countdown time (default: 300 seconds) to shutdown AhsayUBS when [UPS goes on battery]. This option is available only when the [UPS goes on battery] option is selected in the [Shutdown mode]. The timeout should NOT be larger than battery discharge time.
- Email notification: Send email to addresses defined by the [To email] in the [General Email Settings] when the UPS changes its status [On Line Power / On battery] or the UPS triggered the AhsayUBS shutdown event. Whenever the email notification is enabled or disabled, power event will always be logged to the system log in page [Information] > [System Logs].

Please click [Save and Restart] button to save the above settings.

8.2.1.6.2 UPS Driver List

This page lists the UPS drivers according to the manufacturer, model name and the connection type supported by the NUT daemon. To look for a suitable driver:

1. Check the UPS manufacturer, model name and the connecting port.
2. Search the driver in the page accordingly.



Manufacturer	Device Type	Model name	Model extra information	Driver
Ablerex	ups	MS-RT		blazer_ser
Ablerex	ups	625L	USB	blazer_usb
Ablerex	ups	Hope Office 400/600		blazer_ser
ActivePower	ups	400VA		blazer_ser
ActivePower	ups	1400VA		blazer_ser
ActivePower	ups	2000VA		blazer_ser
Advice	ups	TopGuard 2000		blazer_ser
AEC	ups	MiniGuard UPS 700	Megatec M2501 cable	genericups upstype=21
APC	ups	Back-UPS Pro		apcsmart
APC	ups	Matrix-UPS		apcsmart
APC	ups	Smart-UPS		apcsmart
APC	ups	Back-UPS Pro USB	USB	usbhid-ups
APC	ups	Back-UPS USB	USB	usbhid-ups
APC	ups	Back-UPS RS USB	USB	usbhid-ups
APC	ups	Back-UPS LS USB	USB	usbhid-ups
APC	ups	Back-UPS ES/CyberFort 350	USB	usbhid-ups
APC	ups	Back-UPS BF500	USB	usbhid-ups

8.2.1.6.3 Device List

The page lists the serial and USB device path in the system. The connected device path pattern for serial device and USB device are "/dev/ttyu*" and "/dev/ugen*.*" respectively. Since some other USB devices could be connected to the system, it is suggested to connect the system to UPS by serial port. Once the appropriate device path is found, administrator may copy the full path and fill it in the [Port Device Path] field in the [UPS settings].

8.2.1.7 SNMP

SNMP (Simple Network Management Protocol) is a protocol defined for managing the computer devices such as servers, workstations and desktop etc. through IP networks. The software which monitors and configures the devices in the network is called NMS (Network Management Server). When a SNMP agent daemon is enabled in the AhsayUBS, the AhsayUBS administrator may monitor the system status such as performance of CPU, memory, disk and network with a proper setup NMS from a remote machine.

The AhsayUBS has been bundled with the FreeBSD SNMP agent 'bsnmpd' daemon which supports up to SNMP v2c standard. The functions of this daemon include:

- report OID object value upon SNMP query from the NMS via UDP port '161'.
- send traps to the NMS upon defined events in the AhsayUBS.

It is better for the AhsayUBS administrator to install a 'bsnmpd' supported NMS for communication.

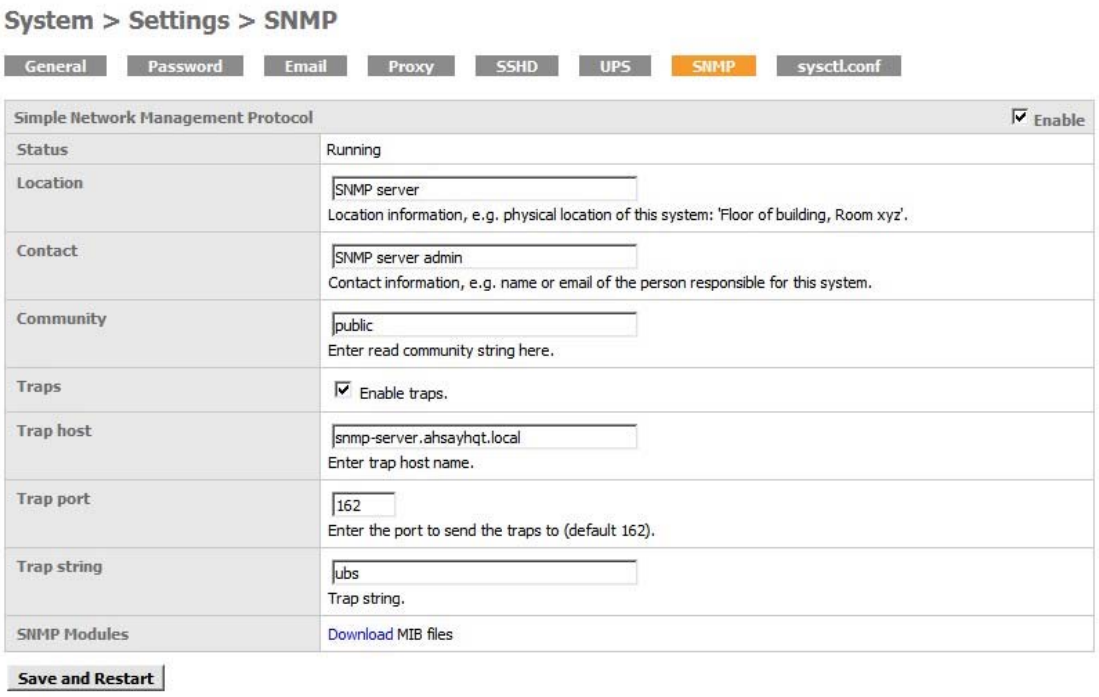
Here are the SNMP modules bundled with the 'bsnmpd' daemon:

- MIB-II
  Implements parts of the internet standard MIB-II.
- Netgraph
  Enable remote access to FreeBSD Netgraph subsystem.
- Host resources
  Implements the HOST-RESOURCES-MIB as standardized in RFC 2790.
- UCD-SNMP-MIB
  Retrieve system performance information and device detail.

The SNMP daemon will be started once the settings are saved in the page [System] > [Settings] > [SNMP]. SNMP triggered event can be found in the AhsayUBS system log at page [Information] > [System Logs].

8.2.1.7.1 SNMP Settings

AhsayUBS Administrator can configure the SNMP settings and check the SNMP daemon status in the page [System] > [Settings] > [SNMP].



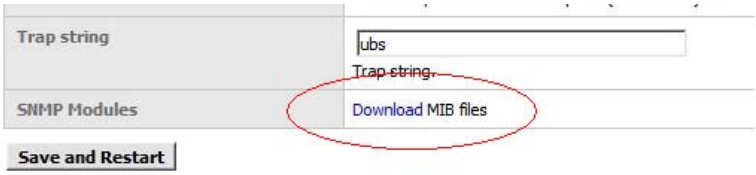
Please enter / select the fields below to configure the 'bsnmpd' daemon:

- Enable 'checkbox': Enable / Disable the 'bsnmpd' daemon.

- Status: 'bsnmpd' daemon current status [Running / Cannot be enabled / Stopped].
- Location: The physical location of the AhsayUBS machine.
- Contact: The textual identification of the contact person for this AhsayUBS machine, together with information on how to contact this person.
- Community: The community string acts as a password to communicate with the NMS. Default is 'public'. It is better to set a value different from the default one or any dictionary words in order to prevent brute force attack. Only read-only community is supported by AhsayUBS.
- Traps: Enable traps (notifications) send from the SNMP daemon.
- Trap host [shown when 'Traps' is enabled]: Enter hostname that the trap will be sent to.
- Trap port [shown when 'Traps' is enabled]: The listening port of the trap host for receiving traps. Default is UDP port '162'.
- Trap string [shown when 'Traps' is enabled]: The passcode for the trap. It should match the one defined in the NMS.

Please click [Save and Restart] button to save the above settings and update the status of the 'bsnmpd' daemon in the AhsayUBS.

Import MIB files to the NMS which are supported by this 'bsnmpd' daemon:
After the 'bsnmpd' is enabled, please download the MIB Zip Archive from the WebAdmin page. The zip file contains all the MIB files which are supported by the 'bsnmpd' daemon. Please extract the files and import them to the NMS / MIB browser.



Browse the OID in the MIB browser to get / monitor the information:
After importing the MIB files into the MIB browser, the system information can be browsed in the MIB tree. Administrators may configure the MIB browser to monitor AhsayUBS by selective OID. Please refer to the Appendix for the OID list and the OIDs' description.

For further details of how to use MIB browser, please refer to the Appendix for MIB browser example. If you are using a MIB browser other than that stated in the Appendix, please refer to the corresponding MIB browser user guide.

8.2.1.8 Sysctl.conf

The "sysctl.conf" is located inside the "/etc" which is a configuration file for making changes of the FreeBSD (which is the OS of the AhsayUBS). This includes many advanced options of the TCP/IP stack and virtual memory

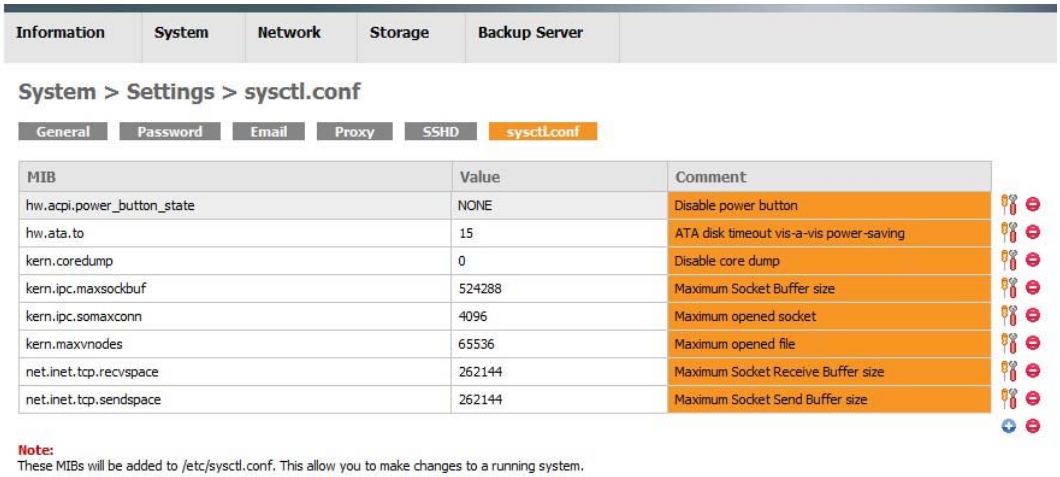
system that can dramatically improve performance of the OS. For more information of "sysctl.conf", please refer to the FreeBSD documentation.

Here are the fields that you can set per MIB entry:

- **Name:** The MIB name.
- **Value:** The value with respect to the MIB name.
- **Comment:** Specify the human-readable description corresponding to this entry.

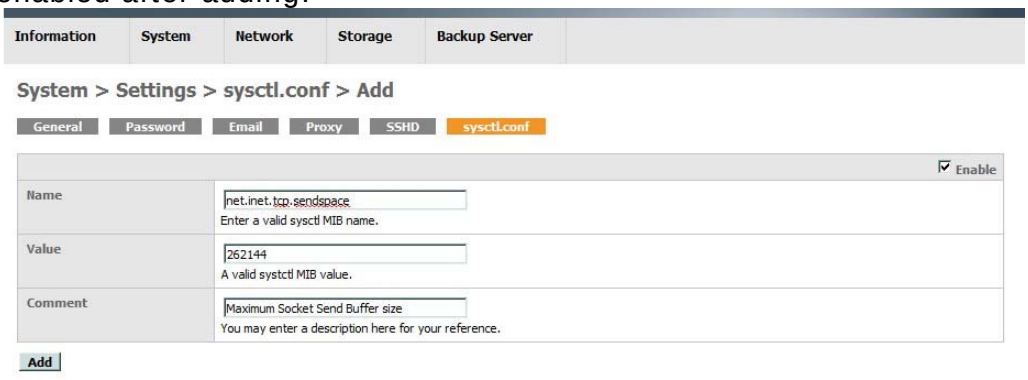
A screenshot of the [System] > [Settings] > [sysctl.conf] is captured below. It shows that all the MIB entries are enabled except the entry "hw.acpi.pwer_button_state".

Here are the guidelines to make change of the "sysctl.conf" file in the AhsayUBS.



Add a MIB entry:

1. Click the ' ' icon.
2. Fill in the required fields in the table. Check the [Enable] checkbox to enable the MID. Leave it unchecked if you do not want the MIB to be enabled after adding.

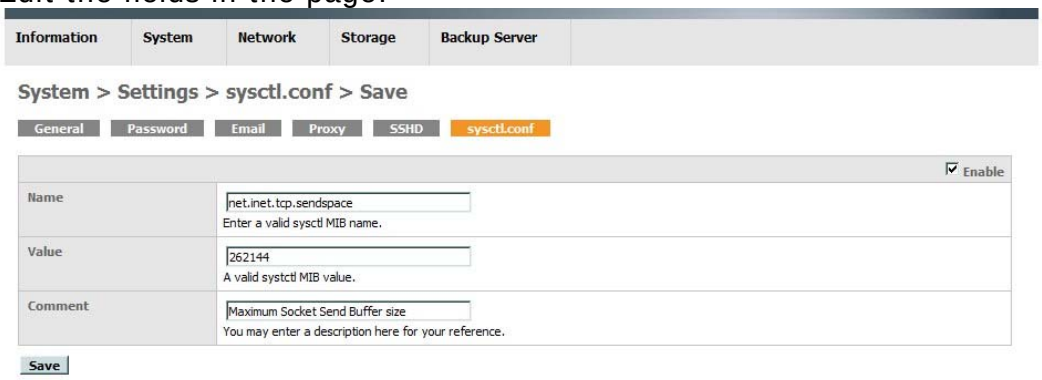


3. Click the [Add] button to add this MIB entry.
4. Click the [Apply Changes] button.
5. The MIB entry is added successfully.

Edit a MIB entry:

1. Look for the MIB entry to be edited.

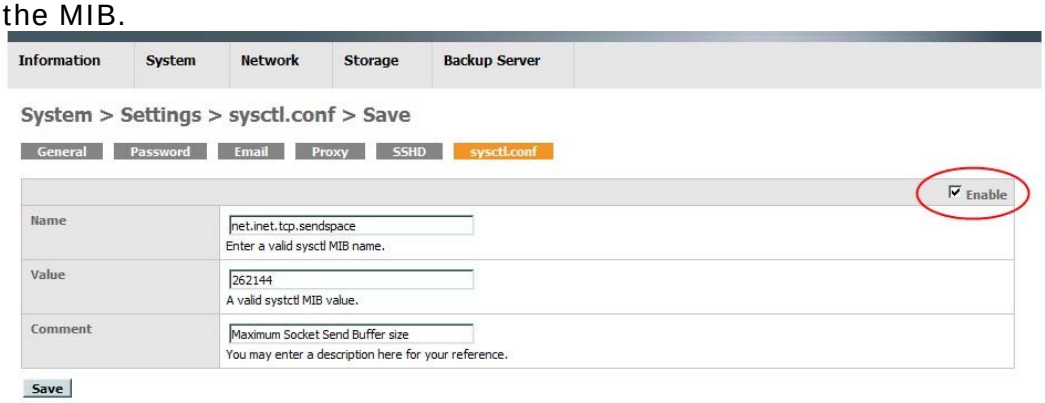
2. Click the '' icon.
3. Edit the fields in the page.



4. Click the [Save] button to add this MIB entry.
5. Click the [Apply Changes] button.
6. The MIB entry is updated successfully.

Enable / Disable a MIB entry:

1. Look for the MIB entry to be edited.
2. Click the '' icon.
3. Check the checkbox [Enabled] to enable the MIB. Uncheck it to disable the MIB.



4. Click the [Save] button to add this MIB entry.
5. Click the [Apply Changes] button.
6. The MIB entry is edited successfully.

Delete a MIB entry:

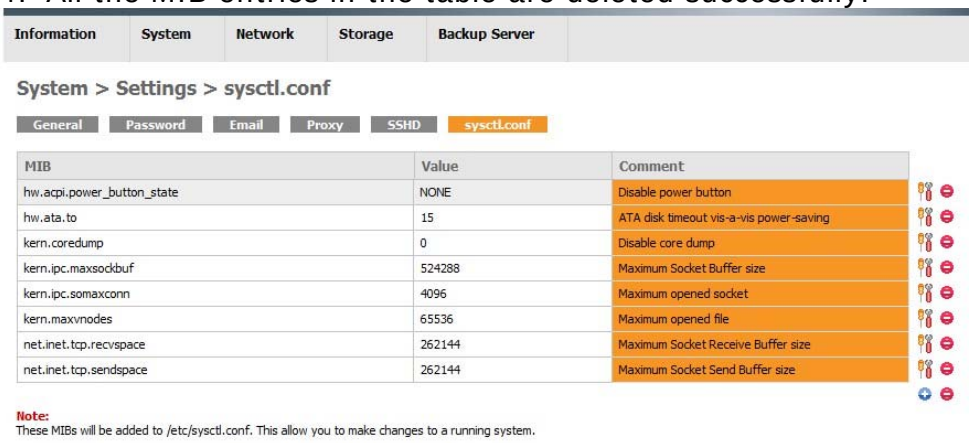
1. Look for the MIB entry to be deleted.
2. Click the '' icon at the row that the MIB entry to be deleted.
3. In the alert box, click [OK] to confirm the delete of the entry. Click [Cancel] to abort.
4. Click the [Apply Changes] button.
5. The MIB entry is deleted successfully.

Delete all MIB entries:

1. Click the '' icon next to the '' icon.

2. In the alert box, click [OK] to confirm deleting all the MIB entries in the table. Click [Cancel] to abort.
3. Click the [Apply Changes] button.

4. All the MIB entries in the table are deleted successfully.



8.2.2 Backup/Restore AhsayUBS Settings

The AhsayUBS runtime configuration is stored as a XML file. The XML file contains all settings information available in AhsayUBS WebAdmin.

In this page you can backup or restore the AhsayUBS runtime configuration in XML file format.

8.2.2.1 Backup Configuration

You can download the runtime configuration file of AhsayUBS WebAdmin by clicking the button [Download configuration].

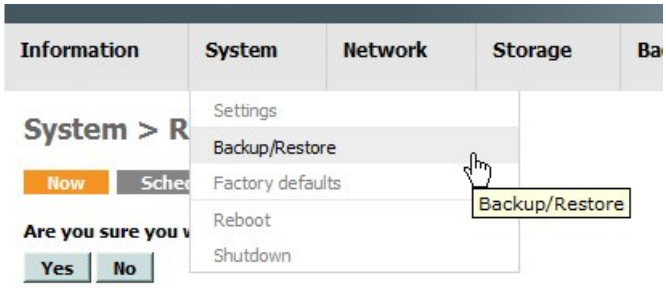
8.2.2.2 Restore Configuration

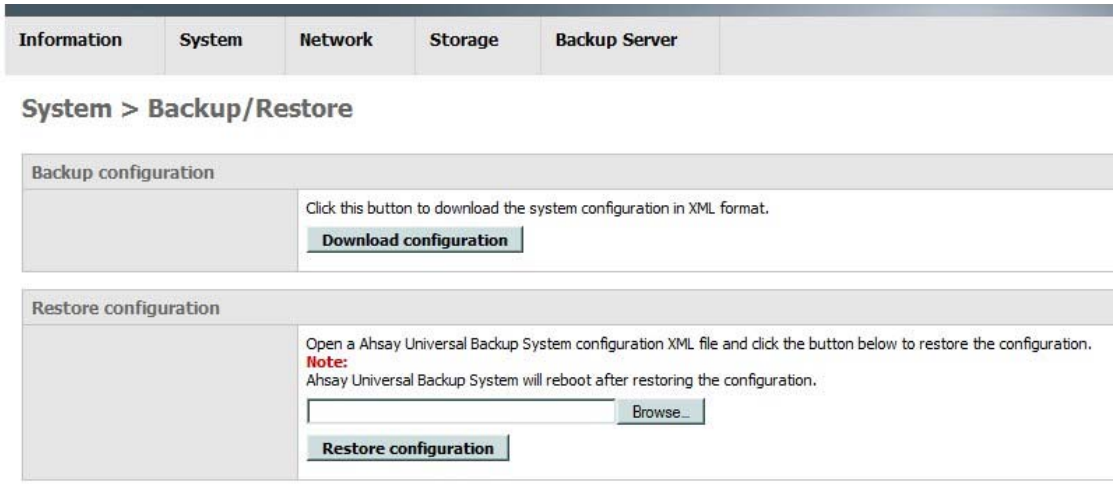
The configuration can be restored in one of the following situations:

1. Adapted a new AhsayUBS with the same configuration of hardware, IP settings
2. Mistakenly configure anything wrongly in the AhsayUBS WebAdmin.

The settings can be restored with your last downloaded configuration file:

1. Click the [Browse…] button to select the configuration file to restore.
2. Click [Restore configuration] button to restore the previous configuration to your AhsayUBS.

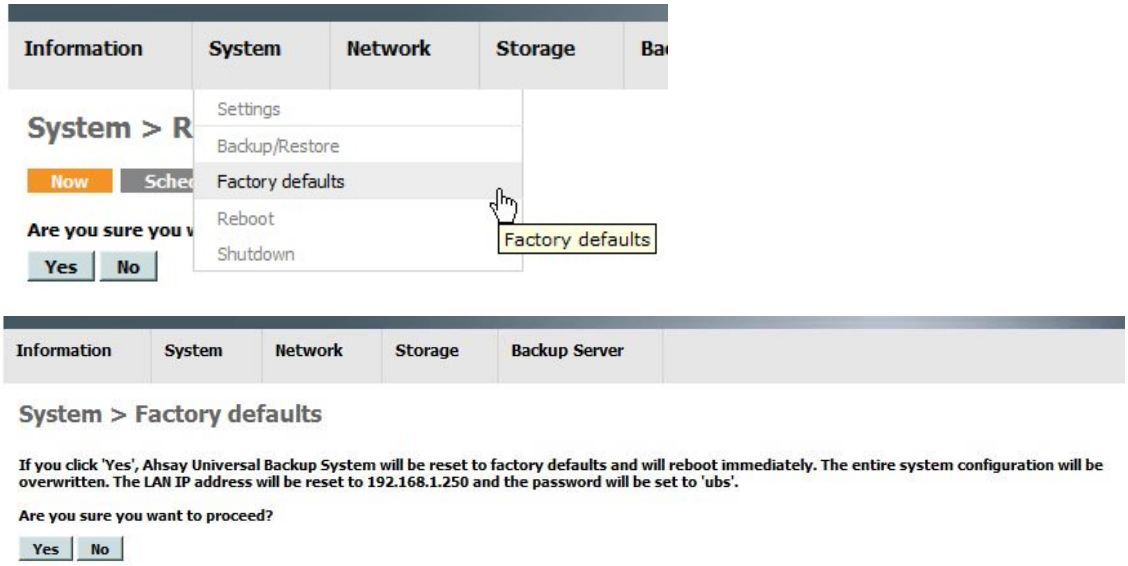




Note: AhsayUBS will reboot after the configuration is restored.

8.2.3 Factory Defaults

You can restore AhsayUBS to factory defaults by clicking [Yes] or clicking [No] to cancel.



Note:

1. The data on the block devices will NOT be erased after AhsayUBS is reset to factory defaults.

2. You can restore the previous settings in AhsayUBS WebAdmin in the page [System] > [Backup/Restore]. Please refer to the section [System] > [Backup/Restore] for details.

3. After resetting AhsayUBS to factory defaults, all iSCSI sessions will be removed in the [Storage] > [iSCSI] page. The status of Expandable Storage will change to "Missing". The Expandable Storage can be re-configured for use by AhsayUBS:

i. Adding it back the iSCSI session inside the [Storage] > [iSCSI] page.

ii. Import the Expandable Storage. Note that the data in the Expandable Storage will not be erased after "factory defaults". For details, please refer to the [Storage] section.

8.2.4 Reboot

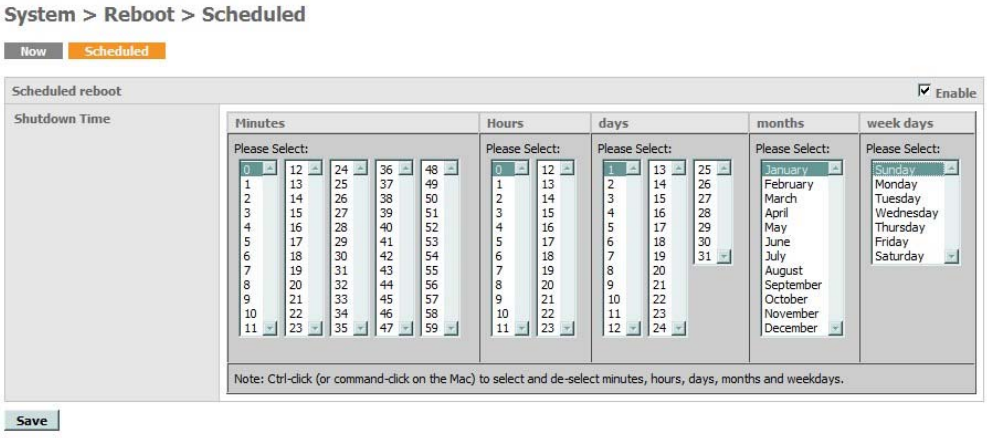
8.2.4.1 Now

Click [Yes] button to reboot your AhsayUBS or [No] to cancel.

WARNING: Please ensure the system's condition is safe for reboot. Otherwise, the backup job could be interrupted if the backup server is in use.

8.2.4.2 Scheduled

You may check the [Enable] checkbox on the top-right hand corner to enable schedule shutdown and schedule the shutdown time by selection the lists in the table [Scheduled reboot] and click the [Save] button to save your settings.



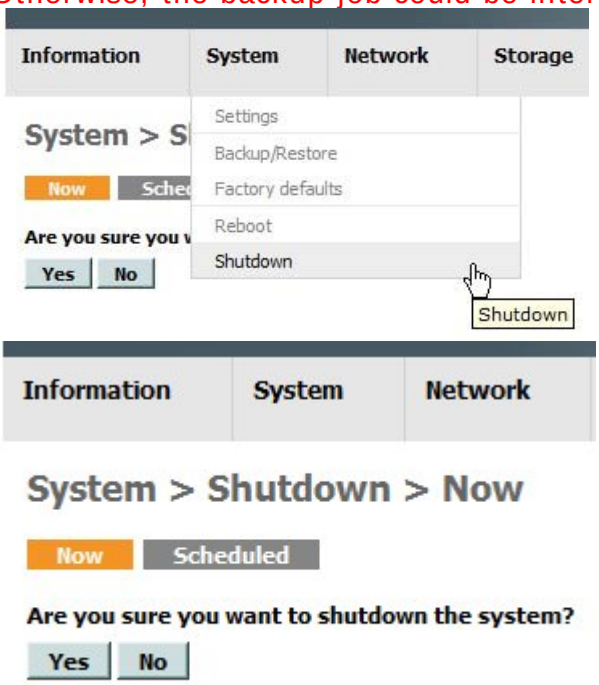
WARNING: Please do not select ALL the minutes for reboot, otherwise the AhsayUBS may need to restore to factory default for stopping the endless rebooting system!

8.2.5 Shutdown

8.2.5.1 Now

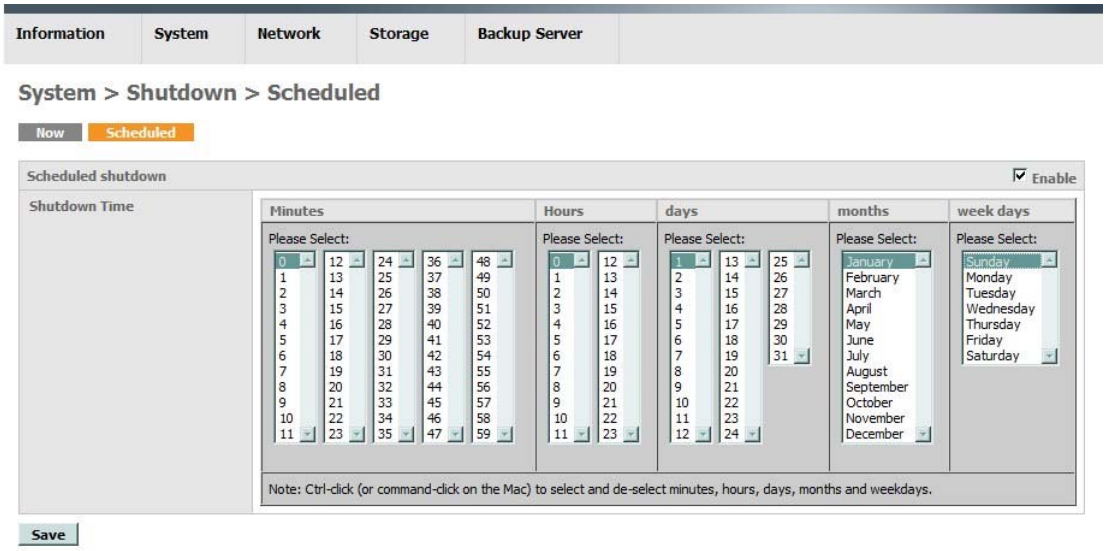
Click [Yes] button to shutdown the AhsayUBS or [No] to cancel.

WARNING: Please ensure the system's condition is safe for shutdown. Otherwise, the backup job could be interrupted if the backup server is in use.



8.2.5.2 Scheduled

You may check the [Enable] checkbox on the top-right hand corner to enable schedule shutdown and schedule the shutdown time by selecting the options in the table [Schedule shutdown] and click the [Save] button to save your settings.

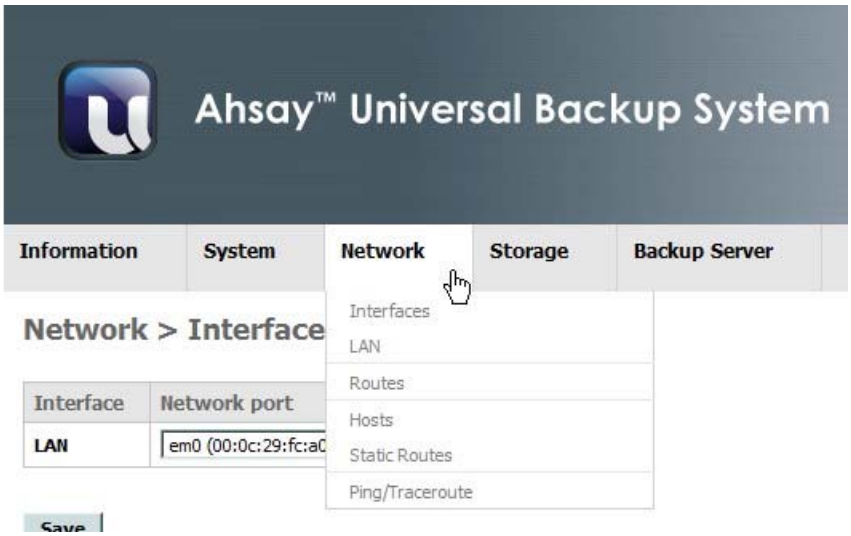


WARNING: Please do not select ALL the minutes for shutdown, otherwise the AhsayUBS may need to restore to factory default for stopping the endless shutting down system!

8.3 Network

This section shows how to configure network settings, tools for network connectivity in the AhsayUBS through the AhsayUBS WebAdmin.

When the mouse cursor is over the word [Network] in the menu bar, the menu will be shown as below:



The [Network] menu has been further divided into the following sections:

- Interfaces (Assign the physical device with a configuration setting).
- LAN/OPT1/OPT2 (Configuration for interface LAN/OPT1/OPT2)
- Routes (Current routing information)
- Hosts (User defined Host – IP Address mapping)
- Static Routes (User defined routing setting)
- Ping/Traceroute (Network tools)

8.3.1 Interfaces

This page shows a summary of physical network devices in this AhsayUBS. The first column shows the interface name (e.g. LAN). The second column shows the network port's name and its physical address.

By default, there should be at least one network device which will be assigned as LAN in the system.

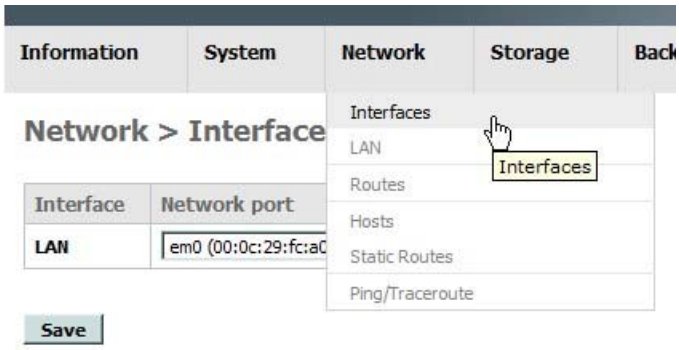
If there are other network interfaces available in the system, a ' ' button will be shown next to the table for addition of other network interfaces. The additional network devices will be assigned as "OPT1", "OPT2" incrementally.

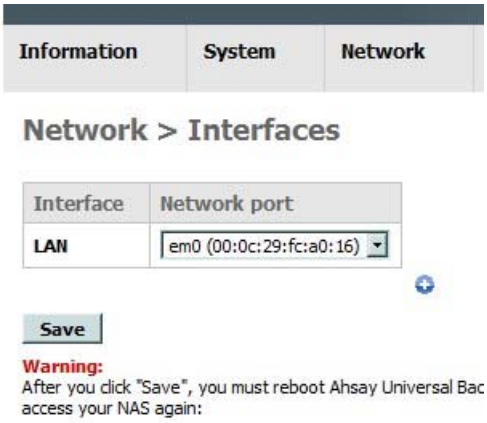
You can assign different network device to the interface name from the dropdown list at the second column. After selecting the interface, press the [Save] button to save your settings.

WARNING: You must select a network interface inside the drop down list after clicking the ' ' icon and click the [Save] button before rebooting the AhsayUBS may be unreachable from the network since there are no network interface selection for the LAN and OPT.

Once you have added an OPT1 network interface, a new configuration page [Network] > [Optional1 (OPT1)] will be added to the system after reboot.

The [Network] > [LAN] denotes the network device configuration for the network device which has been assigned at the [network] > [Interface] page. Additional network interfaces OPT1 can be configured at page [Network] > [OPT1] which is similar to the [LAN] interface.





In addition, a network interface can be deleted by clicking the '⊖' icon corresponding to the network interface that wants to be deleted. After rebooting the AhsayUBS, the network interface will be deleted successfully.

WARNING: When deleting a network interface, the network settings inside the network interface (e.g. IP address) will also be deleted permanently. You may need to set it again when the network interface is added again.

8.3.2 LAN

This page helps to set the configuration of the network interface labeled LAN in the AhsayUBS.

8.3.2.1 IPv4 Configuration

The fields for this section are listed below:

- **Type:** Select DHCP to obtain the IP address automatically. Select [Static] for entering the IP address manually.
- **IP Address:** This will be enabled only in STATIC mode. You need to enter the IP address for the AhsayUBS. Please make sure that the IP address entered can be reached from your computer. The drop down list after the "/" is the subnet mask. The value in here represents the number of bits of the subnet mask address. E.g. if the subnet mask is 255.255.255.0 (i.e. in binary form: 11111111.11111111.11111111.00000000), the subnet number is 24 bit.
- **Gateway:** This will be enabled only in STATIC mode. The default gateway must be entered correctly.

Note: For additional network interfaces, e.g. OPT1, there will be an additional [Activate] checkbox at the top-right hand corner. You may check this checkbox to enable the corresponding network interface.

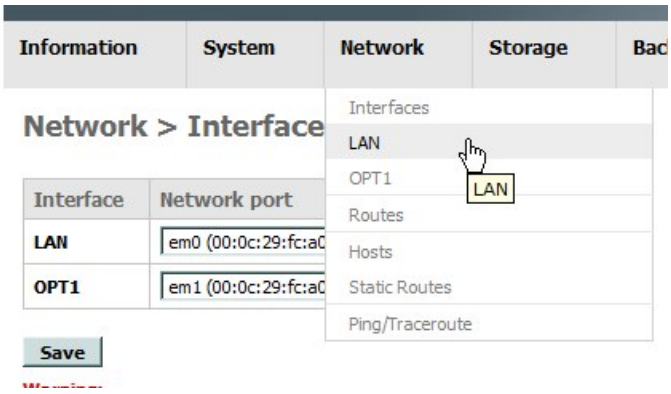
8.3.2.2 Advanced Configuration

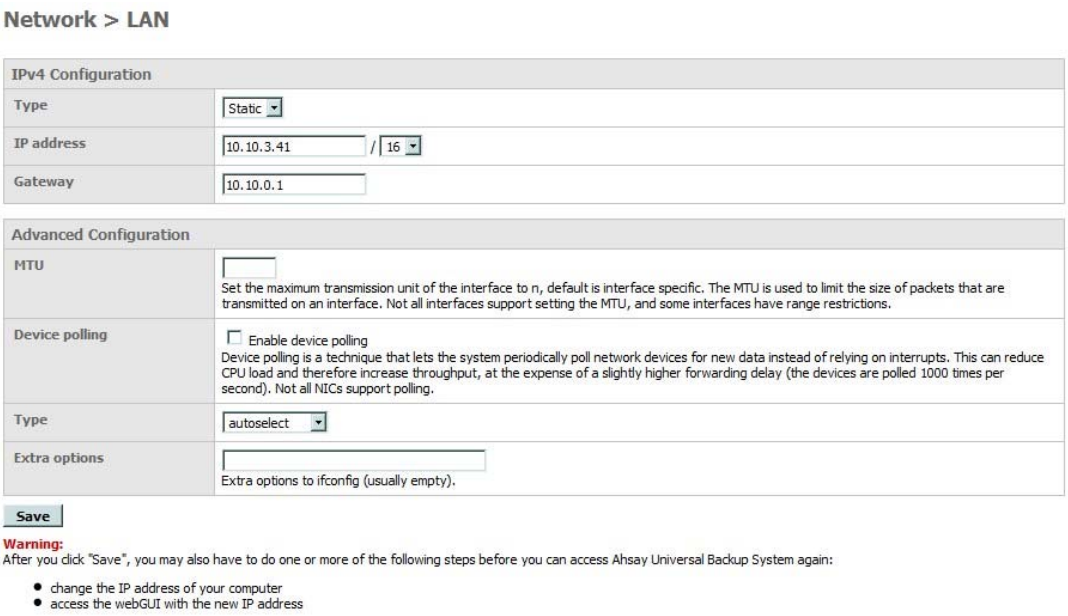
The fields in this section are listed below:

- **MTU:** Set the maximum transmission unit of the interface to n, the default settings is leave to n, default is interface specific (i.e. blank). The MTU is used to limit the size of packets that are transmitted on an interface. Not all interfaces support setting the MTU, and some interfaces have range restrictions.
- **Device polling:** Device polling is a technique that lets the system periodically poll network devices for new data instead of relying on interrupts. This can reduce CPU load and therefore increase throughput, at the expense of a slightly higher forwarding delay (the devices are polled 1000 times per second). Not all NICs support polling.
- **Type:** Select the speed of network from the drop down list.
- **Extra options:** You can enter extra options for the FreeBSD command "ifconfig" here. For more information of this command, please refer to the FreeBSD documentation.

After the configuration is updated, the page is refreshed. If a reboot message is shown, please click the link [reboot] in the message to reboot the AhsayUBS for the changes to take effect.

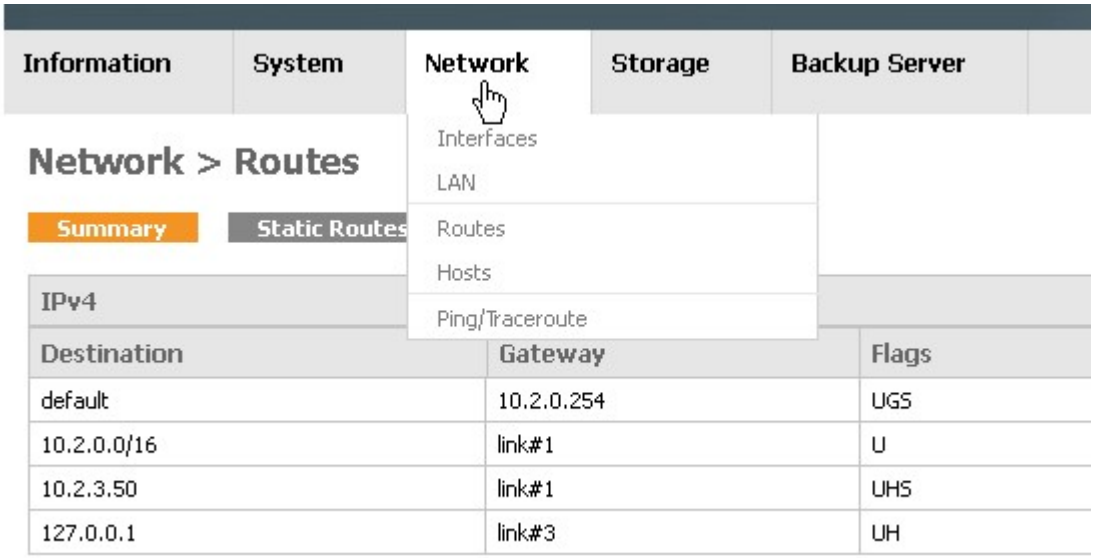
WARNING: Before rebooting the AhsayUBS, please make sure the network settings (i.e. the IP address and the default gateway) in the above page(s) are correct. Otherwise, the AhsayUBS may be UNREACHABLE by the network after rebooting.

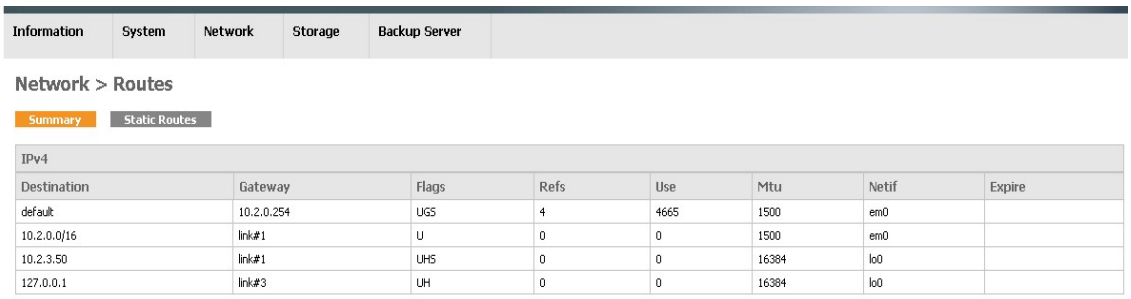




8.3.3 Routes

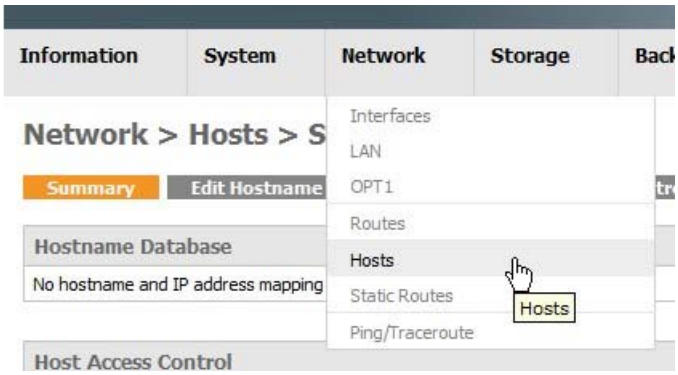
This page shows the routing table of your AhsayUBS which is used to trace the network routing to a target network destination.





8.3.4 Hosts

This page is for the customization of hosts settings.



8.3.4.1 Summary

It contains a summary of the entire host settings inside the AhsayUBS.

The [Hostname Database] table contains the mapping of the hostname and IP address inside the AhsayUBS.

Here are the fields required for each of the hostname database entry:

- **Hostname:** The hostname you want to map with IP address in the [IP address] field.
- **IP Address:** The IP address you want to map with the hostname in the [Hostname] field.
- **Description (Optional):** Enter some description of the mapping for your reference.

You may edit the hostname database settings by the page [Network] > [Hosts] > [Edit Hostname Database].

The [Host Access Control] table contains the settings of the access control of the specific daemon.

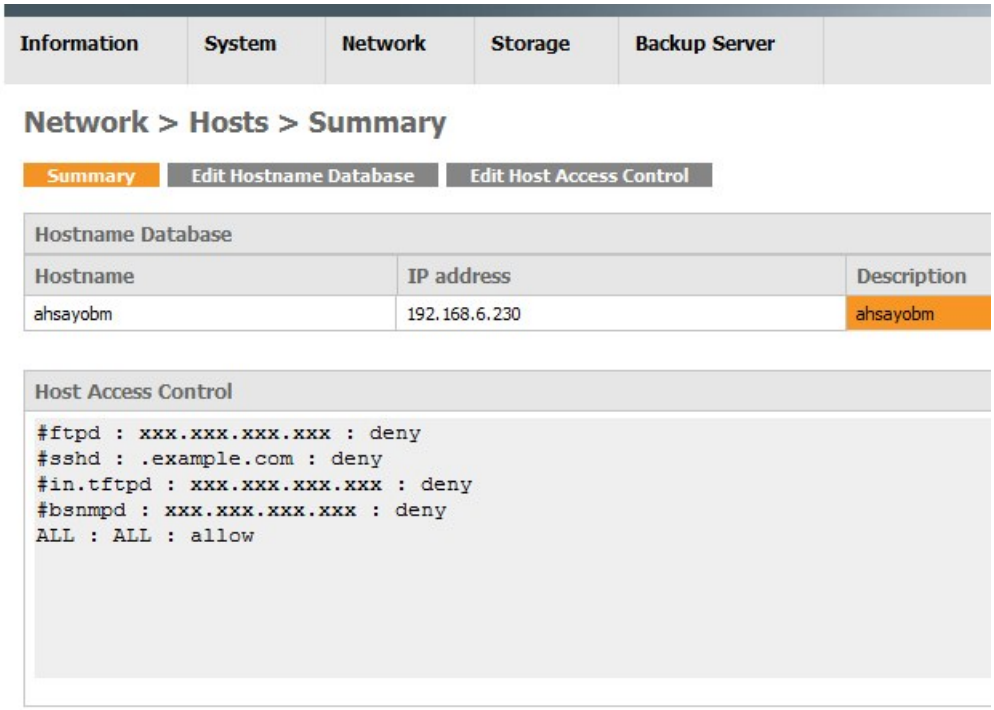
The basic configuration usually takes the form of "daemon:address action", where daemon name of the service started. The address can be a valid hostname, and IP address enclosed in brackets. The action field can be either allow or deny to grant or deny access appropriately. Keep in mind that configuration works off a first rule match semantic, meaning that the configuration file is scanned in ascending order for a matching rule. When a matching result is found and the rule will be applied. Then, the search process will halt. To get detailed information about TCP wrappers, please refer to the FreeBSD documentation.

The default settings of the [Host Access Control] are:

```
#ftpd : xxx.xxx.xxx.xxx : deny
#sshd : .example.com : deny
#in.tftpd : xxx.xxx.xxx.xxx : deny
#bsnmpd : xxx.xxx.xxx.xxx : deny
ALL : ALL : allow
```

Note: If you put the "#" character at the start of a line, then the line will become a comment line.

You may edit the host access control settings by the page [Network] > [Hosts] > [Edit Host Access Control].

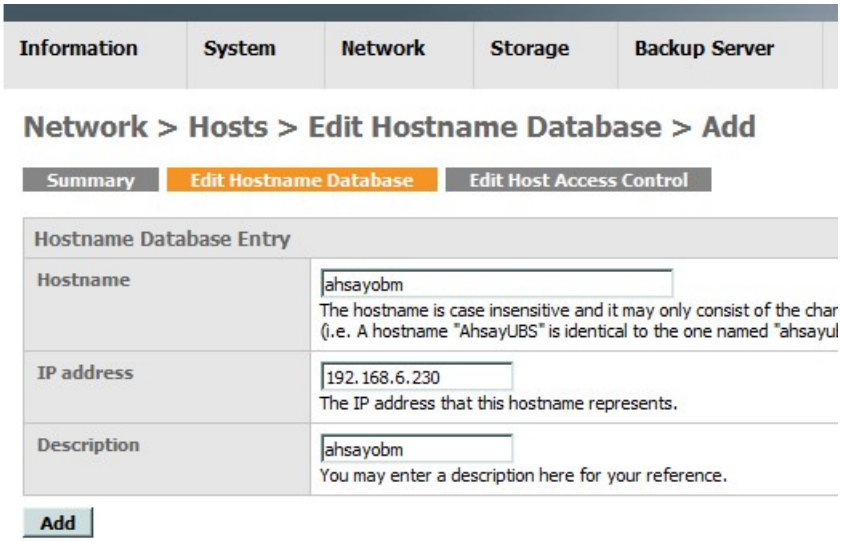


8.3.4.2 Edit Hostname Database

8.3.4.2.1 Add a hostname database entry

To add a hostname to the database, please follow the steps below:

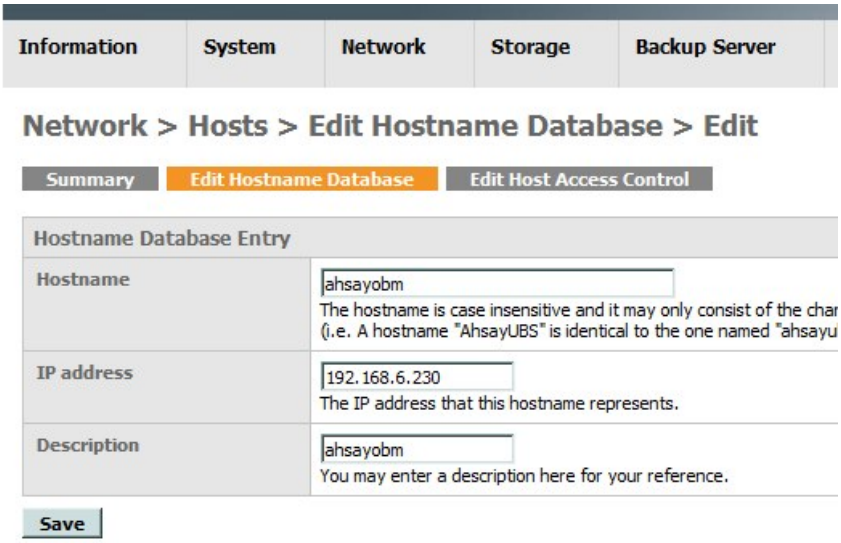
1. (Entry Exist) Click the '⊕' icon.
2. Fill in the required fields.
3. Click the [Add] button.
4. A new entry is added successfully into the hostname database.

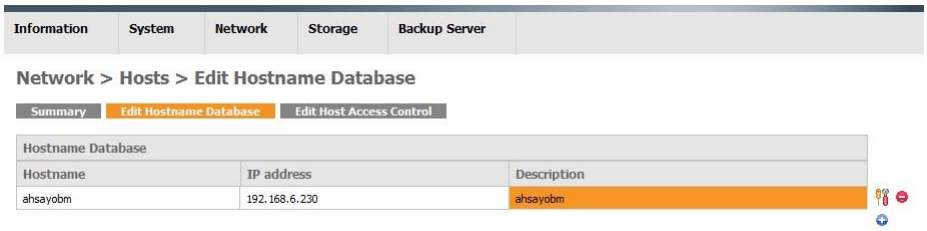


8.3.4.2.2 Edit a hostname database entry

To edit a hostname stored in the database, please follow the steps below:

1. Look for the entry to be edited.
2. Click the '' icon.
3. Edit the fields.
4. Click the [Save] button.
5. The entry is edited successfully.





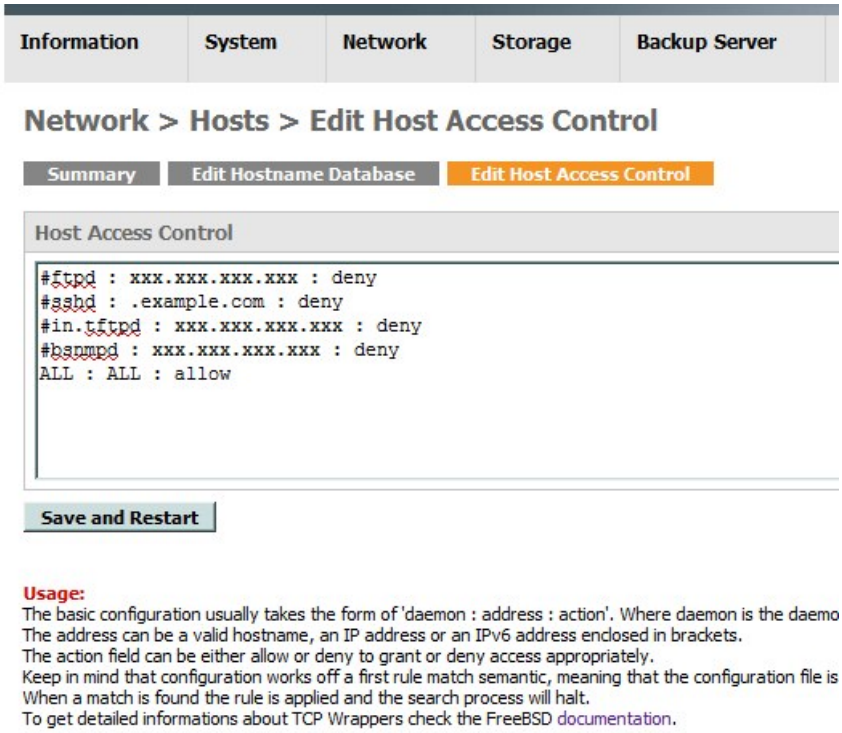
8.3.4.2.3 Delete a hostname database entry

To delete a hostname from the database, please follow the steps below:

1. Look for the entry to be deleted.
2. Click the '' icon.
3. The entry is deleted successfully.

8.3.4.3 Edit Host Access Control

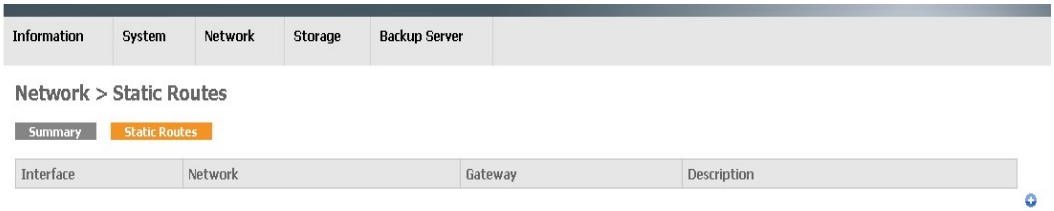
Edit the entries in the Host Access Control textarea and click the [Save and Restart] button to update and restart the server. The new settings will take effect after restarting the services.



8.3.5 Static Routes

This page allows you to customize the static route. If there are several network interfaces in the AhsayUBS, additional routes can be added to allow directing network traffic to other networks.

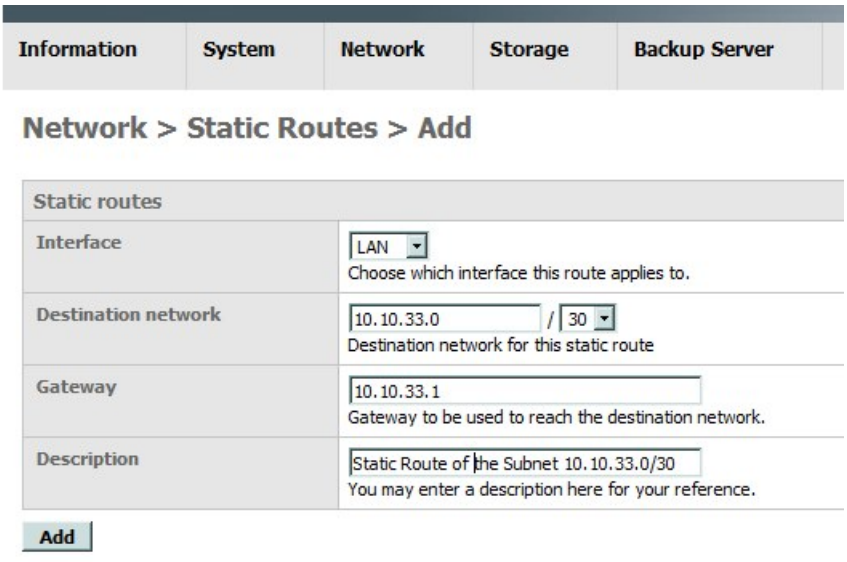
If you want to add a static route, click the ' ' icon to continue.

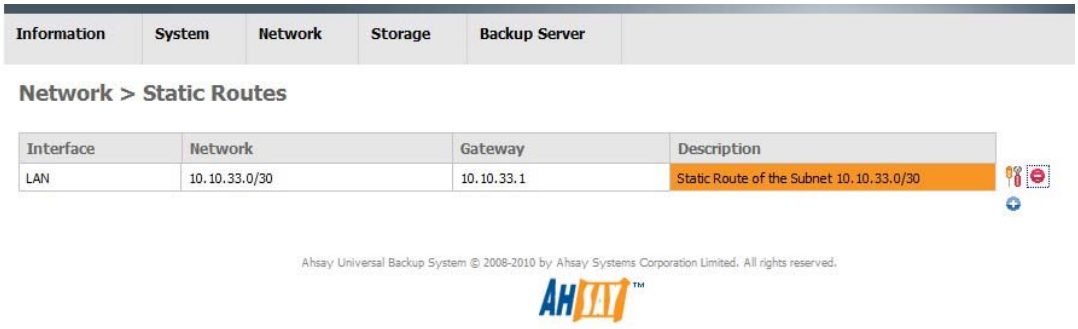


The static routes table will then appear on the browser. Here are the rows that you can choose for configuration.

Interface: Select the interface that used for the static route.
Destination network: The network which the traffic should be directed to via the "Gateway".
Gateway: The IP address of the gateway which has been connected to the destination network.
Description (Optional): Enter some comment related to this static route entry.

Click the [Add] button after completing the table, then click the [Apply change] for the changes to take effect. The message "The changes have been applied successfully." will appear when the entry is added successfully.





Now you can click the ' ' icon to configure the entry or click the ' ' icon to remove the entry.

' ': Edit the entry and click the [Save] -> [Apply changes] button to save the changes.

' ': After clicking this icon, a pop-up dialog will appear to confirm the changes. Clicking the [OK] button to confirm or clicking the [Cancel] button to give up. After the dialog is closed, you need to click the [Apply Changes] button for the changes to take effect. The message of "The changes have been applied successfully." will be shown and it denotes that the entry is removed successfully.

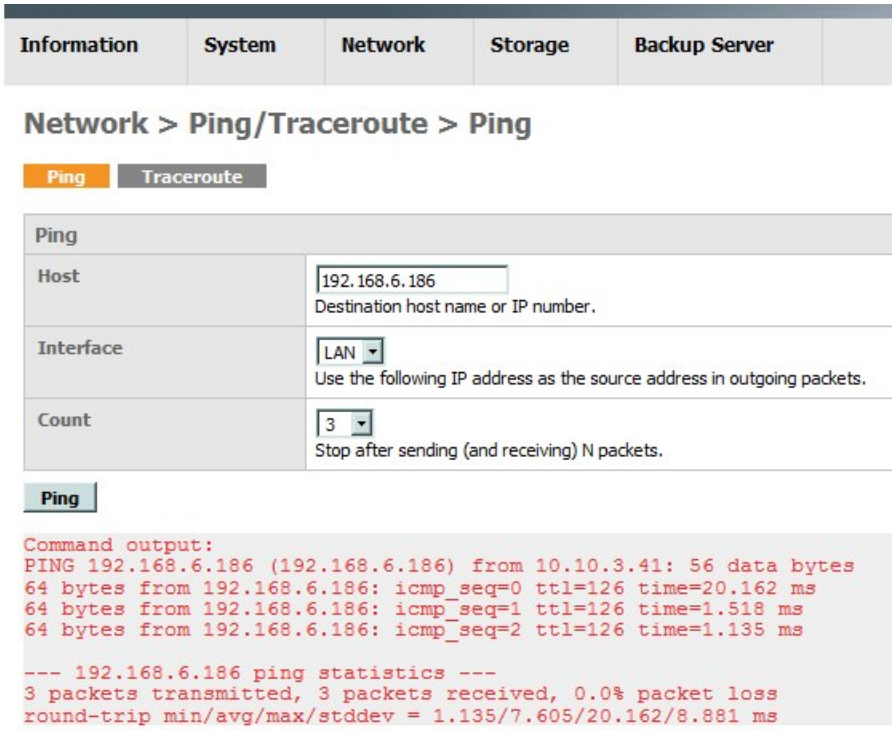
8.3.6 Ping/Traceroute

This page contains the network tools: ping and traceroute. The first page contains the ping tool and the second page contains the traceroute tool.

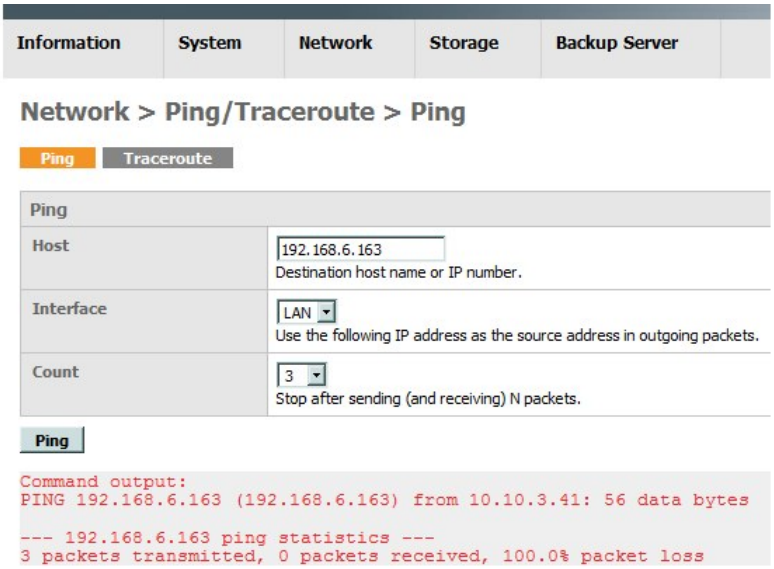
8.3.6.1 Ping

It is the "ping" command in standard UNIX machines. It tests your AhsayUBS network interface whether is can reach the destination hosts specified. After you have entered the required information in the text box, click the [Ping] button to ping the destination host. The output below the [Ping] button will show the results whether the destination can be reach by the AhsayUBS or not.

Below is an example that the AhsayUBS can reach the destination successfully.



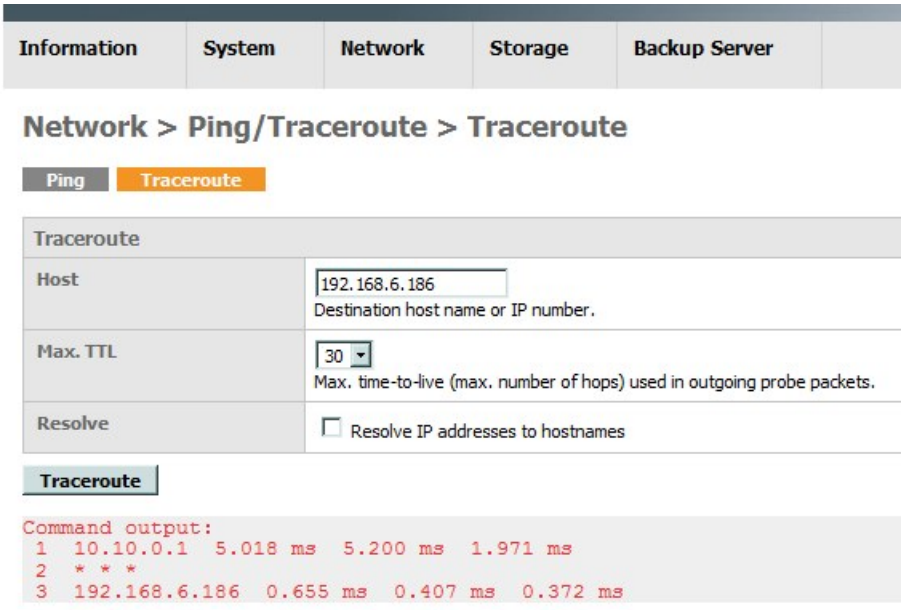
Below is an example that the AhsayUBS failed to reach the destination "192.168.6.163".



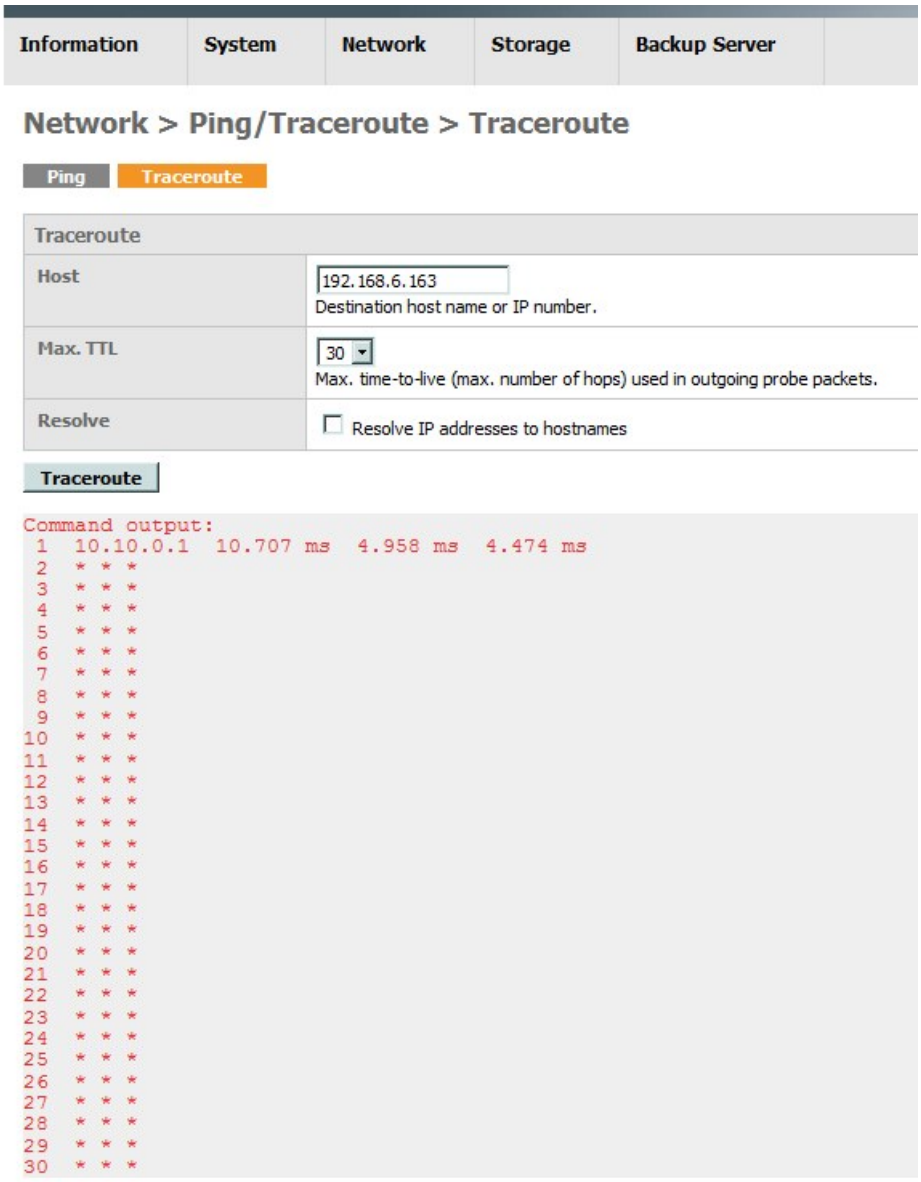
8.3.6.2 Traceroute

It is another tool for testing your AhsayUBS network connection to a destination host you entered in the table below. It also shows the path of the packets travel from the AhsayUBS to the destination host.

Below is an example that the AhsayUBS can reach the destination successfully.



Below is an example that the AhsayUBS failed to reach the destination.



8.4 Storage

8.4.1 Overview

The [Storage] > [Summary] page shows a summary of the volumes created in this AhsayUBS. There are two types of storage volumes defined on the AhsayUBS:

i. System Storage – This is a core storage volume, which is created during AhsayUBS installation. The system storage contains AhsayUBS system files. Therefore, it cannot be removed or unmounted when AhsayUBS is running.

ii. Additional Storage – can be added when the LSFW storage has run out of space. It is used for storing more backup user account data. As additional storage are not core storage volumes. They can be removed or unmounted when AhsayUBS is running.

Details of the storage model in AhsayUBS can be found in the section [AhsayUBS Storage Concepts].

Under this page, volume information will be shown and the actions can be done include:

i. add or remove an additional storage
ii. mount or unmount an additional storage
iii. filesystem check on a volume
iv. rebuild degraded LSFW or additional storage inside this AhsayUBS.

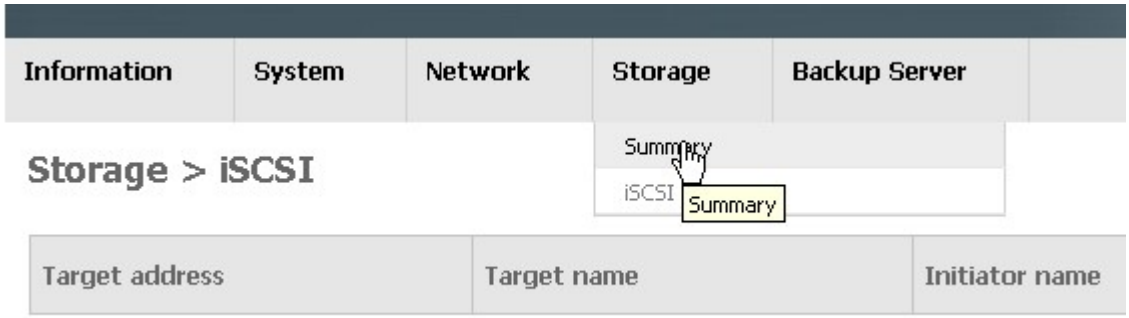
The page [Storage] > [iSCSI] shows a summary of the iSCSI session created in this AhsayUBS. The iSCSI session can be created, edited their information, disconnected and removed in this AhsayUBS in this page.

After an iSCSI session is created, it can be used as a provider for the Expandable Storage (a type of Additional Storage).

8.4.2 [Storage] > [Summary]

8.4.2.1 Storage Information in the WebAdmin

A summary of the storages installed in the AhsayUBS will be shown in this page.



The [Storage] > [Summary] shows the summary of the storages inside the AhsayUBS with volume view. Here is the information that will be shown in the volume:

Volume Pie chart - For the volume size distribution:

i. Yellow means the approximate used space in a volume.
ii. Blue means the approximate the free space available in a volume.

The missing volume pie chart means the volume is not available for the AhsayUBS. It may be due to factors such as:

i. The volume is exported.
ii. Some of the providers (block devices or iSCSI session) are missing.

Volume status icons indicate the various statuses of the volume. It is put beyond the volume pie chart. Enclosed is the description of the volume status icons:

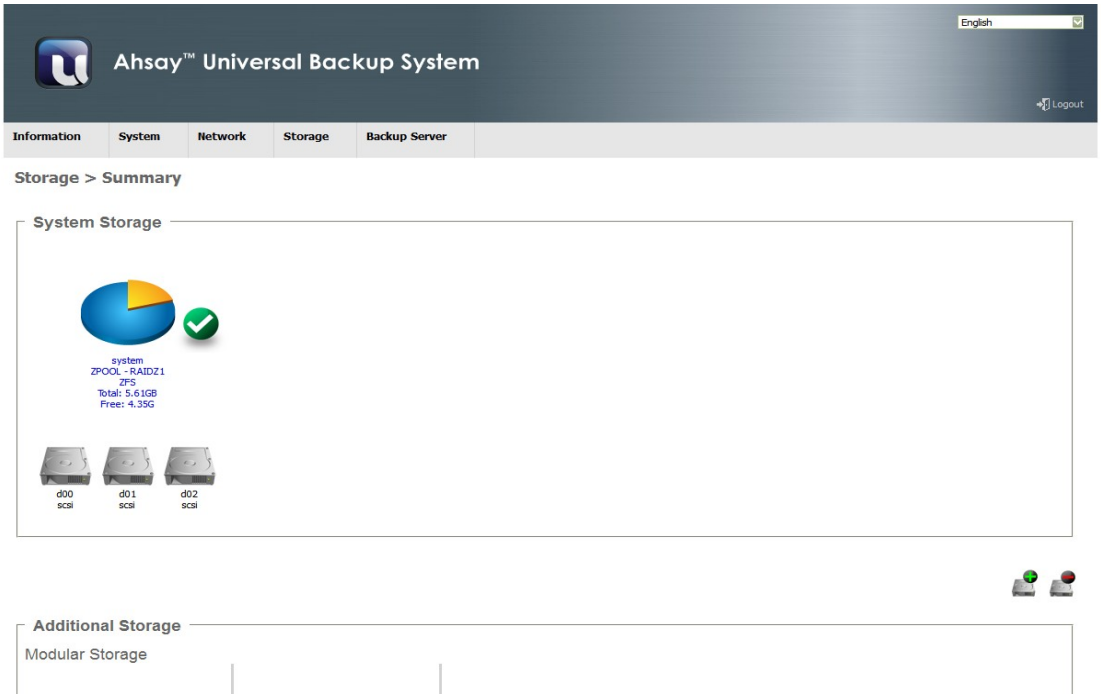
	Healthy	The volume is healthy.
	Degraded	The volume is degraded. One or more providers (block devices) of the volume are missing though the volume can still be used. The volume can become healthy again with a rebuild after replacing the missing providers. For details, please refer to the [Troubleshooting] section.
	Rebuilding	This state will occur after the provider is replaced in the volume. After rebuilding completed, the status will become healthy again. The rebuilding state will not affect the read or write operation of the volume.
	Critical	The volume is not available. It is better to suspend all I/O activity before the volume has undergone further damage.
	Missing	The volume is missing. It cannot be accessed by the AhsayUBS. It may be caused by: • The volume is exported. • The local storage is disconnected. For details, please refer to the [Troubleshooting] section.
	Disconnected	The corresponding remote disk's connection is lost. Please bring the remote storage host up (e.g. iSCSI initiator) to reconnect the remote disk. In order to prevent any data access to the remote storage, the AhsayOBS & AhsayRPS and OBSR Share service will not be allowed to start. Do not try to access anything before reconnecting the remote volume.

The following volume information that will be shown below the volume pie chart:

- Volume ID: 'system' denotes system storage while 'es????' pattern denotes the volume identity.
- RAID Type: RAID type of the volume.
- Filesystem Type: Filesystem type of the volume (UFS or ZFS).
- Total: Total size available for the volume.
- Free: Free space available for the volume to use.

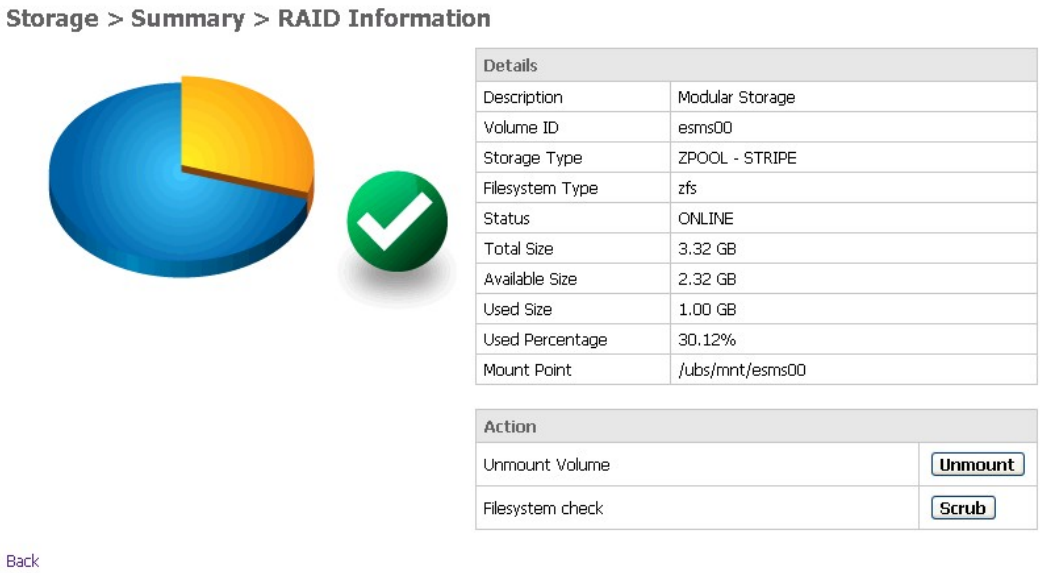
The hard disk icons ' ' below the text shows number of the providers for the volume and its status:

	Healthy	The provider is healthy.
	Degraded	Part of the provider is not available. It is advised to backup the data in the volume and build a new volume again.
	Rebuilding	The state will occur after the provider is replaced in the volume. After rebuilding completed, the status will become healthy again.
	Disconnected	The connection of the remote disk is lost. Please bring the remote storage host up (e.g. iSCSI initiator) to reconnect the remote disk.



When the volume pie chart icon is clicked, the page will be redirected to the [Storage] > [Summary] > [RAID Information].

- **Description:** Description of the volume.
- **Volume ID:** The ID to identify the volume.
- **Storage Type:** RAID type of the volume.
- **Filesystem Type:** Filesystem type of the volume (UFS or ZFS).
- **Status:** State of the volume (ONLINE / DEGRADED / REBUILDING / CRITIAL / DISCONNECTED).
- **Total Size:** Total size available for the volume.
- **Available Size:** Free space available for the volume to use.
- **Used Size:** Used space of the volume.
- **Used Percentage:** Volume space used percentage.
- **Mount Point:** Dirpath where the volume is mounted.

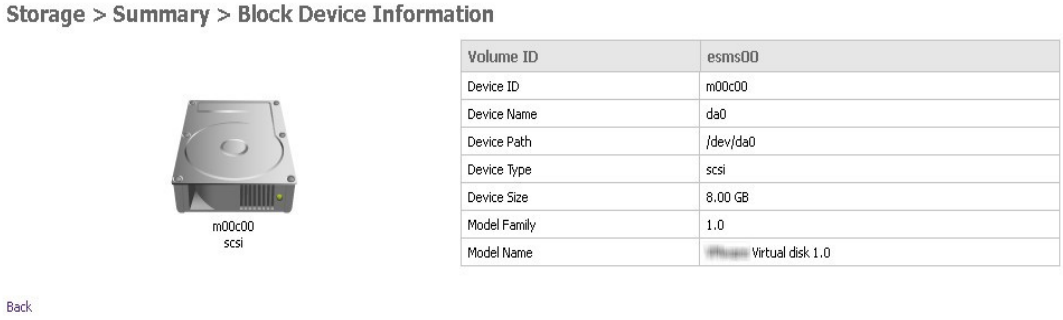


When the hard disk icon is selected, details of each provider will be shown. This page is called [Storage] > [Summary] > [Block Device Information].

Some Block Device Information will be shown in this page:

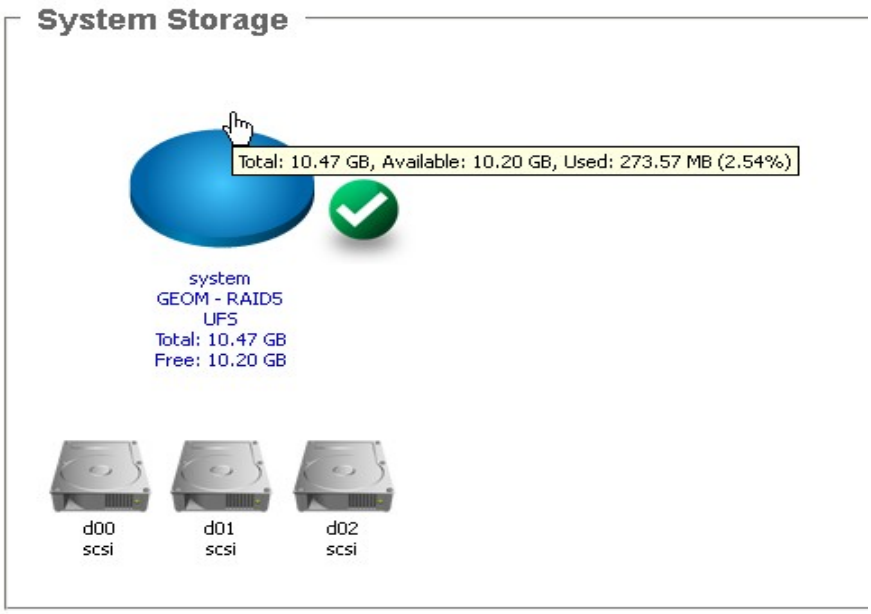
- **Volume ID:** 'system' denotes it is a System Storage provider. Others represent the volume it belongs to.
- **Device ID:** The logical ID that identifies the provider.
- **Device Name:** Physical name of the block device named by the kernel.
- **Device Path:** Block device physical path in the AhsayUBS.
- **Device Type:** Connection type of the device. e.g. ata, ide, scsi, hwraid, iscsi etc.
- **Device Size:** Physical size of the device.

Physical device information, such as [Model Family], [Model Name], [Serial Number] and [Device Firmware Version] are shown which is useful for the AhsayUBS admin to identify the physical block device.

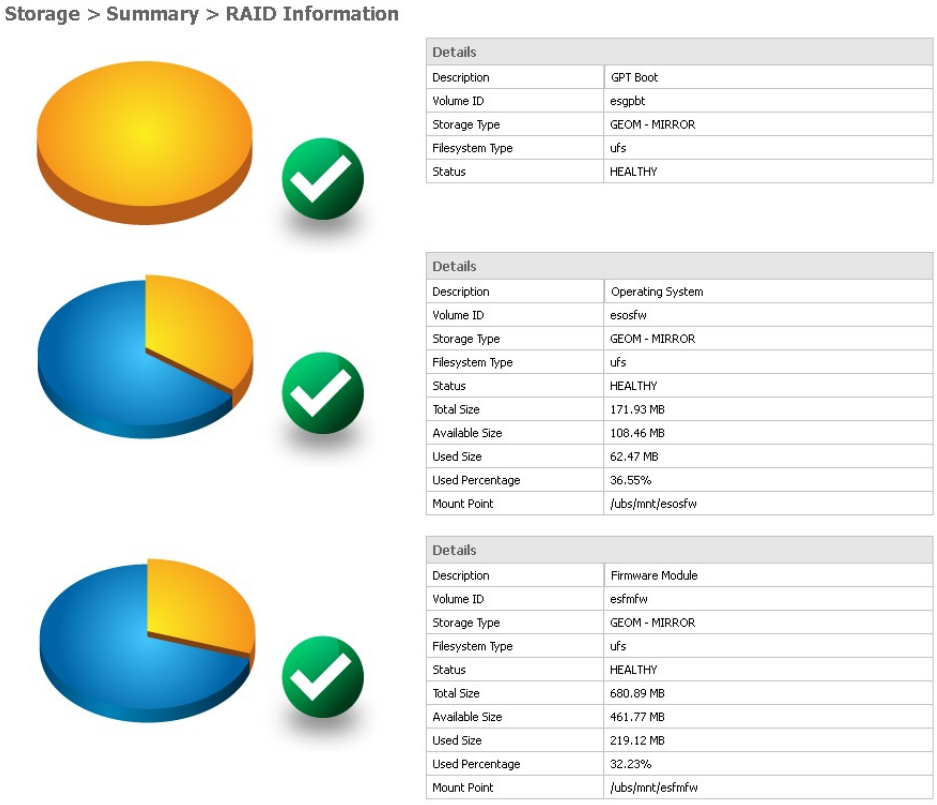


8.4.2.1.1 System Storage

In the page [Storage] > [Summary], only the volume LSFW will be shown.



After clicking the volume pie chart, details of all System Storage will be shown in the page [Storage] > [Summary] > [RAID Information].



8.4.2.1.2 Additional Storage

All configured additional storage devices can be found in the page [Storage] > [Summary]. After clicking the volume pie chart icon, details of the additional storage will be displayed.

Additional Storage can be added when master storage LSFW runs out of space. Once created, the additional storage can be used for storing more user accounts data and their backup snapshots of AhsayOBS & AhsayRPS in this AhsayUBS.

Supported types of the Additional Storage in AhsayUBS:

i. Modular Storage:
   - Supports one or multiple physical block devices for building RAID0, RAID1 and RAIDZ in ZFS from local storage.
   - Supports one remote disk (i.e. iSCSI target) to build a RAID 0 ZFS remote storage.

ii. Expandable Storage: Created with an iSCSI initiator session and hardware RAID volumes. One iSCSI initiator session (one provider) can support creating an expandable storage only. Since iSCSI target / hardware RAID volume can be expanded, the entire disk will be consumed by a single ZPOOL. The creation of the expandable storage will not be supported in the current and further releases of AhsayUBS.

iii. Optional Storages (previously named Optional Labelled Device) in UFS format created in the previous releases of AhsayUBS are also supported, but the creation of new UFS format Optional Storage is not supported as of AhsayUBS v2.1.0.0

8.4.2.2 Create Additional Storage

Additional Storage can be added by clicking the icon in the [Storage] > [Summary] page. If there are no available providers for creating the additional storage, the icon will be hidden.

AhsayUBS admin may either:

i. Shutdown AhsayUBS and insert the block devices. Power on AhsayUBS on again. or
ii. Connecting to the iSCSI target (Please refer to the section [Storage] > [iSCSI] for details.) for the ' ' icon to appear again.

The provider which has been used by other AhsayUBS before will not be listed as an empty block device. It should be zero out before putting into this AhsayUBS.

WARNING:

Please note all data in the block device or the iSCSI initiator will be DESTROYED and CANNOT BE RECOVERED again after the additional storage is created.

8.4.2.2.1 Create Modular Storage (Physical Block Devices)

1. [Local Storage Provider] Make sure the block devices / hardware RAID volume are connected to the AhsayUBS server. If not, shutdown AhsayUBS. Insert a physical block device(s) / create a hardware RAID before booting to AhsayUBS again.
   [Remote Storage Provider] Make sure an iSCSI initiator session is connected and enabled. To verify the existence of an iSCSI initiator, please refer to the section [Storage] > [iSCSI] for details.
2. Go to the page [Storage] > [Summary].
3. Click the ' ' icon.
4. Select the provider(s) included in the volume in the drop down list. Multiple providers can be selected by [Windows] 'Ctrl + Mouse Left Click' / [Mac OS] 'Command + Mouse Left Click'.
5. [Local Storage Provider] Select the RAID type of the volume (RAID 0 / RAID 1 / RAID Z).
6. Click the button [Done].
7. Read the warning message in the alert box carefully. Confirm that 'All of the data will be destroyed in the provider(s)' by clicking [OK] button.
8. The page then will be redirected to the page [Storage] > [Summary] when the modular storage is created. A dialog box will show that whether creating modular storage action is done successfully or not. Click [OK] to close the dialog.

8.4.2.3 Remove Additional Storage

Please ensure that the volume is NOT IN USE before removing. Otherwise, the volume removal action will fail.

Please follow these steps for removing the additional storage:

1. Go to the page [Storage] > [Summary].
2. Click the icon ' '.
3. Click the icon ' ' beyond the volume to be removed.
4. Confirm the alert dialog to remove the additional storage.
5. The page will be refreshed. A dialog will be popped up to show that the volume is removed successfully. The volume will no longer exist in the AhsayUBS now.

WARNING:

All the data in the additional storage will be DESTROYED and CANNOT BE RECOVERED again.

8.4.2.4 Mount and Unmount Additional Storage

8.4.2.4.1 Unmount Additional Storage

Note:
1. System Storage volume is always in use and there cannot be unmounted.
2. Please ensure that the volume is NOT IN USE before unmounting. Otherwise, the unmount volume action will fail.

Please follow these steps for unmount a volume:

1. Go to the page [Storage] > [Summary].
2. Click the volume pie chart icon which is to be unmounted.
3. The page is redirected to [Storage] > [Summary] > [RAID Information]. Click the [Unmount] button to unmount the volume.
4. The page will be refreshed and shows the result that the volume is unmounted successfully or not. Click the button [OK] to close the dialog.

8.4.2.4.2 Mount Additional Storage

Storage volumes cannot be used by the AhsayUBS or the AhsayOBS & AhsayRPS when it is not mounted. To use the volume, please follow these steps for mount a volume:

1. Go to the page [Storage] > [Summary].
2. Click the volume pie chart icon which is to be mounted.
3. The page is redirected to [Storage] > [Summary] > [RAID Information]. Click the [Mount] button to mount the volume.
4. The page will be refreshed and shows the result that the volume is mounted successfully or not. Click the button [OK] to close the dialog.

8.4.2.5 Filesystem Check

To verify the data integrity of the files and recover the filesystem if there are defects inside the file system.

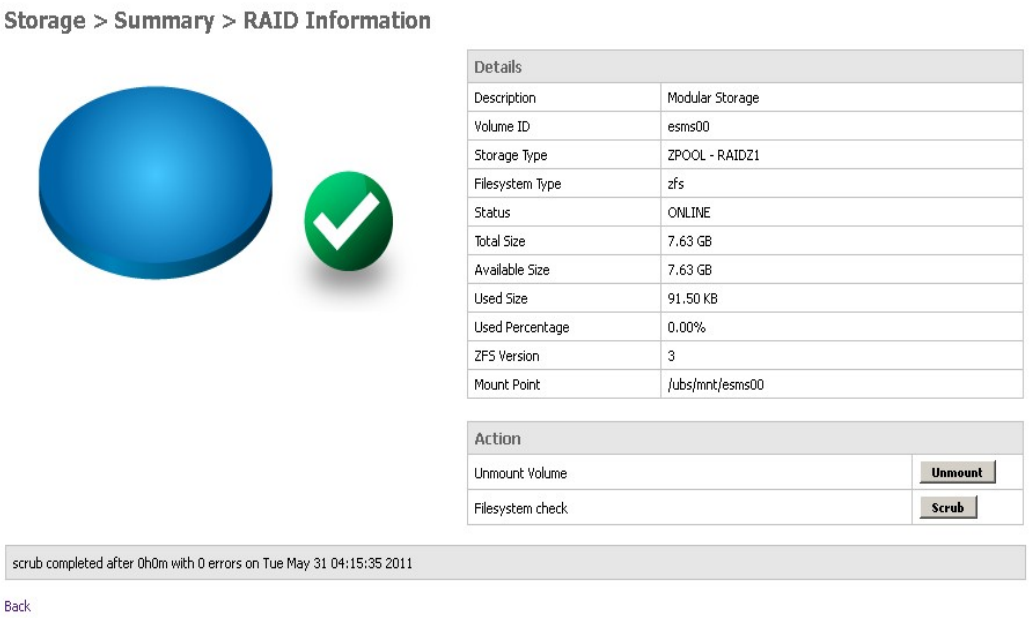
8.4.2.5.1 [ZFS] Scrub

Scrub is the filesystem check process for the ZFS volumes. It can be performed on a volume in either mounted or un-mounted state

Note:
The performance of the mounted volume will be lowered during scrubbing process. Therefore it is recommended to perform ZFS scrubbing operations during off peak hours, when there are no backup jobs running.

To trigger the filesystem check manually, please follow these steps:

1. Go to the page [Storage] > [Summary].
2. Click the volume pie chart icon which is going to scrubbing.
3. The page is redirected to [Storage] > [Summary] > [RAID Information]. Click the [scrub] button to start the scrubbing.
4. Read the alert dialog message and confirm it to start the scrubbing process.
5. The page will be refreshed. A dialog will be shown whether the scrubbing command can be issued successfully or not. Click the [OK] button to close the dialog.
6. Scrubbing message will be shown and refreshed at the bottom of the page during scrubbing.



8.4.2.5.2 [UFS] fsck

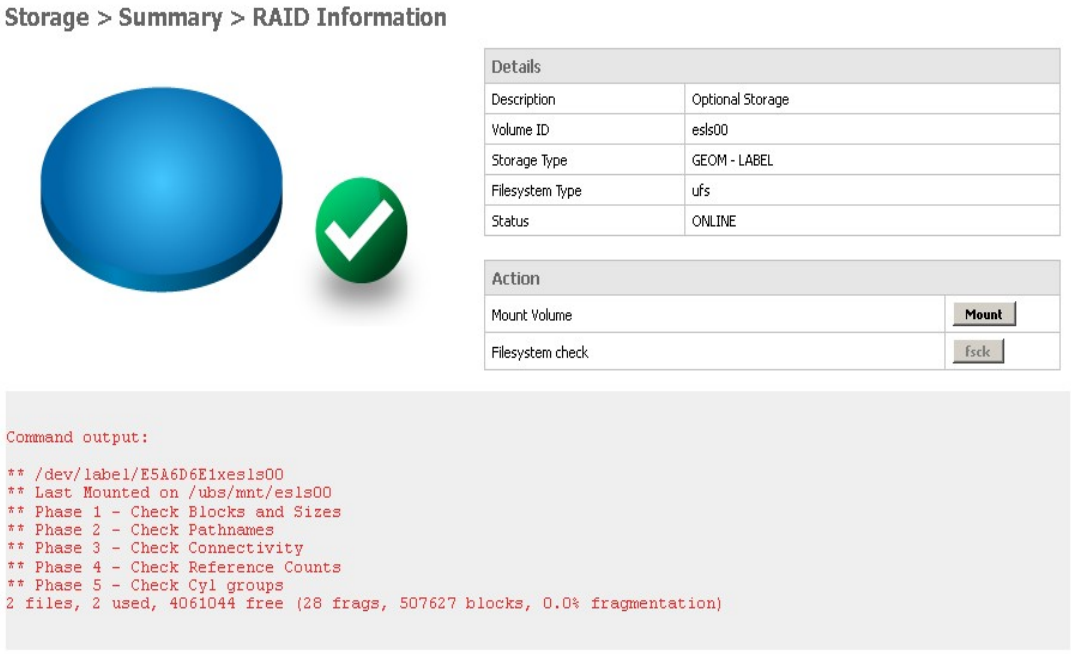
The "fsck" process is the filesystem check process for the UFS volumes. **The "fsck" process must be performed when the UFS volume is offline**. Therefore, "fsck" checks are only available for [Additional Storage] volumes, as the [System Storage] volumes cannot be unmounted. A "fsck" check for [System Storage] is performed during the AhsayUBS boot process.

Note:
Please make sure the volume is not in use before unmounting the volume. It is also recommended that the AhsayOBSR service is shutdown down before unmounting the volume.

To trigger the "fsck" process manually, please follow these steps:

1. Go to the page [Storage] > [Summary].
2. Click the volume pie chart icon which is going to start "fsck".

3. If the volume is not unmounted, please refer to the section [Mount and Unmount Additional Storage].
4. After the volume is unmounted, click the button [fsck] to start the "fsck" process.
5. Read the alert dialog message and confirm it to start the "fsck" process.
6. The page will be refreshed. A dialog will be popped up to show that whether the "fsck" is started successfully. Click the [OK] button to close the dialog.
7. "fsck" messages will be shown on the bottom of the page if the "fsck" process is started successfully.



8.4.2.6 Export and Import Additional Storage (ZFS)

1. When the corresponding block devices or the iSCSI target is undergoing maintenance or
2. [Expandable Storage] The iSCSI target / hardware RAID volume is expanded, the additional storage is needed to be exported and imported again to recognize the expanded size.

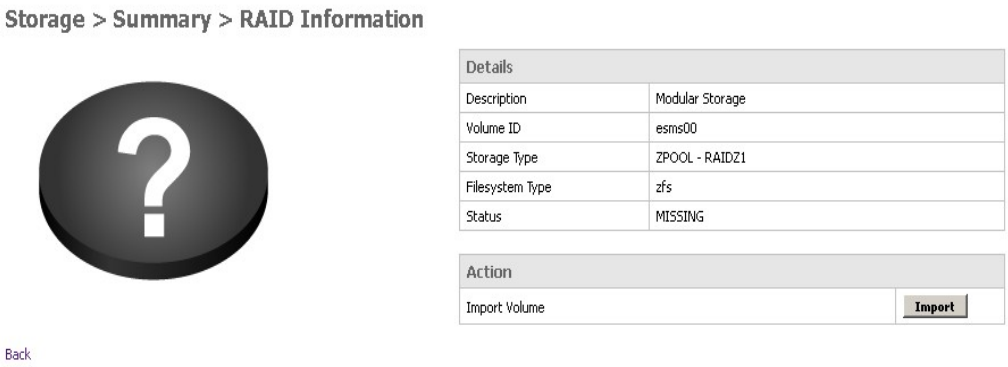
Notes:

1. The System Storage cannot be unmounted. So, the volume(s) in System Storage cannot be exported.
2. The volume is needed to be unmounted before exporting. Therefore, make sure that the volume is not in use.

8.4.2.6.1 Export the Additional Storage

To export an additional storage:

1. Unmount the volume first if it is mounted. For the steps to unmount a volume, please refer to the section [Mount and Unmount Additional Storage].
2. Go to the page [Storage] > [Summary].
3. Click the volume pie chart icon which is going to be exported.
4. Click the button [Export].
5. The page will be refreshed and a dialog will be shown that the volume is exported successfully. Click [OK] to close the dialog box.
6. The volume is now exported. So, the volume is missing in the AhsayUBS now.



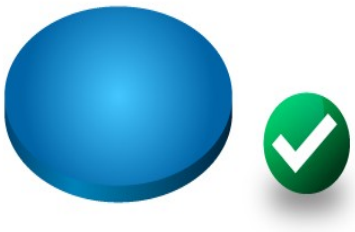
8.4.2.6.2 Import the Additional Storage

The volume needs to be imported again when it is going to be used by the AhsayUBS.

To import a volume:

1. Make sure the corresponding block device(s) (Modular Storage) or the iSCSI connection (Expandable Storage) is connected to the AhsayUBS before importing the volume.
2. Go to the page [Storage] > [Summary].
3. Click the volume pie chart icon which is going to be imported.
4. Click the button [Import].
5. The page will be refreshed and a dialog will be shown that the volume is imported successfully. Click [OK] to close the dialog box.
6. The volume information now can be shown in the AhsayUBS WebAdmin now. It means that the volume can be used again now by the AhsayUBS after mounting it.

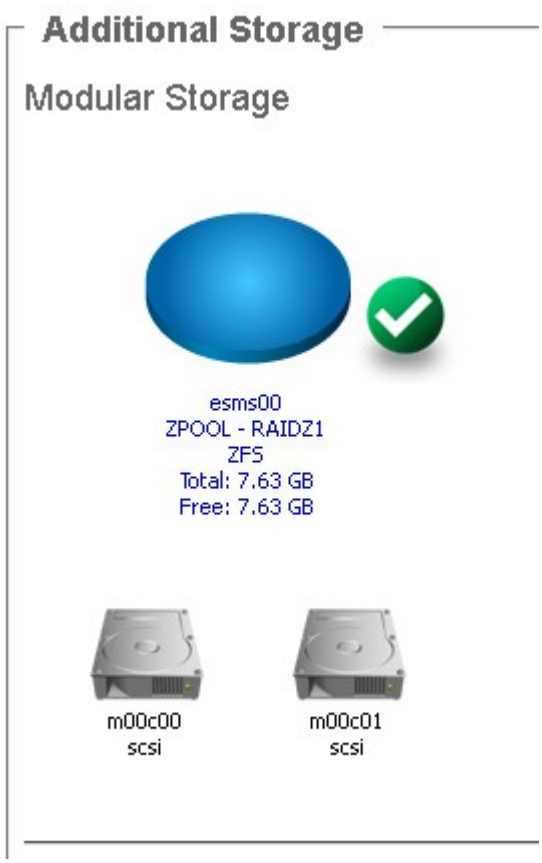
Storage > Summary > RAID Information



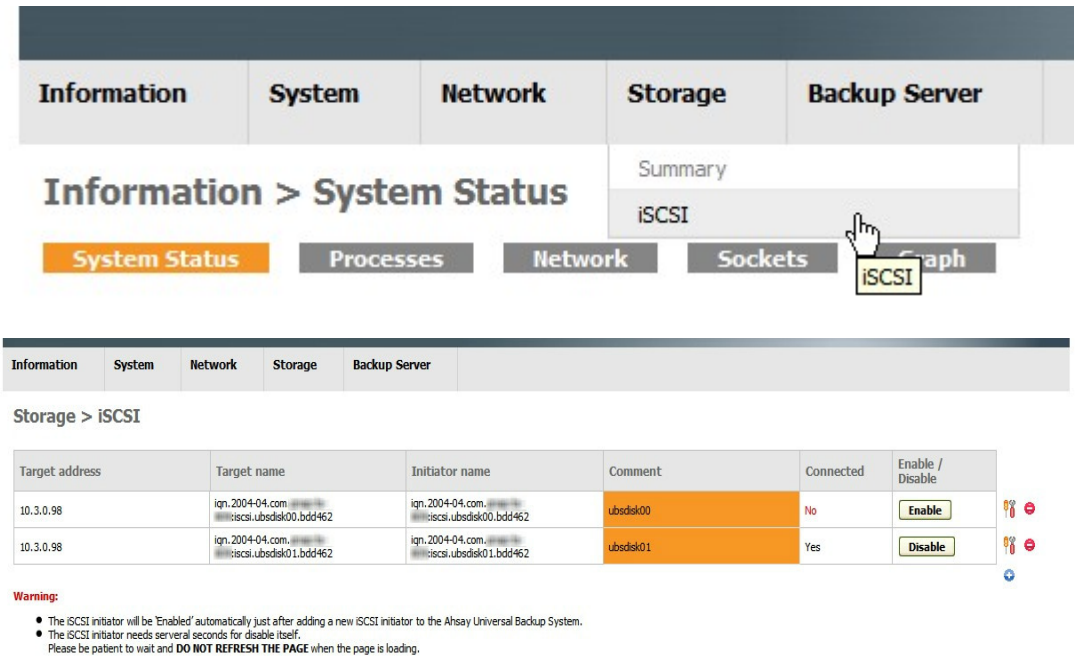
Details	
Description	Modular Storage
Volume ID	esms00
Storage Type	ZPOOL - RAIDZ1
Filesystem Type	zfs
Status	ONLINE
Total Size	7.63 GB
Available Size	7.63 GB
Used Size	91.50 KB
Used Percentage	0.00%
ZFS Version	3
Mount Point	/ubs/mnt/esms00

Action	
Unmount Volume	Unmount
Filesystem check	Scrub

Back



8.4.3 [Storage] > [iSCSI]



In AhsayUBS, iSCSI can only be used for creating the additional storages.

The information that will be shown for each of the iSCSI session entry:

- **Target address:** The IP address / DNS name to the iSCSI target.
- **Target name:** The IQN name of the ISCSI target.*
- **Initiator name:** The IQN to identify the iSCSI target.*
- **Port:** The port of the iSCSI TARGET. Default value is "3260".
- **Comment:** The description of this entry.
- **Connected:** "Yes" when the iSCSI session is connected. "No" when the iSCSI session is disconnected.
- **Enable / Disable:** Enable/Disable the iSCSI session.

Note: The IQN should be in "iqn.<yyyy-mm>.<reversed domain name>:<identifier>" format.

8.4.3.1 Rules for enable / disable / delete iSCSI session:

You may enable / disable the iSCSI initiator session for maintenance the iSCSI target server. When the corresponding additional storages are in use, the iSCSI initator session cannot be disabled.

8.4.3.2 Difference between disable / delete an iSCSI initiator session

Disable:
The iSCSI initiator session entry still exists in the AhsayUBS. Use this function when you want to temporarily disable the session and reconnect it later.

Delete:
The iSCSI initiator session entry will no longer be used in this AhsayUBS.

8.4.3.3 Create a connection to an iSCSI target

Note: Please ensure that the iSCSI target should be greater than 2GB. Otherwise, it cannot be used as the AhsayUBS storage.

1. Go to the page [Storage] > [iSCSI]
2. Click the ' ' icon.
3. Enter the required information inside the [iSCSI] TABLE.
4. Click the [Add] button.
5. An [iSCSI] initiator session is now enabled. The connected iSCSI disk is now ready to be added as Additional Storage for this AhsayUBS. Please refer to the section [Create Additional Storage] for details.

Note: If the iSCSI initiator session remains for a "Connecting..." state for a long time, incorrect connection information may have been used or the iSCSI target host/service could be down. You may destroy this entry and try again.

Storage > iSCSI

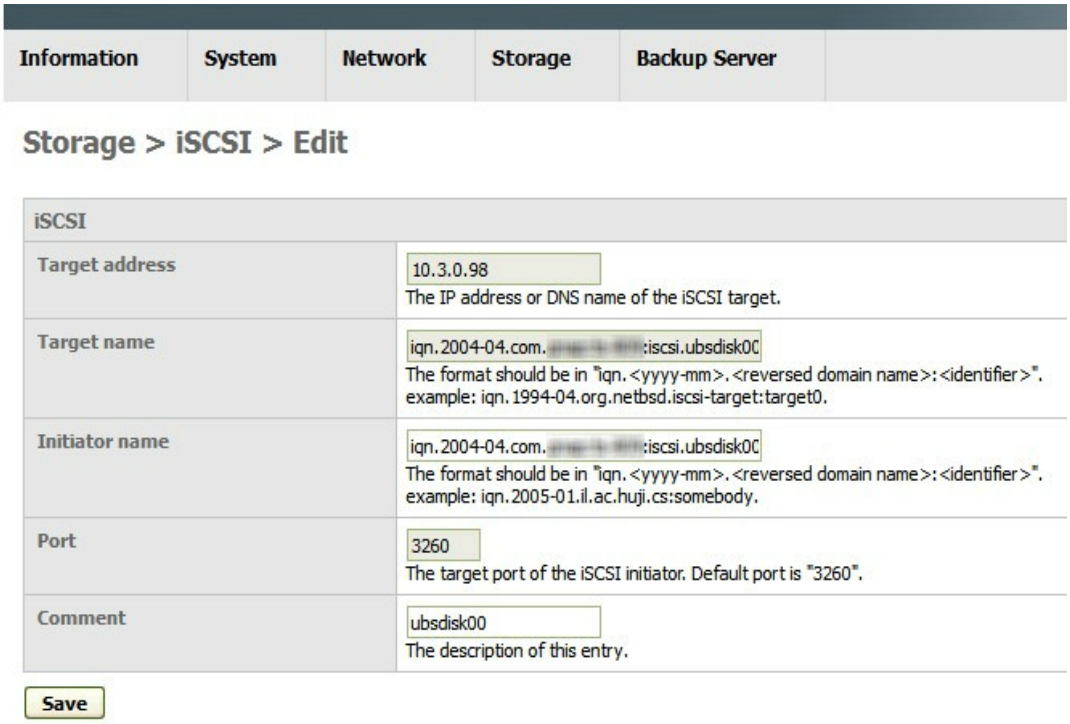
Target address	Target name	Initiator name	Comment	Connected	Enable / Disable
10.10.0.45	iqn.2007-09.jp.ne.peach.istgt:test0	iqn.2007-09.jp.ne.peach.istgt:test0	[redacted]	Yes	Mounted
10.10.0.45	iqn.2007-09.jp.ne.peach.istgt:test1	iqn.2007-09.jp.ne.peach.istgt:test1	[redacted]	Yes	Mounted
10.10.0.45	iqn.2007-09.jp.ne.peach.istgt:test2	iqn.2007-09.jp.ne.peach.istgt:test2	[redacted]	Yes	Mounted
10.10.0.46	iqn.2007-09.jp.ne.peach.istgt:test0	iqn.2007-09.jp.ne.peach.istgt:test0	[redacted]	Yes	Mounted
10.10.0.46	iqn.2007-09.jp.ne.peach.istgt:test1	iqn.2007-09.jp.ne.peach.istgt:test1	[redacted]	Yes	Mounted

8.4.3.4 Edit the configuration of an iSCSI entry

Note:
The corresponding additional storage should be exported or removed before proceed. Note that removing the additional storage will erase all the data in the storage. For steps to export an additional storage, please refer to the section [Export and Import Addition Storage]. For steps to remove an additional storage, please refer to the section [Remove Additional Storage].

Please follow the steps below to change the configuration of an iSCSI initiator entry:

1. Go to the page [Storage] > [iSCSI]
2. Look for the iSCSI initiator entry that is going to be edited.
3. Click the icon ' '.
4. Edit the fields under the [iSCSI] table. (Only the [Initiator name] and the [Comment] can be edited).
5. Click the [Save] button to save the changes.



8.4.3.5 Disable an iSCSI initiator entry

Note:
1. The corresponding modular / expandable storage should be exported or optional storage should be unmounted before disabling any iSCSI initiator session. **The additional storage removal will result in destruction of all the data on the storage volume**. For steps to export an additional storage, please refer to the section [Export and Import Addition Storage]. For steps to remove an additional storage, please refer to the section [Remove Additional Storage].

2. The corresponding additional storage should not be DELETED after disabling the iSCSI initiator entry. Otherwise, the data inside the additional storage may not be re-accessible again by this AhsayUBS after re-enabling this iSCSI initiator session.

Please follow the instructions below to disable an iSCSI initiator entry:

1. Go to the page [Storage] > [iSCSI]
2. Look for the iSCSI initiator entry that going to be disabled.
3. Click the [Disable] button.
4. The iSCSI initiator entry now disabled successfully.

8.4.3.6 Enable an iSCSI initiator entry

Please follow the steps below to enable an iSCSI initiator entry:

1. Go to the page [Storage] > [iSCSI]
2. Look for the iSCSI Initiator entry that going to be enabled.
3. Click the [Enable] button.
4. The iSCSI initiator session has been created successfully.
5. (Optional) The corresponding additional storage can be imported again to use. For details, please refer to the section [Export and Import Additional Storage].

8.4.3.7 Destroy an iSCSI initiator entry

WARNING: Please ensure that all the data in the iSCSI initiator will be erased after it is destroyed.

Please follow the steps below to destroy an iSCSI initiator entry:

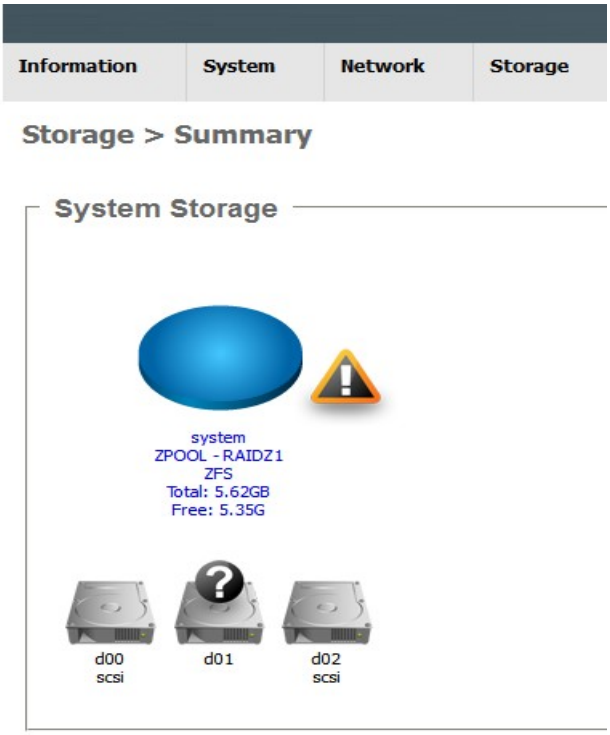
1. Go to the page [Storage] > [iSCSI]
2. Look for the iSCSI initiator entry that going to deleted.
3. Click the icon ' '.
4. The iSCSI initiator entry is destroyed successfully.

8.4.4 Troubleshooting

8.4.4.1 Rebuild Degraded Storage

When one or more block devices have degraded in a volume, the volume can be rebuilt for recovery. The AhsayUBS administrator can get the latest status of the storage volumes by viewing the page [Storage] > [Summary].

The following example shows the System Storage is degraded:



The volume is degraded when the ' ' icon is shown next to the volume.

WARNING: The data inside the rebuilt local block device will be DESTROYED and CANNOT BE RECOVERED.

Notes:
1. The provider which has been used by other AhsayUBS before will not be listed as an empty block device. It should be zero out before put it into this AhsayUBS.

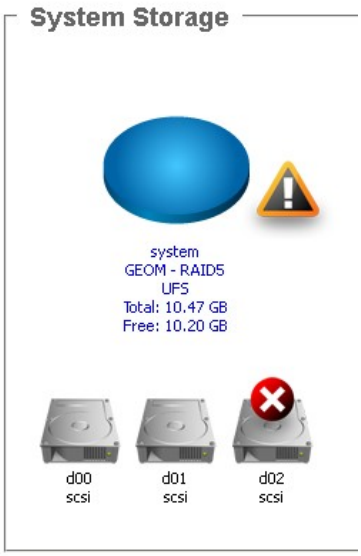
Only two kinds of degraded storage are supported for rebuilding their volume:

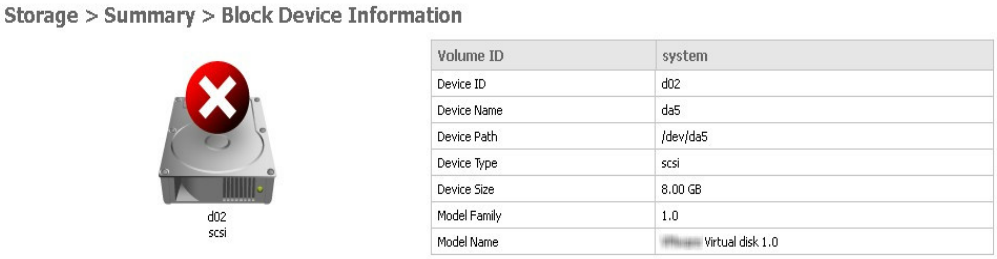
i. System Storage
ii. (Additional) Modular Storage

8.4.4.1.1 Rebuild the System Storage

To rebuild the volume for [System Storage]:

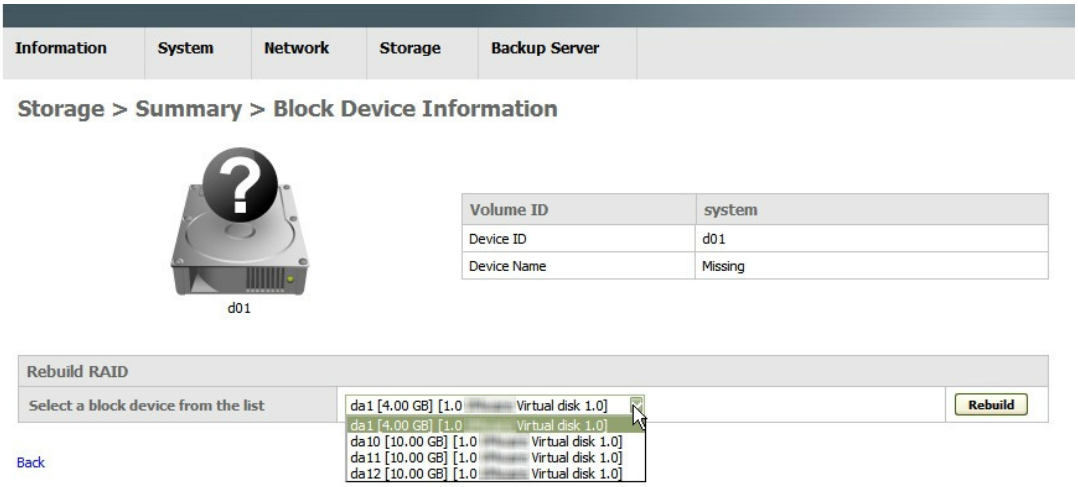
1. Go to the page [Storage] > [Summary].
2. Note down the volume and block device which are degraded.



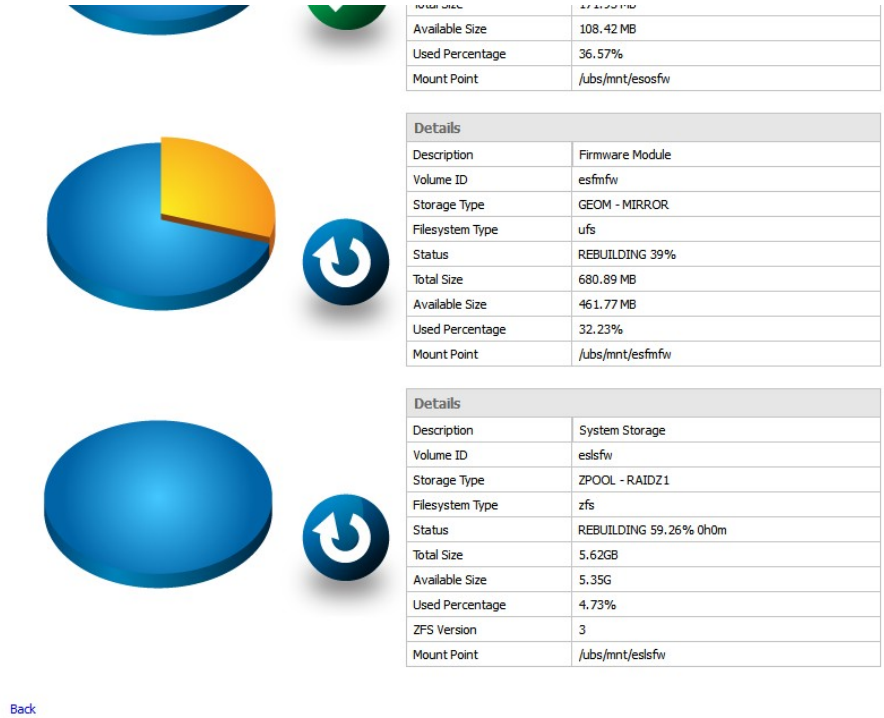


Note: To locate any missing or degraded block devices in AhsayUBS, please refer to [Appendix J – Identifying Physical Local Block Devices on AhsayUBS] for details.

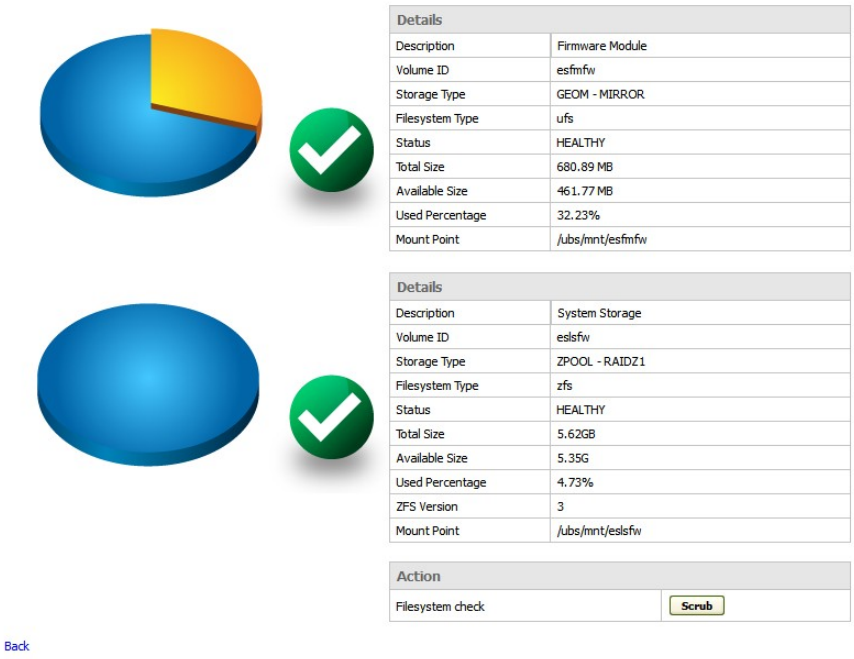
3. Shutdown the AhsayUBS in AhsayUBS WebAdmin.
4. Replace the block device with a healthy one.
5. Power on the AhsayUBS.
6. After the AhsayUBS is booted, login to the AhsayUBS WebAdmin again.
7. Go to the page [Storage] > [Summary].
8. Inside the degrade storage entry, click the storage icon
9. Select a block device for rebuilt the volume.



10. Click the button [Rebuild] to start the rebuild volume process.
11. Warning message will be shown in the alert box. Read it CAREFULLY before proceeds. Click [OK] button to continue the rebuild process. Click [Cancel] to return to the page.
12. After the rebuilding process is started, the page will be redirected to the [Storage] > [Summary] > [RAID Information] page. A dialog will be popped up to shown that the rebuild process is started successfully. Click [OK] button after reading the message.
13. When the block device in the volume is synchronizing, the rebuild icon ' ' will be shown in the volume like this:



The healthy icon ' ' will be shown again beyond the volume when the volume is synchronized completely.



Details	
Description	Firmware Module
Volume ID	esfmfw
Storage Type	GEOM - MIRROR
Filesystem Type	ufs
Status	HEALTHY
Total Size	680.89 MB
Available Size	461.77 MB
Used Percentage	32.23%
Mount Point	/ubs/mnt/esfmfw

Details	
Description	System Storage
Volume ID	eslsfw
Storage Type	ZPOOL - RAIDZ1
Filesystem Type	zfs
Status	HEALTHY
Total Size	5.62GB
Available Size	5.35G
Used Percentage	4.73%
ZFS Version	3
Mount Point	/ubs/mnt/eslsfw

Action	
Filesystem check	Scrub

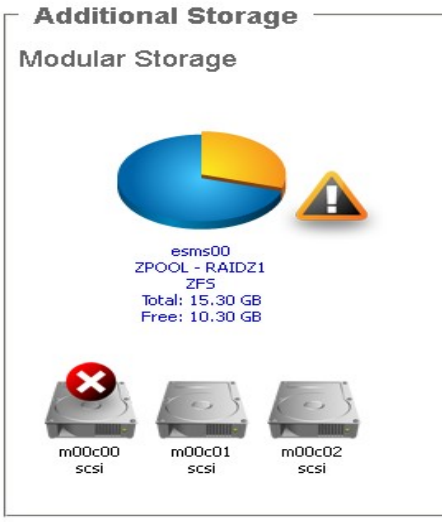
Back

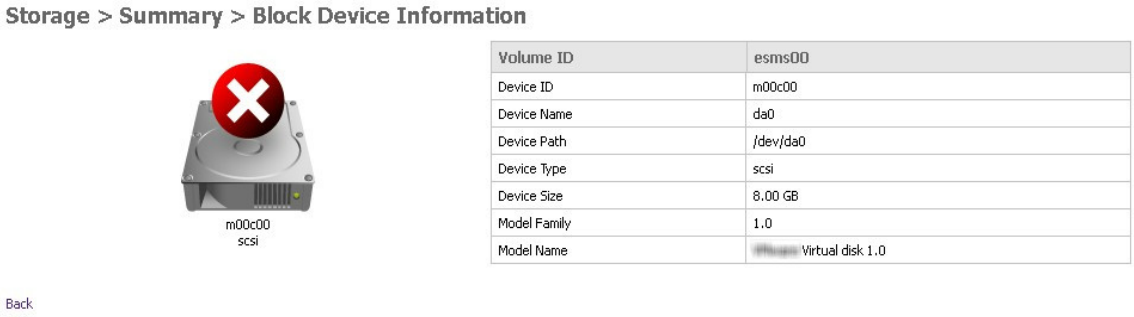
The block device missing icon ' ' will be replaced by the block device healthy icon ' ' since the block device is replaced and it is not missing now.

8.4.4.1.2 Rebuild the Modular Storage

To rebuild the volume for [Modular Storage]:

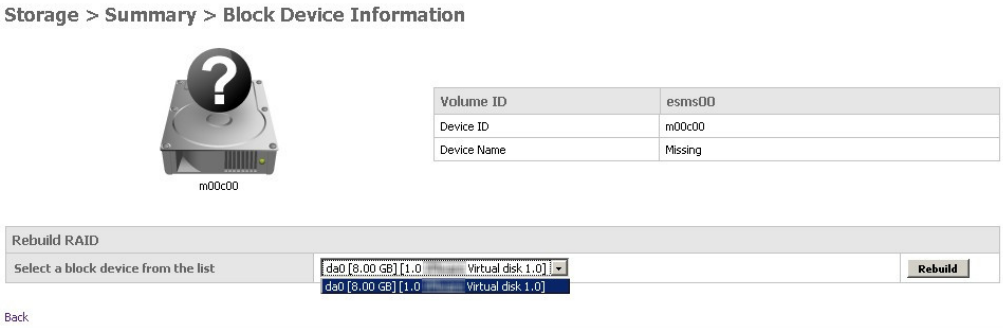
1. Go to the page [Storage] > [Summary].
2. Note down the volume and block device which are degraded.



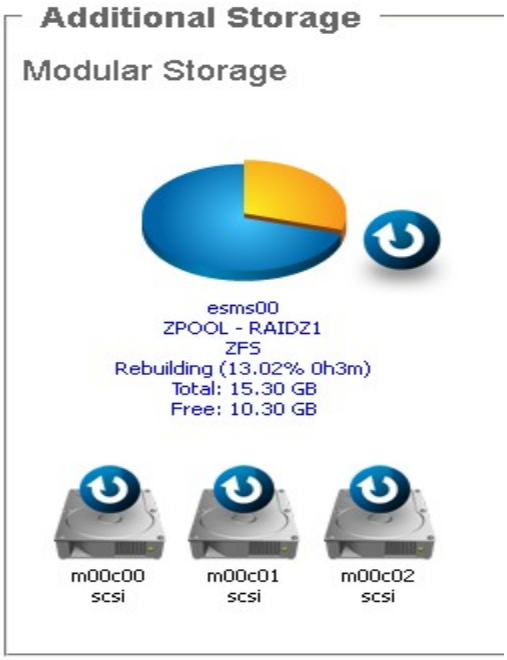


For the method to look for the missing or degraded block devices in AhsayUBS, please refer to the [Appendix J – Identifying Physical Local Block Devices on AhsayUBS] for details.

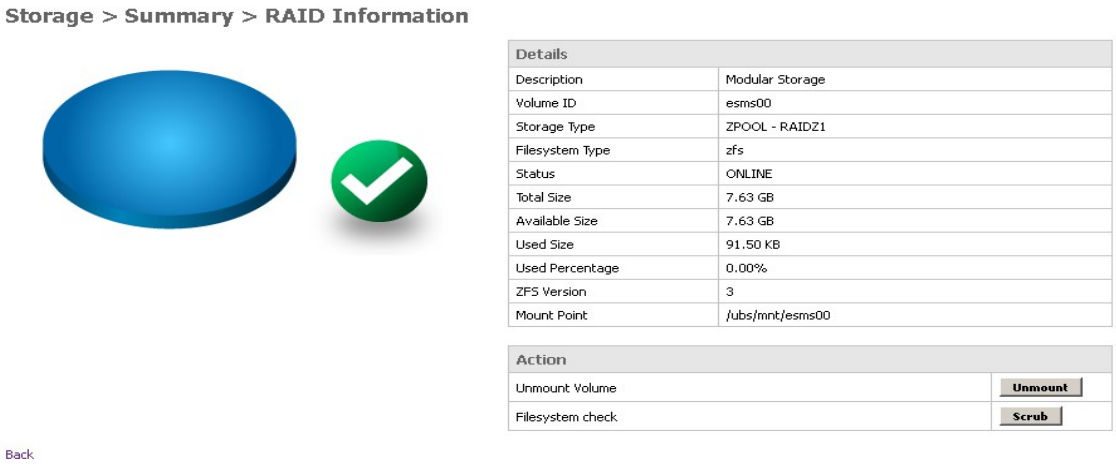
3. Shutdown the AhsayUBS in AhsayUBS WebAdmin.
4. Replace the block device with a healthy one.
5. Power on the AhsayUBS.
6. After the AhsayUBS is booted, login to the AhsayUBS WebAdmin again.
7. Go to the page [Storage] > [Summary].
8. Inside the degrade storage entry, click the storage icon ' '.
9. Select a block device for rebuilt the volume.



10. Click the button [Rebuild] to start the rebuild volume process.
11. Warning message will be shown in the alert box. Read it CAREFULLY before proceeds. Click [OK] button to continue the rebuild process. Click [Cancel] to return to the page.
12. After the rebuilding process is started, the page will be redirected to the [Storage] > [Summary] > [RAID Information] page. A dialog will be popped up to shown that the rebuild process is started successfully. Click [OK] button after reading the message.
13. When the block device in the volume is synchronizing, the rebuild icon ' ' will be shown in the volume like this:



The healthy icon ' ' will be shown again beyond the volume when the volume is synchronized completely.



The block device missing icon ' ' will be replaced by the block device healthy icon ' ' since the block device is replaced and it is not missing now.

8.4.4.2 Additional Storage(s) in Disconnected State

The additional storage DISCONNECTED state will only appear in the volume which is created on a remote disk (i.e. iSCSI initiator session). This states that the addition storage corresponding remote disk provider (i.e. iSCSI initiator session) is disconnected from the AhsayUBS.

In order to identify disconnected additional storage, an additional schedule job has been added to AhasyUBS. When any additional storage has been detected

in disconnected state, the following actions will be taken in order to prevent further loss of data:

- Service stop and prohibit the service start of the following services:
  - AhsayOBS & AhsayRPS
  - Share OBSR
- The enabled additional storage volumes will remain mounted. The system will wait for iSCSI initiator reconnection. In case the iSCSI initiator exits due to session timeout, AhsayUBS administrator may create another iSCSI initiator sessions by the 'Retry' button at page "Storage > iSCSI".
- Email will be sent to AhsayUBS administrator (The 'To email' defined in the 'General email setting').

At this stage,

- the corresponding remote disk's (i.e. the iSCSI initiator session) network connection to this UBS machine is lost.
- though the corresponding additional storage is still mounted, the data in this volume cannot be accessed nor written anything to the storage.

To fix the problem, login the AhsayUBS WebAdmin

- Alert dialog contains the disconnected additional storage and their corresponding iSCSI initiator information will be shown after AhsayUBS WebAdmin login.
- The lost of iSCSI connection may result from network connectivity issue. Try to use "Network > Ping / Traceroute" tool to test if the iSCSI target host is reachable. After resolving the network issue, the iSCSI target host will be reconnected with AhsayUBS machine and the data in the additional storage can be accessed again.
- After resolving the additional storage disconnection issue, service start will be allowed for the following services. Please refer to the section [Backup Server] for details.
  - AhsayOBS & AhsayRPS
  - Share OBSR

8.4.5 Additional User Storage Migration

8.4.5.1 Introduction

As of AhsayUBS v2.7.0.0, additional user storage migration from an old AhsayUBS machine to new AhsayUBS machine is supported.

AhsayUBS additional user storage migration is performed using a UNIX shell script. The migration process only supports additional user storage volumes, the system storage (firmware) volume, i.e. FreeBSD and AhsayOBS binaries are not supported. After a successful migration, the data on the file system can be used by the AhsayOBS service on the new AhsayUBS server.

Supported Hard Disk Interfaces:

- Local: IDE, SCSI, SATA, Hardware RAID

- Foreign: iSCSI

Supported Additional Storage Types:

The storage migration script only supports the migration of additional storage with only one provider (single hard disk). The storage volume to be migrated must in a healthy state. The support storage types include:

- Optional Storage (GPT Partition 6 with UFS)
- Expandable Storage (No Partition with ZPOOL on entire disk)
- Modular Storage with CLOG only (GPT Partition 7 with ZFS)
- Modular Storage with CLOG & SLOG (GPT Partition 11 / 13 with ZFS)

WARNING:

1. AhsayUBS system storage (esosfw/eslsfw) is NOT supported by the storage migration shell script.

2. After volume migration the original storage label in the migrated storage volume will be updated. The previous AhsayUBS installation will no longer be able to use the migrated storage volume.

3. Since the profile.ini file (/ubs/conf/profile.ini) will be updated by this shell script. DO NOT perform any add or remove storage operations via the AhsayUBS webadmin console when the volume is migration is in progress.

8.4.5.2 Storage Migration Procedure

Assumptions

1. The volume to be migrated is in a healthy state.
2. There are no disk errors prior to migration.
3. SSH is enabled on AhsayUBS

To perform a migration of an existing additional storage volume to a new AhsayUBS server:

1. Connect ONE hard disk containing foreign storage volume to the new AhsayUBS machine.

For local hard disk:
i. Shutdown the old AhsayUBS machine.
ii. Remove the specific hard disk from the old AhsayUBS machine.
iii. Shutdown the new AhsayUBS machine.
iv. Connect the hard disk to the new AhsayUBS machine.
v. Power on the new AhsayUBS machine.

Note:

1. If the additional user volume is created on a hardware RAID, then the RAID card along with all the hard drives which make up the RAID logical volume must be installed onto the new AhsayUBS server.

2. After connecting the RAID logical volume on the new AhsayUBS machine, please ensure the logical volume can be detected on the RAID card BIOS.

For iSCSI hard disk:

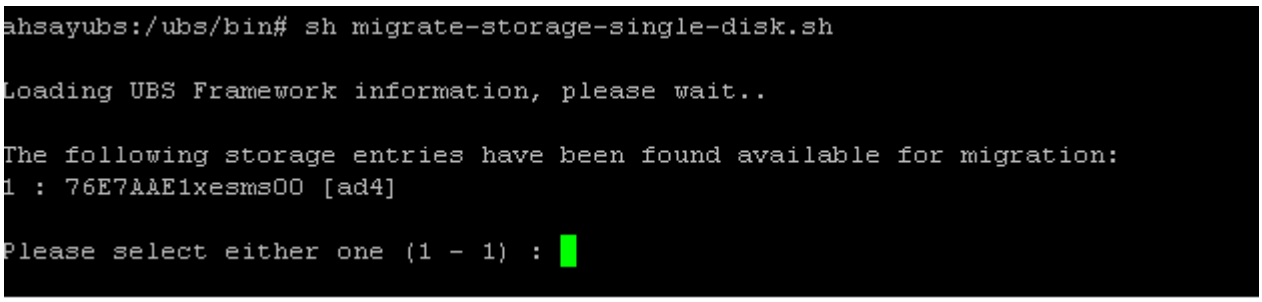
i. Login to the old AhsayUBS machine webadmin console.
ii. Umount specific iSCSI volume.
iii. Disconnect the iSCSI hard disk from the old AhsayUBS machine.
iv. Power on the new AhsayUBS machine.
v. Create a new iSCSI session in the AhsayUBS webadmin to connect the iSCSI hard disk.

2. Login AhsayUBS via SSH.

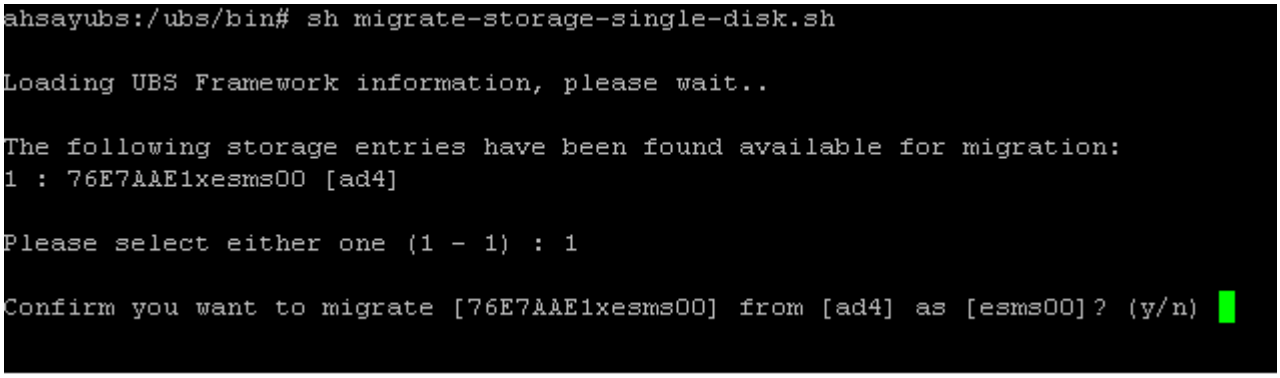
3. Enter the following command to start the migration the additional storages:

#sh /ubs/bin/migrate-storage-single-disk.sh

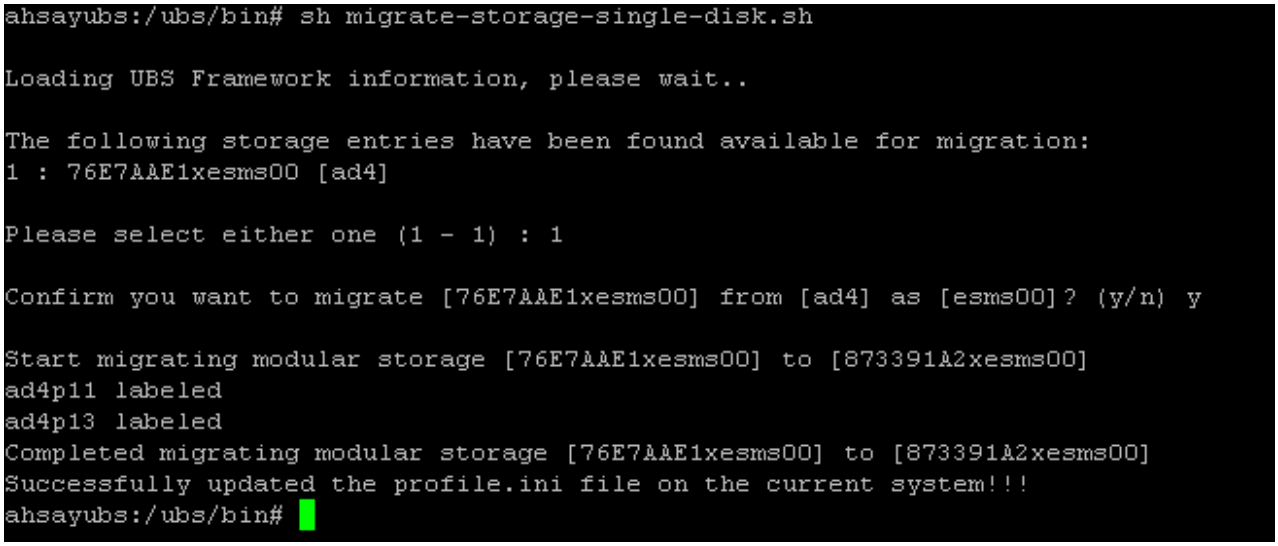
The shell script will begin the process of 'discovering' any connected foreign user storage volumes. Once the user storage volume 'discovery' has completed, the storage volumes eligible for migration will be listed.



Choose from the listed storage entries and input the entry number. The shell script will then prompt to confirm before starting the storage migration. Enter 'y' to confirm and start the storage migration.



After confirming the volume to be migrated, the script will proceed with the migration process. The storage migration result will be shown when the process is completed.



After completion AhsayUBS will automatically mount the migrated volume.

4. When the storage migration process is completed, please login to AhsayUBS WebAdmin. Go to the [Storage] > [Summary] page to check if the migrated storage is mounted.

5. The migrated storage volume is ready for use. Please update the new user home path in AhsayOBS web console under [Manage System] -> [Server Configuration] -> [System Settings] -> [User Homes].

8.5 Backup Server

When the mouse point is pointed over the wordings [Backup Server] in the menu bar, the menu will be shown as below:

8.5.1 Server Status

The page [Backup Server] > [Server Status] allows you to start and stop the AhsayOBS & AhsayRPS. It will show a table named [Online Backup Server and Replication Server] which includes the information of AhsayOBS & AhsayRPS in the AhsayUBS.

Here are the information and settings provided in the table:

- **Status:** Show the service status of the AhsayOBS & AhsayRPS in this AhsayUBS.
- **Http Port:** The http port used by the AhsayOBS & AhsayRPS. Default is 80. *1
- **Https Port:** The https port used by the AhsayOBS & AhsayRPS. Default is 443. *1
- **Check Storage Connectivity:** The UBS system have included a schedule check on storage connectivity. Upon any disconnected storage scenario, it will shutdown the "AhsayOBS & AhsayRPS" and "Share OBSR" if this option is enabled.
- **Access Server Files:** For user to access the OBSR_HOME in the AhsayUBS in the client machine. Please follow these steps to access the OBSR_HOME.
    i. Click the [Share OBSR] button
    ii. Connect to the shared SAMBA directory.
    iii. (For WINDOWS and MAC OS only) Type the username and password used in the AhsayUBS WebAdmin.
    iv. Now you can access the OBSR Home. (NIX: Please access the OBSR home in the directory, /mnt/obsr).
- **Tools (Only shown when AhsayOBS & AhsayRPS is started):** Click the [WebAdmin] button to open a new window for accessing the AhsayOBS & AhsayRPS in the AhsayUBS.

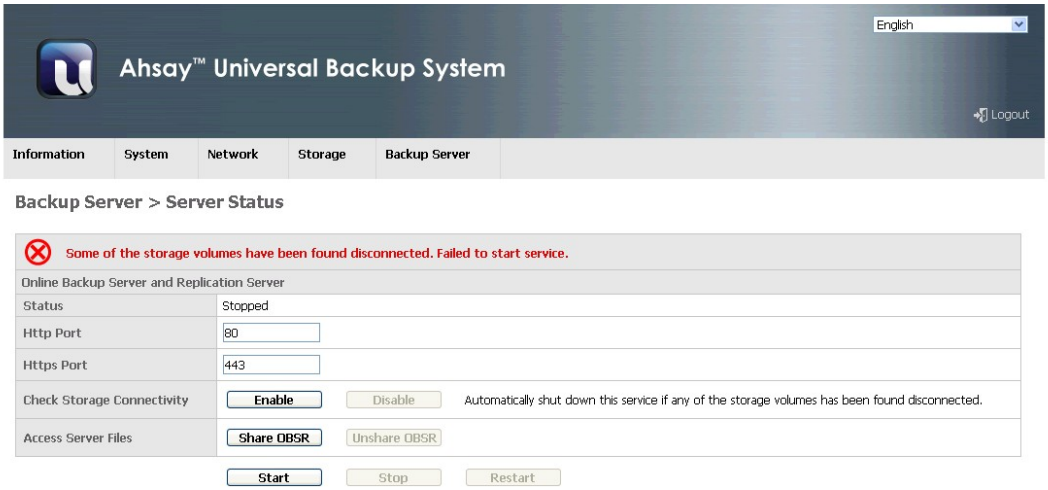
Note: Please do not set the port to the server port from "9-1023" except port 80 and port 443. Please check the default configuration from chapter 7.3.

To Start/Stop/Restart AhsayOBS & AhsayRPS in this AhsayUBS System, please click the [Start] / [Stop] / [Restart] button.

The following is the screen capture when the AhsayOBS & AhsayRPS is started.

The following is the screen capture when the AhsayOBS & AhsayRPS is stopped.

The following is the screen capture of the failed storage dependency during service start of "AhsayOBS & AhsayRPS" or "Share OBSR" service. It is caused by lost of iSCSI initiator connection of additional storage created on a remote disk provider (i.e. iSCSI initiator session). The failed storage dependency must be resolved before enabling these services. Please refer to the [Storage Summary] > [Troubleshooting] section for details.



8.5.2 Tape Utility

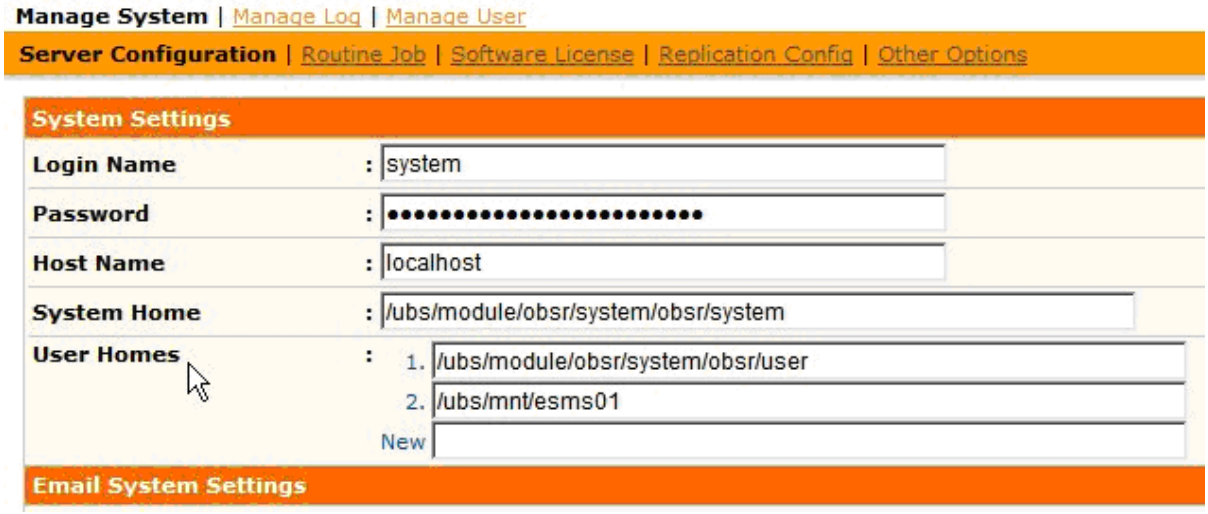
8.5.2.1 Introduction

The AhsayUBS administrator may backup selected user accounts to tape cartridge while the backup server remains online. The AhsayOBS user account data can be restored to the AhsayUBS server either to the original or an alternate location. The tape backup/restore operation is managed from the AhsayUBS webadmin console.

8.5.2.1.1 'User Home' setting in the Backup Server

AhsayOBS stores all user accounts under the 'User Home' directories. When a new user account is being created, AhsayOBS will create a directory with the user's login name under the assigned 'User Home' path. The created user directory is used for storing user configuration and backup files. The list of user names can also be found from the AhsayOBS WebAdmin.

The 'User Home'(s) setting can be viewed from the AhsayOBS WebAdmin [Server Configuration] page:



8.5.2.1.2 Tape Device and Tape Standards

FreeBSD provides full support for SCSI-I, SCSI-II and SCSI-III tape drives. As AhsayUBS is built on top of the FreeBSD operating system, SCSI tape drives are therefore supported. The 'sa – SCSI Sequential Access device drive' will be used for accessing the tape device.

Note: Tape libraries and tape changers are NOT supported by AhsayUBS.

The following tape drive standards are supported by FreeBSD. Each tape standard has its own maximum data capacity and transfer rate. For each hardware type and supported tape standard, the cost of the tape drive and tape cartridge varies.

I. DAT - Digital Audio Tape (format: DDS - Digital Data Storage)
II. DLT - Digital Linear Tape (halted development since 2007)
III. LTO - Linear Tape Open

Tape Format	Release Date	Tape Drive Type	Media Type (R/W)	Native Capacity (GB)	Transfer Rate (MB/s)
DAT (DDS)	2007	DAT 160	DAT 160	80	6.9
	2009	DAT 320	DAT 320	160	12
DLT – value	2001	DLT VS80	DLT IV	40	3

line	2003	DLT VS160	VS1	80	8
	2005	DLT-V4	VS1	150-160	9-11
DLT – performance line	2002	SDLT 320	SDLT I	160	16
	2004	SDLT 600	SDLT II	300	36
	2006	DLT-S4	S4	800	60
LTO	2000	LTO-1	LTO-1	100	20
	2003	LTO-2	LTO-2, LTO-1	200	40
	2005	LTO-3	LTO-3, LTO-2	400	80
	2007	LTO-4	LTO-3, LTO-4	800	120
	2010	LTO-5	LTO-5, LTO-4	1500	140

Before purchasing a tape drive, please consult your hardware vendor to confirm compatibility of the device with the FreeBSD operating system.

The following factors should also be considered:

i. Compatible hardware interfaces with the AhsayUBS machine for connecting tape drive.
ii. Tape cartridge capacity for storing user data.
iii. Tape transfer rate.

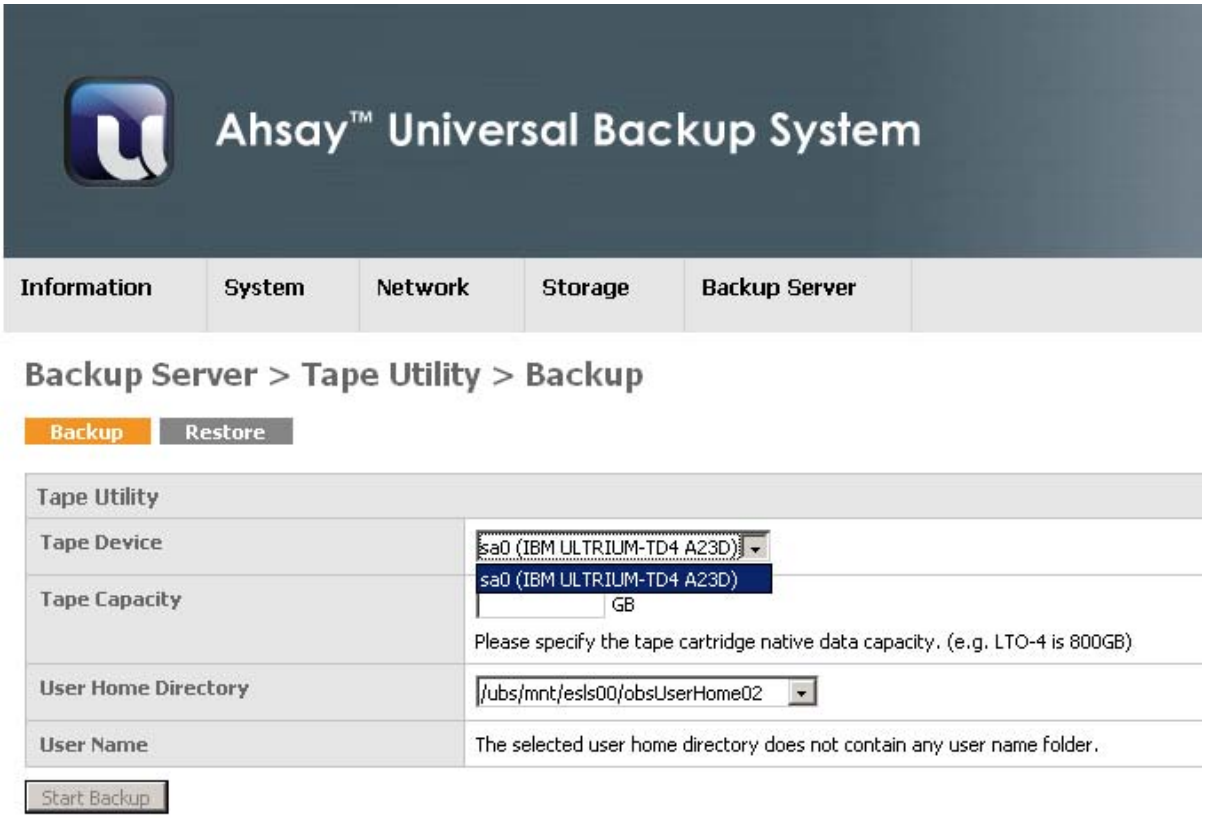
Note: Tape backup/restore on AhsayUBS has been developed and tested using a DELL PowerVault LTO-4 tape drive, connected to a DELL 6GB HBA SAS controller using 800GB LTO-4 tape cartridges.

8.5.2.1.3 Tape Backup/Restore Process via the AhsayUBS WebAdmin

An AhsayUBS administrator may backup/restore user home data to/from tape cartridges via the AhsayUBS webadmin console [Backup Server] > [Tape Utility] menu option.

Before using the [Tape Utility] option, the tape device must be:

1. Connected with the AhsayUBS server.
2. The tape device must be powered on.
3. AhsayUBS must be able to detect the tape hardware. The identified tape device will be shown in the [Backup Server] > [Tape Utility] > [Tape Device] (As shown in the following example).



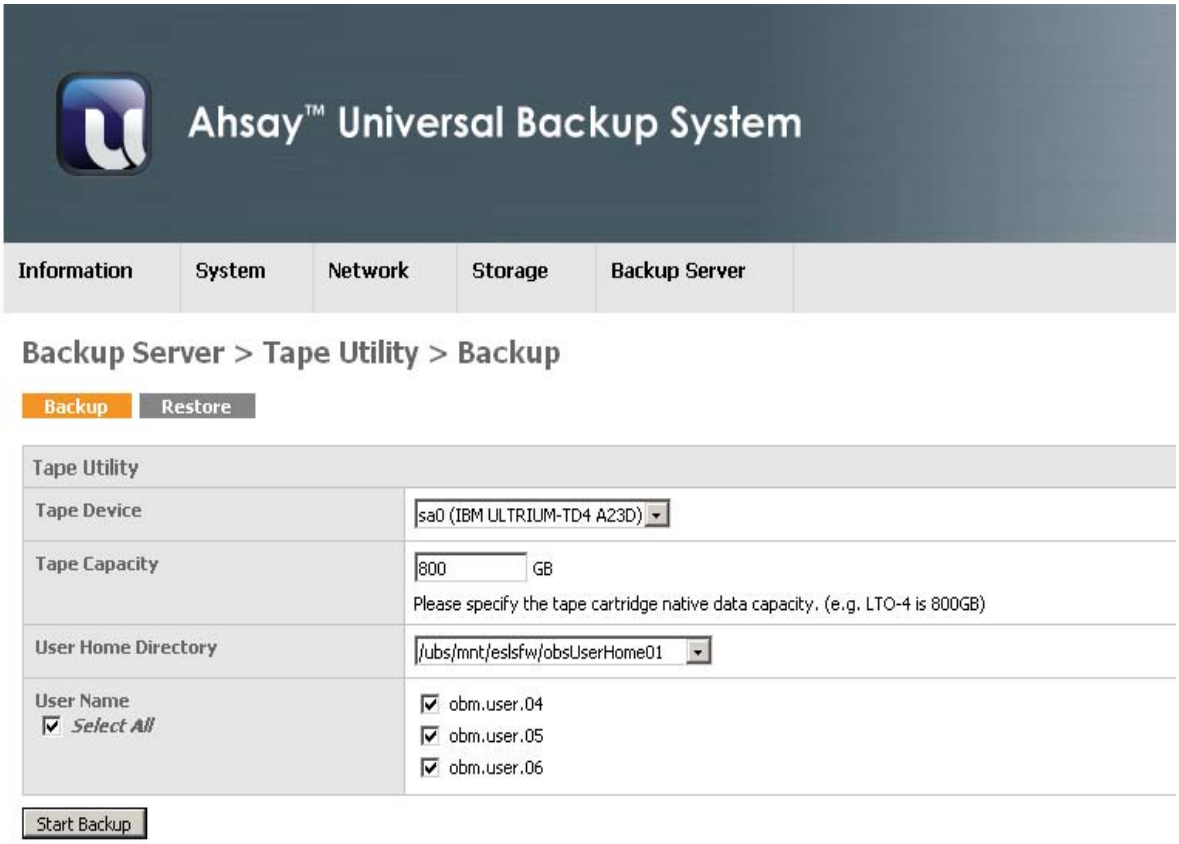
In most cases, a single tape cartridge will not be sufficient to store all the data on a user home volume. During a backup operation if the current tape cartridge is full, AhsayUBS will prompt for a new tape cartridge to be inserted into the tape drive. For tape restore operations if the data spans more than one tape cartridge, AhsayUBS will prompt for the insertion of the next tape cartridge.

If a tape device is not supported or no tape drive is installed on the AhsayUBS machine, the AhsayUBS webadmin [Backup Server] > [Tape Utility] menu option will be disabled, the following message **"The system cannot find any supported tape device."** (As shown in the following example).

Notes:

1. Tape cartridges must be managed, handled, and stored properly. Proper care by trained staff is important to prevent inadvertent errors and media damage.
2. Only ONE tape backup/restore process can be started at a time.
3. Only ONE tape cartridge can be used for tape backup/restore process at a time.Therefore, manual tape cartridge replacement is required when the current tape cartridge full.
4. Only ONE AhsayOBS 'User Home' path can be selected for backup at a time.
5. Only CONSECUTIVE tape cartridge can be used for restore.
6. Any corrupted or damaged intermediate tape cartridge(s) will result in the failure of the entire tape restore process.
7. The AhsayOBS service MUST BE stopped prior to a tape restore, if restoring to an existing AhsayOBS 'User Home' path.

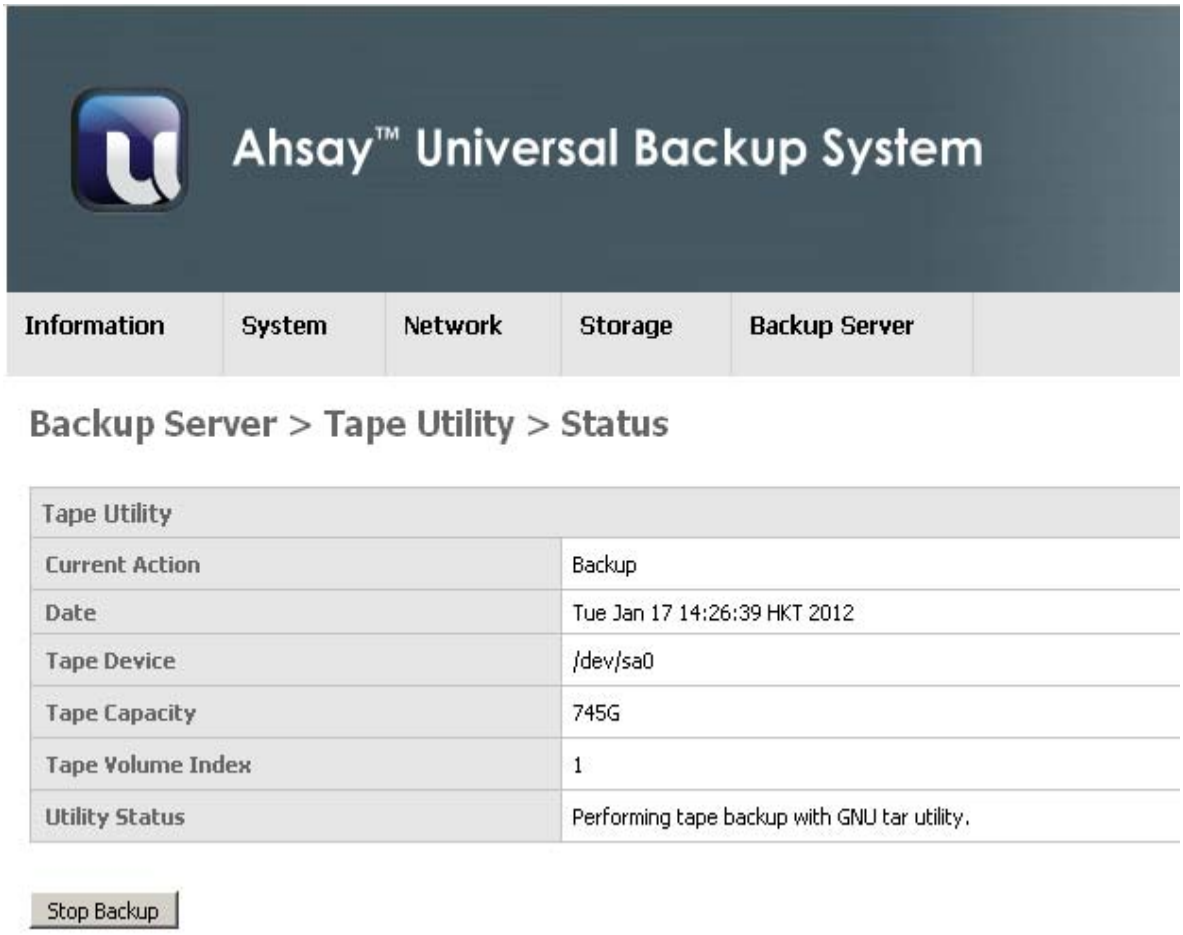
8.5.2.1.4 Tape Backup Process



(Example: tape backup using 800GB LTO-4 tape cartridge)

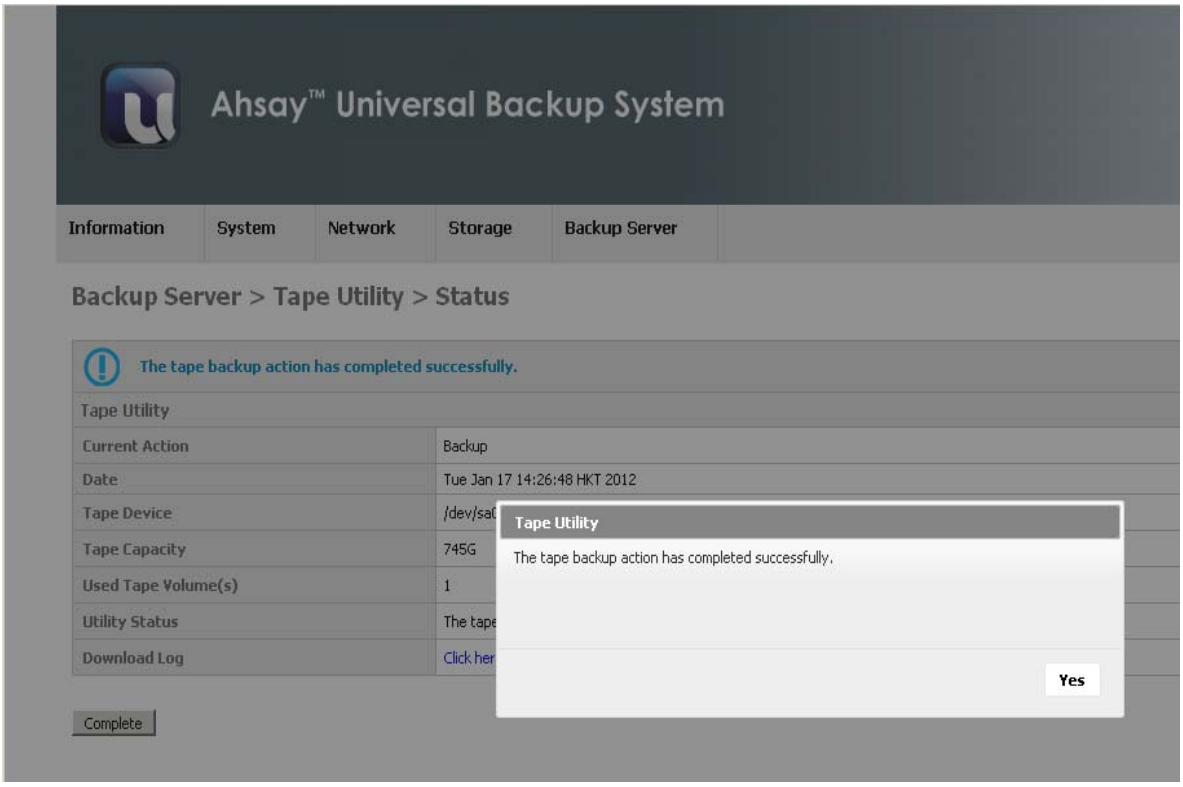
WARNING: All the data on the tape cartridge(s) will be erased after the tape backup process is started.

1. Login to the AhsayUBS webadmin console.
2. Go to the [Backup Server] > [Tape Utility] > [Backup] page.
3. Select the [Tape Device] to be used for the tape backup process.
4. Insert a new tape cartridge to the tape device.
5. Enter the tape cartridge capacity in GB. (As stated on the tape cartridge) The tape cartridge capacity is used for marking the end of a volume.
6. Select an AhsayOBS user home path from the drop down list.
7. Choose AhsayOBS user names selectively or select all AhsayOBS user names for backup.
8. Click the [Start Backup] button to start the tape backup process. When the tape backup process is started, you will be redirected to the [Backup Server] > [Tape Utility] > [Status] page.

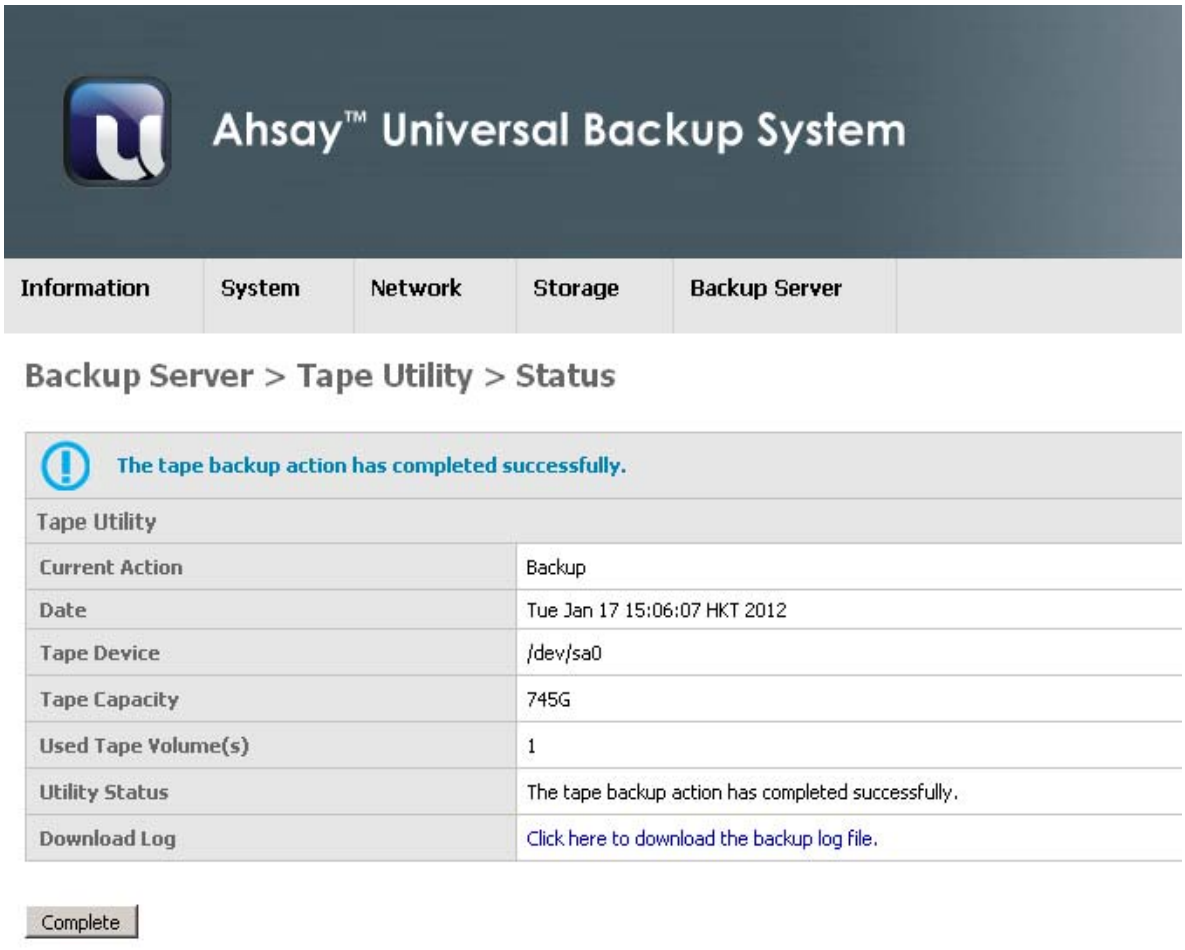


Note: A tape backup job can be stopped at anytime by pressing the [Stop Backup] button.

9. The tape backup process can be monitored from the [Backup Server] > [Tape Utility] > [Status] page.
10. When the backup tape cartridge reaches its volume size limit, a [Continue] button will be shown in the [Backup Server] > [Tape Utility] > [Status] page.
11. Eject the existing tape cartridge from the AhsayUBS server and insert a new tape cartridge.
12. Click the [Continue] button on the [Backup Server] > [Tape Utility] > [Status] page.
13. The tape backup process will continue if there are no errors after the new tape cartridge is inserted.The tape backup process will not continue if an already used tape is inserted.
14. Repeat step 9 – 13.



15. When the tape backup process is either completed. Press the "Yes" button to continue.



16. Download the log files from Tape Utility status page (if required)
17. Click the [Complete] button to start another Tape Backup/Restore Process.

Note: After pressing the [Complete] button the tape backup/restore logs will be cleared.

8.5.2.1.5 Tape Restore Process

WARNING:

1. The data in the restore path will be erased or replaced by the data in the tape cartridge(s). Please ensure that the data in the restored directory path can be overwritten.
2. Before proceeding with a tape restore to "User Home Directory", it is strongly recommended to stop the AhsayOBS service.

1. Login to the AhsayUBS webadmin console.
2. Go to the page [Backup Server] > [Tape Utility] > [Restore].
3. Select the [Tape Device] to be used for the tape restore process.
4. Insert the first volume of the tape cartridge restore set into the tape device.

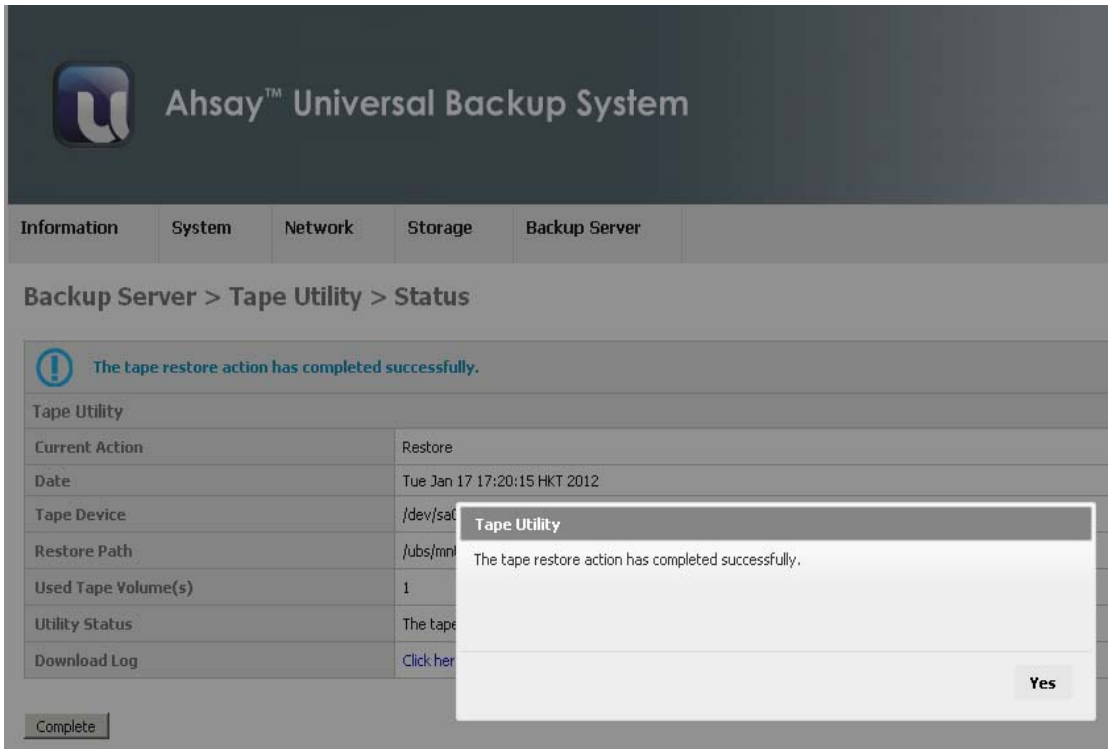
5. Select an AhsayOBS user home path from the drop down list or input an alternative restore path.
6. If you want to clean up the restore path, check the 'Remove the directory contents before restore' checkbox. **Use with caution**.
7. Click the [Start Restore] button to start the tape restore process. When the tape restore process is started, you will be redirected to the [Backup Server] > [Tape Utility] > [Status] page.

Note: If the AhsayOBS service is still running and restore to "User Home Directory" option is selected. The AhsayOBS service will be stopped before the restore process is initiated. During this stage the [Backup Server] > [Tape Utility] > [Status] will be "Stopping backup server". After the tape restore has completed the AhsayOBS service will be automatically restarted again.

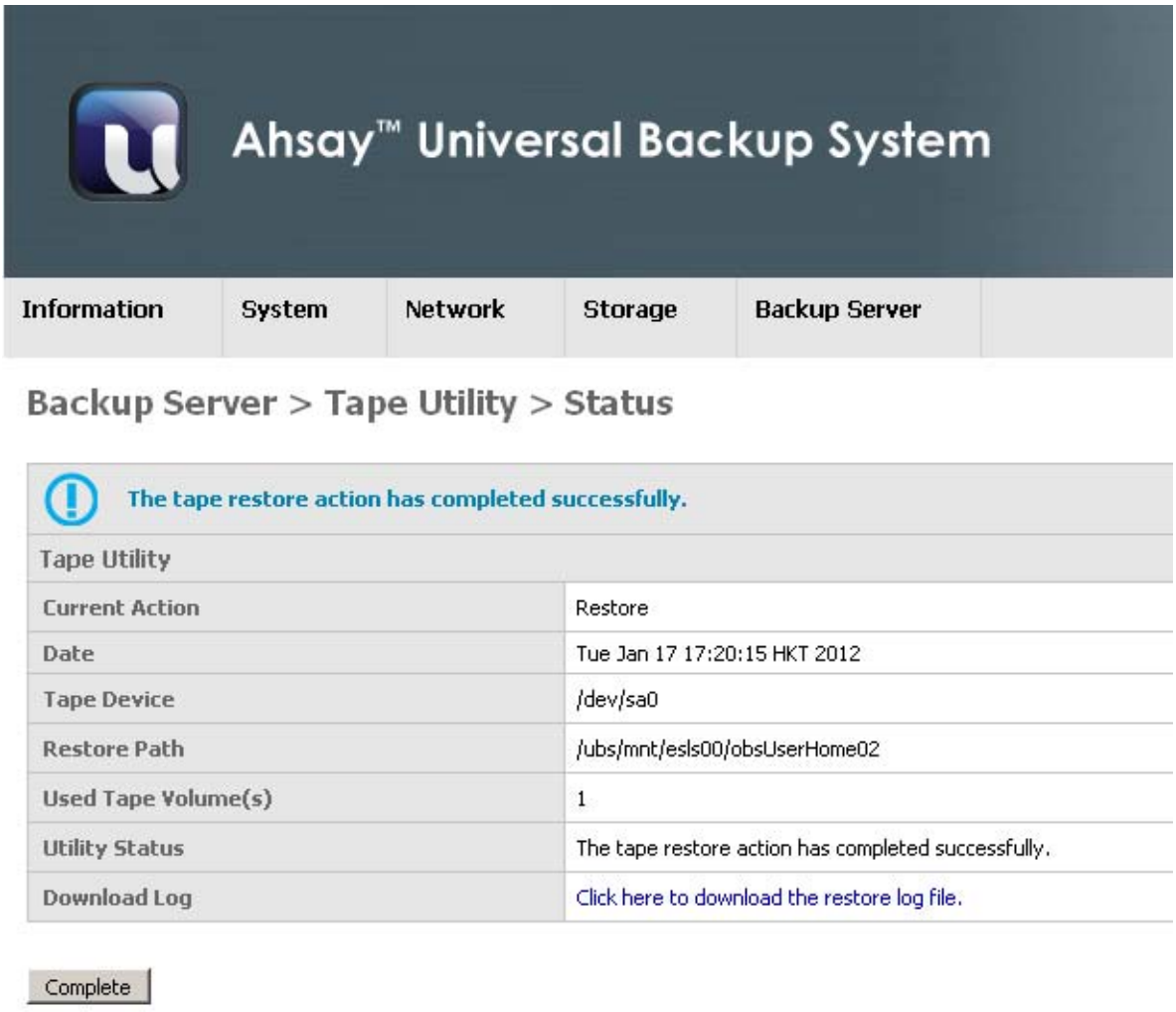
Note: A tape restore job can be stopped at anytime by pressing the [Stop Restore] button.

8. The tape restore process can be monitored from the [Backup Server] > [Tape Utility] > [Status] page.
9. When the restore operation on current tape cartridge is completed, a [Continue] button will be shown in the [Backup Server] > [Tape Utility] > [Status] page.
10. Eject the existing tape cartridge and insert the next tape cartridge into the tape device.

11. Click the [Continue] button in the [Backup Server] > [Tape Utility] > [Status] page.
12. The tape restore process will continue if there are no errors after the next tape cartridge is inserted. The tape testore process will not continue if an incorrect tape cartridge is inserted.
13. Repeat step 8 – 12.



14. When a tape restore process is completed. Press the "Yes" button to continue.

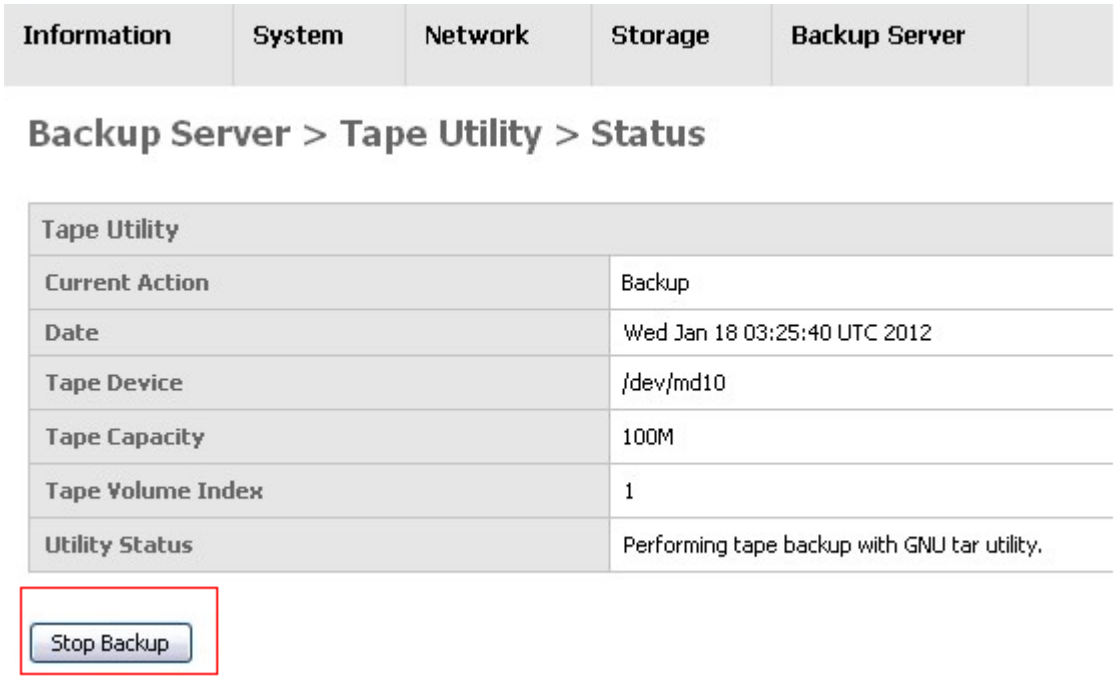


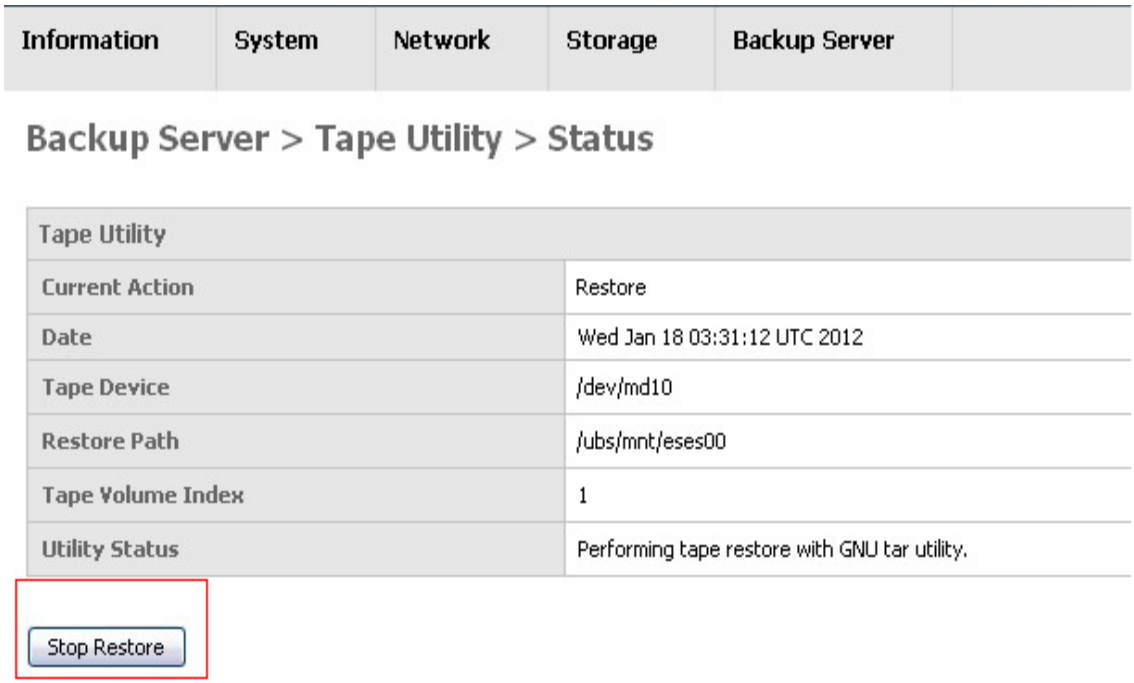
15. Download the log files from the Tape Utility status page (if required).
16. Click the [Complete] button to start another Tape Backup / Restore Process.

Note: After pressing the [Complete] button the tape backup/restore logs will be cleared.

8.5.2.1.6 Stopping Tape Backup/Restore Job

The tape backup/bestore process can be terminated at any time by pressing the [Stop Backup] or [Stop Restore] button at the bottom left corner on the AhsayUBS weadmin console [Backup Server] > [Tape Utility] > [Status] page.

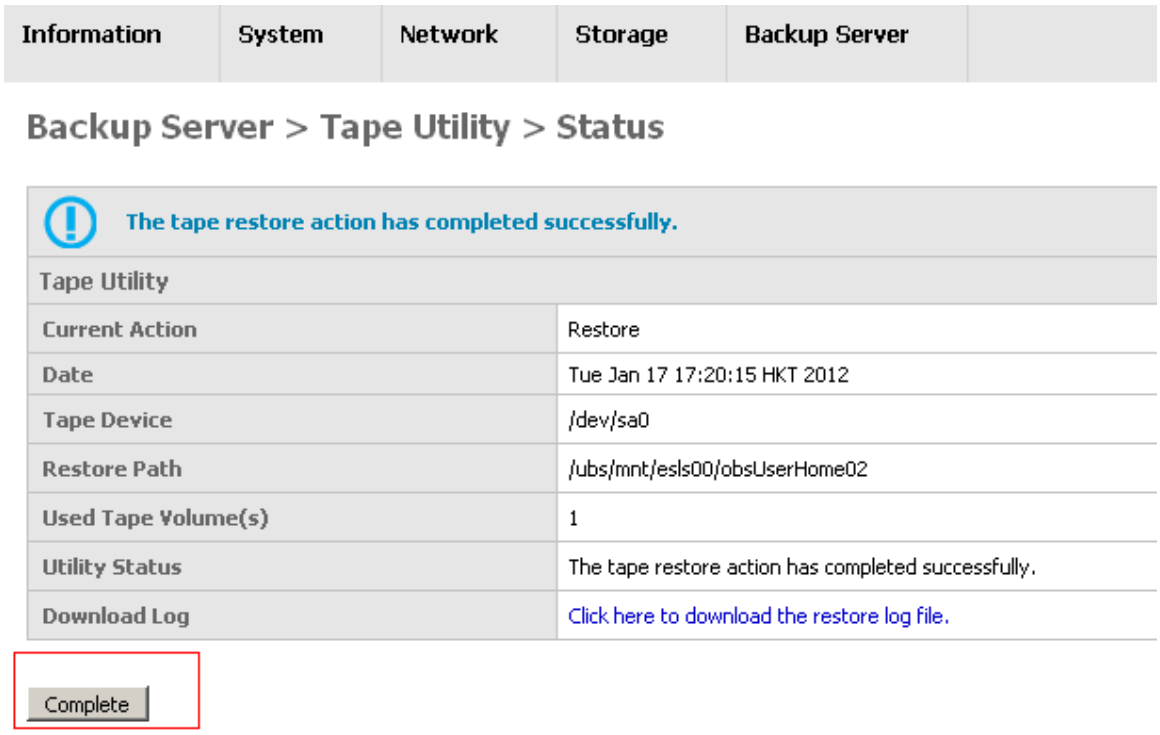




8.5.2.1.7 Start another Tape Backup/Restore Process

When the tape backup/restore job is completed successfully or if the job is terminated unexpectedly, a [Complete] button will be shown at the bottom

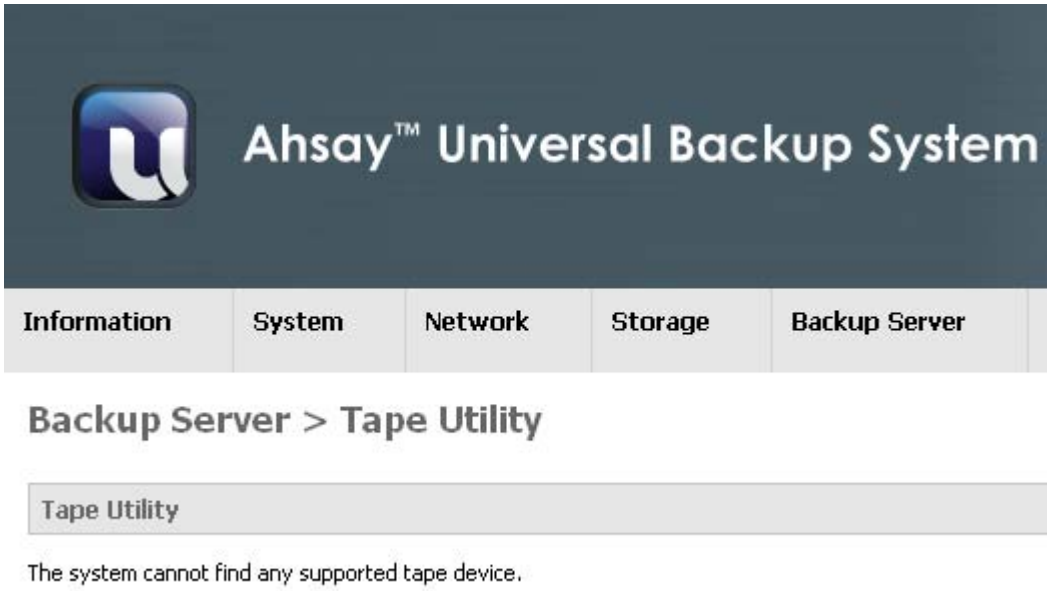
left corner on the [Backup Server] > [Tape Utility] > [Status] page. The [Complete] button must be pressed in order to start another tape backup/restore Process.



Note: Once the [Complete] button is pressed the last tape backup/restore log files will be cleared.

8.5.2.1.8 Unsupported Tape Drive

If AhsayUBS cannot detect any tape device, i.e. the connected tape device is not shown on the [Backup Server] > [Tape Utility] backup/restore page.



Please check if the:

1. Tape device controller card is working properly.
2. Tape device is connected to the AhsayUBS hardware interface properly.
3. Tape device is powered on after it is connected to the AhsayUBS machine.

In addition, you can verify if the tape device is detected by FreeBSD.

1. Login to AhsayUBS using SSH.
2. Enter the command "camcontrol devlist". It should return the following results:

<TAPE_DRIVE_DEV_NAME> at scbus0 target 0 lun 0 (pass0,da0)

If a supported tape drive is connected to an AhsayUBS machine and powered on, a device name "sa*" will exist in the device path "/dev". The default device path for a tape device is '"dev/sa0", if the command "ls –la /dev/sa0" is entered the device will be listed.

If an installed tape device is not shown in the [Backup Server] > [Tape Utility] page and cannot be located via SSH on FreeBSD, then it may not be a supported tape device. Please contact your hardware vendor for further assistance.

8.5.2.1.9 Tape Cartridge Failure

If the tape cartridge spins continuously and never comes to a stop, the tape cartridge maybe damaged or inserted incorrectly. The tape cartridge should be ejected in order to prevent further damage to the tape device.

To eject the tape cartridge, use the eject button on the tape device. If it does not work, the tape cartridge can be ejected by via commandline using ssh. The following are the steps to issue the force eject command:

1. Login the AhsayUBS server via SSH.
2. Type the following command to eject the tape cartridge:

 # mt -f "/dev/${TAPE_DEV_NAME}" offline

If AhsayUBS is undergoing a:

i. Multiple volume tape backup process, it can be continued by replacing with the existing cartridge with a new one. After that, you may click the [Continue] button to continue the tape backup process.

ii. Multiple volume tape restore process, the tape cartridge failure may indicate the break down of restore cartridge chain. It is advised to terminate the tape restore process and seek support from the tape maintenance staff.

8.6 AhsayUBS Firmware Management Console

(For advanced users ONLY)

You can directly access the AhsayUBS the firmware management console by connecting your AhsayUBS server to a monitor and keyboard.

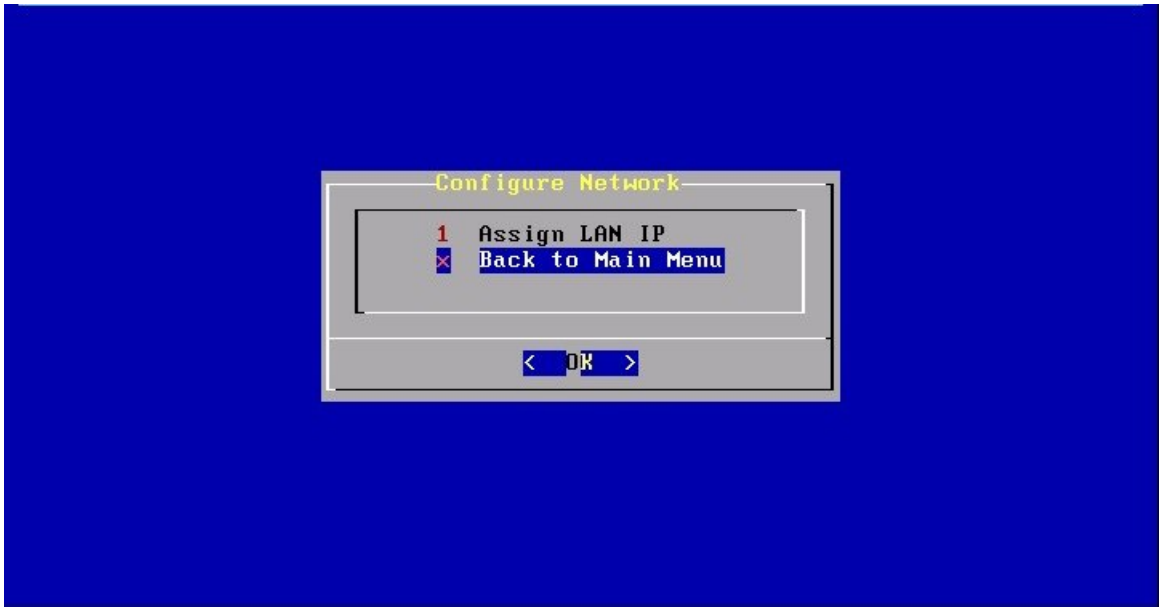
Press [Space] bar or [Shift] key to bypass the following splash screen.

The AhsayUBS Management Console menu:

Note:
1. Always press [Esc] to back to the main menu when the data is mistakenly entered.

8.6.1 Configure Network

After choosing this option, the following screen will appear. It will assign IP address to your AhsayUBS LAN network interface. You can set the network either with DHCP or a static IP address.



8.6.1.1 DHCP

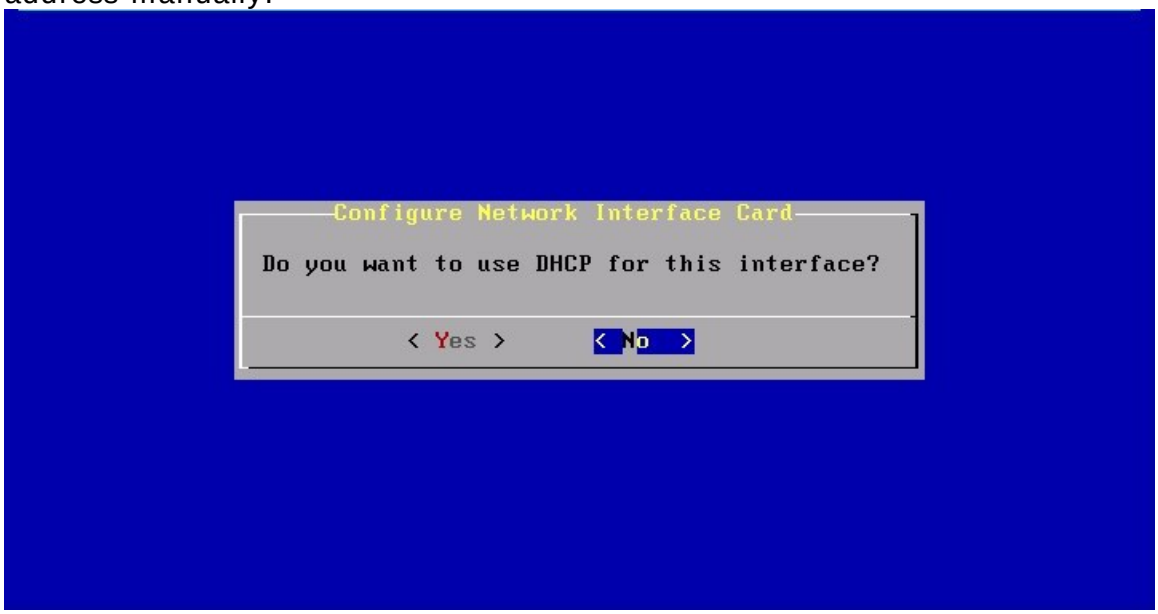
To use [DHCP], choose [Yes]. Then the system will automatically determine the network information (IPv4 address, subnet, gateway and DNS server)

itself. It will then display the IP address and the AhsayUBS WebAdmin's URL in the console. You can now use the IP address "http://{SERVER_IP_ADDRESS}:8080" to access the AhsayUBS WebAdmin in the browser.

Finally, choose [OK] to back to the main menu.

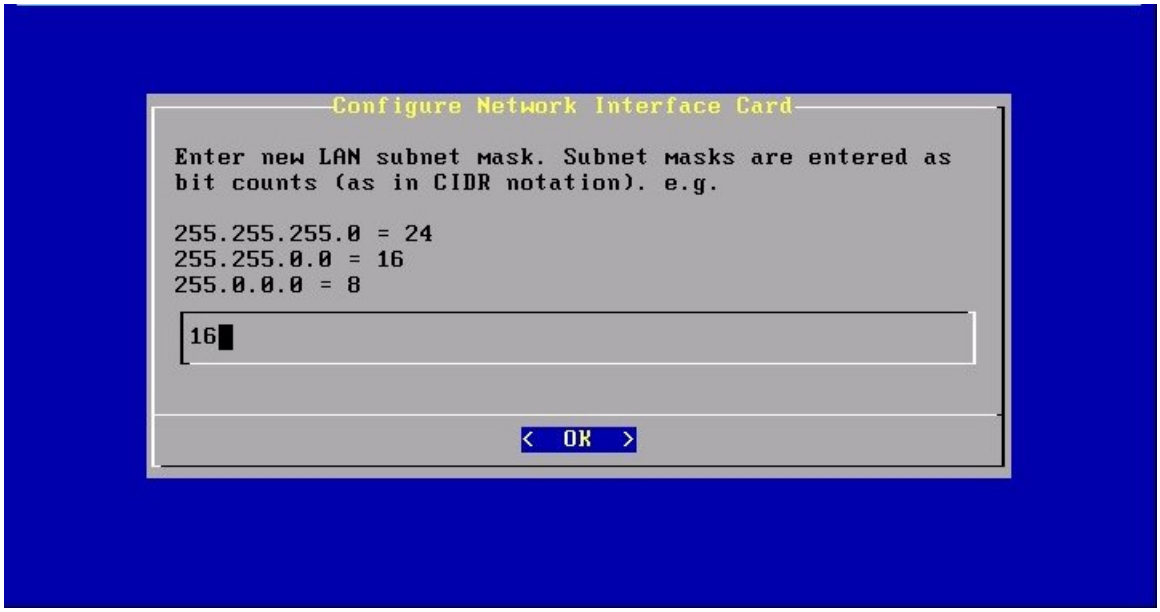
8.6.1.2 Static IP

A [Static IP] can be assigned for the AhsayUBS. Choose [No] to set the IP address manually.



Enter an IPv4 address for this AhsayUBS. Choose [OK] to continue.

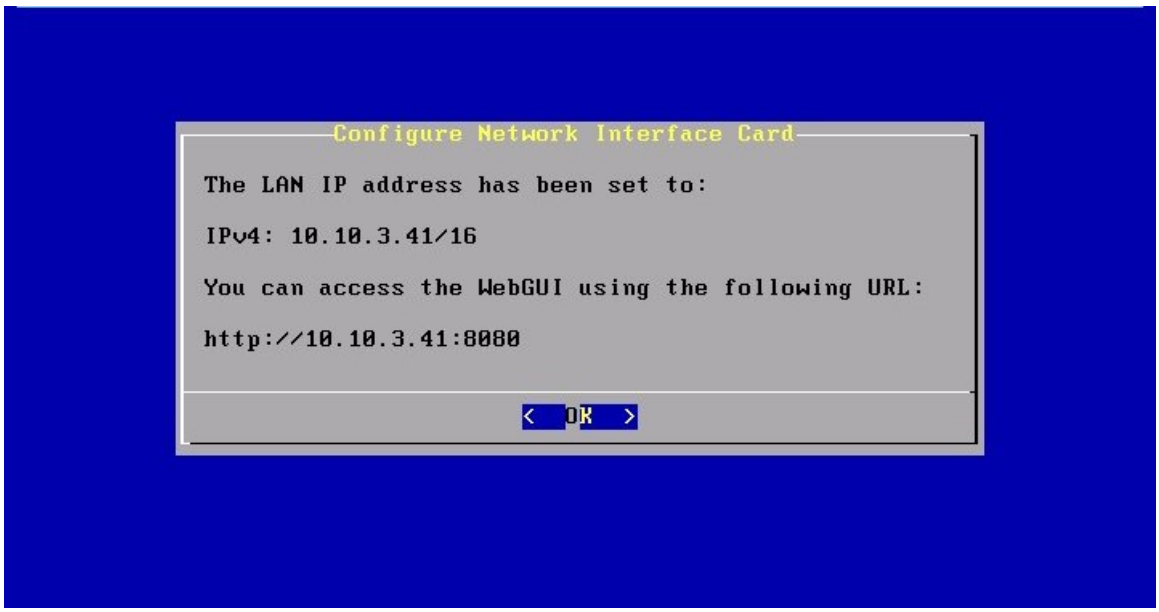
Enter the subnet for this IP Address. Choose [OK] to continue.



Enter the gateway for outgoing packet. Choose [OK] to continue.

Enter the DNS address and choose [OK] to continue.

After that, the below screen will be shown. Now you can access the AhsayUBS WebAdmin by the URL shown on the screen (i.e. http://10.10.3.41:8080 in this example) for continue other configurations.



8.6.2 Reset AhsayUBS to Factory Defaults

Here is another way for you to reset the AhsayUBS to factory default.

After you choose this option, a confirming dialog will be shown as below. Choose [Yes] to reset the AhsayUBS to factory defaults. Choose [No] to cancel the operation.

Note:

1. The data on the block devices will NOT be erased after AhsayUBS is reset to factory defaults.

2. You can restore the previous settings in AhsayUBS WebAdmin in the page [System] > [Backup/Restore]. Please refer to the section [System] > [Backup/Restore] for details.

3. After resetting AhsayUBS to factory defaults, all iSCSI sessions will be removed in the [Storage] > [iSCSI] page. The status of Expandable Storage will change to "Missing". The Expandable Storage can be re-configured for use by AhsayUBS:

i. Adding it back the iSCSI session inside the [Storage] > [iSCSI] page.

ii. Import the Expandable Storage. Note that the data in the Expandable Storage will not be erased after "factory defaults". For details, please refer to the [Storage] section.

8.6.3 Shutdown System

Choose this option for shutting down the AhsayUBS.

Note: You can also shutdown your AhsayUBS inside the AhsayUBS WebAdmin. For more information, please refer to Chapter 8.2.5 in this document.

On the below screen, choose [Yes] to reboot the system. Choose [No] to exit and cancel the request.

WARNING:

Please make sure the system is safe for reboot before clicking the [Yes] button. Otherwise, the backup job could be interrupted if the backup server is in use.

8.6.4 Reboot System

Choose this option for reboot the AhsayUBS.

Note: You can also reboot your AhsayUBS in the AhsayUBS WebAdmin. For more information, please refer to Chapter 7.2.4.

On the below screen, choose [Yes] to reboot the system and choose [No] to abort the request.

WARNING:

Please make sure the system is safe for reboot before clicking the [Yes] button. Otherwise, the backup job could be interrupted if the backup server is in use.

8.6.5 Customizing AhsayUBS

Customization of the AhsayUBS is separated into two sections:

1. Customization of AhsayOBS & AhsayRPS.
2. Customization of the AhsayUBS Firmware.

8.7 Customization of the AhsayOBS & AhsayRPS

For the customization of the AhsayOBS & AhsayRPS, please refer to the Ahsay Customization Portal User Guide.

8.8 Customization of AhsayUBS Firmware

AhsayUBS Firmware provides two user interfaces:
1. WebAdmin
2. System Management Console

The firmware customization includes the following categories:

General:
1. the product and vendor detail
2. the installer system configuration
3. the factory default system configuration

System Management Console:
1. dialog color
2. console splash screen image

WebAdmin:
1. images
2. content pages

Important: All the files should be edited by a UNIX-format supported text editor (e.g. Notepad++). Otherwise, the configuration files may contain unsupported characters and the AhsayUBS may fail to startup properly.

The full file paths of the corresponding customizable files are listed below:

General	
Text:	/ubs/factorycustomer.ini
Deployment Configuration	/ubs/factory/config.xml
Factory Default Configuration	/ubs/factory/config.xml
System Management Console	
Dialog Color Customization	/root/.dialogrc
Console Splash Screen Image	/boot/splash.bmp
WebAdmin	
Images	/usr/local/www/image/*.*
Content Pages	/usr/local/www/info_firmware_about.php /usr/local/www/info_help.php

Ahsay Customization Portal (ACP) now supports the customization of AhsayUBS firmware. ACP will build the AhsayUBS installers in both ISO and IMG formats. The steps are shown in the following:

1. Login ACP.
2. Customize the AhsayUBS WebAdmin language properties inside the Group "Universal Backup System Firmware". The branding information is

also needed to be customized. Please customize the AhsayACB / AhsayOBM / AhsayOBS & AhsayRPS language properties since the AhsayUBS installer will include these products.

3. Upload the customized files to ACP. All of the AhsayUBS Firmware contents will be placed in the directory "custom-ubs".
4. Select the format of the AhsayUBS installer to be built in the table (ISO / IMG format).
5. Click the "Build" button to start building the AhsayUBS installers.

Please refer to the Ahsay Customization Portal User's Guide for more information of how to use ACP.

8.8.1 Customizing General Section

8.8.1.1 Text in custom.ini

The file stores the branding information of AhsayUBS which is located in the directory "/ubs/factory".

The data in the file can be edited in the properties inside the Group "Branding Information" in ACP.

Properties in "custom.ini" file	ACP Language Property	Description
Custom Application Properties		
ubs.product.version	* Remarks: It will be auto-generated by the build engine.	The product version number
ubs.product.revision		The product revision number.
ubs.product.buildtime		The build time of the installer image.
Custom Partner Properties		
ubs.product.name.full	%UBS_FULL_NAME_SYSTEM% (English Only)	The product full name.
ubs.product.name.acronym	%UBS_SHORT_NAME_SYSTEM% (English Only) Note: The space inside the string is trimmed before use.	The product name acronym.
ubs.product.comment	%UBS_COMMENTS_SYSTEM% (English Only)	The detail description of the product
ubs.product.copyright	%UBS_COPYRIGHT%	The product copyright

		string.
ubs.vendor.name	%COMPANY_NAME_SYSTEM% (English Only)	The vendor name.
ubs.vendor.email	%SUPPORT_EMAIL%	The vendor email.
ubs.vendor.url	%COMPANY_URL%	The vendor URL address.

Note that the product copyright string pattern "Copyright (C)" will be replace as '©' symbol in WebAdmin. The file "custom.ini" will be prepared by ACP. If the file is uploaded to ACP, the file will be replaced by ACP. So, it is better to edit the above properties inside ACP.

8.8.1.2 Installer System Configuration File

The XML config file "/ubs/deploy/config/xml" is used as the system configuration for the install runtime. All system services are disabled by default. PLEASE DO NOT EDIT UNSPECIFIED ITEMS OTHER THAN THOSE STATED BELOW.

XML Tag	Default Value	Description
<hostname>	ahsayubs	Default system hostname.
<domain>	local	Default system domain name.
<password>	ahsayubs	Default admin login password.
<timezone>	Etc/UTC	Default system timezone. *1
<motd>	QWhzYXkgVW5pdmVyc2Fs1	Default base64 encoded motd

*1 Please refer to Appendix F for the list of available timezones.

Please download the file for customization in the directory [Home > custom-ubs > app > ubs > deploy] inside ACP. Upload it to the directory after customization.

8.8.1.3 Factory default System Configuration File

The XML config file "ubs/factory/config.xml" is used for configuring the AhsayUBS firmware's WebAdmin. The following system settings are customizable:

XML Tag	Default Value	Description
<language>	en	Default WebAdmin language. *1
<username>	admin	Login name to the AhsayUBS WebAdmin and SSH.
<password>	ahsayubs	Default admin login password.
<motd>	QWhzYXkgVW5pdmVyc2FsIEJhY2t1cCBTeXN0ZW0NCg0K	Default base64 encoded motd message. *2
<hostname>	ahsayubs	Default system hostname
<domain>	Local	Default system domain name.
<timezone>	Etc/UTC	Default system timezone. *3
<webgui> <port> </port> <webgui>	8080	Default WebAdmin port. *4
<webgui> <protocol> </protocol> </webgui>	http	Default WebAdmin protocol. *5
<sysctl></sysctl>	[multiple values defined in the XML]	Default entries for the "/etc/sysctl.conf. *6

Notes:

1. Please refer to Appendix D for the list of available languages.
2. Please refer to Appendix E for more information about the base64 encoding.
3. Please refer to Appendix F for the list of available timezones.
4. The port number used must be between "1024-65536".
5. If "https" is used for the WebAdmin protocol, the following tags will become effective.
   <webgui><certificate></certificate></webgui>
   <webgui><privatekey></privatekey></webgui>

6. For more information, please refer to Appendix H.

8.8.2 Customizing System Management Console

8.8.2.1 Shell Dialog Color Customization

The dialog color in the system management console can be customized. In general, colors "black / blue / cyan / magenta / green / red / white / yellow" can be used. For details, please refer to the FreeBSD documentation about the command "cdialog".

Before Customization, the layout of the system management console is:

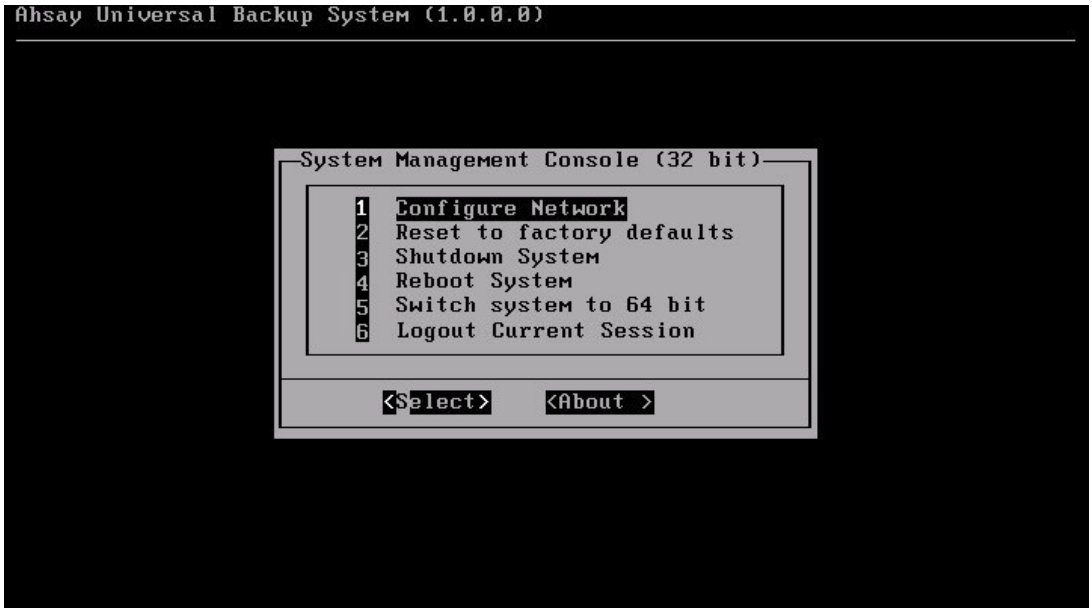
In order to generate your customized dialog color setting, you may generate a template file for customization with the following command:

```
Cdialog –create-rc <filename>
```

<filename> is the filename of the template file.

Edit the generated template file. After the file is edited, backup the original "/root/.dialogrc" as "/root/.dialogrc.bak". Rename the template file as "/root/.dialogrc". To review the customization effect, run the command "/ubs/bin/console.sh" inside the shell.

Example after customization:



Please download the ".dialogrc" file for customization in the directory [Home > custom-ubs > app > ubs > console] inside ACP. Upload it to the directory after customization.

8.8.2.2 Console Splash Screen Image Customization

A Splash Screen will be shown when the AhsayUBS console is idle. The files should be in:

i. bitmap format with 1024px x 768px, 8pp (256 color) for 32-bit machine.
ii. bitmap format with 320px x 200px, 8pp (256 color) for 64-bit machine.

The following is the default splash screen shown in the console screen:

Please rename the files:

i. 32-bit machine splash screen file to "splash_1024x768.bmp"
ii. 64-bit machine splash screen file to "splash_320x200.bmp"

Then upload the files to the directory [Home > custom-ubs > intaller > splash] on ACP after customization.

8.8.3 Customizing WebAdmin

8.8.3.1 Customizing Webadmin Images

All WebAdmin images files are stored in "/ubs/webadmin/www/images". The following are the dimension and description of the customizable images files.

Filename	Dimensions (Width x Height)	Description
bar_begin.png	2px x 15px	Start of the percentage bar inside the contents of [CPU usage], [Memory usage], [Swap usage] and [Disk space usage] in the page [Information] > [System Status]
bar_close.png	2px x 15px	End of the percentage bar inside the contents of [CPU usage], [Memory usage], [Swap usage] and [Disk space usage] in the page [Information] > [System Status]
bar_free.png	1px x 15px	Unused state of the percentage bar inside the contents of [CPU usage], [Memory usage], [Swap usage] and [Disk space usage] in the page [Information] > [System Status]
bar_used.png	1px x 15px	Used state of the percentage bar inside the contents of [CPU usage], [Memory usage], [Swap usage] and [Disk space usage] in the page [Information] > [System Status]
favicon.png	41px x 39px	URL icon of the WebAdmin
footer.png	127px x 42px	The vendor logo at the bottom in each of the WebAdmin page.
header_bg.png	2400px x 143px	The title bar background image in each of the Webdmin page.
header_logo.png	524px x 143px	The title bar logo with words in each of the WebAdmin page.

icon_calendar.png	16px x 16px	The calendar icon to choose the [System time] in the WebAdmin page [System] > [Settings] > [General]
icon_create.png	17px x 17px	Add icon for adding each of the entry in the tables.
icon_delete.png	17px x 17px	Confirming delete icon when deleting each of the entry before clicking the [Apply] button.
icon_edit.png	17px x 17px	Icon represents edit action in each of the entries in the table.
icon_remove.png	17px x 17px	Icon represents delete action in each of the entry before clicking the [Apply] button.
login_bg.png	471px x 500px	Background image in the login page.
login_logo.pnt	353px x 140px	The logo with title in the login page.
logout.png	16px x 16px	Logout icon inside the title bar.
msg_alert.png	28px x 28px	The alert message icon inside the alert message box after a config change is done. (The message usually displays in the first line of the tables.)
msg_error.png	28px x 28px	The error message icon inside the alert message box after config change is done. (The message usually displays in the first line of the tables.)
msg_warn.png	28px x 28px	The warning message icon inside the alert message box to alert the WebAdmin user in the first line of the tables.
tab_l.png	3px x 36px	Customization is not supported.
tab_r.png	250px x 36px	
std/disk_status_degraded.png	64px x 64px	Block Device state (Degraded) icon inside the page [Storage] > [Summary].
ind/disk_status_degraded.png	128px x 128px	
std/disk_status_healthy.png	64px x 64px	Block Device state (Healthy) icon inside the page [Storage] > [Summary].
ind/disk_status_healthy.png	128px x 128px	

std/disk_status_missing.png	64px x 64px	Block Device state (Missing) icon inside the page [Storage] > [Summary].
ind/disk_status_missing.png	128px x 128px	
std/disk_status_rebuild.png	64px x 64px	Block Device state (Rebuilding) icon inside the page [Storage] > [Summary].
ind/disk_status_rebuild.png	128px x 128px	
std/volume_size_unknown.png	128px x 96px	Volume pie chart (Missing) inside the page [Storage] > [Summary].
ind/volume_size_unknown.png	240px x 180px	
std/volume_status_critical.png	64px x 64px	Volume state (Critical) icon inside the page [Storage] > [Summary].
ind/volume_status_critical.png	128px x 128px	
std/volume_status_degraded.png	64px x 64px	Volume state (Degraded) icon inside the page [Storage] > [Summary].
ind/volume_status_degraded.png	128px x 128px	
std/volume_status_healthy.png	64px x 64px	Volume state (Healthy) icon inside the page [Storage] > [Summary].
ind/volume_status_healthy.png	128px x 128px	
std/volume_status_rebuild.png	64px x 64px	Volume state (Rebuilding) icon inside the page [Storage] > [Summary].
ind/volume_status_rebuild.png	128px x 128px	
std/volume_step_*.png	128px x 96px	Volume pie chart which showing the available and free space of a volume where '*' equals to 00-20 steps with 5% increment from 0% – 100% inside the page [Storage] > [Summary].
ind/volume_step_*.png	240px x 180px	
volume_add.png	32px x 32px	Add Additional Storage icon inside the page [Storage] > [Summary].
volume_delete.png	48px x 48px	Remove volume icon which placed beyond the left hand side of the volume pie chart after the "Remove Additional Storage icon is clicked in the page [Storage] > [Summary].
volume_remove.png	32px x 32px	Remove Additional Storage icon inside the page [Storage] > [Summary].

Please upload the images to the ACP inside the directory [Home > custom-ubs > app > ubs > webadmin > www > images] after customization.

8.8.3.2 Customizing WebAdmin content pages

The WebAdmin pages will be placed in "/ubs/webadmin/www". The following WebAdmin content pages are customizable:

NOTE: The content in the "info_help.php" page can be customized in the language property "UI_INFO_HELP".

Filename	**Usage**
info_firmware_about.php	This is the page [Information] > [About] as shown in the WebAdmin. It provides firmware detail and license used in the firmware. Partners can customize this page with additional branding information.

Please download the files for customization in the directory [Home > custom-ubs > app > ubs > webadmin > www] inside ACP. Upload them to the directory after customization.

Some of the customizable items inside the WebAdmin pages can be edited as the language properties. Here are the language properties that customize the WebAdmin page:

Filename	Language Property	Usage
info_help.php	UI_INFO_HELP	This is page [Information > Help] as shown in the WebAdmin. It provides help resources to the WebAdmin user. Partners can customize this page with additional help contents.

Please note that only HTML code is supported inside the language property value, no PHP code is allowed.

Appendix

Appendix A – Supported Processors

Ahsay™ Universal Backup System only supports the "i386" and "amd64" processor architecture.

For processor type "amd64", the following processors are supported:
- AMD Athlon™64 ("Clawhammer").
- AMD Opteron™ ("Sledgehammer").
- All multi-core Intel Xeon™ processors except Sossaman have EM64T support.
- The single-core Intel Xeon processors "Nocona", "Irwindale", "Potomac", and "Cranford" have EM64T support.
- All Intel Core 2 (not Core Duo) and later processors
- All Intel Pentium® D processors
- Intel Pentium 4s and Celeron Ds using the "Cedar Mill" core have EM64T support.
- Some Intel Pentium 4s and Celeron Ds using the "Prescott" core have EM64T support. Please read the Intel Processor Spec Finder for the definitive answer about EM64T support in Intel processors.

Note:

AhsayUBS supports a maximum of 32 virtual processor cores. Please refer to Chapter 4.1 Backup System Requirements for details of processor core configuration.

Appendix B - Supported Disk Controllers

For an updated list of supported disk controllers drivers, please refer to the FreeBSD website
http://www.freebsd.org/releases/8.3R/hardware.html#DISK

MegaCli support

'MegaCli' is the Command Line Interface for the MegaRAID SAS family of RAID controllers, used to configure and manage connected storage devices. The 'MegaCli' utility files have been prepared by LSI and should be downloaded from the company's website.

1 Go to the following URL, and accept the license agreement
http://www.lsi.com/downloads/Public/MegaRAID%20Common%20Files/8.02.16_MegaCLI.zip

2 Download and extract the '8.02.16_MegaCLI.zip' to a temp directory. Read '8.02.16_MegaCLI.txt' for supported controllers

3 Browse 'FREEBSD' folder at the temp directory for 'MegaCli' and 'MegaCli64'

4 Login to UBS via SSH

5 Enable write option on UBS mount point '/ubs/mnt/esfmfw'

```
> mount -uw /ubs/mnt/esfmfw
```

6 Create module directories at '/ubs/mnt/esfmfw' . If you are using an i386 processor, you need to create the path with i386, otherwise you need to create the path amd64.

```
For i386
> mkdir -p /ubs/mnt/esfmfw/module/i386/bin

or

For amd64
> mkdir -p /ubs/mnt/esfmfw/module/amd64/bin
```

7 Copy the 'MegaCli' or 'MegaCli64' files to UBS via WinSCP (if you are using Windows PC)

If you are using i386 processors, copy the file MegaCli to the following path

/ubs/mnt/esfmfw/module/i386/bin/MegaCli

If you are using AMD type processors, rename the file MegaCli64 to MegaCli and copy the file MegaCli to the following path

/ubs/mnt/esfmfw/module/amd64/bin/MegaCli

8 Grant execution permission to the files

```
For i386
> chmod 755 /ubs/mnt/esfmfw/module/i386/bin/MegaCli

or

For amd64
> chmod 755 /ubs/mnt/esfmfw/module/amd64/bin/MegaCli
```

Select the correct command according to your CPU type.

9 Test the 'MegaCli' utility by listing the help option

```
For i386
> /ubs/mnt/esfmfw/module/i386/bin/MegaCli  -h -NoLog

or

For amd64
> /ubs/mnt/esfmfw/module/amd64/bin/MegaCli -h -NoLog
```

Select the correct command according to your CPU type.

Note:
For supported LSI products, please download the following document from LSI http://kb.lsi.com/Attachment983.aspx

For the full list of command options, please refere to chapter 5 of the following document http://kb.lsi.com/Attachment902.aspx

Appendix C - Supported Ethernet Interfaces

For an updated list of supported Ethernet interfaces drivers, please refer to the FreeBSD website
http://www.freebsd.org/releases/8.3R/hardware.html#ETHERNET

Appendix D – Platform Hardware Test

Ahsay™ Universal Backup System has been tested installing on the following platform:

Dell PowerEdge R710 Server
Intel(R) Xeon(R) CPU X5570 @ 2.93GHz (8 thread @ 4 core)
Tested Hardware:
Broadcom NetXtreme II BCM5709
Qlogic ISP 2432 PCI FC-AL Adapter
Dell PERC H700 Integrated Controller
Dell Dell USB Keyboard, class 0/0, rev 1.10/3.01, addr 3

Note:

Before installing AhsayUBS v2.3.0.2 or above on a Dell PowerEdge R710 server, it is recommended to check the network card firmware version before deployment. Please verify the network card firmware for the Dell PowerEdge R710 is v6.2.14(A04) or above. As older network card firmware versions may be incompatible with FreeBSD v7.3p6 kernel found in AhsayUBS v2.3.0.2 and could result in system instability.

Dell PowerEdge 1950 Server
Tested Hardware:
Broadcom NetXtreme II BCM5708

Model: Dell PowerEdge 830
CPU: Intel(R) Pentium(R) D CPU 2.80GHz (2800MHz) (2MB L2 Cache)
Tested Hardware:
Dell CERC SATA RAID 2 (PCIe x16 Dell CERC SATA 1.5/6ch Hardware Raid card) (aacdu)
Dell PERC 5/i Controller SAS (PCIe x4 Dell Expandable RAID Controller) (mfi)
Adaptec SATA RAID 2410SA (PCIe x16 Adaptec 2410SA Family Controller) (aacdu)
Adaptec AAR-1220SA (PCIe x1 Adaptec 1220SA Family Controller) (ar)

Appendix E – Supported Languages

List of languages

Value in the "config.xml"	Language
bg	Bulgarian
ca	Catalan
cs	Czech
da	Danish
de	German
el	Greek
en	English
es	Spanish
eu	Basque
fi	Finnish
fr	French
hu	Hungarian
is	Icelandic
it	Italian
iw	Hebrew
ja	Japanese
ko	Korean
lt	Lithuanian
nl	Dutch
no	Norwegian
pl	Polish
pt_BR	Portuguese (Brazil)
pt_PT	Portuguese (Portuguese)
ro	Romanian
ru	Russian
sl	Slovenian
sv	Swedish
th_TH	Thai (Thai Digit)
tr	Turkish
zh_CN	Chinese (Simplified)
zh_TW	Chinese (Traditional)

Appendix F – Message of the Day

"motd" stands for "Message of the Day". It is the message displayed just before login in the shell. The default value is:

```
Ahsay Universal Backup System
```

After base64 decoding, it will become "QWhxYXkgVW5pdmVyc2FsIEJhY2t1cCBTeXN0ZW0NCg0K". The base64 encoder will preserved the new line character in the message. Therefore, multiple lines can be displayed in the message.

To generate the code and paste it in the XML tag in the config file, please type the motd to the base64 encoder and past the output in the XML tag "<motd>" in the config file.

Appendix G – Supported Timezone

The following is the supported timezone that can be set in <timezone> XML tag.

Africa
Africa/Algiers
Africa/Luanda
Africa/Porto-Novo
Africa/Gaborone
Africa/Ouagadougou
Africa/Bujumbura
Africa/Douala
Africa/Bangui
Africa/Ndjamena
Africa/Kinshasa
Africa/Lubumbashi
Africa/Brazzaville
Africa/Abidjan
Africa/Djibouti
Africa/Cairo
Africa/Malabo
Africa/Asmera
Africa/Addis_Ababa
Africa/Libreville
Africa/Banjul
Africa/Accra
Africa/Conakry
Africa/Bissau
Africa/Nairobi
Africa/Maseru
Africa/Monrovia
Africa/Tripoli
Africa/Blantyre
Africa/Bamako
Africa/Timbuktu
Africa/Nouakchott
Africa/Casablanca
Africa/El_Aaiun
Africa/Maputo
Africa/Windhoek
Africa/Niamey
Africa/Lagos
Africa/Kigali
Africa/Sao_Tome
Africa/Dakar
Africa/Freetown
Africa/Mogadishu
Africa/Johannesburg
Africa/Khartoum
Africa/Mbabane
Africa/Dar_es_Salaam
Africa/Lome
Africa/Tunis
Africa/Kampala
Africa/Lusaka
Africa/Harare
Africa/Ceuta
America
America/Argentina
America/Indiana
America/Kentucky
America/North_Dakota
America/Danmarkshavn
America/Scoresbysund
America/Godthab
America/Thule
America/New_York
America/Chicago
America/Denver
America/Los_Angeles
America/Juneau
America/Yakutat
America/Anchorage
America/Nome
America/Adak
America/Phoenix
America/Boise
America/Indianapolis
America/Louisville
America/Detroit
America/Menominee
America/St_Johns
America/Goose_Bay
America/Halifax
America/Glace_Bay
America/Montreal
America/Toronto
America/Thunder_Bay
America/Nipigon
America/Rainy_River
America/Winnipeg
America/Regina
America/Swift_Current
America/Edmonton
America/Vancouver
America/Dawson_Creek
America/Pangnirtung
America/Iqaluit

America/Rankin_Inlet
America/Cambridge_Bay
America/Yellowknife
America/Inuvik
America/Whitehorse
America/Dawson
America/Cancun
America/Merida
America/Monterrey
America/Mexico_City
America/Chihuahua
America/Hermosillo
America/Mazatlan
America/Tijuana
America/Anguilla
America/Antigua
America/Nassau
America/Barbados
America/Belize
America/Cayman
America/Costa_Rica
America/Havana
America/Dominica
America/Santo_Domingo
America/El_Salvador
America/Grenada
America/Guadeloupe
America/Guatemala
America/Port-au-Prince
America/Tegucigalpa
America/Jamaica
America/Martinique
America/Montserrat
America/Managua
America/Panama
America/Puerto_Rico
America/St_Kitts
America/St_Lucia
America/Miquelon
America/St_Vincent
America/Grand_Turk
America/Tortola
America/St_Thomas
America/Aruba
America/La_Paz
America/Noronha
America/Belem
America/Fortaleza
America/Recife
America/Araguaina
America/Maceio
America/Bahia
America/Sao_Paulo
America/Campo_Grande
America/Cuiaba
America/Porto_Velho
America/Boa_Vista
America/Manaus
America/Eirunepe
America/Rio_Branco
America/Santiago
America/Bogota
America/Curacao
America/Guayaquil
America/Cayenne
America/Guyana
America/Asuncion
America/Lima
America/Paramaribo
America/Port_of_Spain
America/Montevideo
America/Caracas
America/Shiprock
America/North_Dakota/Center
America/Kentucky/Monticello
America/Kentucky/Louisville
America/Indiana/Marengo
America/Indiana/Knox
America/Indiana/Vevay
America/Indiana/Indianapolis
America/Argentina/Buenos_Aires
America/Argentina/Cordoba
America/Argentina/Tucuman
America/Argentina/La_Rioja
America/Argentina/San_Juan
America/Argentina/Jujuy
America/Argentina/Catamarca
America/Argentina/Mendoza
America/Argentina/ComodRivadavia
America/Argentina/Rio_Gallegos
America/Argentina/Ushuaia
Antarctica
Antarctica/Casey
Antarctica/Davis
Antarctica/Mawson
Antarctica/DumontDUrville
Antarctica/Syowa
Antarctica/Vostok
Antarctica/Rothera
Antarctica/Palmer
Antarctica/McMurdo

Antarctica/South_Pole
Arctic
Arctic/Longyearbyen
Asia
Asia/Kabul
Asia/Yerevan
Asia/Baku
Asia/Bahrain
Asia/Dhaka
Asia/Thimphu
Asia/Brunei
Asia/Rangoon
Asia/Phnom_Penh
Asia/Harbin
Asia/Shanghai
Asia/Chongqing
Asia/Urumqi
Asia/Kashgar
Asia/Hong_Kong
Asia/Taipei
Asia/Macau
Asia/Nicosia
Asia/Tbilisi
Asia/Dili
Asia/Calcutta
Asia/Jakarta
Asia/Pontianak
Asia/Makassar
Asia/Jayapura
Asia/Tehran
Asia/Baghdad
Asia/Jerusalem
Asia/Tokyo
Asia/Amman
Asia/Almaty
Asia/Qyzylorda
Asia/Aqtobe
Asia/Aqtau
Asia/Oral
Asia/Bishkek
Asia/Seoul
Asia/Pyongyang
Asia/Kuwait
Asia/Vientiane
Asia/Beirut
Asia/Kuala_Lumpur
Asia/Kuching
Asia/Hovd
Asia/Ulaanbaatar
Asia/Choibalsan
Asia/Katmandu
Asia/Muscat
Asia/Karachi
Asia/Gaza
Asia/Manila
Asia/Qatar
Asia/Riyadh
Asia/Singapore
Asia/Colombo
Asia/Damascus
Asia/Dushanbe
Asia/Bangkok
Asia/Ashgabat
Asia/Dubai
Asia/Samarkand
Asia/Tashkent
Asia/Saigon
Asia/Aden
Asia/Yekaterinburg
Asia/Omsk
Asia/Novosibirsk
Asia/Krasnoyarsk
Asia/Irkutsk
Asia/Yakutsk
Asia/Vladivostok
Asia/Sakhalin
Asia/Magadan
Asia/Kamchatka
Asia/Anadyr
Asia/Istanbul
Atlantic
Atlantic/Cape_Verde
Atlantic/St_Helena
Atlantic/Faeroe
Atlantic/Reykjavik
Atlantic/Azores
Atlantic/Madeira
Atlantic/Canary
Atlantic/Bermuda
Atlantic/Stanley
Atlantic/South_Georgia
Atlantic/Jan_Mayen
Australia
Australia/Darwin
Australia/Perth
Australia/Brisbane
Australia/Lindeman
Australia/Adelaide
Australia/Hobart
Australia/Melbourne
Australia/Sydney
Australia/Broken_Hill

Australia/Lord_Howe
CET
CST6CDT
EET
EST
EST5EDT
Etc
Etc/GMT
Etc/UTC
Etc/UCT
Etc/GMT-14
Etc/GMT-13
Etc/GMT-12
Etc/GMT-11
Etc/GMT-10
Etc/GMT-9
Etc/GMT-8
Etc/GMT-7
Etc/GMT-6
Etc/GMT-5
Etc/GMT-4
Etc/GMT-3
Etc/GMT-2
Etc/GMT-1
Etc/GMT+1
Etc/GMT+2
Etc/GMT+3
Etc/GMT+4
Etc/GMT+5
Etc/GMT+6
Etc/GMT+7
Etc/GMT+8
Etc/GMT+9
Etc/GMT+10
Etc/GMT+11
Etc/GMT+12
Etc/Universal
Etc/Zulu
Etc/Greenwich
Etc/GMT-0
Etc/GMT+0
Etc/GMT0
Europe
Europe/London
Europe/Belfast
Europe/Dublin
Europe/Tirane
Europe/Andorra
Europe/Vienna
Europe/Minsk
Europe/Brussels
Europe/Sofia
Europe/Prague
Europe/Copenhagen
Europe/Tallinn
Europe/Helsinki
Europe/Paris
Europe/Berlin
Europe/Gibraltar
Europe/Athens
Europe/Budapest
Europe/Rome
Europe/Riga
Europe/Vaduz
Europe/Vilnius
Europe/Luxembourg
Europe/Malta
Europe/Chisinau
Europe/Monaco
Europe/Amsterdam
Europe/Oslo
Europe/Warsaw
Europe/Lisbon
Europe/Bucharest
Europe/Kaliningrad
Europe/Moscow
Europe/Samara
Europe/Belgrade
Europe/Madrid
Europe/Stockholm
Europe/Zurich
Europe/Istanbul
Europe/Kiev
Europe/Uzhgorod
Europe/Zaporozhye
Europe/Simferopol
Europe/Nicosia
Europe/Mariehamn
Europe/Vatican
Europe/San_Marino
Europe/Ljubljana
Europe/Sarajevo
Europe/Skopje
Europe/Zagreb
Europe/Bratislava
Factory
GMT
HST
Indian
Indian/Comoro
Indian/Antananarivo
Indian/Mauritius

Indian/Mayotte
Indian/Reunion
Indian/Mahe
Indian/Kerguelen
Indian/Chagos
Indian/Maldives
Indian/Christmas
Indian/Cocos
MET
MST
MST7MDT
PST8PDT
Pacific
Pacific/Rarotonga
Pacific/Fiji
Pacific/Gambier
Pacific/Marquesas
Pacific/Tahiti
Pacific/Guam
Pacific/Tarawa
Pacific/Enderbury
Pacific/Kiritimati
Pacific/Saipan
Pacific/Majuro
Pacific/Kwajalein
Pacific/Yap
Pacific/Truk
Pacific/Ponape
Pacific/Kosrae
Pacific/Nauru
Pacific/Noumea
Pacific/Auckland
Pacific/Chatham
Pacific/Niue
Pacific/Norfolk
Pacific/Palau
Pacific/Port_Moresby
Pacific/Pitcairn
Pacific/Pago_Pago
Pacific/Apia
Pacific/Guadalcanal
Pacific/Fakaofo
Pacific/Tongatapu
Pacific/Palau
Pacific/Port_Moresby
Pacific/Pitcairn
Pacific/Pago_Pago
Pacific/Apia
Pacific/Guadalcanal
Pacific/Fakaofo
Pacific/Tongatapu
Pacific/Funafuti
Pacific/Johnston
Pacific/Midway
Pacific/Wake
Pacific/Efate
Pacific/Wallis
Pacific/Honolulu
Pacific/Easter
Pacific/Galapagos
SystemV
SystemV/AST4ADT
SystemV/EST5EDT
SystemV/CST6CDT
SystemV/MST7MDT
SystemV/PST8PDT
SystemV/YST9YDT
SystemV/AST4
SystemV/EST5
SystemV/CST6
SystemV/MST7
SystemV/PST8
SystemV/YST9
SystemV/HST10
WET

Appendix H – Example of config.xml

The following is one of the default sysctl entries in the factory default config file "/ubs/factory/config.xml".

```
<sysctl>
      <param>
        <enable/>
        <uuid>dc8e537a-34f2-4aa7-afe8-
cd631a52005a</uuid>
        <name>hw.ata.to</name>
        <value>15</value>
        <comment>ATA disk timeout vis-a-vis
power-saving</comment>
      </param>
<sysctl>
```

Where:

XML Tag	Description
<param></param>	start / end tag of an entry
<enable/>	The entry is enabled. If the tag is missing, the entry is disabled.
<uuid></uuid>	The unique id for the WebAdmin. ******
<name></name>	The variable name of the entry
<value></value>	The value of the entry
<comment></comment>	Description of the entry

For the variable name in the "/etc/sysctl.conf", please refer to FreeBSD documentation.

Appendix I – Example of uuid.php

The following is the php script for generating a new uuid. You may save it as the "/root/uuid.php". Run it in the AhsayUBS shell command prompt:

"php/root/uuid.php"

A new uuid will be generated. Copy it and paste it in the "<uuid></uuid>" tag.

```
<?php
  require("util.inc");
  echo uuid()."\n";
?>
```

An example output:

```
X-Powered-By: PHP/5.2.8
Content-type: text/html

e52e9dbb-e772-40a0-9426-d17fd4d17c23
```

Appendix J – Identifying Physical Local Block Devices on AhsayUBS

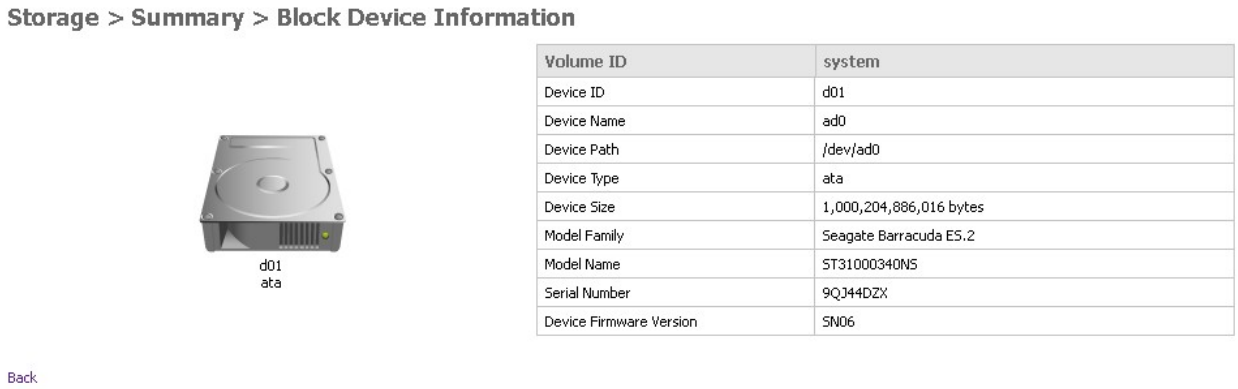
Method 1: Serial Number

The "Serial Number" is the unique identifier for a block device. Thus, the block device can be found physically in the machine by its serial number.

Here are the steps to look for the serial number in the AhsayUBS WebAdmin:

1. In the page [Storage] > [Summary], click on the block device icon ' ' that looking for.The page then will be redirected to [Storage] > [Summary] > [Block Device Information].

2. If the "Serial Number" can be retrieved by the block device, the row "Serial Number" will exist in the table.



Volume ID	system
Device ID	d01
Device Name	ad0
Device Path	/dev/ad0
Device Type	ata
Device Size	1,000,204,886,016 bytes
Model Family	Seagate Barracuda ES.2
Model Name	ST31000340NS
Serial Number	9QJ44DZX
Device Firmware Version	SN06

Method 2: Device name

If a block device is connected to a specific controller e.g. 'ad' for ATA or 'da' for SCSI. The connector will be named and ordered starting from 0, e.g. ad0, ad1, da0, da1 … etc. Therefore, the block device can be identified according to the controller name and the connector number.

To look for the device name, please follow the steps below:

1. In the page [Storage] > [Summary], click on the block device icon ' ' that looking for. The page then will be redirected to [Storage] > [Summary] > [Block Device Information].

2. The "Device Name" exists in the information table.

Storage > Summary > Block Device Information

Volume ID	esms00
Device ID	m00c00
Device Name	da0
Device Path	/dev/da0
Device Type	scsi
Device Size	8.00 GB
Model Family	1.0
Model Name	[redacted] Virtual disk 1.0

Back

Appendix K – SNMP OID List

The following OIDs are supported by AhsayUBS. By importing corresponding MIB definition files, those OID values are visible via MIB browser and Network Management Software (NMS). For the complete list of OIDs, please refer to the following MIB documentation:

U.C. Davis
http://www.net-snmp.org/docs/mibs/ucdavis.html

Fokus Begemot (Mib-II)
http://www.freebsd.org/cgi/man.cgi?query=snmp_mibII&sektion=3&manpath=FreeBSD+8.3-RELEASE+and+Ports

Fokus Begemot (Host Resource)
http://www.freebsd.org/cgi/man.cgi?query=snmp_hostres&sektion=3&manpath=FreeBSD+8.3-RELEASE+and+Ports

Fokus Begemot (NetGraph)
http://www.freebsd.org/cgi/man.cgi?query=snmp_netgraph&sektion=3&manpath=FreeBSD+8.3-RELEASE+and+Ports

Notes: Please refer to the page [System] > [Settings] > [SNMP] for a simplified OID list.

The following OIDs are supported by the FreeBSD SNMP service.
By importing the corresponding MIB definition files, the OID values can be retrieved by MIB browser and Network Management Software (NMS).

System Information	
OID Prefix	iso.org.dod.internet.mgmt.mib-2.system.
OID Name	**OID Description**
sysDescr	A textual description of the this node. It is denoted by the CPU and kernel information.
sysContact	The textual identification of the contact person for this managed node, together with information on how to contact this person. It is denoted by the above 'Contact' text field.
sysName	An administratively-assigned name for this managed node. It is denoted by the fully-qualified domain name.
sysLocation	The physical location of this node. It is denoted by the above 'Location' text field.

CPU Statistics	
OID Prefix	iso.org.dod.internet.private.enterprises.ucdavis.systemStats.
OID Name	**OID Description**
ssCpuUser	The percentage of CPU time spent processing user-level code over the last minute.
ssCpuSystem	The percentage of CPU time spent processing system-level code over the last minute.
ssCpuIdle	The percentage of CPU time spent idle over the last minute.

System	
OID Prefix: iso.org.dod.internet.mgmt.mib-2.system.	
sysName	An administratively-assigned name for this managed node. By convention, this is the node's fully-qualified domain name.
sysDescr	A textual description of the node. This value should include the full name and version identification of the system's hardware type, software operating-system, and networking software. It is mandatory that this only contain printable ASCII characters.
sysLocation	The physical location of this node (e.g., 'telephone closet, 3rd floor').
sysContact	The textual identification of the contact person for this managed node, together with information on how to contact this person.

Memory	
OID Prefix: iso.org.dod.internet.private.enterprises.ucdavis.memory.	
memTotalReal	The total amount of physical memory (kBytes) installed on this host.
memAvailReal	The amount of physical memory (kBytes) currently available.
memTotalSwap	The total amount of swap space (kBytes) configured for this host.
memAvailSwap	The amount of swap space (kBytes) currently available.
memTotalFree	The total amount of memory (kBytes) available for use on this host.

Storage	
Each storage entry in the AhsayUBS system has been indexed by the 'dskIndex' attribute (which is located in the attribute suffix). The corresponding 'dskPath', 'dskDevice', 'dskTotal', 'dskAvail', 'dskUsed' and 'dskPercent' attributes will be mapped by the same index. e.g. 'dskIndex.1' implies 'dskPath.1', 'dskDevice.1', 'dskTotal.1', 'dskAvail.1', 'dskUsed.1' and 'dskPercent.1'	
OID Prefix: iso.org.dod.internet.private.enterprises.ucdavis.dskTable.dskEntry.	
dskIndex	Integer reference number (row number) for the disk MIB.
dskPath	Logical path where the disk is mounted.
dskDevice	Logical path of the device for the partition.
dskTotal	Total size of the disk (kBytes).
dskAvail	Available space on the disk (kBytes).
dskUsed	Used space on the disk (kBytes).

dskPercent	Percentage of space used on disk.
Each storage entry in the UBS system has been indexed by the 'hrStorageIndex' attribute (which is located in the attribute suffix). The corresponding 'hrStorageDescr', 'hrStorageSize' and 'hrStorageUsed' attributes will be mapped by the same index. e.g. 'hrStorageIndex.1' implies 'hrStorageDescr.1', 'hrStorageSize.1' and 'hrStorageUsed.1'	
OID Prefix: iso.org.dod.internet.mgmt.mib-2.host.hrStorage.hrStorageTable.hrStorageEntry.	
hrStorageIndex	A unique key assigned by the MIB to represent a storage area in the host.
hrStorageDescr	A description of the type and instance of the storage described by this entry.
hrStorageSize	The storage size in units of 'hrStorageAllocationUnits'.
hrStorageUsed	Used storage space in units of 'hrStorageAllocationUnits'.

Network	
Each network interface in the AhsayUBS system has been indexed by the 'ifIndex' attribute (which is located in the attribute suffix). The 'ifIndex' and 'ifAdEntIfIndex' correspond to the same indexed interface.	
The corresponding 'ifDescr', 'ifSpeed', 'ifPhysAddress', 'ifAdEntAddr' and 'ifAdEntNetMask' attributes will be mapped by the same index. e.g. 'ifIndex.1' implies 'ifDescr.1', 'ifSpeed.1', 'ifPhysAddress.1', 'ifAdEntAddr.1' and 'ifAdEntNetMask.1'	
OID Prefix: iso.org.dod.internet.mgmt.mib-2.interfaces.ifTable.ifEntry.	
ifIndex	A unique key assigned to each interface from MIB. Its value ranges between 1 and the value of 'ifNumber'. The value for each interface must remain constant at least from one re-initialization of the entity's network management system to the next re-initialization.
ifDescr	A textual string containing information about the interface. This string should include the name of the manufacturer, the product name and the version of the hardware interface.
ifSpeed	An estimate of the interface's current bandwidth in bits per second. For interfaces which do not vary in bandwidth or for those where no accurate estimation can be made, this object should contain the nominal bandwidth.
ifPhysAddress	The interface's address at the protocol layer immediately 'below' the network layer in the protocol stack. For interfaces which do not have such an address (e.g., a serial line), this object should contain an octet string of zero length.
OID Prefix: iso.org.dod.internet.mgmt.mib-2.ip.ipAddrTable.ipAddrEntry.	

ipAdEntIfIndex	The index value which uniquely identifies the interface. The value is the same as 'ifIndex'.
ipAdEntAddr	IP address assigned to the interface.
ipAdEntNetMask	The subnet mask associated with the IP address to the interface. The value of the mask is an IP address with all the network bits set to 1 and all the hosts bits set to 0.

Routing	
This entity's IP Routing table.	
OID Prefix: iso.org.dod.internet.mgmt.mib-2.ip.ipForward.ipCidrRouteTable.	
ipCidrRouteIfIndex	The 'ifIndex' value that identifies the local interface through which the next hop of this route should be reached.
ipCidrRouteNextHop	On remote routes, the address of the next system enroute; Otherwise, 0.0.0.0.

CPU Statistics	
The following attributes provide measure to CPU usage in number of 'ticks' (typically 1/100s). On a multi-processor system, the counter values are cumulative over all CPUs, so their sum will typically be N*100 (for N processors).	
OID Prefix: iso.org.dod.internet.private.enterprises.ucdavis.systemStats.	
ssCpuRawWait	The number of 'ticks' spent waiting for I/O.
ssCpuRawKernel	The number of 'ticks' spent processing in the kernel over the last minute.
ssCpuRawSystem	The number of 'ticks' spent processing system-level code over the last minute. This object may sometimes be implemented as the combination of the 'ssCpuRawWait(54)' and 'ssCpuRawKernel(55)' counters, so care must be taken when summing the overall raw counters.
ssCpuRawUser	The number of 'ticks' spent processing user-level code over the last minute.
ssCpuRawIdle	The number of 'ticks' spent idle over the last minute.

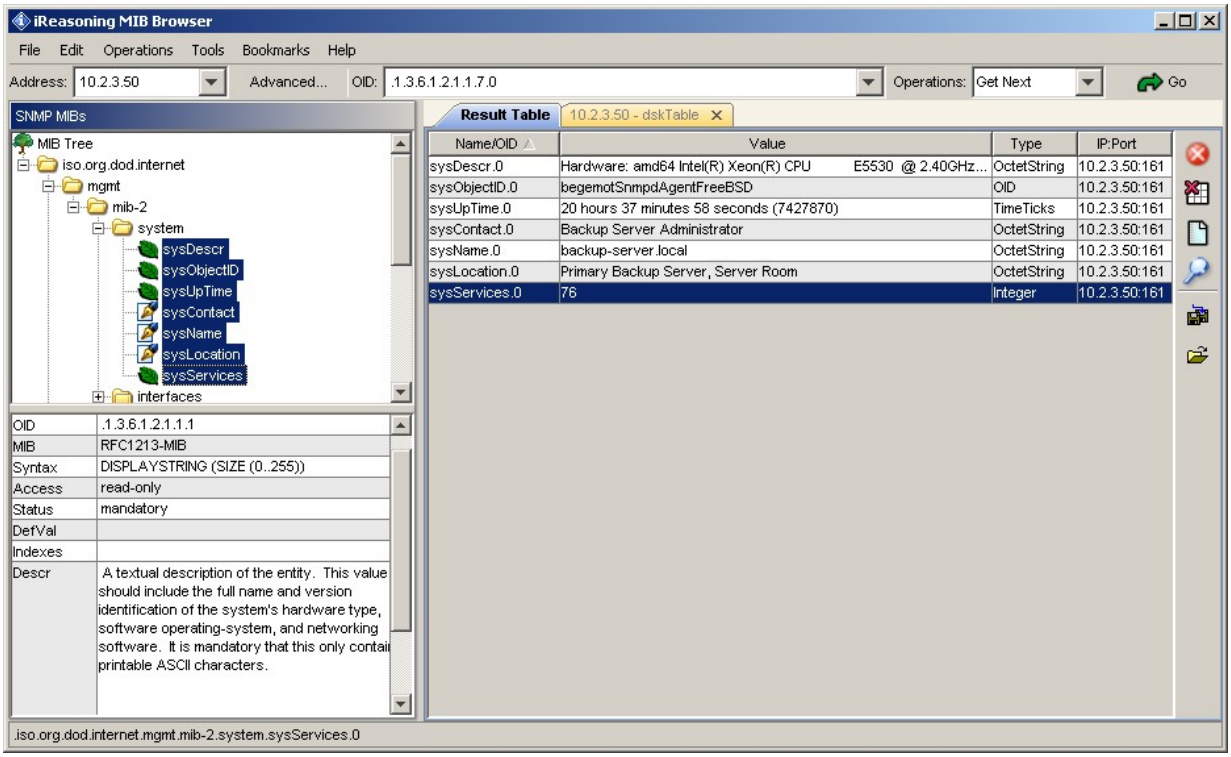
Disk I/O Statistics
Each storage device in the AhsayUBS system has been indexed by the 'diskIOIndex' attribute. The corresponding 'diskIODevice', 'diskIONRead' and 'diskIOWritten' attributes will be mapped by the same index. e.g. 'diskIOIndex.1' implies 'diskIODevice.1', 'diskIONRead.1' and

'diskIOWritten.1'	
OID Prefix: iso.org.dod.internet.private.enterprises.ucdavis.ucdExperimental.ucdDiskIOMIB .diskIOTable.diskIOEntry.	
diskIOIndex	Reference index for each observed device.
diskIODevice	The name of the device we are counting / checking.
diskIONRead	The number of bytes read from this device since boot.
diskIOWritten	The number of bytes written to this device since boot.

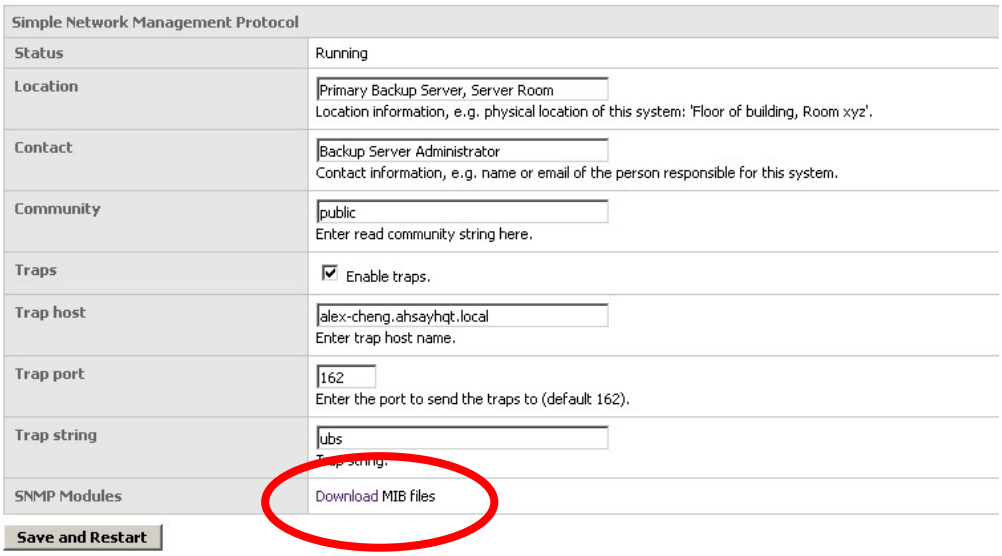
Appendix L - MIB Browser

MIB Browser allows administrators to load MIB definition files and connects to SNMP enabled network devices and applications. Some MIB browsers provide both text view and table view for the retrieved MIB values. In the following, we are going to demonstrate with the 'iReasoning MIB Browser Personal Edition'. (http://ireasoning.com/downloadmibbrowserfree.php)

1. The MIB Browser GUI includes the following views:
   - Address and Advanced (menu bar, for SNMP agent connection configuration)
   - MIB Tree (top left panel, presenting the supported MIB entities)
   - MIB Description (bottom left panel, presenting the MIB entity detail)
   - Result Table (top right panel, presenting the OID query result)

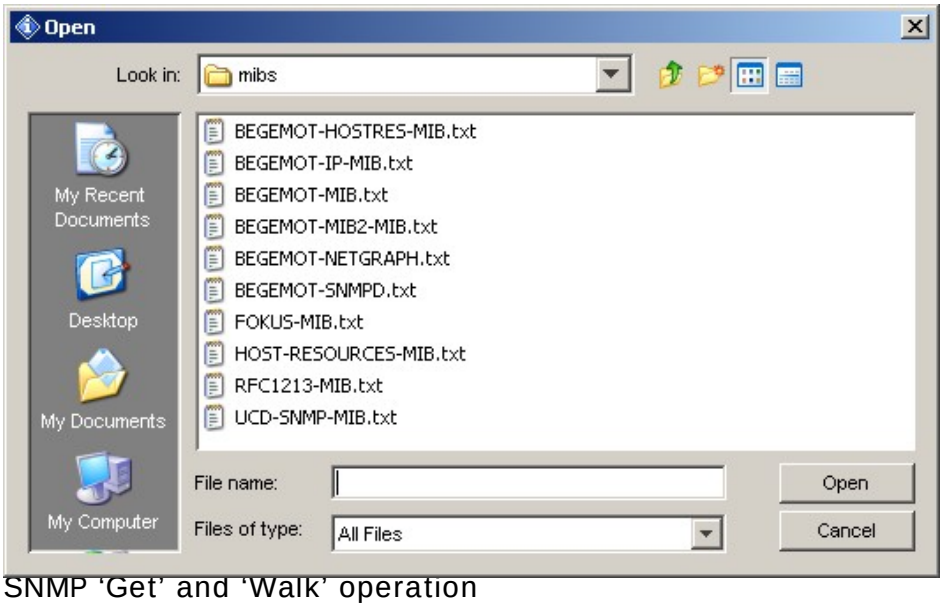


2. Additional MIB definition files can be loaded to the MIB Browser. Download and extract the MIB archive from UBS [System -> Settings -> SNMP].



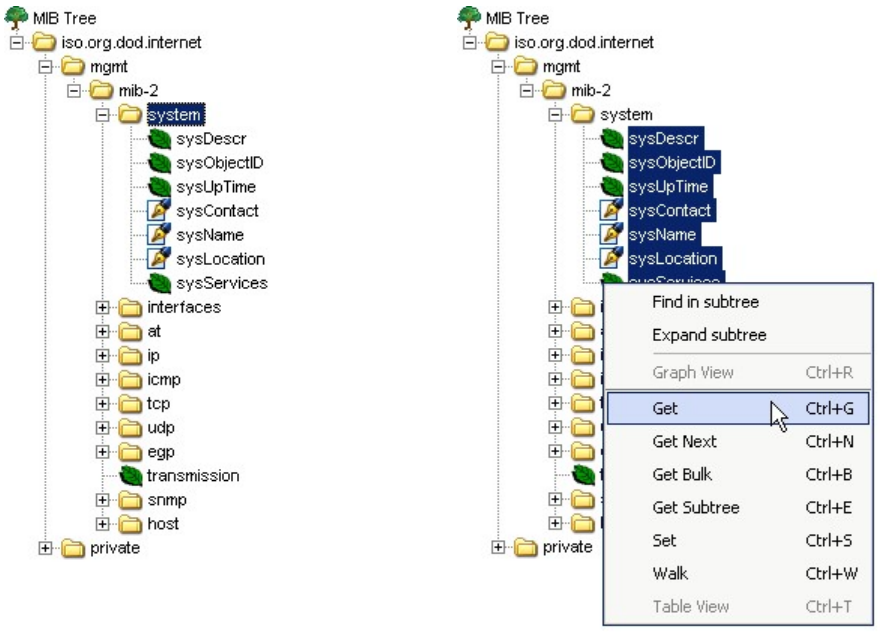
Click on 'File -> Load MIBs' to load the following MIB definition files:

- BEGEMOT-HOSTRES-MIB.txt
- BEGEMOT-IP-MIB.txt
- BEGEMOT-MIB.txt
- BEGEMOT-MIB2-MIB.txt
- BEGEMOT-NETGRAPH.txt
- BEGEMOT-SNMPD.txt
- FOKUS-MIB.txt
- HOST-RESOURCES-MIB.txt
- RFC1213-MIB.txt
- UCD-SNMP-MIB.txt



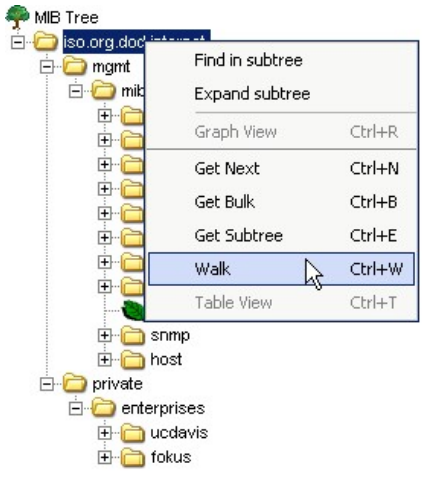
3. SNMP 'Get' and 'Walk' operation

By selecting specific OID entities, the SNMP 'Get' operation will retrieve the selected OID values. The OID entities will be mapped with the corresponding name defined in the MIB files. For example, we may retrieve the all entity values under the OID 'iso.org.dod.internet.mgmt.mib-2.system' via the MIB Browser.



Name/OID	Value	Type
sysUpTime.0	20 hours 28 minutes 39 seconds (7371999)	TimeTicks
sysName.0	backup-server.local	OctetString
sysLocation.0	Primary Backup Server, Server Room	OctetString
sysDescr.0	Hardware: amd64 Intel(R) Xeon(R) CPU E5530 @ 2.40GHz running at 2393 Software: FreeBSD 8.3-RELEASE (revision 199506)	OctetString
sysContact.0	Backup Server Administrator	OctetString
sysObjectID.0	begemotSnmpdAgentFreeBSD	OID
sysServices.0	76	Integer

On the other hand, the MIB Browser may walk through the entire MIB Tree by the SNMP 'Walk' operation. All OID entities will be retrieved from the SNMP agent. If the corresponding MIB definition file is not found, the retrieved OID will be displayed in numeric format.



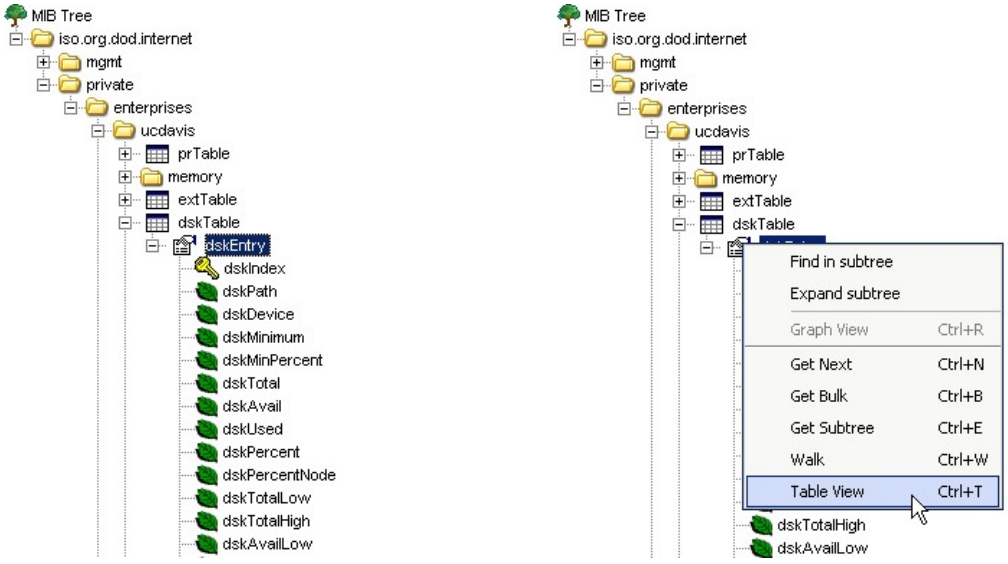
Name/OID	Value	Type
sysDescr.0	Hardware: amd64 Intel(R) Xeon(R) C...	OctetString
sysObjectID.0	begemotSnmpdAgentFreeBSD	OID
sysUpTime.0	17 minutes 48 seconds (106863)	TimeTicks
sysContact.0	Backup Server Administrator	OctetString
sysName.0	backup-server.local	OctetString
sysLocation.0	Primary Backup Server, Server Room	OctetString
sysServices.0	76	Integer
.1.3.6.1.2.1.1.8.0	180 milliseconds (18)	TimeTicks
.1.3.6.1.2.1.1.9.1.2.1	begemotSnmpdTransUdp	OID
.1.3.6.1.2.1.1.9.1.2.2	begemotSnmpdTransLsock	OID
.1.3.6.1.2.1.1.9.1.2.3	.1.3.6.1.6.3.1	OID
.1.3.6.1.2.1.1.9.1.2.4	begemotSnmpd	OID
.1.3.6.1.2.1.1.9.1.2.5	.1.3.6.1.2.1.31	OID
.1.3.6.1.2.1.1.9.1.2.6	.1.3.6.1.2.1.48	OID
.1.3.6.1.2.1.1.9.1.2.7	.1.3.6.1.2.1.49	OID
.1.3.6.1.2.1.1.9.1.2.8	.1.3.6.1.2.1.50	OID
.1.3.6.1.2.1.1.9.1.2.9	.1.3.6.1.2.1.4.24	OID

4. MIB Browser Table View

Some OID may exist as customized entry type. Multiple instances of entity value may exist under certain OID. For example, a system may contain multiple disks that each disk could be indexed by a unique index value. In such case, the MIB Browser may provide the 'Table View' that all supported entity values can be presented in table format.

Name	dskEntry
OID	.1.3.6.1.4.1.2021.9.1
MIB	UCD-SNMP-MIB
Syntax	DskEntry
Access	not-accessible
Status	current
DefVal	
Indexes	dskIndex
Descr	An entry containing a disk and its statistics.

From OID 'iso.org.dod.internet.private.ucdavis.dskTable.dskEntry', we may retrieve the system disk detail in table view with the corresponding 'dskPath', 'dskDevice', 'dskTotal', 'dskUsed' and 'dskPercent' entity values.



	dskIndex	dskPath	dskDevice	dskTotal	dskAvail	dskUsed	dskPercent	dskPercentNode
1	1	/	/dev/md0	126702	29324	97378	77	11
2	2	/dev	devfs	1	0	1	100	100
3	3	/ubs/mnt/esfmfw	/dev/mirror/48555C78xesfmfw	756748	485064	211146	30	2
4	4	/ubs/mnt/eslsfw	eslsfwx48555C78	5515483	5220355	295128	5	0
5	5	/var	/dev/md1	15598	14178	174	1	2
6	6	/ubs/mnt/esosfw	/dev/mirror/48555C78xesosfw	190252	83140	91892	53	0

Appendix M – VMware Tools Support

Since AhsayUBS 2.9.0.0, we have added the support on the VMware tools. Please refer to the following link on the usage.

http://sourceforge.net/apps/mediawiki/open-vm-tools/index.php?title=Packaging