Ahsay Backup

Ahsay Universal Backup System v8

Administrator's Guide

Ahsay Systems Corporation Limited

25 May 2021

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Revision History

Date	Descriptions	Type of modification
15 January 2019	First revision of AhsayUBS Administrator's Guide v8	New
6 February 2020	Updated Ch. 8.5.2 with the latest support hardware; Added how to repair an AhsayUBS volume after it has been expanded in Appendix N	New / Modification
30 July 2020	Updated Ch. 4.1 with the recommended memory size for agentless backup jobs	Modification
30 April 2021	Updated screenshots and fixed formatting of the whole document; Updated Release Announcements in Ch. 1; Updated Important Notice in Ch. 4	Modification
25 May 2021	Updated Ch. 1; Ch. 5.1; Ch. 9.5.1; Appendix M	Modification

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1 Release Announcement

1. AhsayUBS is bundled with the latest version of AhsayCBS v8. Starting from AhsayCBS v8.1.0.0 onwards:

   All AhsayCBS installations will have the **Ahsay Cloud Backup Suite NFS services** installed and running by default listening on ports 111, 1058, and 2049. The NFS service is to facilitate VM Run Direct on AhsayCBS by allowing VMware vCentre/ESXi hosts to directly access the backed up VM files on AhsayCBS User Home as an NFS mount to access the guest VM for recovery.

2. OpenJDK8 is used by AhsayCBS v8.1.0.0 onwards.

3. Tomcat v8 is used by AhsayCBS v8.1.0.0 onwards.

4. AhsayUBS 8 runs only on machines installed with 64bit CPU.

5. AhsayUBS v8 is supported on VMware ESXi v6.5 or above. As AhsayUBS v8 uses FreeBSD 11.2 and FreeBSD 11.x is only supported on VMware ESXi v6.5 or above.

   For information on compatibility between FreeBSD 11.x and VMware ESXi versions, please refer to the VMware Compatibility Guide.

6. AhsayUBS 8 includes support for Open VM Tools on FreeBSD. For more information please refer to Appendix K.

7. Upgraded ZFS filesystem version v5 and ZPOOL storage version v28.

8. Expanded hardware support on FreeBSD 11.2. For more information please refer to Appendix A, Appendix B and Appendix C.

9. Supports both iSCSI and Additional Storage features.

10. AhsayUBS 8 supports upgrade from AhsayUBS 2.29 (OBSR v6.29) or AhsayUBS 7.17 (CBS v7.17). It is advised you first upgrade your server to these latest releases and update your clients to matching versions before upgrading to v8.

2 Storage Models

2.1 The UFS storage model

For backwards compatibility with older AhsayUBS versions, the UFS storage model is also supported. After upgrade, 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   46 0xffffffff80200000 10d1490  kernel
 2    1 0xffffffff812d2000 8cf0     vesa.ko
 3    1 0xffffffff8139c000 17378    ahci.ko
 4    1 0xffffffff813b4000 f108     mvs.ko
 5    1 0xffffffff8c3c4000 7b68     geom_concat.ko
 6    1 0xffffffff8c3cc000 8f60     geom_stripe.ko
 7    1 0xffffffff8c3d5000 25ae8    geom_mirror.ko
 8    1 0xffffffff8c3fb000 25c38    geom_raid5.ko
 9    1 0xffffffff8c611000 221398   zfs.ko
10    1 0xffffffff8c833000 7500     opensolaris.ko
11    1 0xffffffff8c83b000 11150    krpc.ko
12    1 0xffffffff8c84d000 9afc     iscsi_initiator.ko
13    1 0xffffffff8c857000 14bd     splash_bmp.ko
```

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

```
ahsayubs:/# df -h
Filesystem                    Size    Used   Avail Capacity  Mounted on
/dev/md0                      170M    152M     18M    90%    /
devfs                         1.0K    1.0K      0B   100%    /dev
/dev/mirror/9689F4EFxesosfw   186M    108M     63M    63%    /ubs/mnt/esosfw
/dev/mirror/9689F4EFxesfmfw   744M     20K    684M     0%    /ubs/mnt/esfmfw
eslsfwx9689F4EF                87G     87G     66M   100%    /ubs/mnt/eslsfw
 /dev/md1                      15M    2.5M     11M    18%     /var
```

The Optional Labelled Device in the legacy AhsayUBS will be 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].

2.2 The ZFS storage model

AhsayUBS v8 is implemented with ZFS v5 and ZPOOL v28. The existing ZPOOL(s) created on older AhsayUBS versions using ZPOOL v13 will not be upgraded to ZPOOL v28, only newly created ZPOOLs will be applied with the ZIL (ZFS Intent Log).

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   46 0xffffffff80200000 10d1490  kernel
 2    1 0xffffffff812d2000 8cf0     vesa.ko
 3    1 0xffffffff8139c000 17378    ahci.ko
 4    1 0xffffffff813b4000 f108     mvs.ko
 5    1 0xffffffff8c3c4000 7b68     geom_concat.ko
 6    1 0xffffffff8c3cc000 8f60     geom_stripe.ko
 7    1 0xffffffff8c3d5000 25ae8    geom_mirror.ko
 8    1 0xffffffff8c3fb000 25c38    geom_raid5.ko
 9    1 0xffffffff8c611000 221398   zfs.ko
10    1 0xffffffff8c833000 7500     opensolaris.ko
11    1 0xffffffff8c83b000 11150    krpc.ko
12    1 0xffffffff8c84d000 9afc     iscsi_initiator.ko
13    1 0xffffffff8c857000 14bd     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 87GB "`eslsfwx9689F4EF`" mount as '`/ubs/mnt/eslsfw`'.

```
ahsayubs:/# df -h
Filesystem                    Size    Used   Avail Capacity  Mounted on
/dev/md0                      170M    152M     18M     90%    /
devfs                         1.0K    1.0K      0B    100%    /dev
/dev/mirror/9689F4EFxesosfw   186M    108M     63M     63%    /ubs/mnt/esosfw
/dev/mirror/9689F4EFxesfmfw   744M     20K    684M      0%    /ubs/mnt/esfmfw
eslsfwx9689F4EF                87G     87G     66M    100%    /ubs/mnt/eslsfw
 /dev/md1                      15M    2.5M     11M     18%    /var
```

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

```
ahsayubs:/# zpool status
  pool: eslsfwx9689F4EF
 state: ONLINE
  scan: scrub repaired 0 in 0h42m with 0 errors on Sun Apr 25 00:42:27
2021
config:

        NAME                        STATE     READ WRITE CKSUM
        eslsfwx9689F4EF             ONLINE       0     0     0
          label/9689F4EFxd00p09     ONLINE       0     0     0
        logs
          label/9689F4EFxd00p07     ONLINE       0     0     0

 errors: No known data errors
```

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/9689F4EFxesosfw /ubs/mnt/esosfw ufs ro 1 1
/dev/mirror/9689F4EFxesfmfw /ubs/mnt/esfmfw ufs ro 1 1
```

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

1. /ubs/mnt/eslsfw/obsr/user
2. /ubs/mnt/eslsfw/obsr/system
3. /ubs/mnt/eslsfw/obsr/system/obs/policies
4. /ubs/mnt/eslsfw/obsr/conf
5. /ubs/mnt/esfmfw/obsr/system/obsr/webapps
6. /ubs/mnt/eslsfw/obsr/rcvshome

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:

1. GPT Boot – {UID}xesgpbt
2. Operating System Framework – {UID}xesosfw
3. 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.

2.3 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 start 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 14.51% of the pool: `eslsfwx9689F4EF`

```
ahsayubs:/# zpool status
  pool: eslsfwx9689F4EF
 state: ONLINE
  scan: scrub in progress since Mon Apr 26 08:31:27 2021
        12.6G scanned out of 86.6G at 35.9M/s, 0h35m to go
        0 repaired, 14.51% done
config:

        NAME                      STATE     READ WRITE CKSUM
        eslsfwx9689F4EF           ONLINE       0     0     0
          label/9689F4EFxd00p09   ONLINE       0     0     0
        logs
          label/9689F4EFxd00p07   ONLINE       0     0     0

errors: No known data errors
```

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 AhsayCBS 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.

2.4 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.

```
ahsayubs:/# dmesg | grep ZFS
ZFS filesystem version: 5
ZFS storage pool version: features support (5000)
ZFS filesystem version: 5
ZFS storage pool version: features support (5000)
ahsayubs:/# zpool get version
NAME              PROPERTY  VALUE    SOURCE
eslsfwx9689F4EF   version   -        default
```

```
ahsayubs:/# dmesg | tail -20
SMP: AP CPU #11 Launched!
SMP: AP CPU #13 Launched!
SMP: AP CPU #2 Launched!
SMP: AP CPU #8 Launched!
SMP: AP CPU #9 Launched!
SMP: AP CPU #4 Launched!
SMP: AP CPU #6 Launched!
SMP: AP CPU #15 Launched!
SMP: AP CPU #7 Launched!
SMP: AP CPU #12 Launched!
SMP: AP CPU #5 Launched!
random: unblocking device.
Trying to mount root from ufs:/dev/md0 []...
GEOM_MIRROR: Device mirror/9689F4EFxesgpbt launched (1/1).
GEOM_MIRROR: Device mirror/9689F4EFxesosfw launched (1/1).
GEOM_MIRROR: Device mirror/9689F4EFxesfmfw launched (1/1).
ZFS filesystem version: 5
ZFS storage pool version: features support (5000)
iscsi: version 2.3.1
```

2.5 Storage Model Migration

For legacy AhsayUBS environments that wish to migrate from UFS to ZFS storage model, only a manual migration method is available where you need to offload your locally stored User Home data, AhsayUBS settings, and AhsayCBS settings; to a temporary storage device, reinstall AhsayUBS from new, then copy the data and settings from the temporary storage to the new AhsayUBS installation.

The migration process will generally involve:

1. Copying the existing user data from AhsayUBS server to another storage device.
   - This refers to the data in all locally stored User Homes stored on the filesystem
2. Backup your AhsayUBS configuration via the AhsayUBS Management Console.
   - [System] | [Backup/Restore] | [Backup Configuration]
3. Backup of your AhsayCBS configuration (conf/*), policies (system/obs/policies/*), export your branding properties, and any non-standard customizations. If you need to retain logs (logs/*) and (system/*), exclude (system/cbs/Installers/*) which contain old branded builds.
4. Use the latest AhsayUBS installer to install a new version of AhsayUBS on the existing machine, which will overwrite all existing data, returning your server to bare state.
5. Set the AhsayUBS IP, so that you can login to the management console.
6. Restore your AhsayUBS configuration.
7. Stop AhsayCBS service.
8. Restore your AhsayCBS configuration.
9. Copy the user data from the temporary storage device back to the AhsayUBS server.
10. Startup the AhsayCBS service and verify AhsayCBS state is normal.

3 Overview

The process to setup Ahsay Universal Backup System (AhsayUBS) firmware onto a machine is done in four stages:

1. Installer Image Deployment, installation to physical server.

   Deploys Ahsay Universal Backup System Installer image (*ubs-installer.img*) on a removable USB storage device

2. Firmware Installation/Upgrade.

   Install/upgrade Ahsay Universal Backup System Firmware onto the machine.

3. Ahsay Universal Backup System Configuration.

   Configure the Ahsay Universal Backup System Firmware (FreeBSD).

4. Backup Server Configuration.

   Configure the Backup Server, Redirectors, or Replication Server (AhsayCBS)

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 5 System Requirements of this document.

Ahsay Universal Backup System Firmware

AhsayUBS Firmware is based on a customized version of FreeNAS firmware with AhsayCBS bundled and is specifically optimized to run AhsayCBS. Apart from AhsayCBS, it also contains some basic features that system administrator requires, e.g. SSH and system monitoring tools.

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 “System Storage”. Several RAID devices will be created on the “System Storage”:

1. GPT Boot (GPBT)
2. Operating System Framework (OSFW)
3. Firmware Module Framework (FMFW)
4. Logical Storage Framework (LSFW)

The **GPBT**, **OSFW** and **FMFW** volume are configured as RAID1 mirror in UFS file system to form the core system.

The **LSFW** *software* RAID device:

- Supports JBOD, RAID0, RAID1 and RAIS5 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 required is 1** [data loss for any one failed drive], for **RAID1 and RAIDZ the minimum number of disks required is 2** [data loss if more than one failed drive]).

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 AhsayCBS configuration files and backup data will be stored on LSFW**.

HARDWARE RAID?

For systems employing *hardware* RAID, you are limited to one hardware RAID presentable to the server at time of AhsyUBS installation (you may add additional hardware RAID volumes, after AhsayUBS new installation is completed.). If you have more than one hardware RAID volumes, then you will be prevented from installation. For such systems, you will not be presented with choice of RAID settings at time of AhsayUBS installation (you only present one volume).

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

1. Adding a new block device to the system hardware.
2. 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 supported additional storages: '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:**

1. 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 (ZIL = ZFS Intent Log).

2. Expandable Storage (ZFS) [legacy]

   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.

3. Optional Storage (UFS) [legacy]

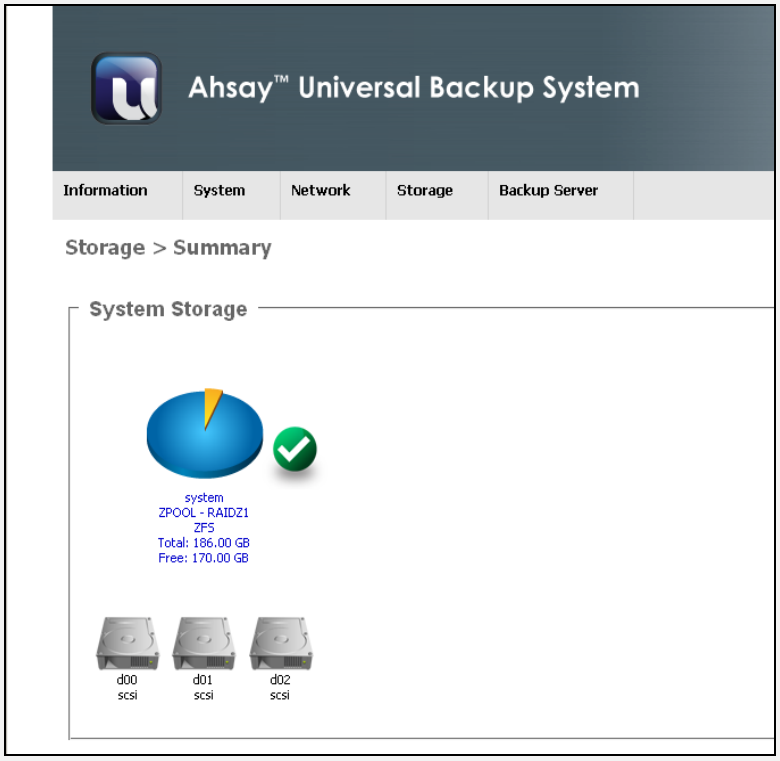
   called “Optional Labelled Device” on earlier AhsayUBS versions. It is for supporting the older migrated AhsayUBS installations only and cannot be created in this version of AhsayUBS.

By configuring the AhsayCBS, the “Additional Storage” can be used as additional storage for storing server configuration files and backup data.

NOTE

Minimum size 500GB 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.



4 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 physical machine.

- To prevent unauthorized access to the AhsayUBS System Management Console, it is advised to change the default AhsayUBS administrator password.
- If AhsayUBS is running on a VMware host, the tape backup utility is not supported.

  As VMware does not support Tape Drives connected directly to ESXi 5.x or above

  For more information please refer to this article https://kb.vmware.com/s/article/2007904.
- Expansion of existing disk volumes is not supported running on either software or hardware backed RAID. Doing so will destroy the volume and cause permanent data loss.

  In case you have accidentally expanded an existing disk volume you can try the steps discussed in Appendix N to repair it. However, even though the damaged volume is repaired there may still be significant data loss.
- The existing ZPOOL(s) created on older AhsayUBS versions using ZPOOL v13 will not be upgraded to ZPOOL v28, only newly created ZPOOLs will be applied with the ZIL (ZFS Intent Log).
- For legacy AhsayUBS environments who wish to migrate from UFS to ZFS storage model, only a manual migration method is available. For more information kindly refer to Chapter 2.5 Storage Model Migration.

5 System Requirements

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

5.1 Backup System Requirements

The selected machine must meet the following requirements:

- CPU that is FreeBSD 11.2 i386 / amd64 compatible.

  For the list of FreeBSD 11.2 i386 / amd64 compatible processors, please refer to Appendix A.

- Memory Size: 4 GB minimum. If the AhsayUBS installer detects the machine is installed with less than 2GB RAM the installation or upgrade process will be aborted.

- Disk Storage Space: 1000GB per disk minimum

  (If your users will store backup data onto the AhsayUBS server, you should plan for the largest drives allowable by your system, as future drive upgrade will be difficult.)

- Network interface card (NIC): At least 1 NIC that is FreeBSD 11.2 compatible.

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

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

1. Install AhsayUBS on a 64bit machine.
2. Install sufficient RAM as ZFS volumes require relatively large amount of memory.
   i. If an AhsayUBS server will be used for agent-based backup jobs, it is recommended to install at least 8 GB RAM.
   ii. If an AhsayUBS server will be used for agentless backup jobs, it is recommended to install at least 32 GB RAM.

   The actual amount of RAM required will be dependent on the size of the ZFS volume, the number of concurrent backup jobs running and the amount of I/O activity on the ZFS volume.

5.2 Firewall Settings

Please ensure you have updated your network firewall settings to allow network traffic through the following ports to your AhsayUBS server:

Port	Description
80	HTTP port for incoming backup and restore traffic, browsing the AhsayCBS web interface. [Port number can be customized]
443	HTTPS port for incoming backup and restore traffic, browsing the AhsayCBS web interface. [Port number can be customized]
25	Outgoing SMTP port to the SMTP server
8080	AhsayUBS web administration console. [Port number can be customized]
111	Port Mapper
1058	Mount Port **Required for Run Direct on AhsayCBS
2049	Port for NFS Service
Any incoming TCP port(s)	Any incoming TCP port(s) used by previous version of replication receiver(s), e.g. 9444, 9445…

5.3 AhsayUBS Processor Configuration

AhsayUBS supports up to a maximum of 256 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)

5.4 Installer Media Requirements

AhsayUBS installer is available in *img* and *ISO* formats.

1. The ***img* format** is used for deployment on a USB flash drive (minimum 2GB), for installation to a physical server.

2. The ***ISO* format** is used for VMware installation/upgrades only; and is not for use on deployment to CD/DVD media.

5.5 Installer Deployment

For physical server deployment, please ensure the following requirements are met before deploying Ahsay™ Universal Backup System image to a USB flash drive.

1. The USB flash drive should meet the minimum 2GB storage size requirements.

2. 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**.

3. 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.

5.6 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” disk volumes) installed in the machine.
- The new 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 hardware/software 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. For more information kindly refer to Rebuild Degraded Storage for instructions on how to rebuild the device.

6 Installer Image Deployment

This chapter describes how to prepare the installer source to deploy AhsayUBS on a physical server.

If you are deploying AhsayUBS as a Virtual Machine on VMware, you may skip this deployment section.

Removable Storage Device

WARNING

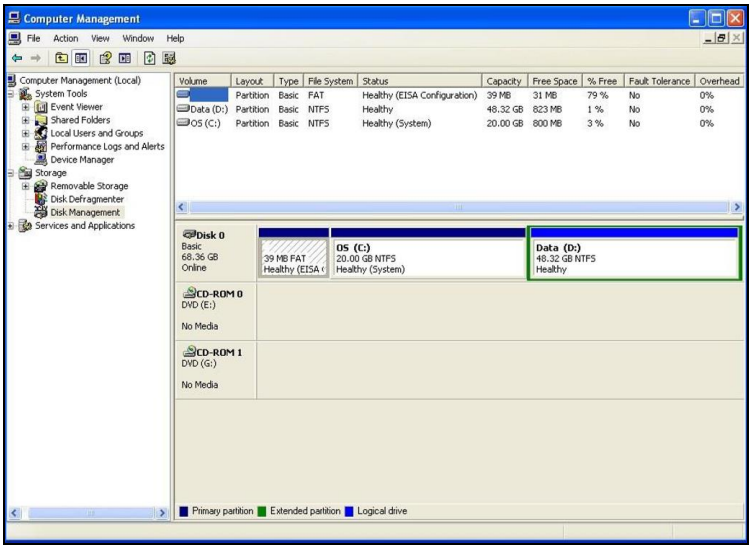
Please backup any data stored in the removable USB storage device before deploying the AhsayUBS Installer image onto it. Otherwise, all the data in the USB storage device will be DESTROYED.

Step 1: Preparation

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

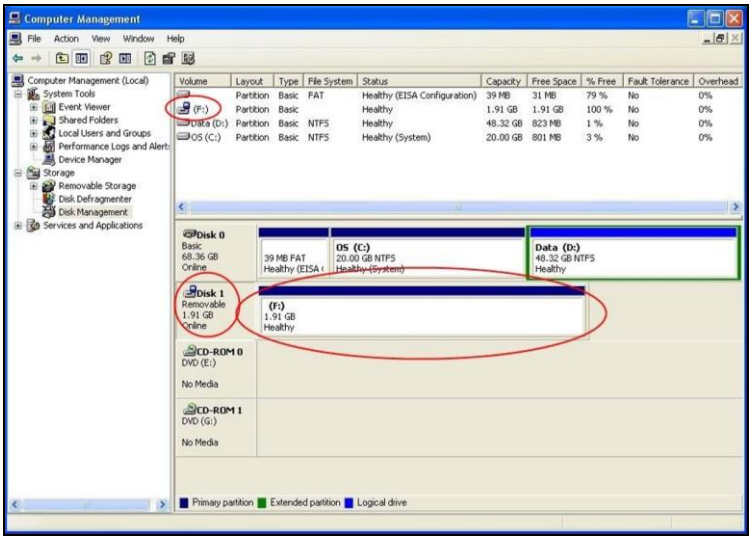
1. Right click on [My Computer] on the desktop and select [Manage].

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



3. 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.

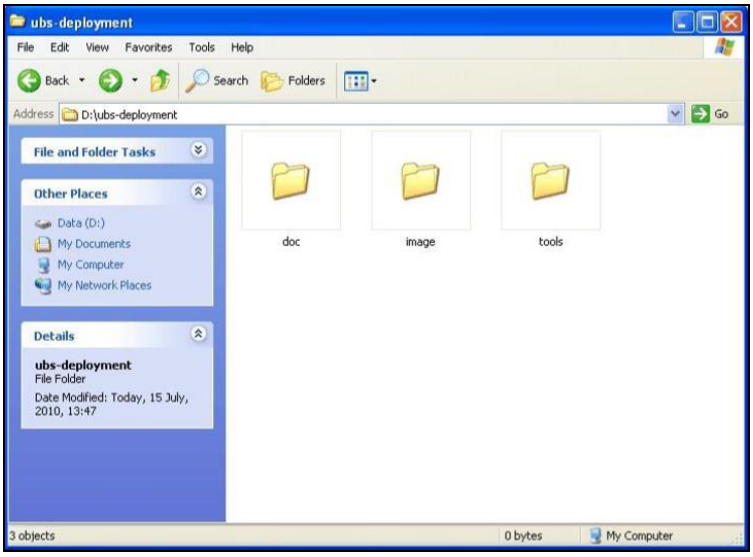
   The new disk should be shown in the [Computer Management] console. In our example, it is shown as [Disk 1] with a drive letter "*F".*



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

1. Download the AhsayUBS Deployment Utility from our website and extract all files from the bundle to a temporary directory.

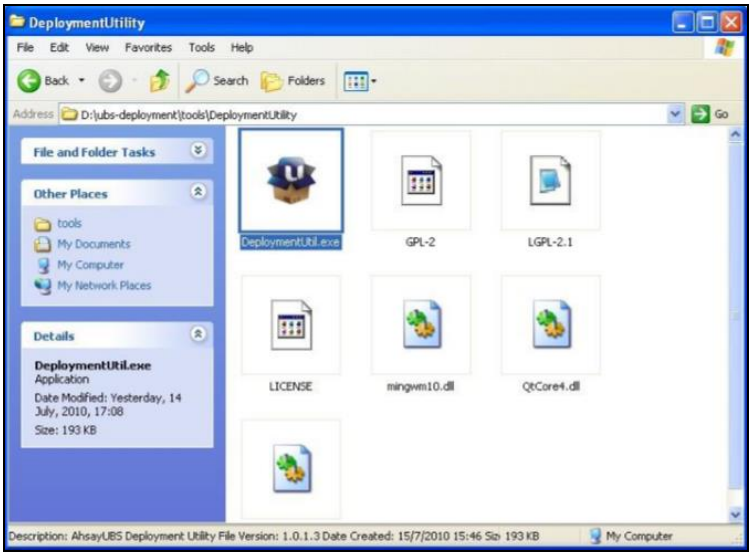
   In this example, *D:\ubs-deployment.*



   The deployment program is stored in Deployment Utility folder under *%UBS_DEPLOYMENT_DIR%\tools\.*

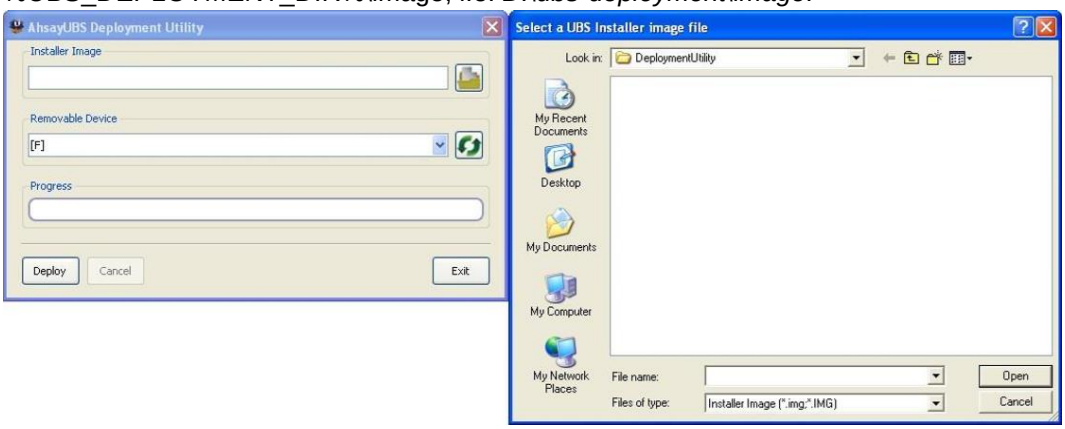
   In this example, the path for the deployment utility is *D:\ubs-deployment\tools\DeploymentUtility.*

2. Double click the "*DeploymentUtil.exe*" icon to launch the utility.

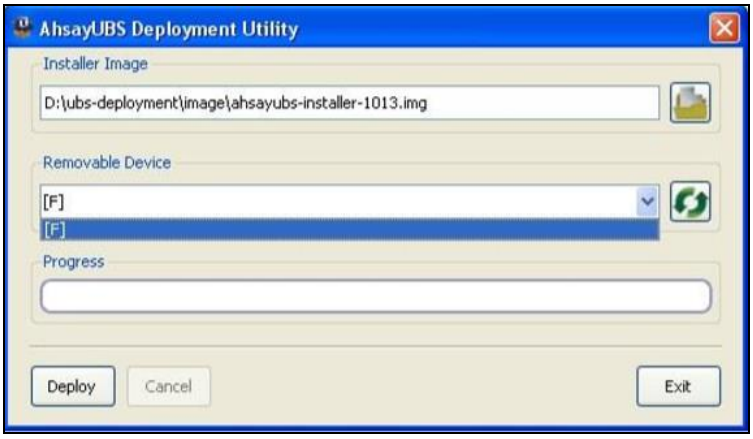


3. After launching the Deployment Utility software, click on the '  ' from the [Image File] to select the image file to copy.

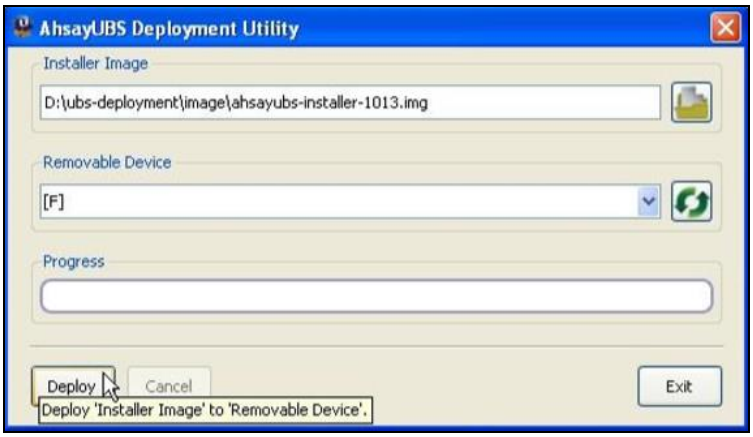
4. In the popup windows, select the AhsayUBS installer image: ahsayubs-installer-*.img from %UBS_DEPLOYMENT_DIR%\image, i.e. *D:\ubs-deployment\image*.



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

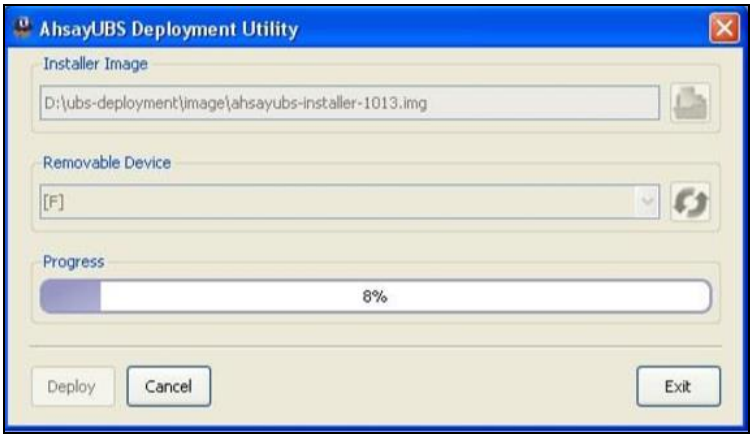


6. Click on the [Deploy] button to write the AhsayUBS installer image to the selected device.



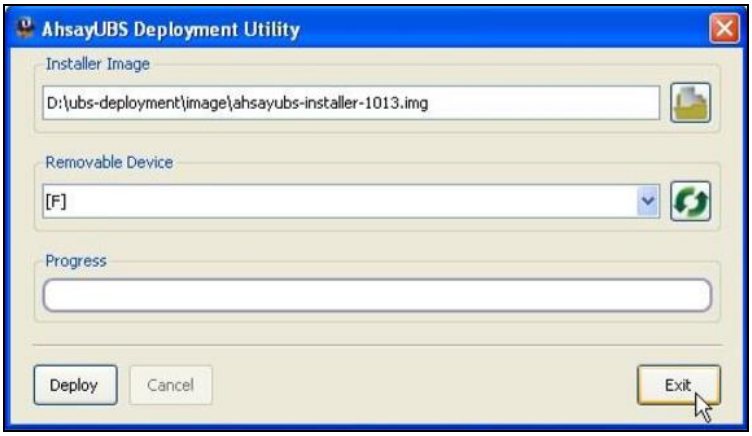
7. After clicking the [Deploy] button, a warning dialog window will be displayed on the screen. Click the [Yes] button to continue. However, if you have chosen the wrong image file/drive, please click the [No] button to abort the process and repeat steps 1-7 again.

8. If you click the [Yes] button in step 7, 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.

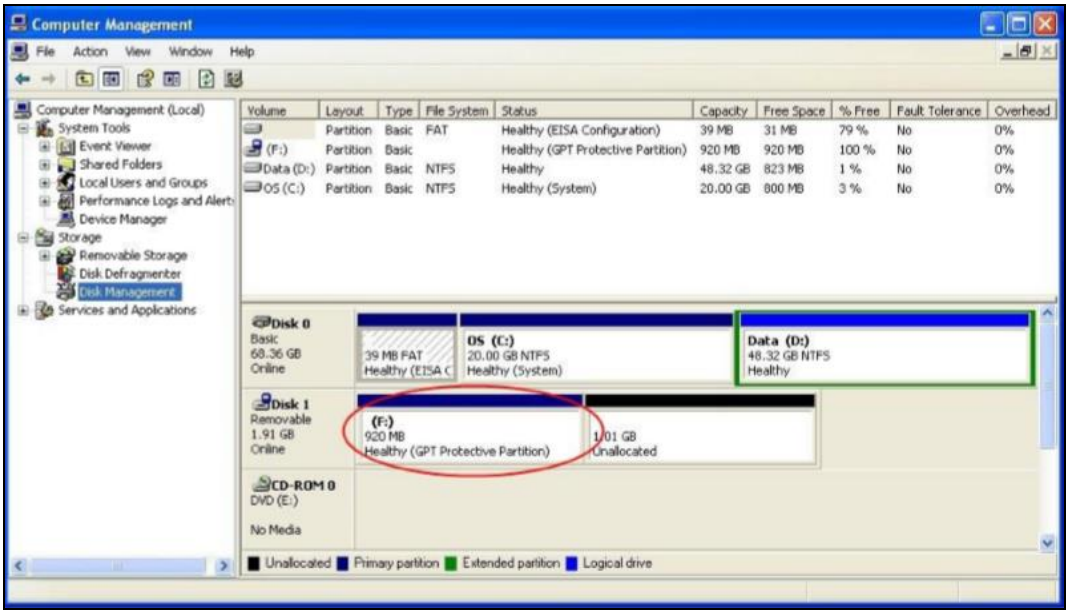


9. When it has completed the writing process, the following message will be shown on the screen.

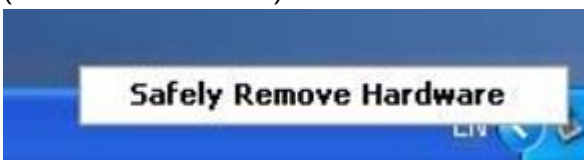
10. The deployment process is now completed. You may close the software by clicking the [Exit] button.



11. 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.



12. Then remove the hardware safely by clicking 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).



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

7 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.

7.1 Pre-Installation

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

1. Physical server installation: Deploy the AhsayUBS image to USB removable storage device.
2. Virtual Machine installation: Download the AhsayUBS ISO from https://www.ahsay.com/jsp/en/downloads/ahsay-downloads_latest-software_ahsayubs.jsp.
3. The installation media is connected to the target machine.
4. Shutdown the target machine.
5. Power on the machine and enter the BIOS settings page. (Please refer to the motherboard manual for the instruction to enter BIOS settings page.)
6. Configure the boot priority of the AhsayUBS machine to boot from the USB removable storage device, or ISO.
7. Save the settings and exit the BIOS.
8. Reboot the machine and boot up from the installer device.

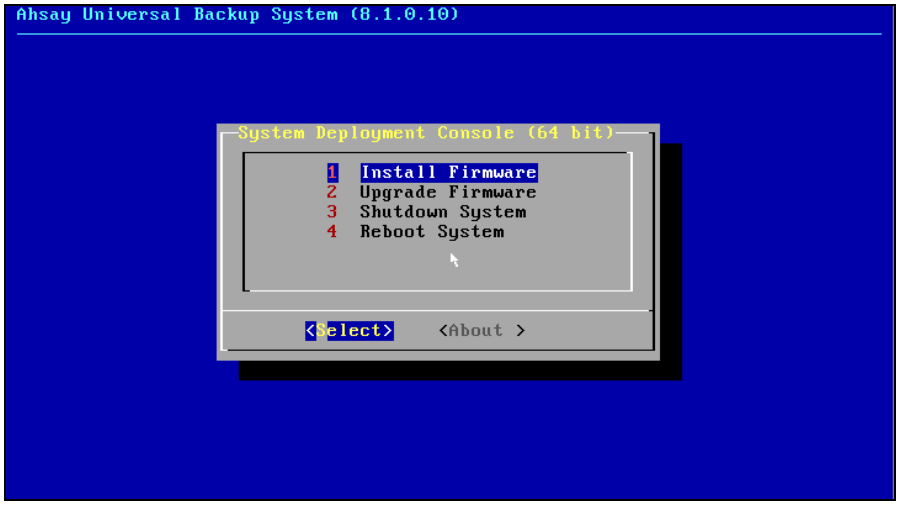
NOTE

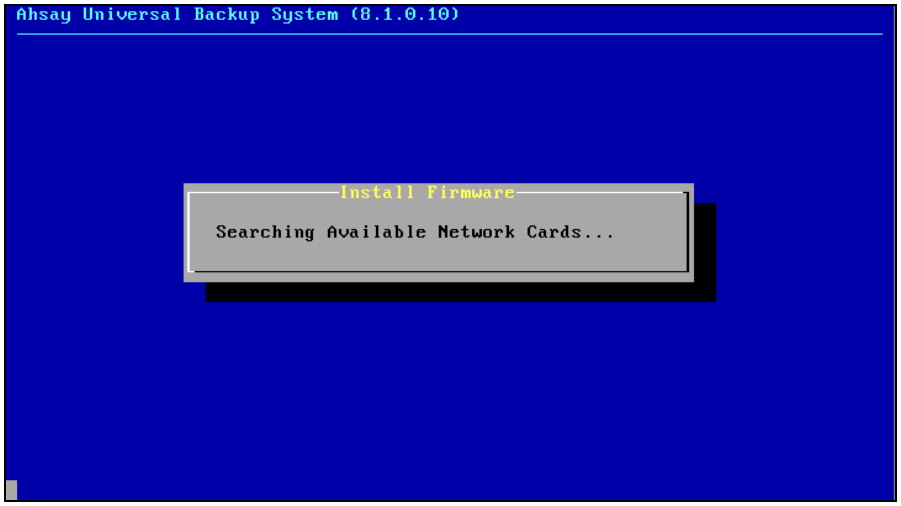
When you reinstall AhsayUBS, please refer to the following link to perform user storage migration.

7.2 Installing AhsayUBS Firmware (New Install)

1. After booting up from the installer device, the main menu will be shown.

   Select [1] to start the *New Installation* of the AhsayUBS firmware.



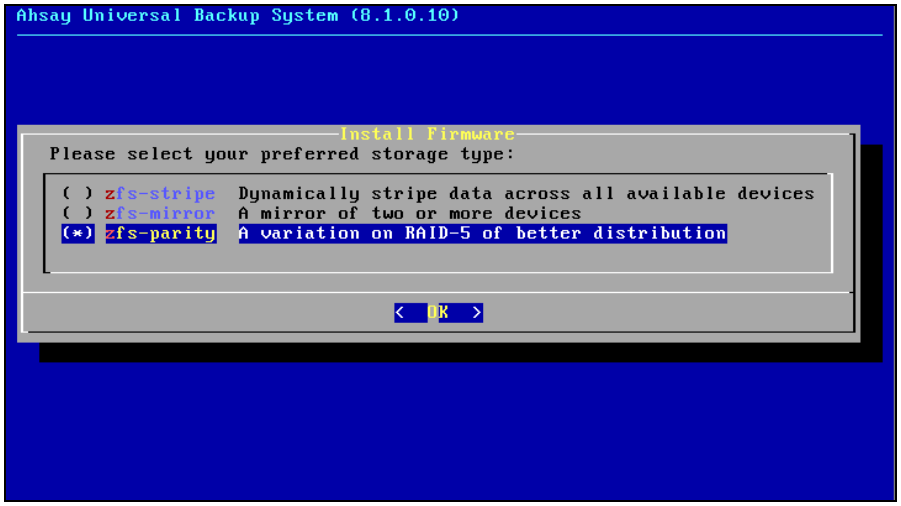


2. A warning message will be shown on the screen.

   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. If your system has *multiple hard disks*, you will be presented with preferred storage type. If you are running with *one hard disk* or *hardware RAID with one volume presented*, this screen may not be shown.

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

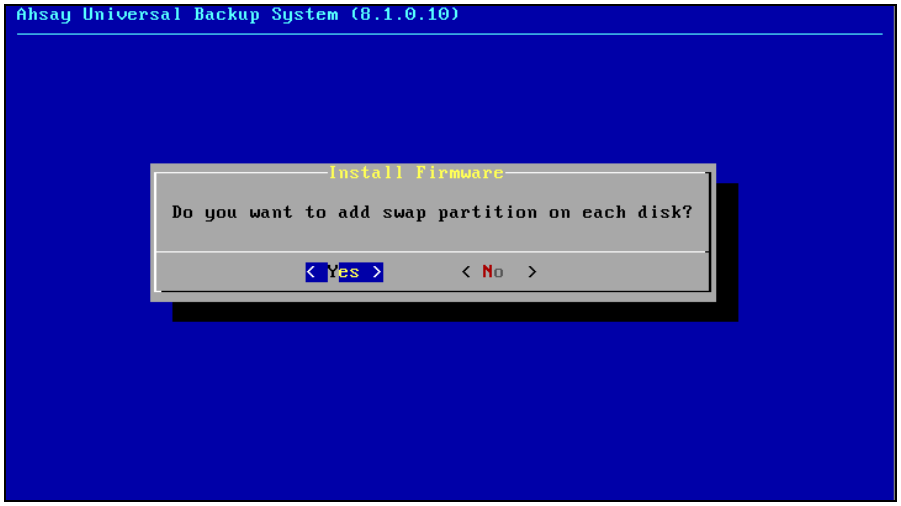


   zfs-stripe = RAID0 (data loss if any one drive failure)
   zfs-mirror = RAID1 (data loss if more than one drive failure)
   zfs-parity = RAIDZ (data loss if more than one drive failure)

   The file system LSFW will store the user data and the backup snapshots of AhsayCBS. 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.

   Tip: 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 temporarily.



   It is strongly recommended to create a swap partition for AhsayUBS. As a rule of thumb, the swap partition should be about double the size of physical memory (RAM). Systems with minimal RAM may perform better with more swap. Configuring too little swap can lead to inefficiencies in the VM page scanning code and might create issues later if more memory is added.

   For details refer to the FreeBSD Guide on Designing the Partition Layout.

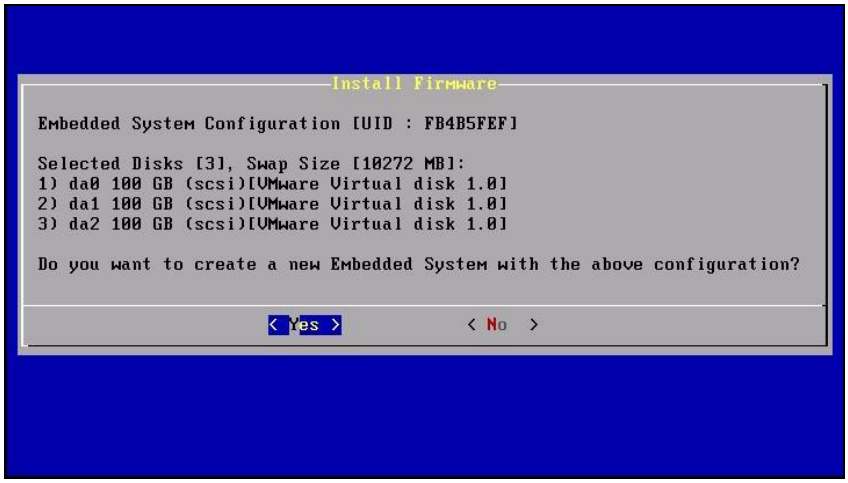
5. If you choose to create a swap partition in step 4, you will be asked to enter the size of the swap partition.

NOTE

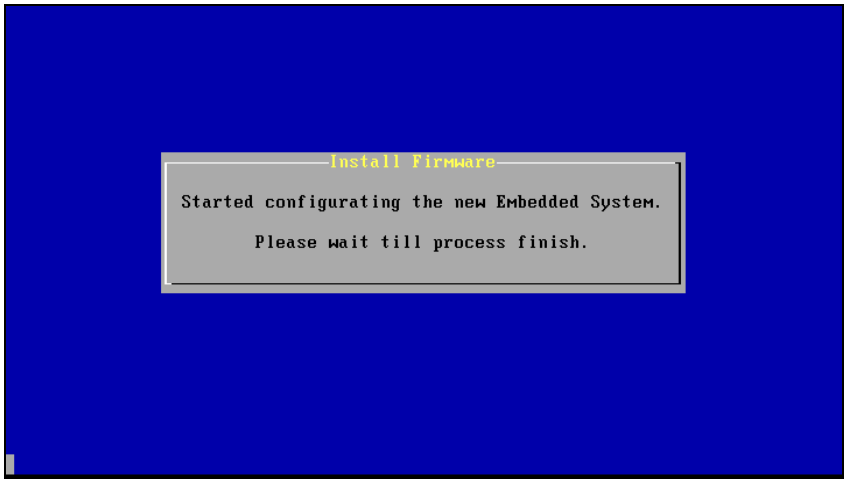
The total swap file size should be at least double the size of the physical memory installed on the AhsayUBS machine.

6. After inputting the swap file size, a summary of the settings for the storage configuration will be shown.

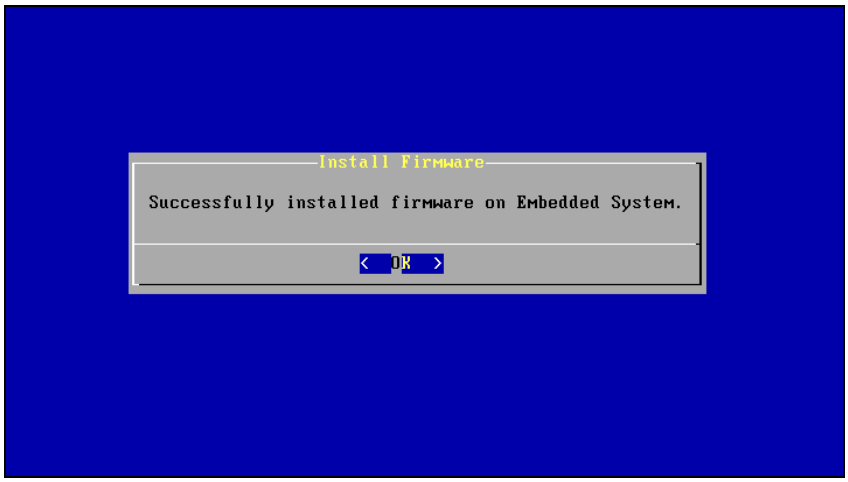
   Select [Yes] to accept these settings and continue with the installation, select [No] if you would like to make any changes to the current configuration.



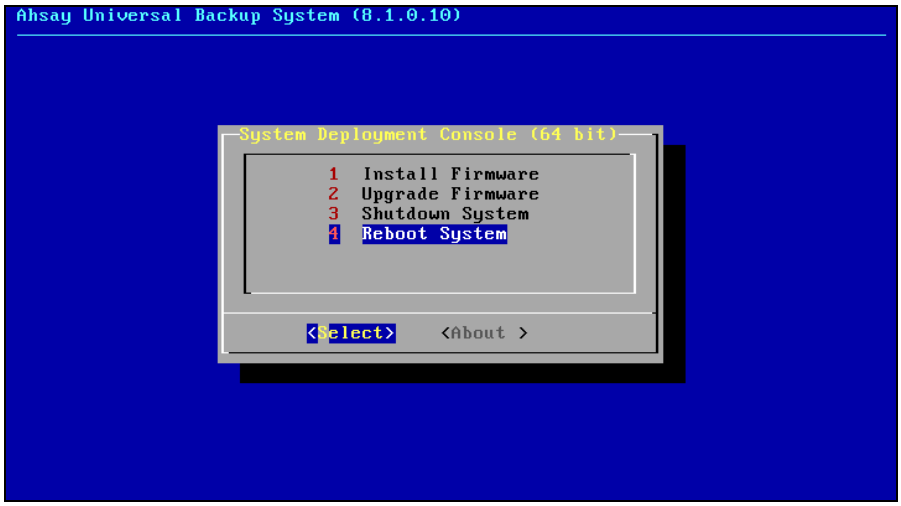
7. Once the settings have been confirmed the file system will be configured.



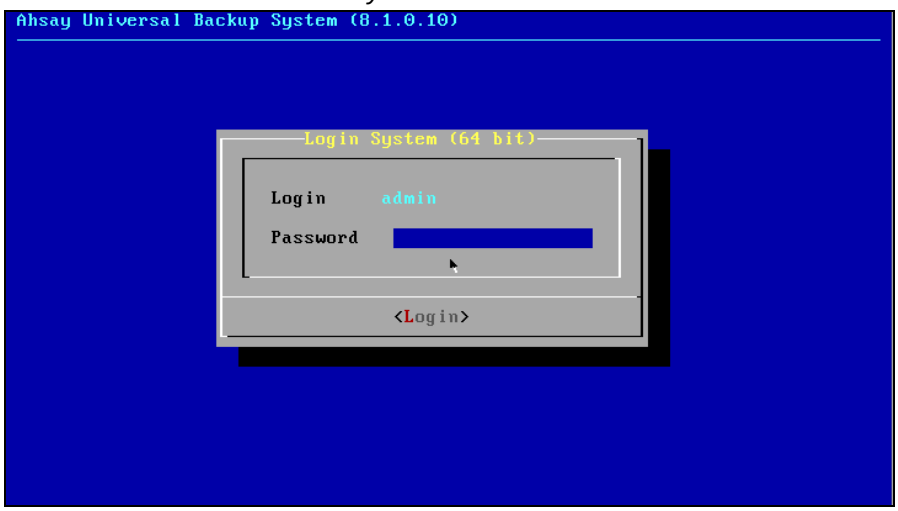
8. AhsayUBS Firmware is now installed on the target machine.



9. Remove the installation media and press [OK]. Then select option [4] 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 Post-Installation to complete the installation.

7.3 Upgrading AhsayUBS Firmware

Please use the upgrade option if AhsayUBS is previously installed on the machine, and to preserve existing configuration and data:

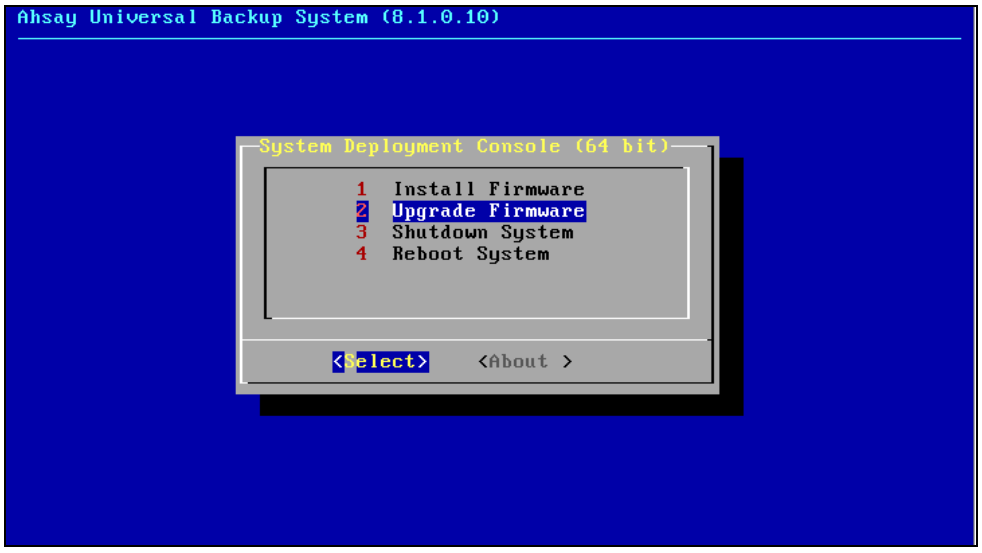
Pre-Requisites:

- You have enabled AhsayCBS AutoSave at least one full day prior to performing upgrade; or, you may make an offsite copy of the CBS "*conf*" folder, "*system/obs/policies*" folders
- You have exported your AhsayUBS Web Console settings

Important:

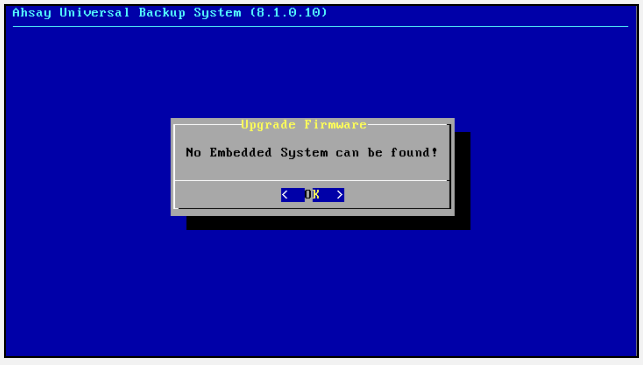
- Upgrade to AhsayUBS 8 cannot downgrade or rollback to earlier AhsayUBS v6 or v7 version. As a precaution, you may want to take a snapshot if your VM environment allows.

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

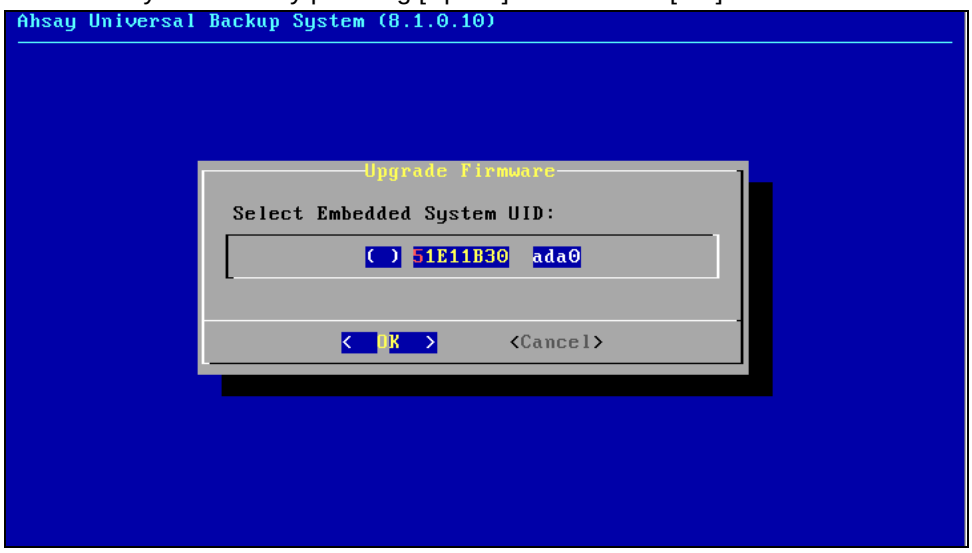


NOTE

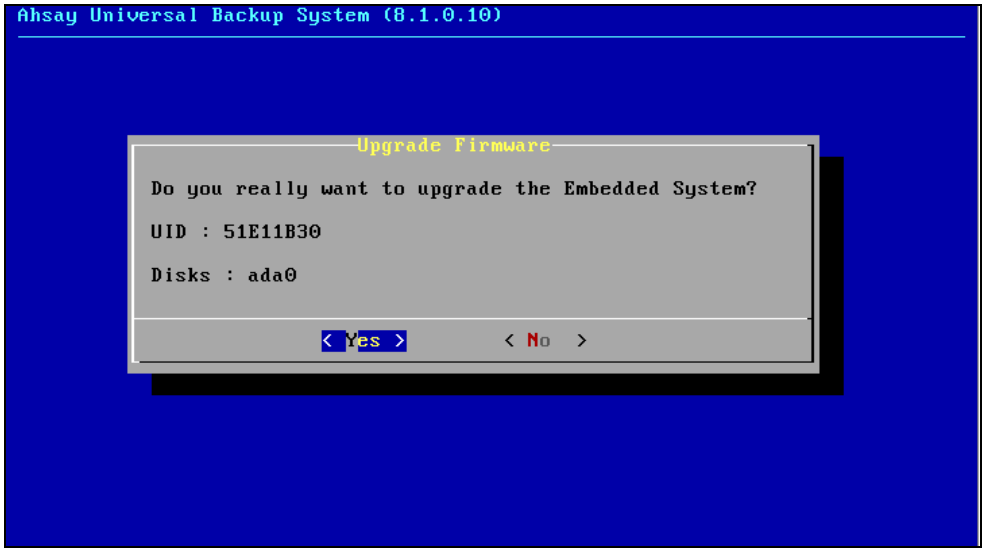
If there are no embedded systems found inside the machine, please use the option [Install] instead of [Upgrade]. For the detailed steps to install, please refer to Installing AhsayUBS Firmware (New Install).



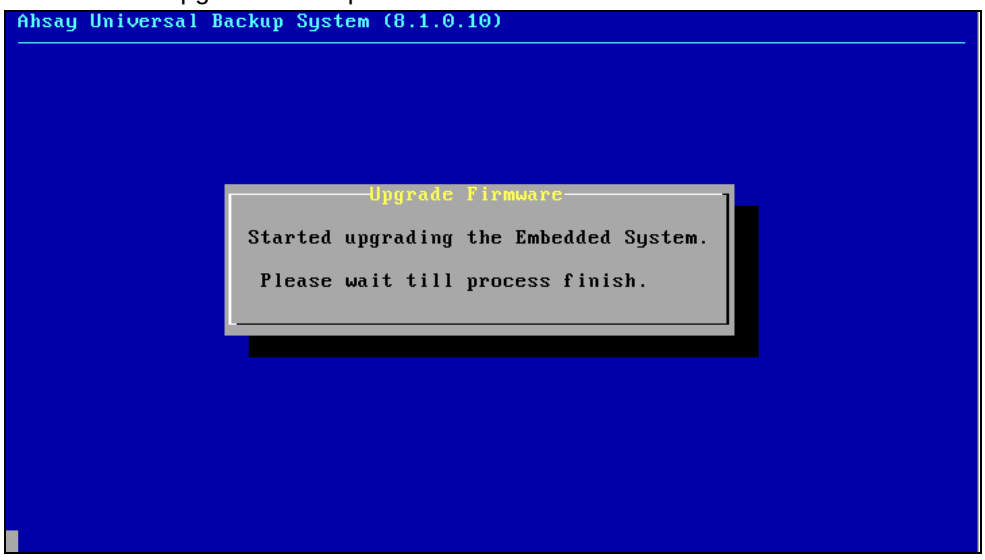
2. Select the system UID by pressing [Space] bar. Choose [OK] to continue.



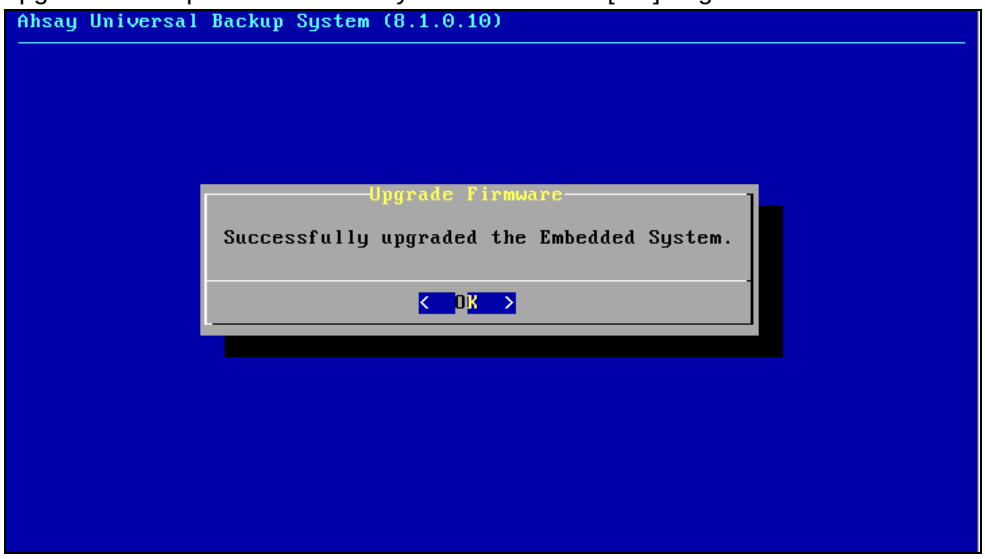
3. When the following message is shown, choose [Yes] to start the upgrade and [No] to abort.



4. Wait until the upgrade is completed.



5. 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.

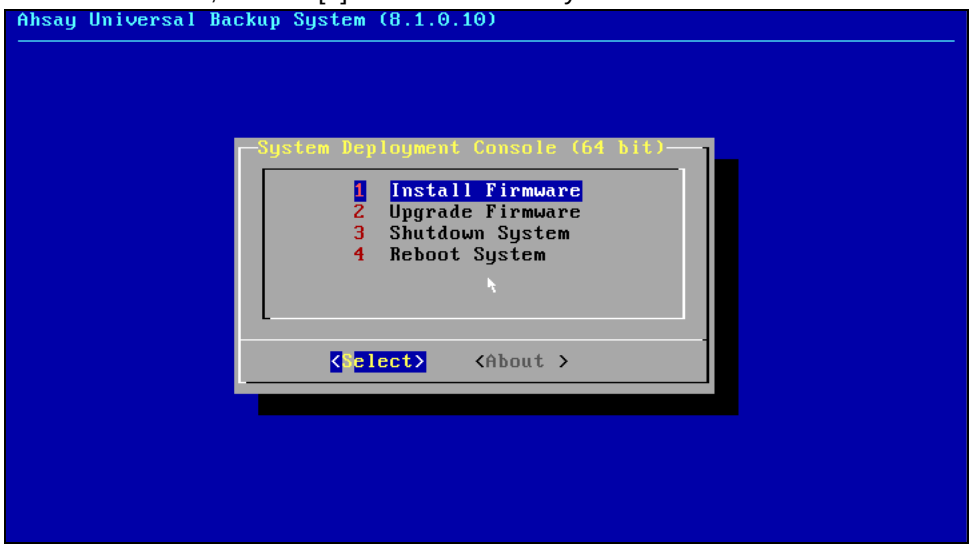


6. Refer to Post-Installation to complete the upgrade process.

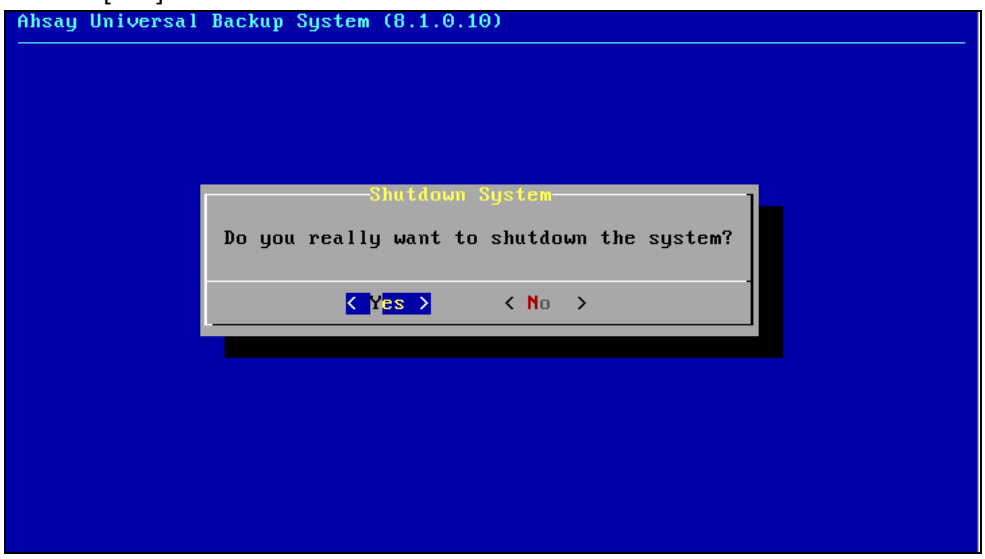
7.4 Post-installation

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 to the System Management Console with the administrator password.
8. Configure AhsayUBS with your preferred network settings. (refer to Configure Network Settings)

(For software-RAID Configuration Only)

9. Login the AhsayUBS Web Administration Interface (web port 8080).
10. Go to page [Storage] > [Summary] and wait for the status of the System Storage to change 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 AhsayCBS service.

The installation/upgrade is now completed.

WARNING

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

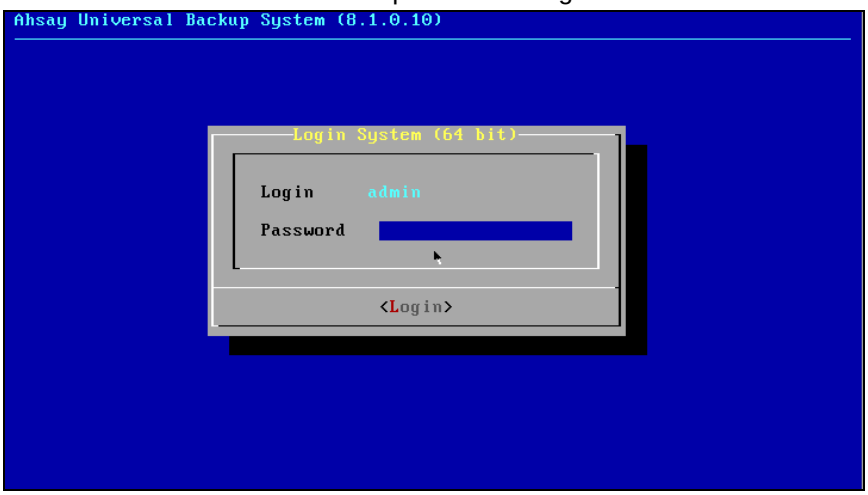
8 Basic AhsayUBS Firmware Configuration

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

8.1 System Console

8.1.1 Login to System Console

Before using the functions of AhsayUBS System Console, please login using the administration credentials to complete the configuration.



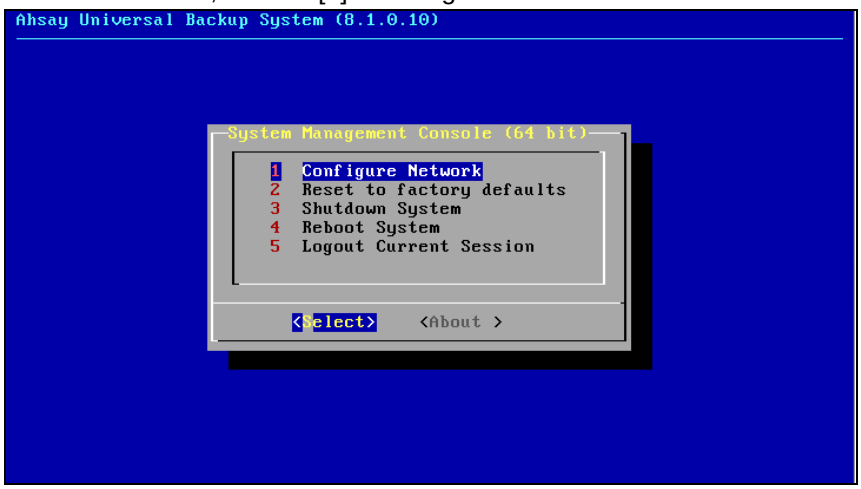
The default login credentials for AhsayUBS console are:

Username: admin

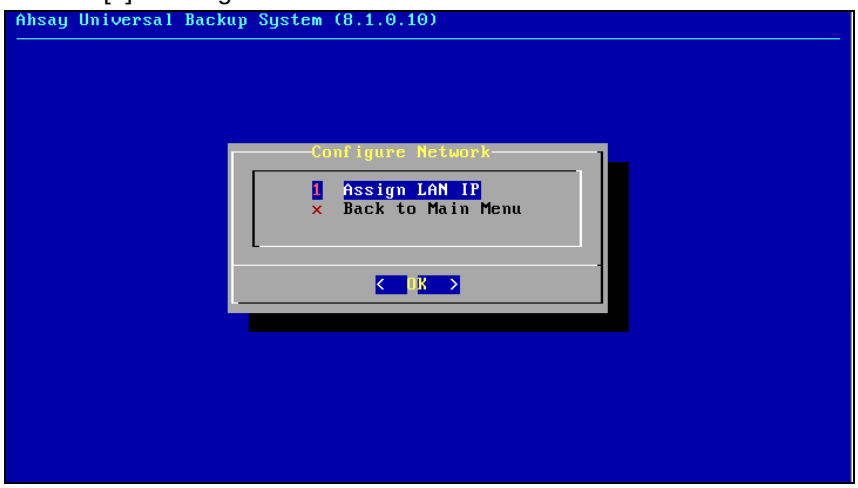
Password: ahsayubs

8.1.2 Configure Network Settings

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



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



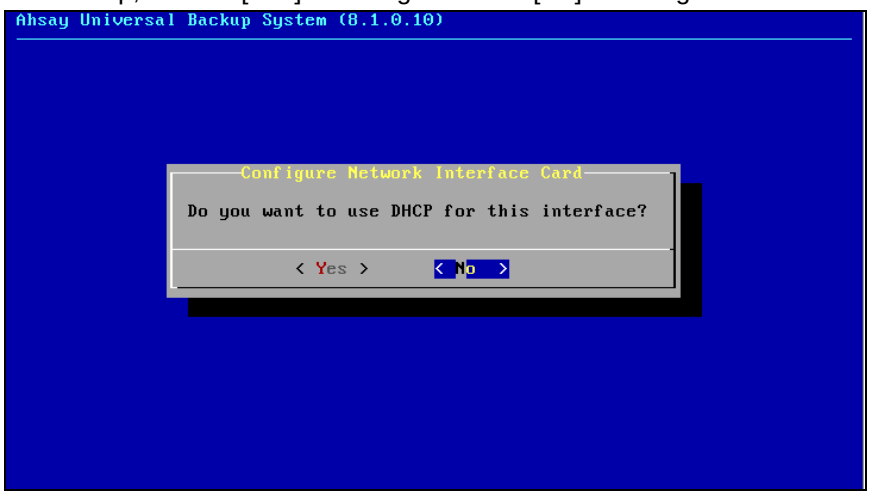
Select the method for setting up the IP Address on the device. There are two methods:

- **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

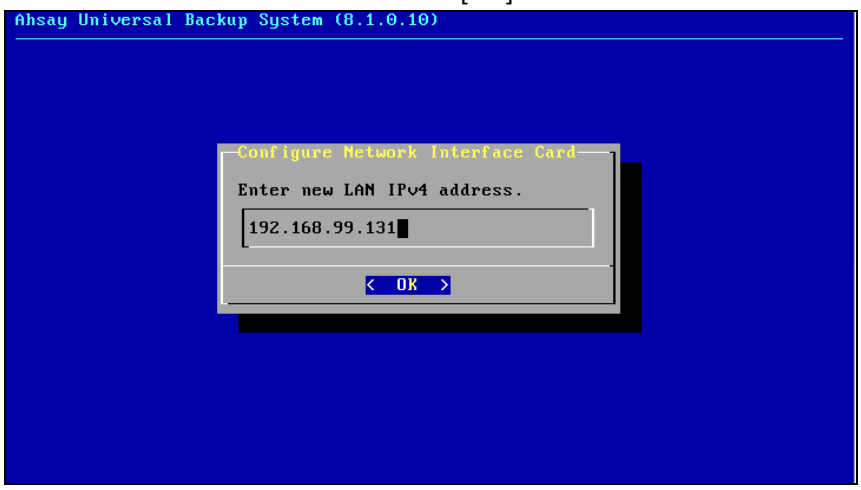
You can press the [Esc] key to go back to the main menu if you selected the wrong option.

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

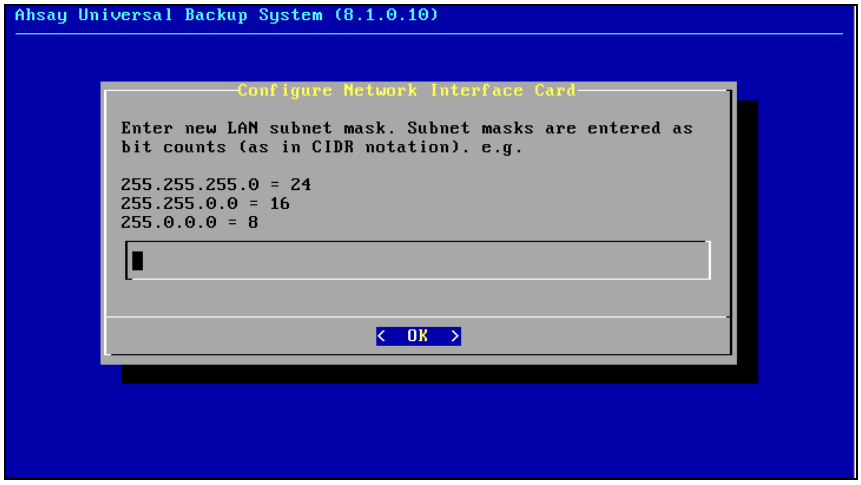


The following steps will only be displayed when [No] is chosen in step 3:

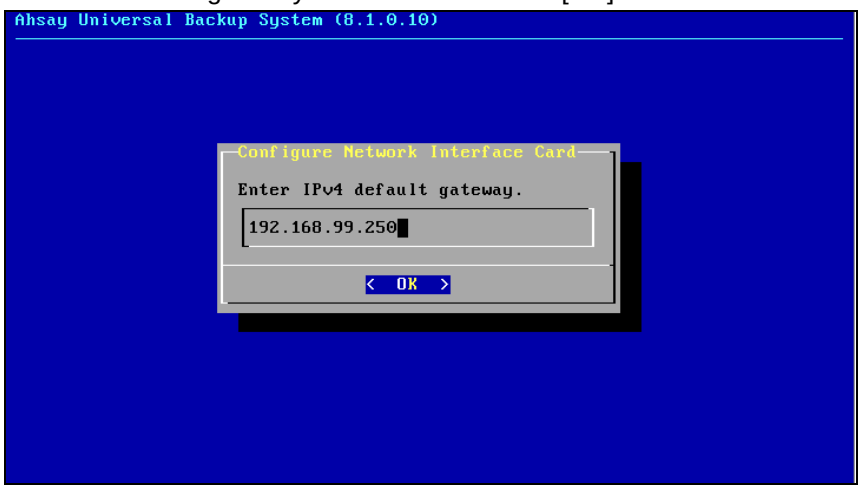
i. Enter the IPv4 IP address and choose [OK] to continue.



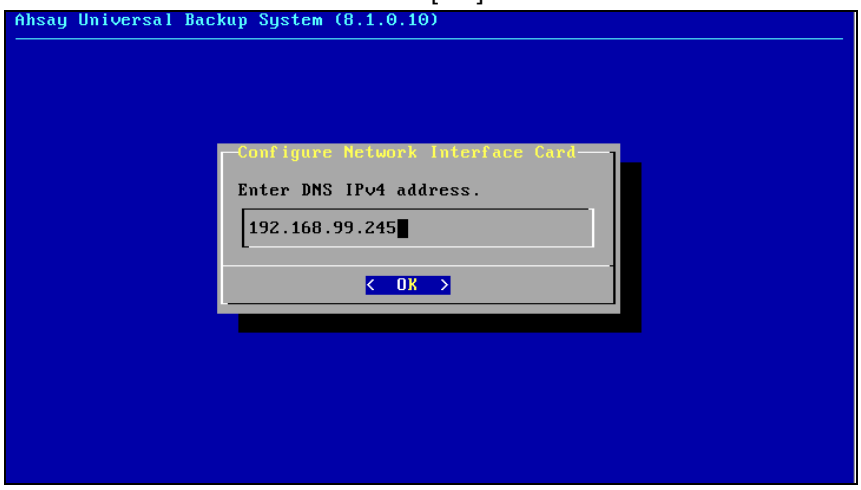
ii. Enter the subnet and choose [OK] to continue.



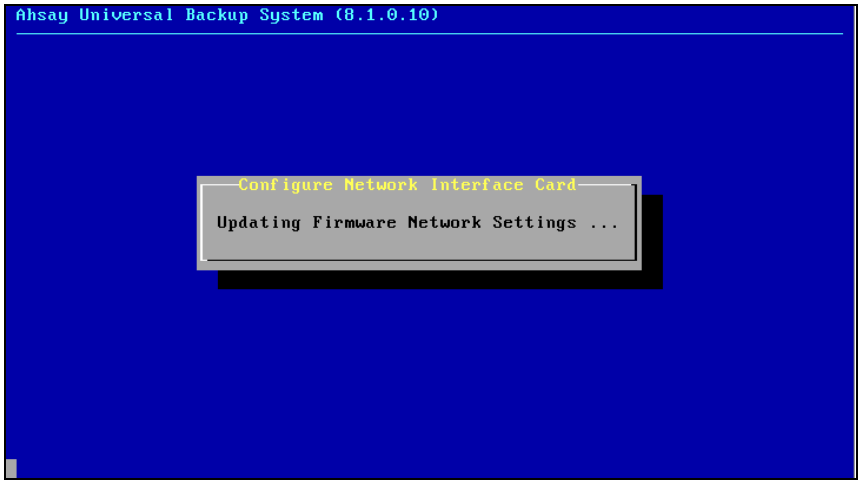
iii. Enter the default gateway address and choose [OK] to continue.



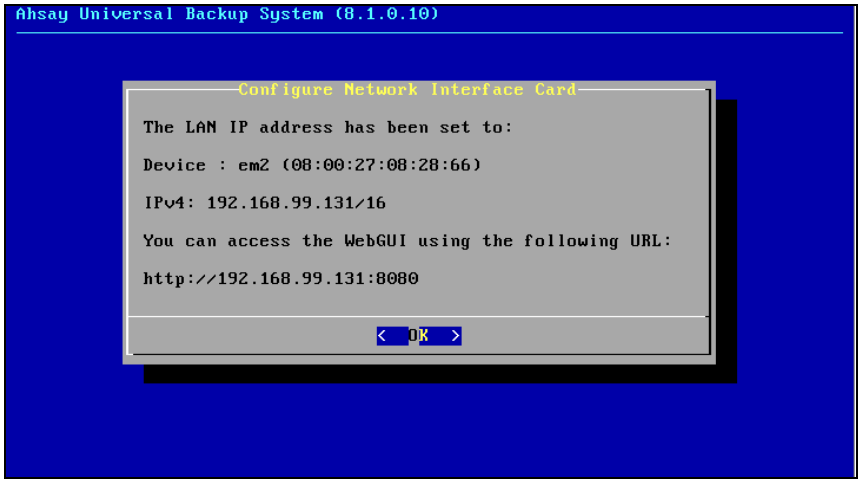
iv. Enter the DNS address and choose [OK] to continue.



4. Wait for AhsayUBS Firmware to finish updating the network configuration.



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



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

8.1.3 Login System

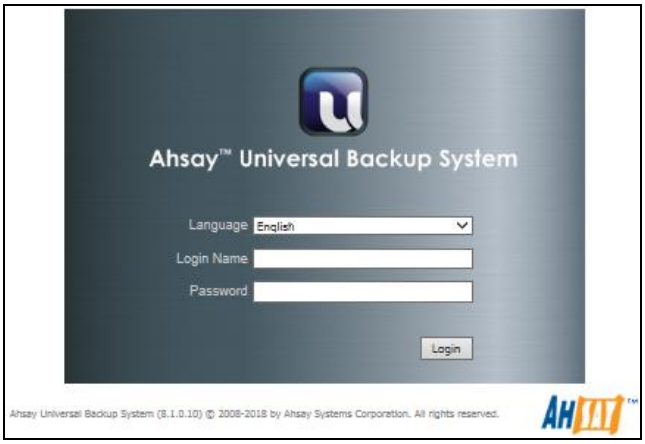
Launch your browser and type the AhsayUBS WebAdmin's IP address and AhsayUBS WebAdmin service port in the address bar.

For example, the AhsayUBS IP: 192.168.99.131 and the default WebAdmin server **port is 8080** (you can change this port later). The default URL address to access the AhsayUBS Web Admin would be: http://192.168.99.131:8080; as shown in the previous screenshot.

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:

Username: admin

Password: ahsayubs



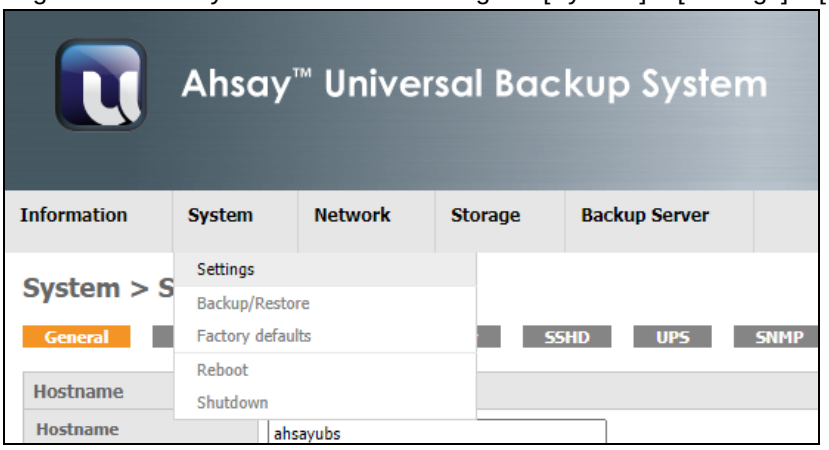
NOTE

- When logging in using a web browser, you can only use admin for the Username. But if using a ssh, you may use either root or admin for the Username.
- AhsayUBS WebAdmin console will automatically logout after 10 minutes of inactivity.

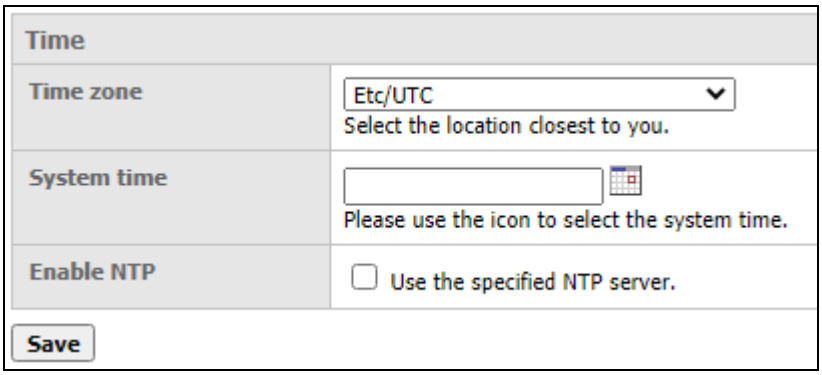
8.1.4 System Time and Time Zone Setup

Accurately configure the date and time settings of AhsayUBS. Without accuracy, logs and backup schedules may be incorrect.

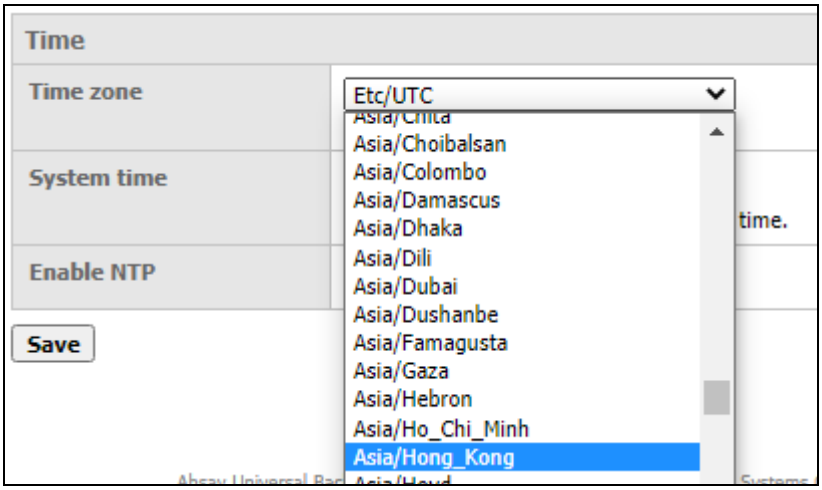
1. Login to the AhsayUBS WebAdmin and go to [System] > [Settings] > [General].



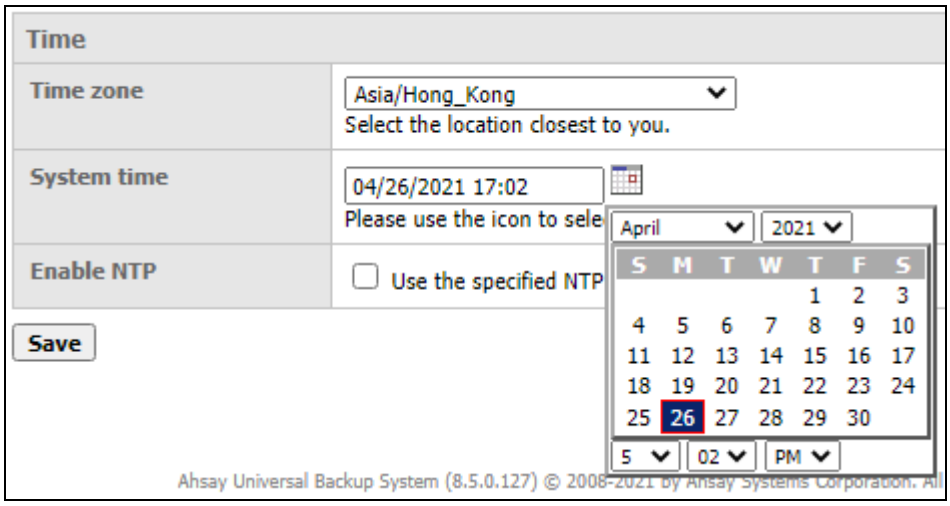
2. You can find the [Time] settings at the bottom of the page.

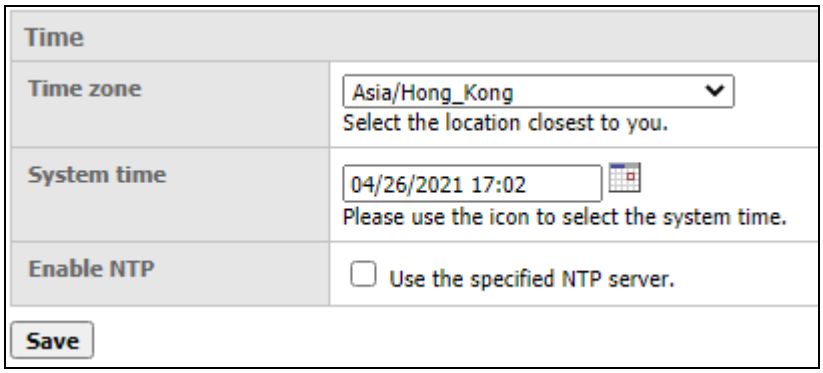


3. Select the appropriate time zone from the [Time zone] drop down menu.

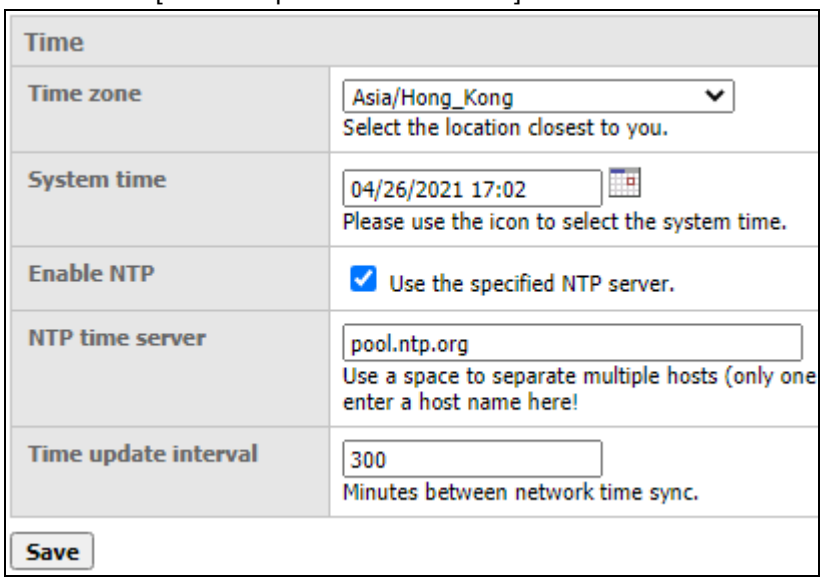


4. After you have selected the appropriate time zone. Click on the [Calendar] Icon and a small calendar will pop up. Select the current date and specify the current time.

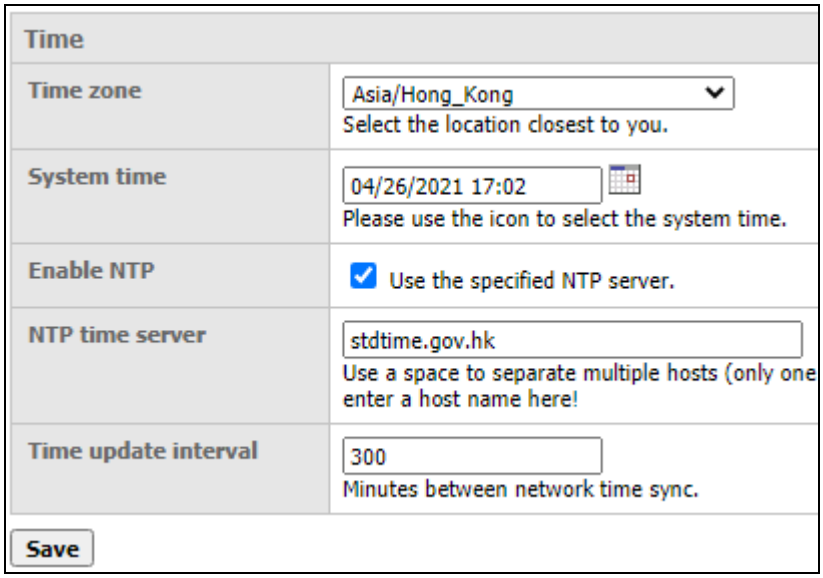




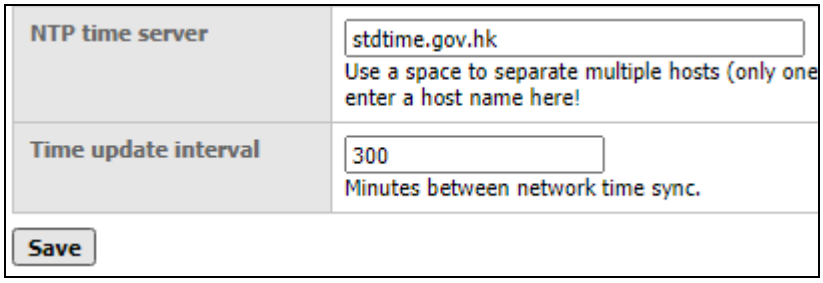
5. You have provided the appropriate time. If you prefer NTP synchronization, please checked the [Use the specified NTP Server] checkbox.



6. 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.



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

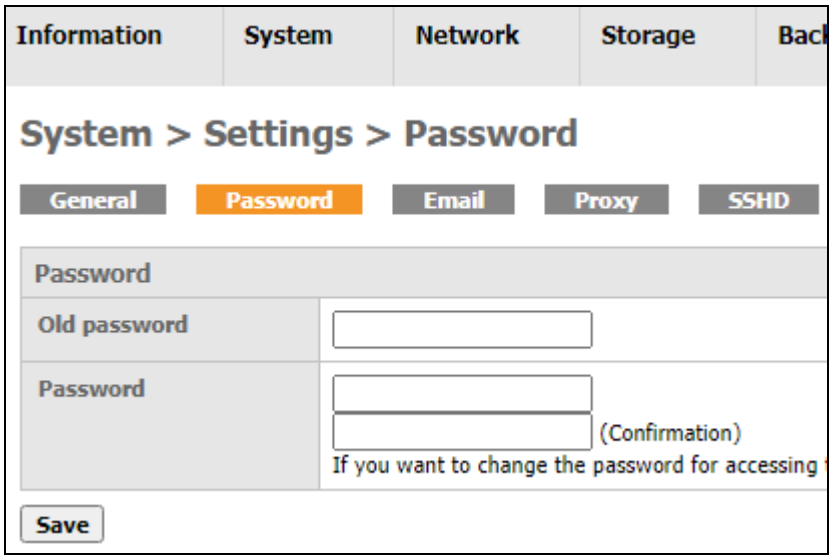


8.1.5 Change WebAdmin Password

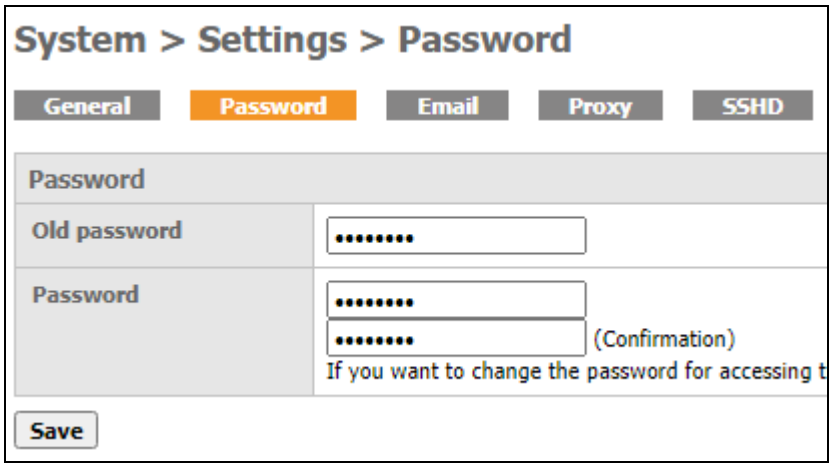
For security reasons, changing the default AhsayUBS WebAdmin password is recommended during the initial setup of the AhsayUBS WebAdmin.

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

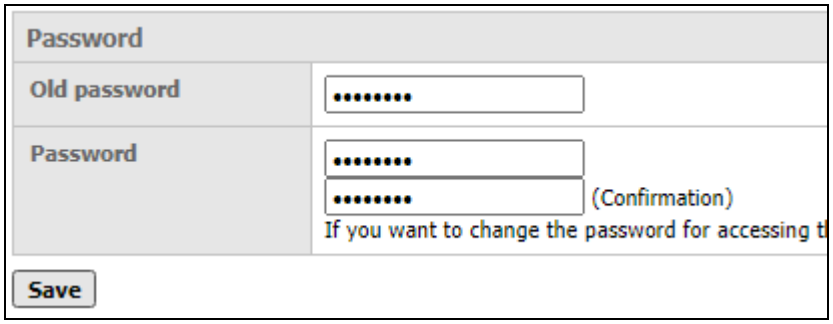
1. Login to the AhsayUBS WebAdmin and go to [System] > [Settings] > [Password].



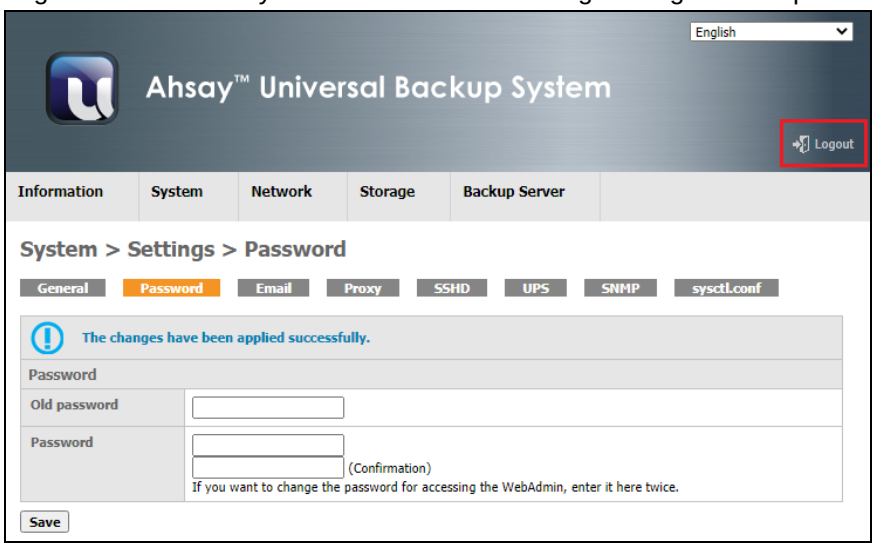
2. Fill in the correct values in the appropriate fields.



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



4. Logout from the AhsayUBS WebAdmin and re-login using the new password.



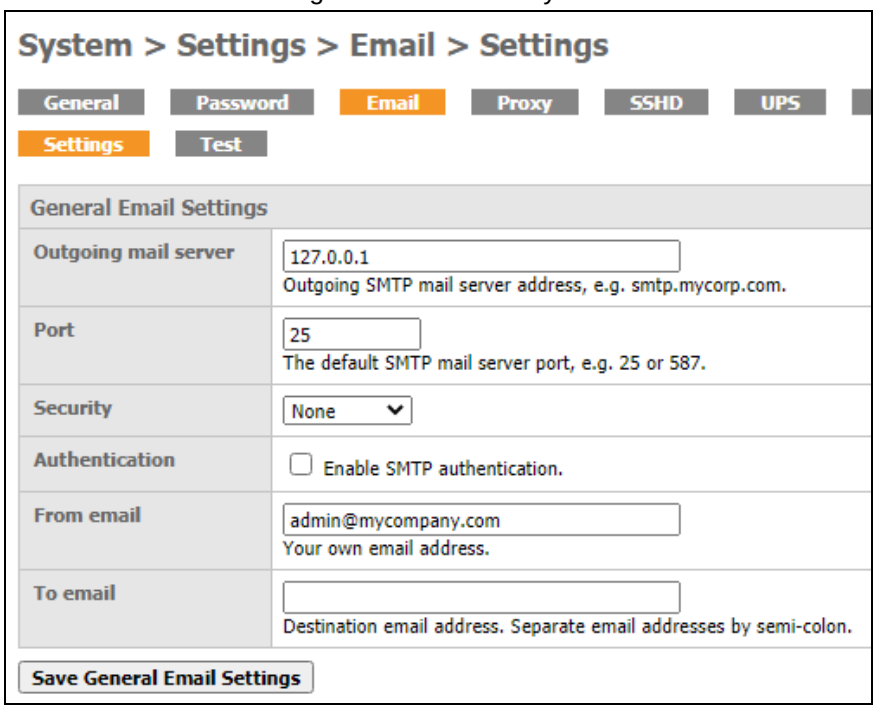
8.1.6 Email Setup

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 following:

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

2. 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.



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

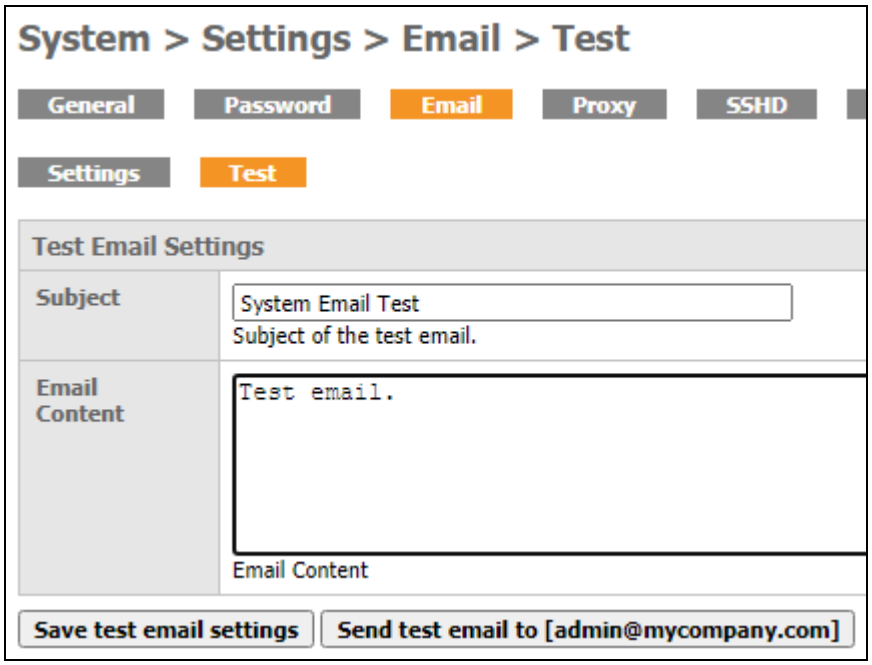
4. Click [Save General Email Settings] buttons to save the settings.

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

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

7. Fill in the all the fields shown in the screen.

8. 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.

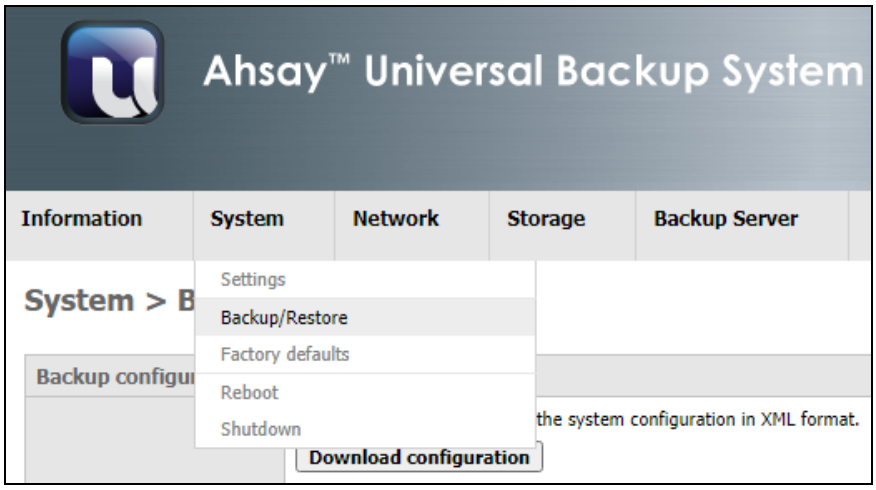


8.1.7 Backup System Configuration

Once you have completed the system configuration on the AhsayUBS WebAdmin. It is recommended to backup the AhsayUBS system configuration settings.

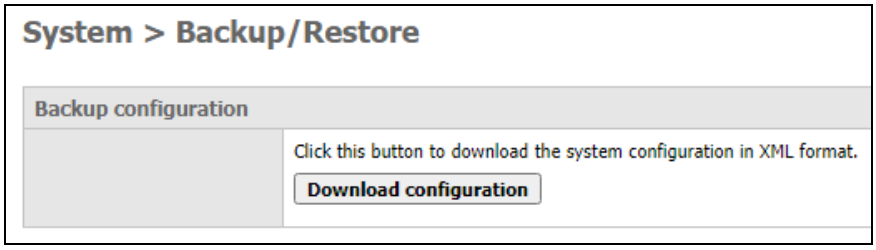
AhsayUBS provides a feature to export the system settings to an XML file.

1. Click [System] > [Backup/Restore]



2. Click the [Download configuration] button to save the current settings as an XML file on your machine.

   This configuration file is useful for system upgrade and system recovery.



Any time you make configuration changes through the AhsayUBS WebAdmin, you should plan to make a backup of your configuration for disaster recovery.

8.2 Backup Server Configuration

Ahsay Cloud Backup Suite (AhsayCBS) is bundled with Ahsay UBS Firmware. However, it must be configured properly before use.

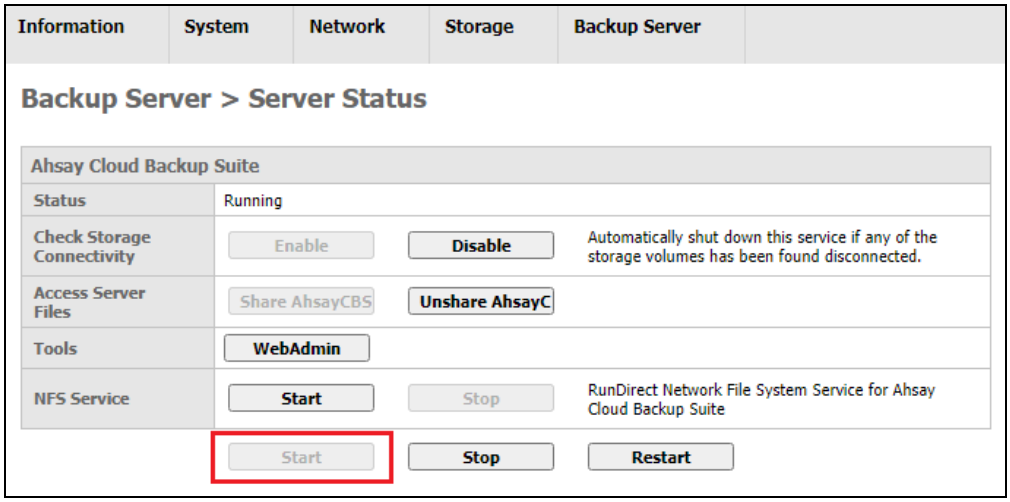
8.2.1 Startup/Stop Services

Please follow the instructions to startup/stop the backup server and the NFS Service:

1. Login to AhsayUBS WebAdmin.

2. Go to [Backup Server] > [Server Status].

3. Click the [Start] button to startup the backup server. Once the backup server has started, you may click the [WebAdmin] button to go to the CBS login page. The default IP address of the backup server is the same as the UBS system and the default server port is 80 (you can reconfigure the connector port via AhsayCBS web admin console).



4. To start the NFS service, go to NFS Service and click on [Start].

   As the NFS service is used for VM RunDirect on AhsayCBS if this service is not started VM RunDirect on AhsayCBS will not work.

8.2.2 Login to AhsayCBS

At the AhsayCBS login page, you can login with default AhsayCBS admin credentials. The default credential username: *system* and the password: *system.*

For first time login, starting with AhsayCBS v8.3.4.0 and onwards, you will be asked to change the password before you can proceed.

Please refer to the AhsayCBS Quick Start Guide for further information on configuring AhsayCBS.

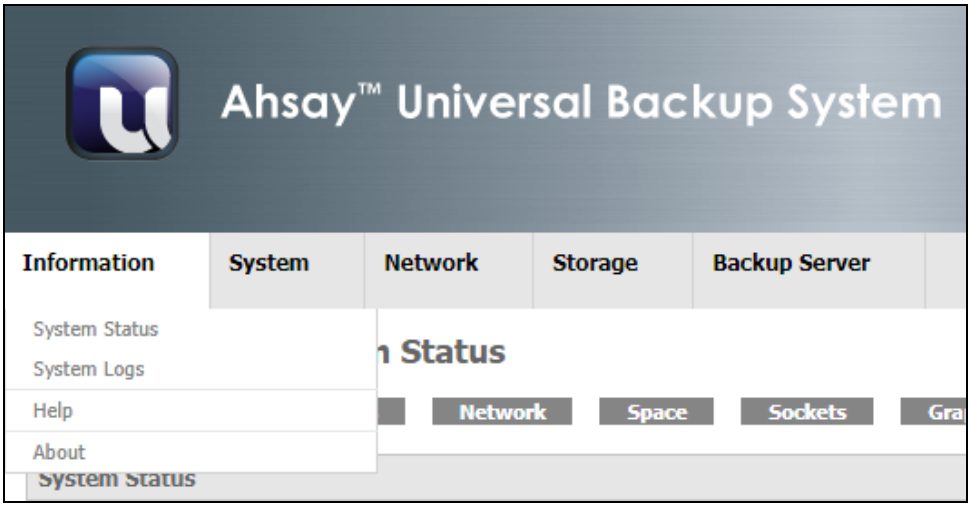
9 Advanced Configuration for AhsayUBS Firmware

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

9.1 Information

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

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



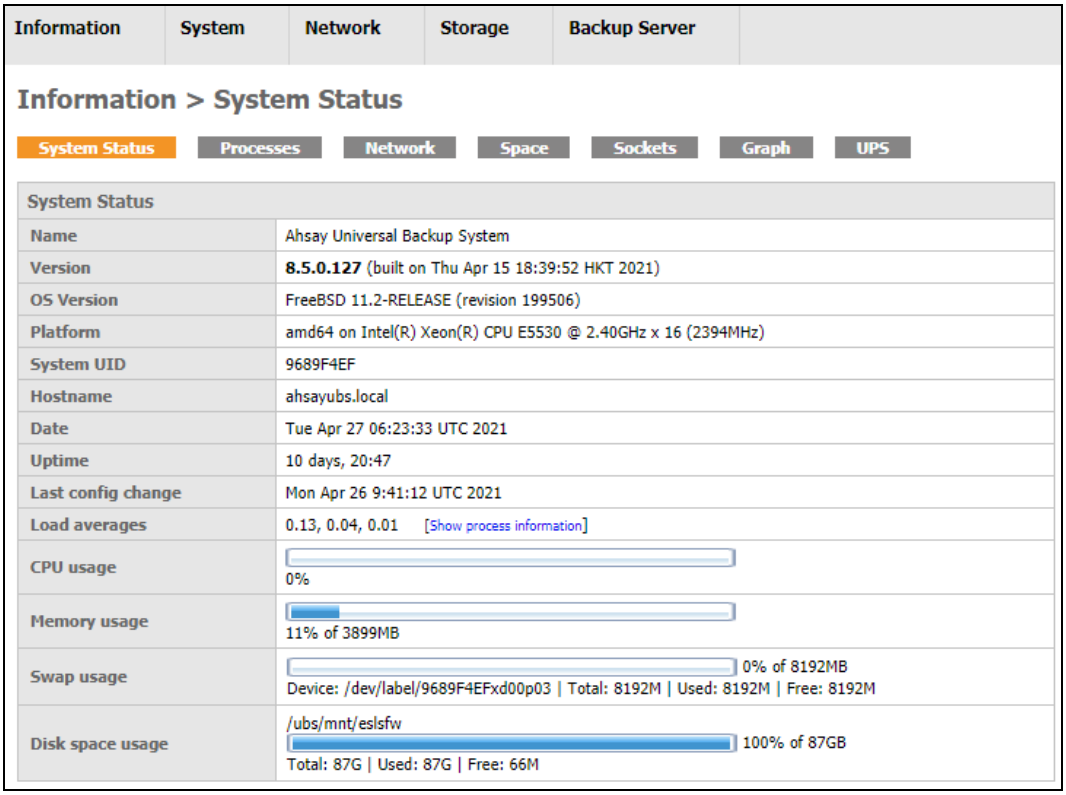
The [Information] menu has been further divided into the following sections:

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

9.1.1 System Status

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

System Status



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

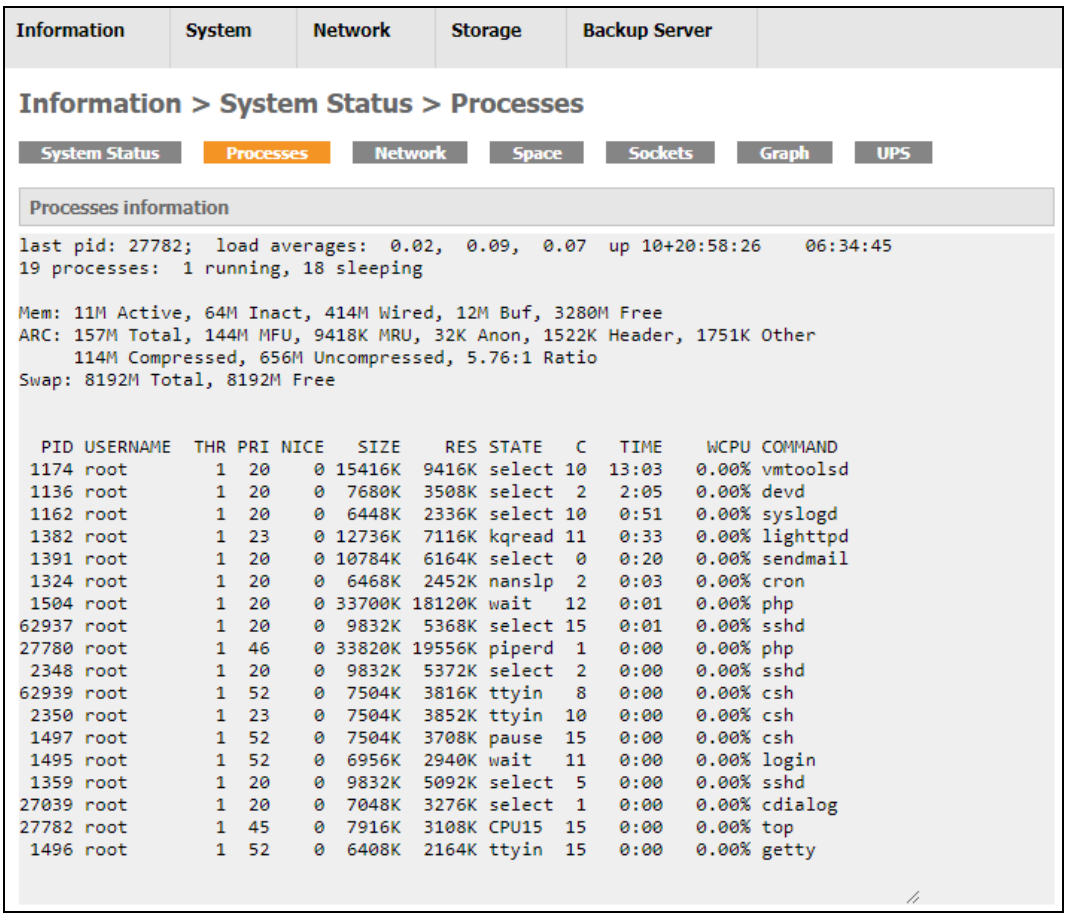
- **Name:** The name of the product. i.e. AhsayUBS
- **Version:** The version number and built time of the AhsayUBS Firmware.
- **OS Version:** The OS name and its version in the AhsayUBS.
- **Platform:** Type of CPU and its speed in the AhsayUBS.
- **System UID:** The ID of the AhsayUBS. The ID will be different with each installation of AhsayUBS.
- **Hostname:** The hostname of the 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 saved your settings in the 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 the AhsayUBS.

- **CPU usage:** Actual CPU usage now in percentage in the AhsayUBS.
- **Memory usage:** The percentage of memory in use with respect to the physical memory in the AhsayUBS.
- **Swap usage:** Provided swap path and its usage information in each of the swap partitions in the AhsayUBS. The swap space acts as the virtual memory, it allows the AhsayUBS to store extra data in the swap space if there is not enough physical memory. 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 the 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.

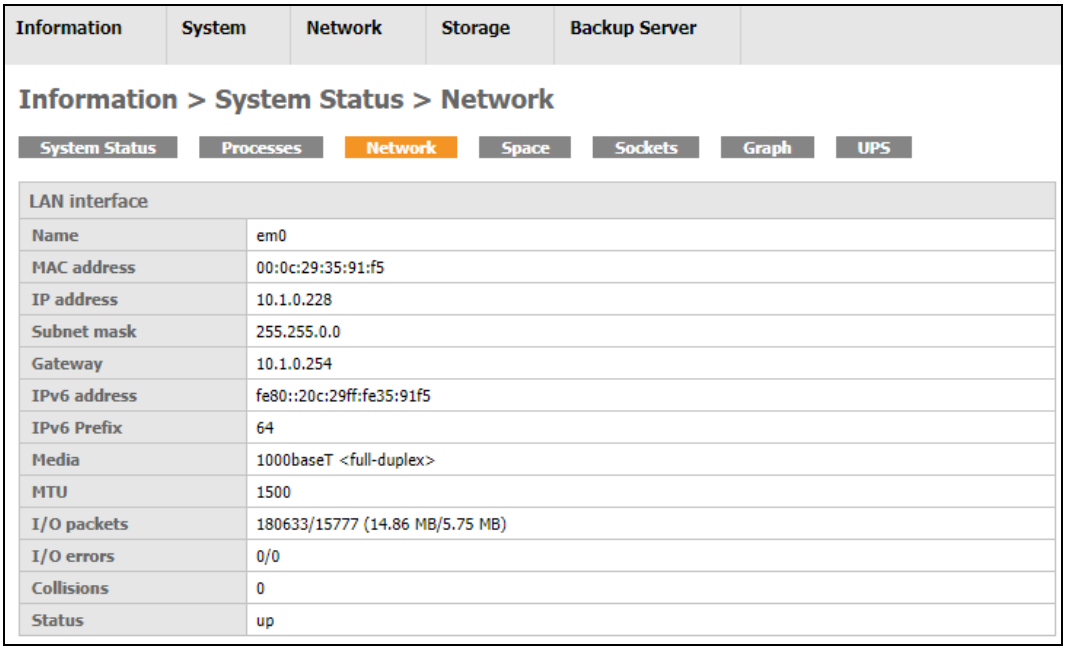
Processes

The [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.



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:

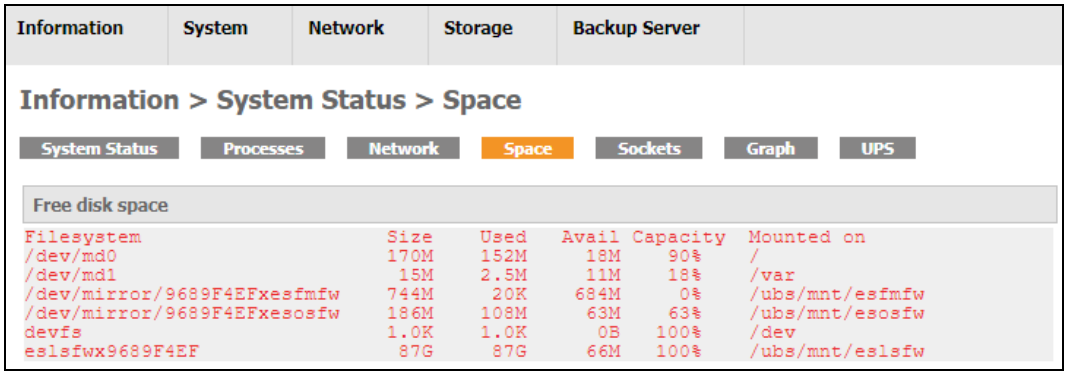
- **Name:** The real name of the interface stated in the OS.
- **MAC address:** The physical address for the interface.
- **IP address:** The IP address currently set for the interface.
- **Subnet mask:** The subnet mask currently set for the interface.
- **Gateway:** The gateway currently set for the interface.
- **IPv6 address:** The IPv6 address currently set for the interface.
- **IPv6 Prefix:** The network prefix currently set for the interface.
- **Media:** The shared media currently set for the interface.
- **MTU:** The maximum transfer unit currently set for the 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 the interface from system uptime.
- **Collisions:** Number of collisions from system uptime.
- **Status:** State of the interface. Up or Down.

Space

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

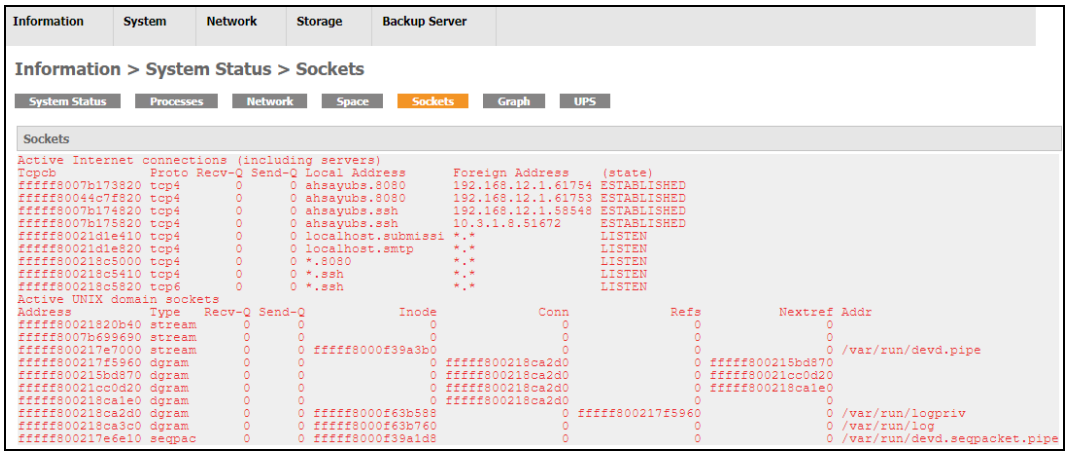
- Total Size of Corresponding File System
- Used Size of Corresponding File System
- Available Size of Corresponding File System
- Capacity Occupied in Corresponding File System

In the example below, a device name “/dev/md0” has been mounted at the root directory. It has 170MB in total and 152MB in use. The used capacity is 90% (152MB/170MB) and 18MB remains available for use.



Sockets

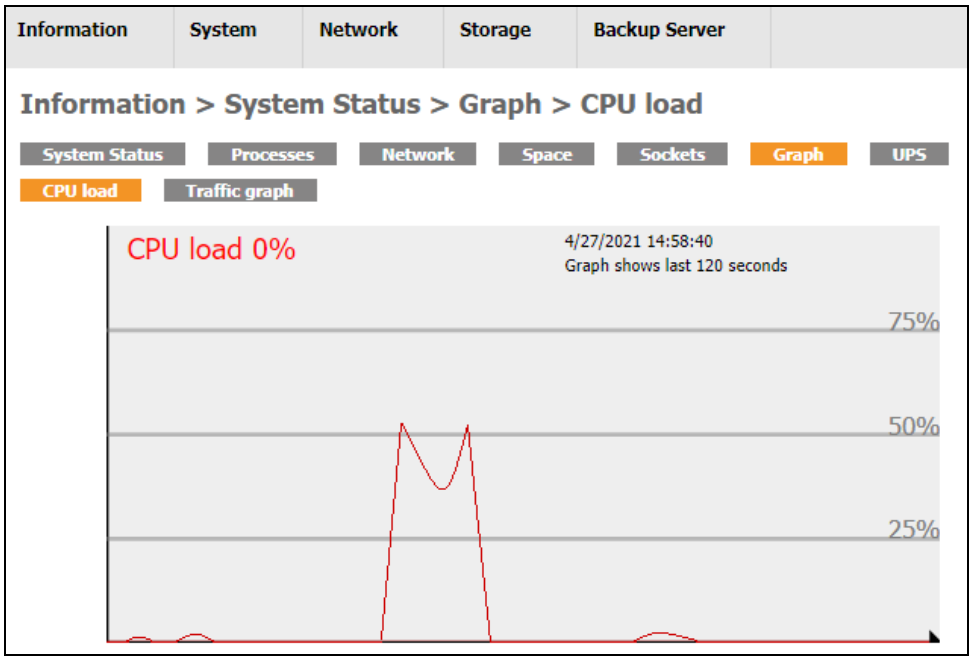
This page provides the information of the [Active Internet connections] and [Active UNIX domain sockets].



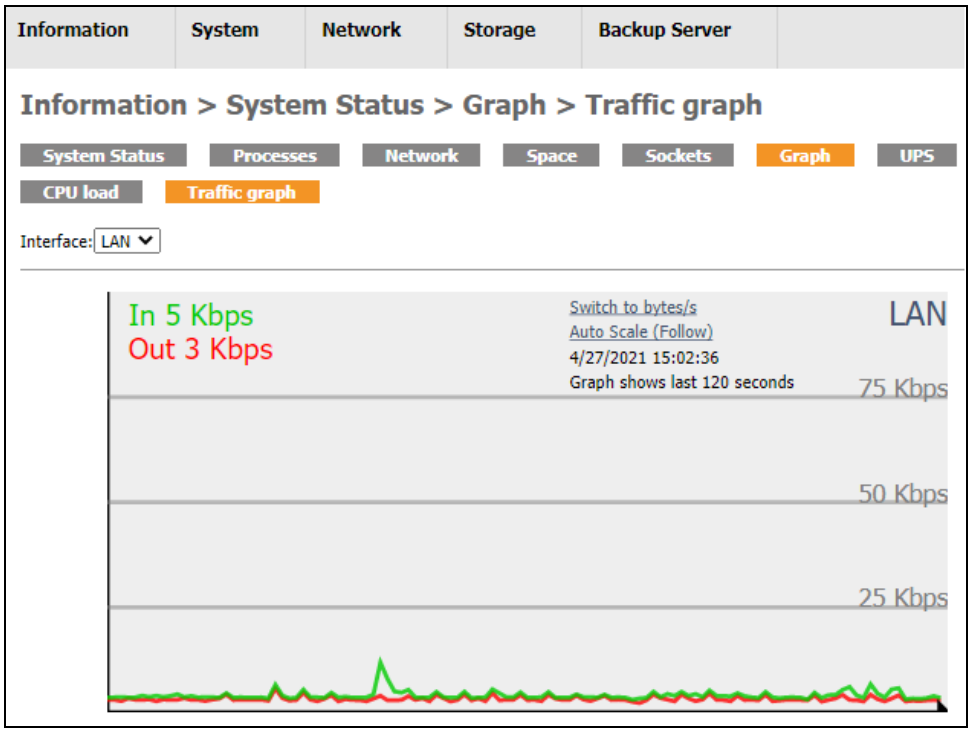
Graph

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.

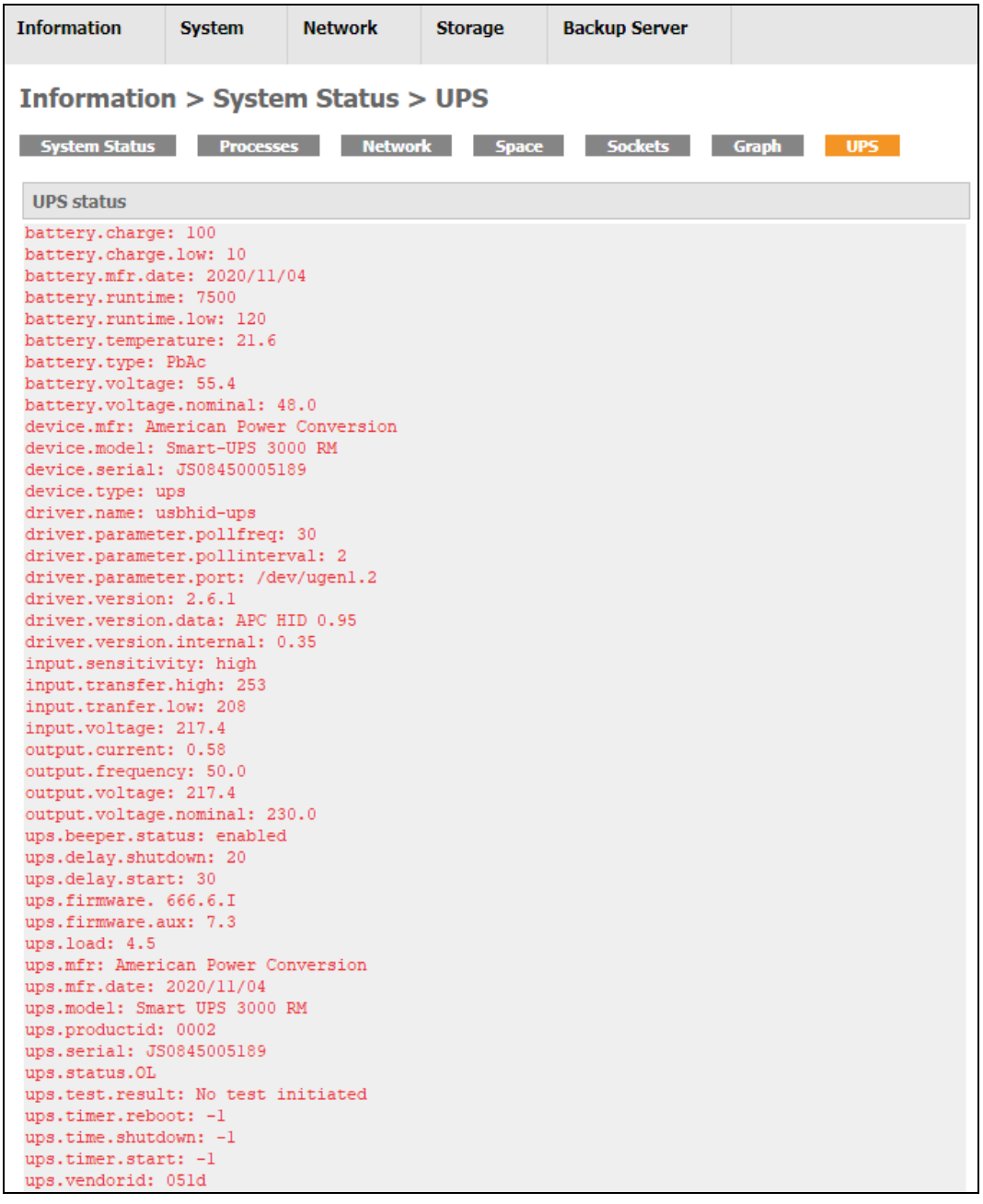


UPS Status

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

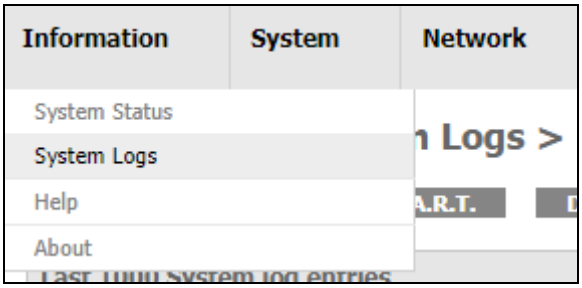
For more information about how to configure a connected UPS, please refer to the section related to UPS settings.



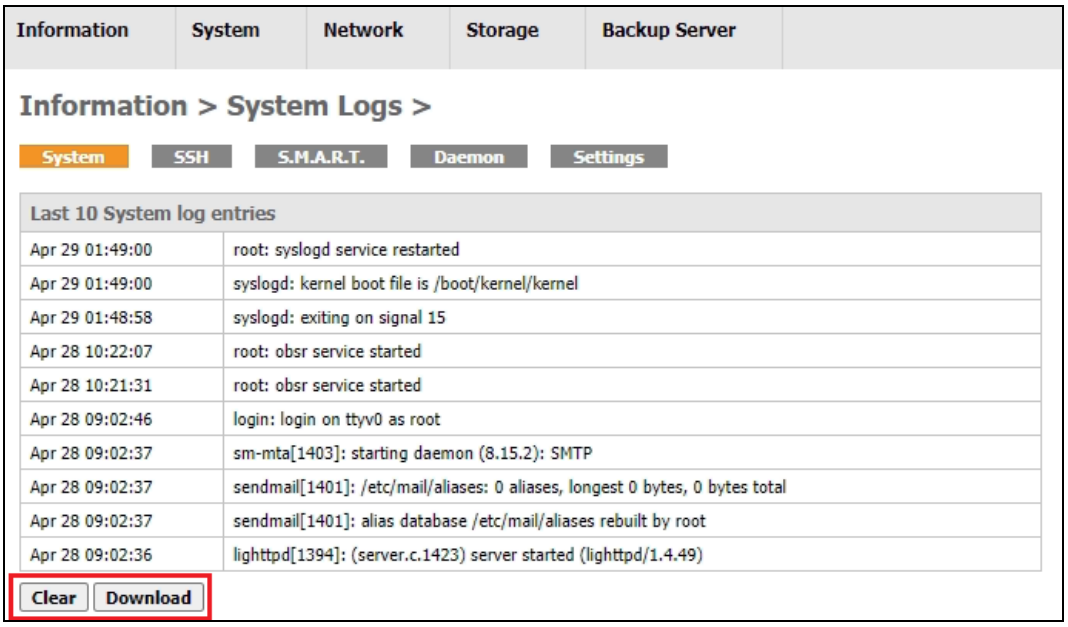
9.1.2 System Logs

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 system log types 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.

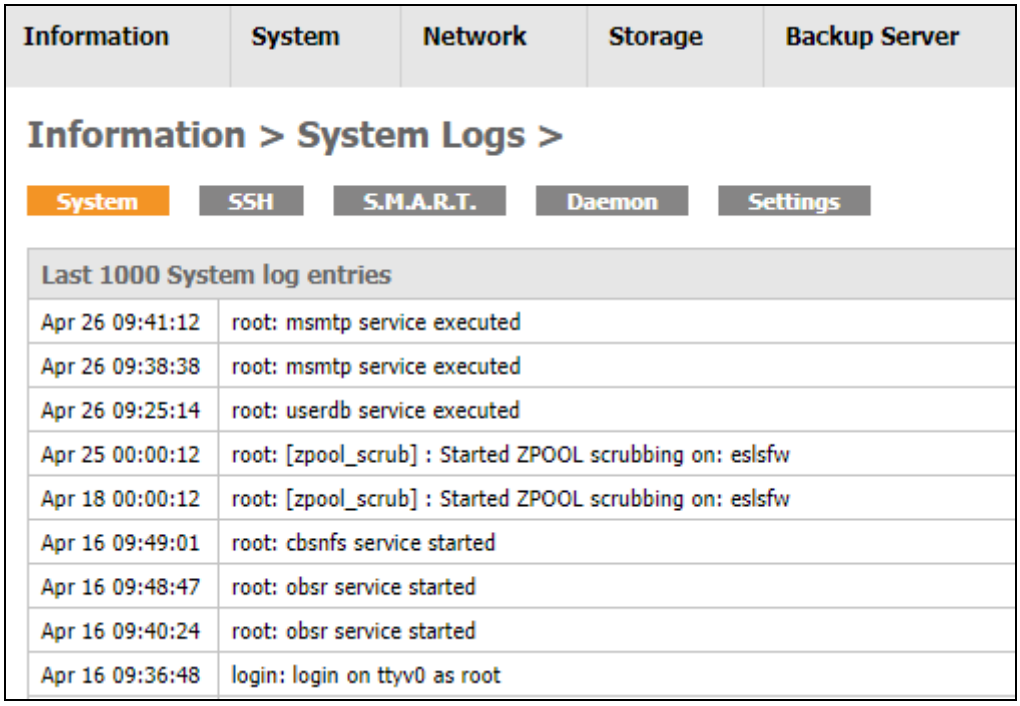


WARNING

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

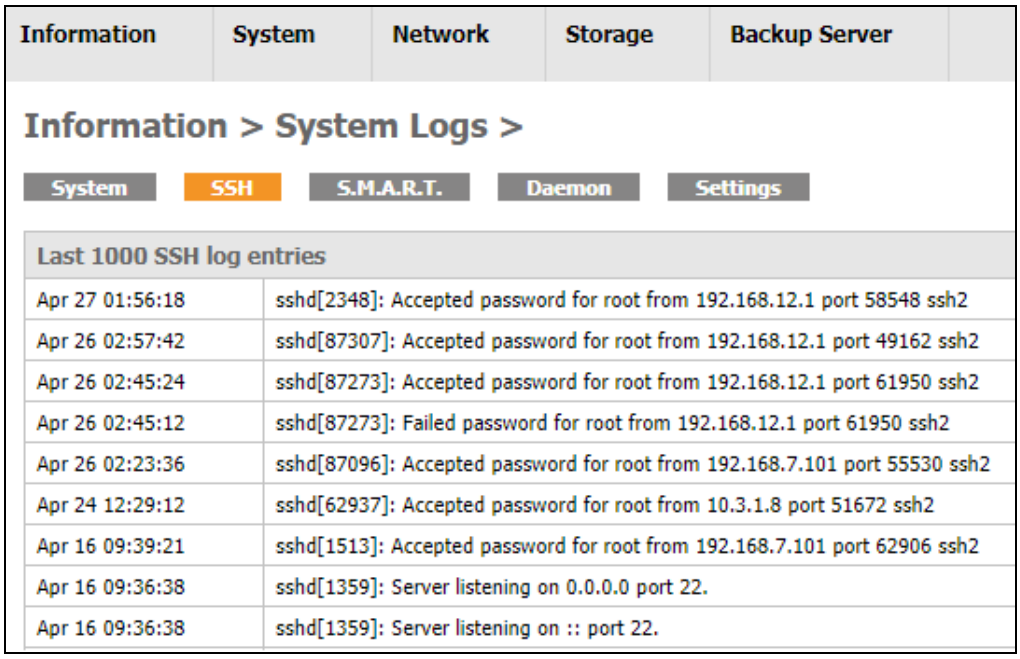
System

This page contains the system logs.



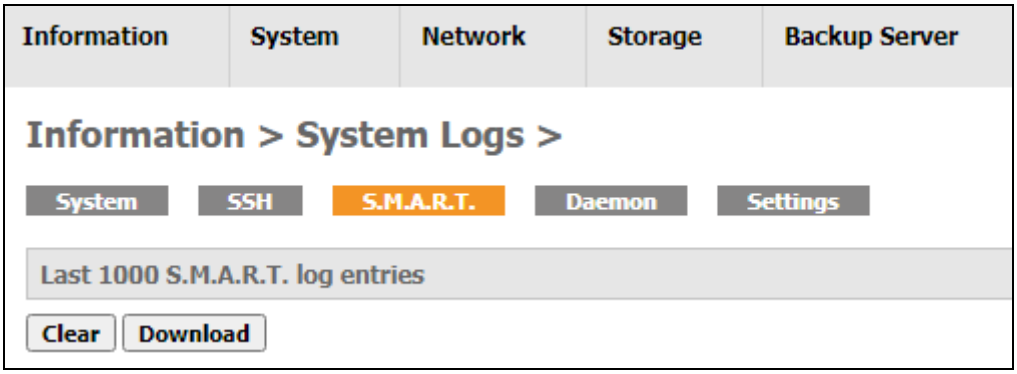
SSH

This page contains the logs for all SSH traffic.



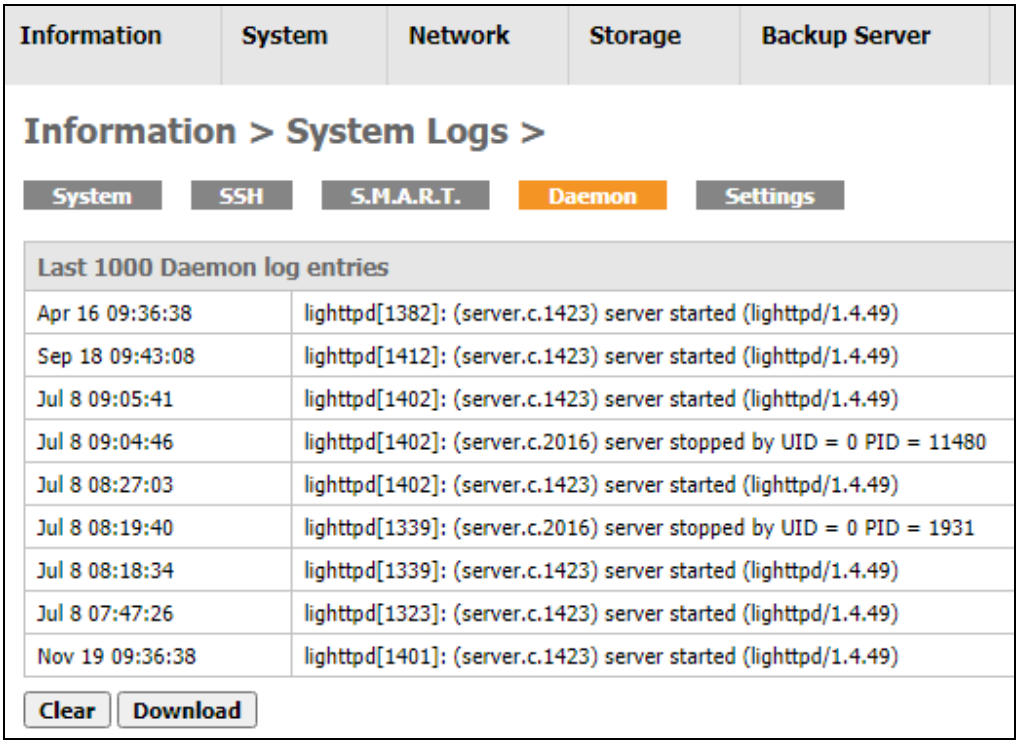
S.M.A.R.T.

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



Daemon

This page contains logs related to daemons.

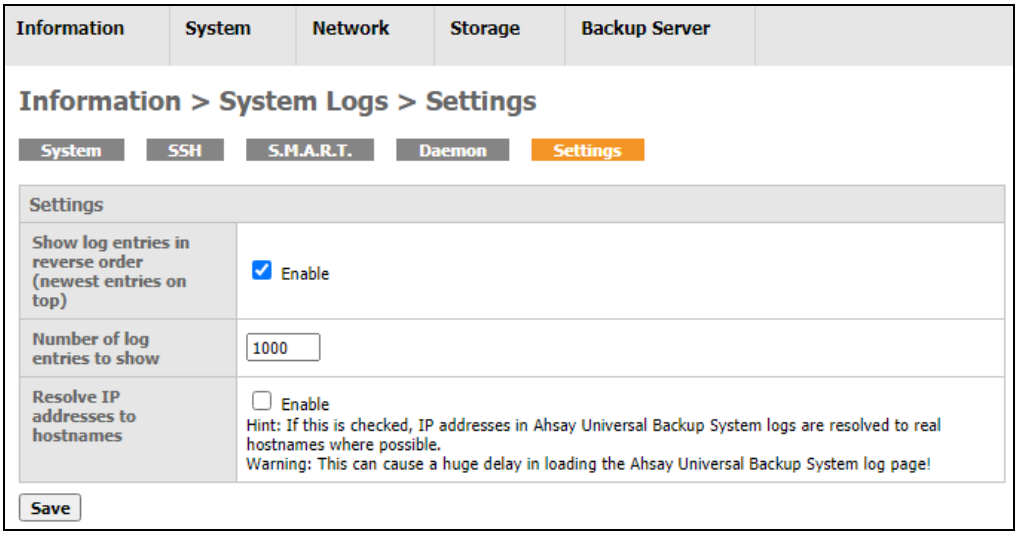


Settings

Modify these settings for the log displayed 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

To save your settings, click the [Save] button, click the menus above to view the logs again and to verify if the settings had been changed.

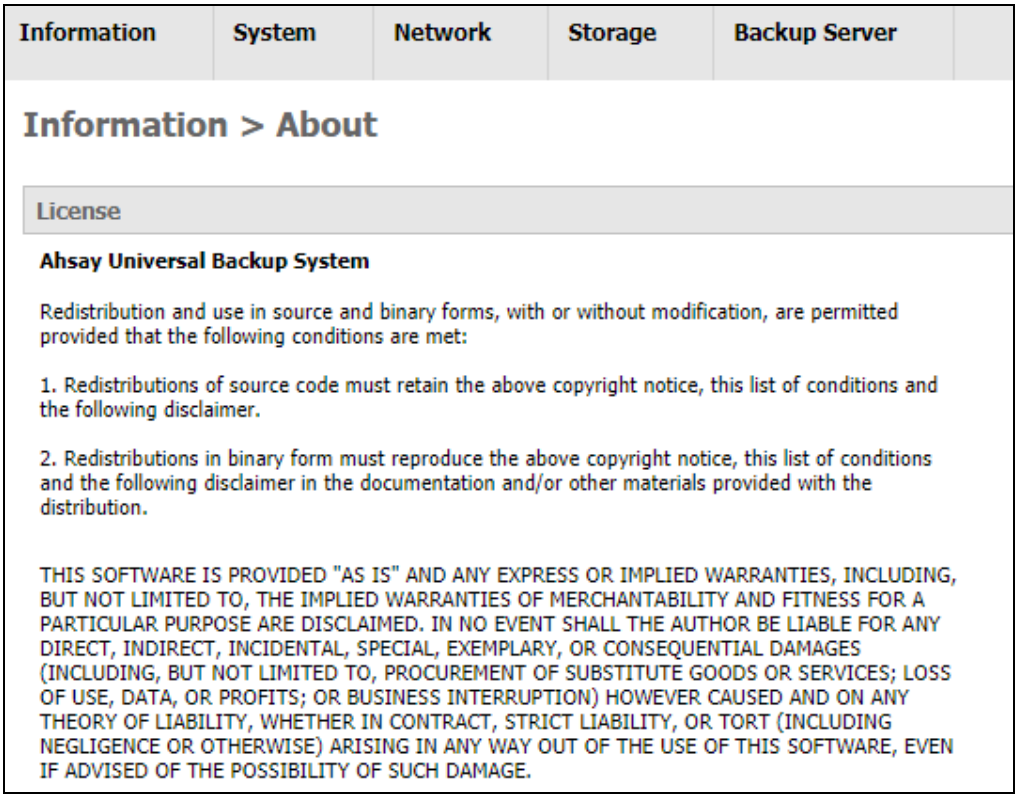


9.1.3 Help

Contains a link to the Ahsay Support Centre if you require to contact Ahsay for technical support.

9.1.4 About

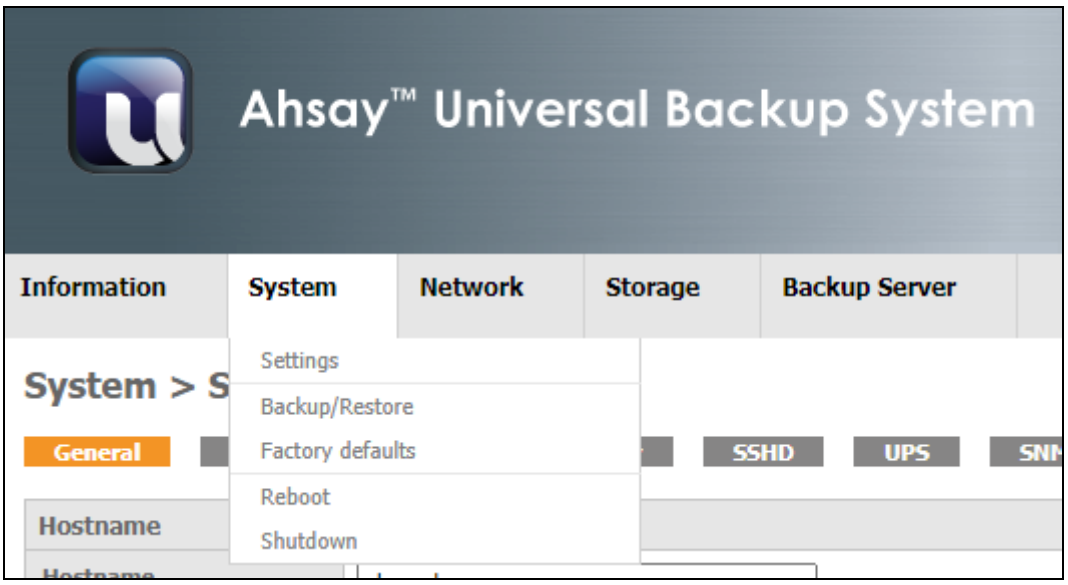
About page for the AhsayUBS.



9.2 System

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

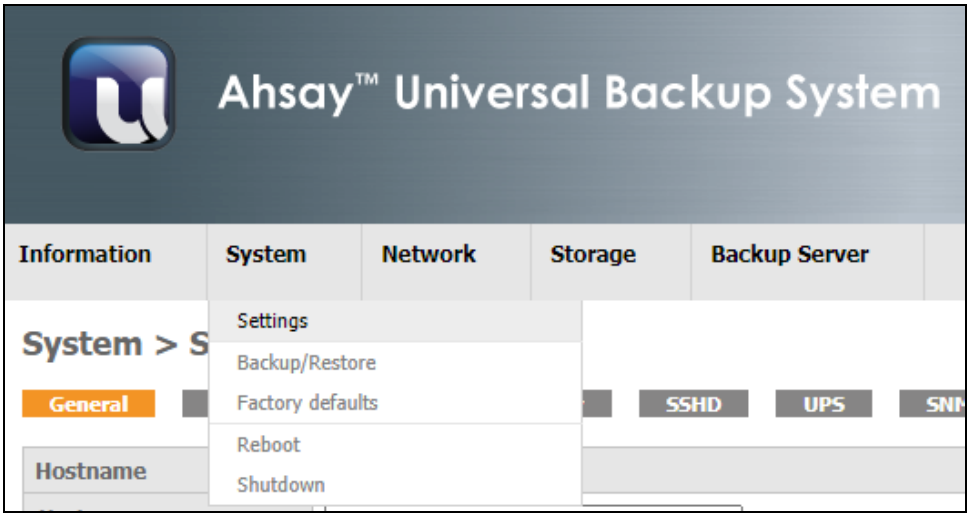
When the mouse cursor is pointed over the word [System] in the menu bar, the menu will be shown as below:



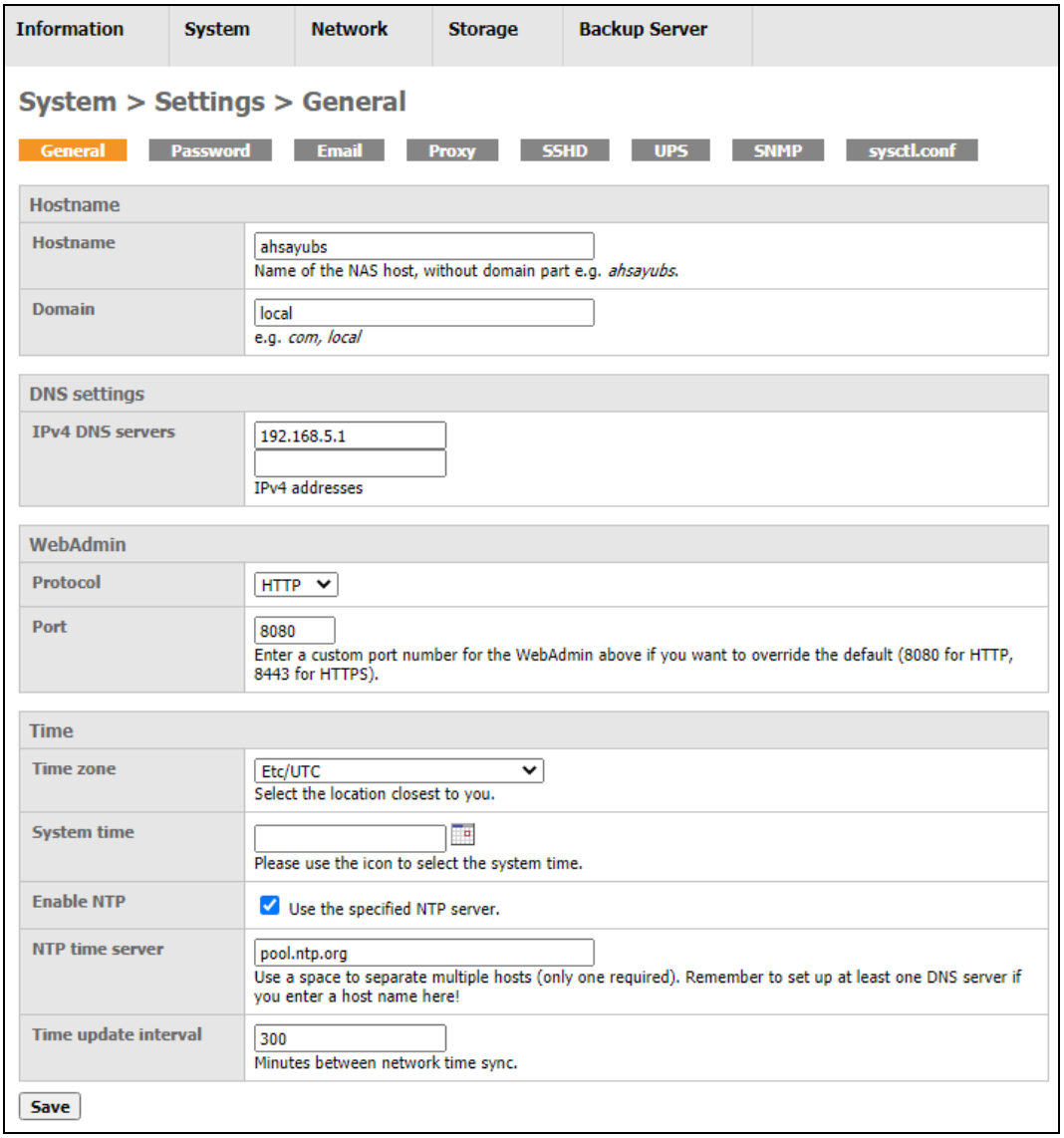
The [System] menu has been further divided into the following sections:

- 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)

9.2.1 Settings



The general system settings can be set here.



General

Hostname:

- **Hostname:** Sets the hostname of this AhsayUBS. It is advised to use a 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.

WebAdmin:

- **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 Firewall Settings section for the default port configuration.

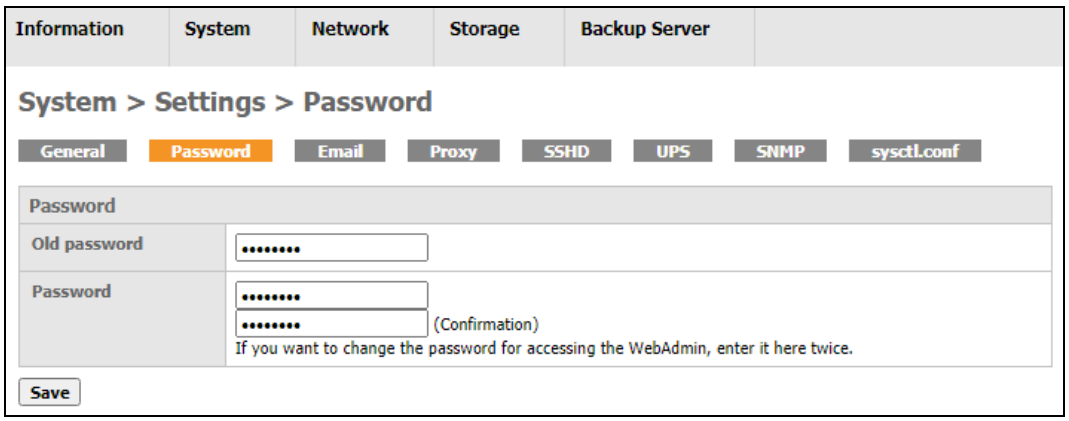
- **Certificate (for HTTPS only):** Paste a signed certificate in X.509PEM format to the textbox provided for this AhsayUBS.
- **Private key (for HTTPS only):** Paste a private key in PEM format to the textbox provided for this AhsayUBS.

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.

Password

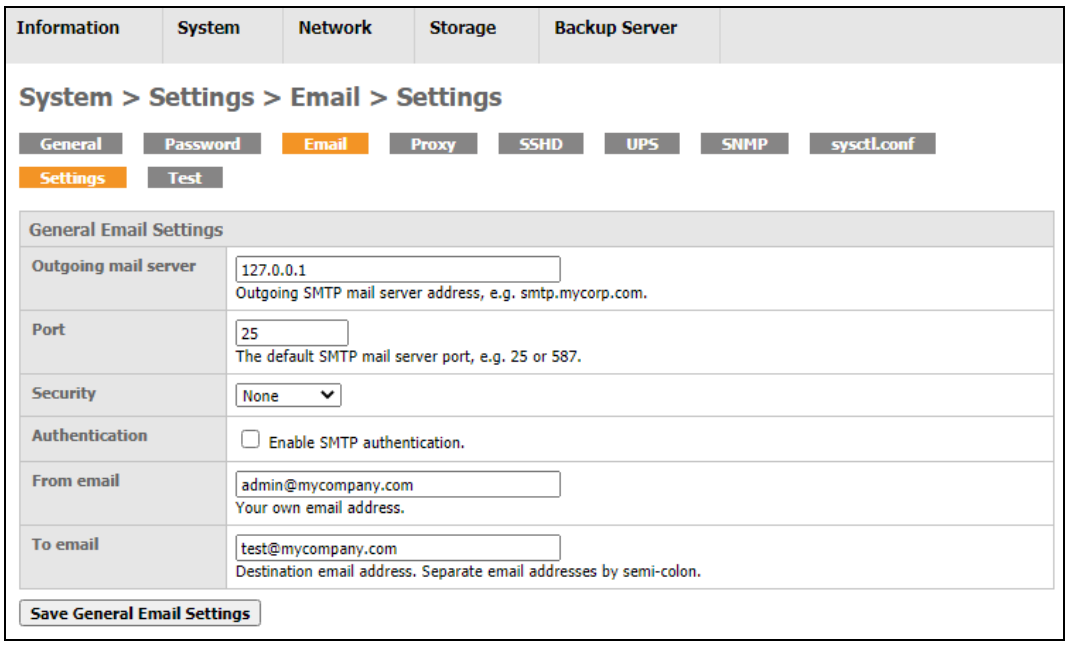
This page allows you to set the password for the default administrator account of the AhsayUBS (i.e. **admin**). You need to provide old password to authenticate the change in password. It is required type the new password. Then you can click the [Save] button to save your settings.



Email

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 configure in the [General Email Settings]:

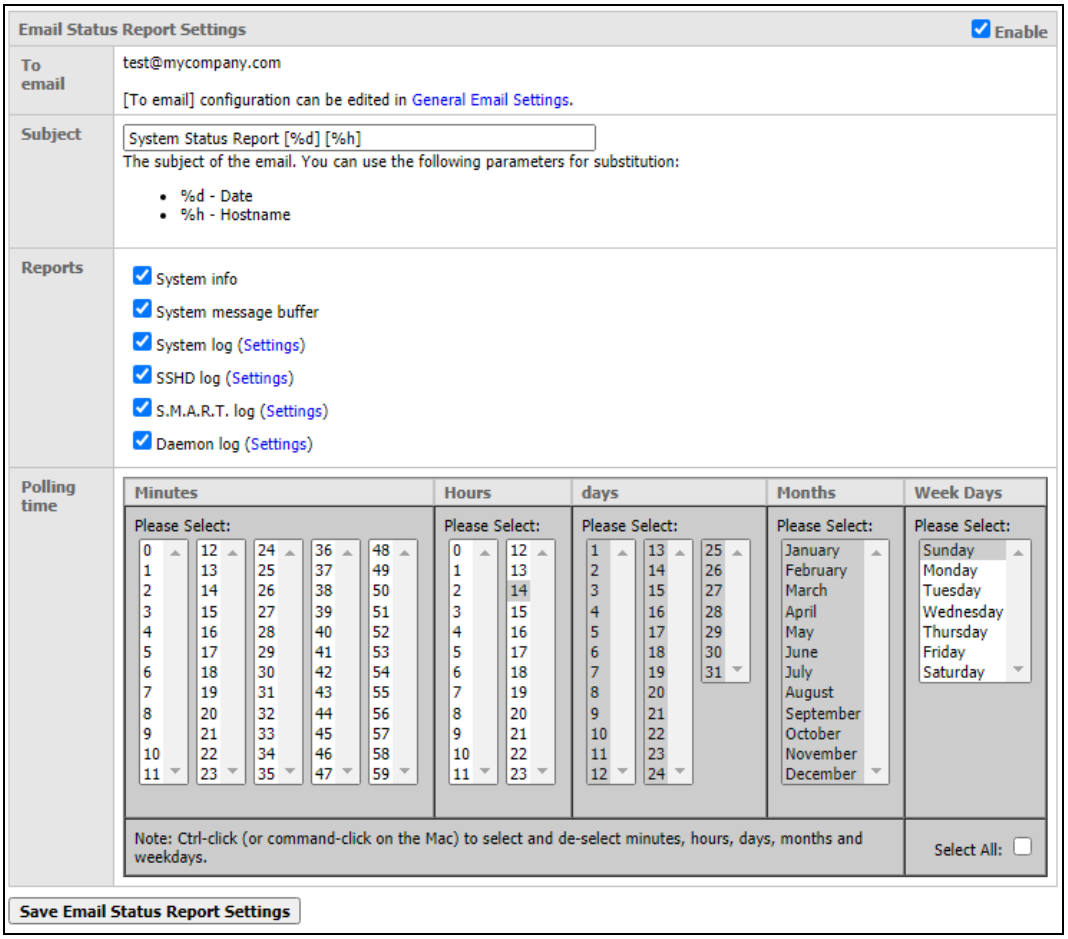
- **Outgoing mail server:** Please enter the outgoing SMTP mail server address e.g. “smtp.mycompany.com”.
- **Port:** Please enter the SMTP mail server port. The default port number for SMTP server is port **25**.
- **Security:** Please select the security protocol. You can choose **None**, **SSL** or **TLS**.
- **Authentication:** Click the checkbox to enable the SMTP authentication.
- **Login Name (Shows only when Authentication is enabled):** The login name for the SMTP name server.
- **Password (Shows only when Authentication is enabled):** The password for the SMTP mail server.
- **Authentication Method (Shows only when Authentication is enabled):** 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
  - 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

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

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



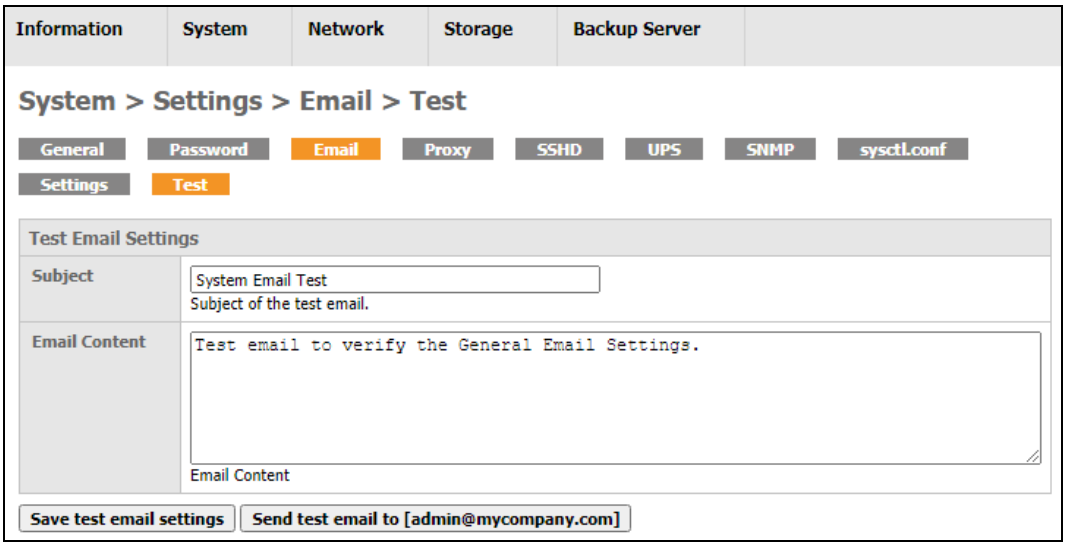
The following fields can be set in the [Email Status Report Settings]:

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

Test

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



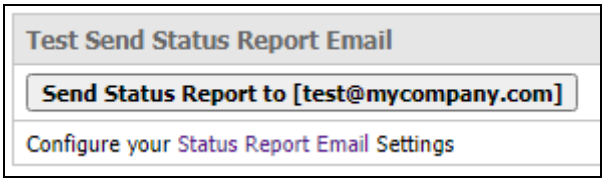
The [Test Email Settings] is for verifying the settings in the [General Email Settings] in the page [System]> [Settings] > [Email] > [Settings]. To verify the settings, you can now send a test email to the [From email] inside the [General Email Settings] by:

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.

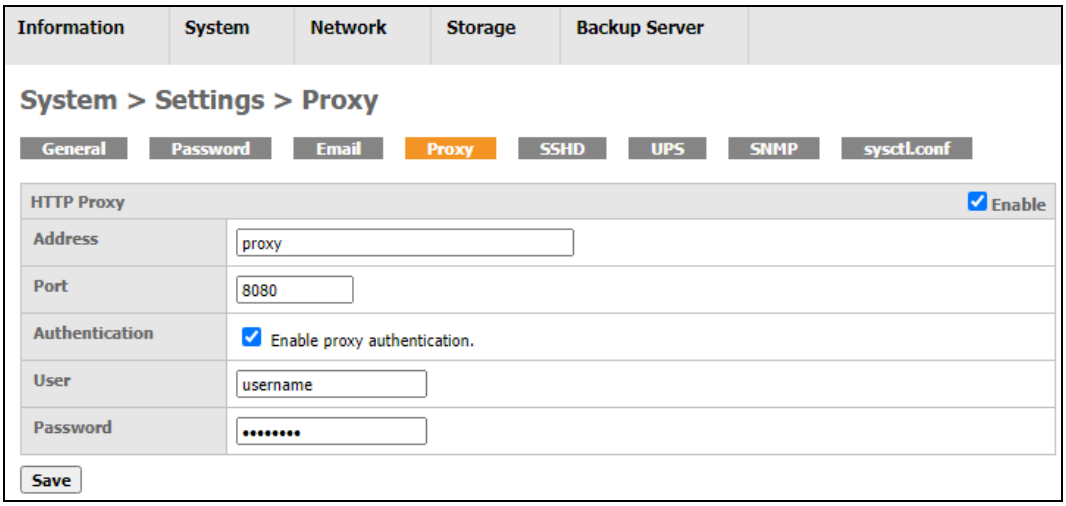
You may also verify the settings inside the [Email Status Report Settings] by sending a test email to the email entered inside the [To email] field in the [Email Status Report Settings] table (i.e. [System] > [Settings] > [Email] > [Settings]).

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.



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.
- **User (Shows only when Authentication is enabled):** Enter the username for login to the proxy server.
- **Password (Shows only when Authentication is enabled):** Enter the password for login to the proxy server.

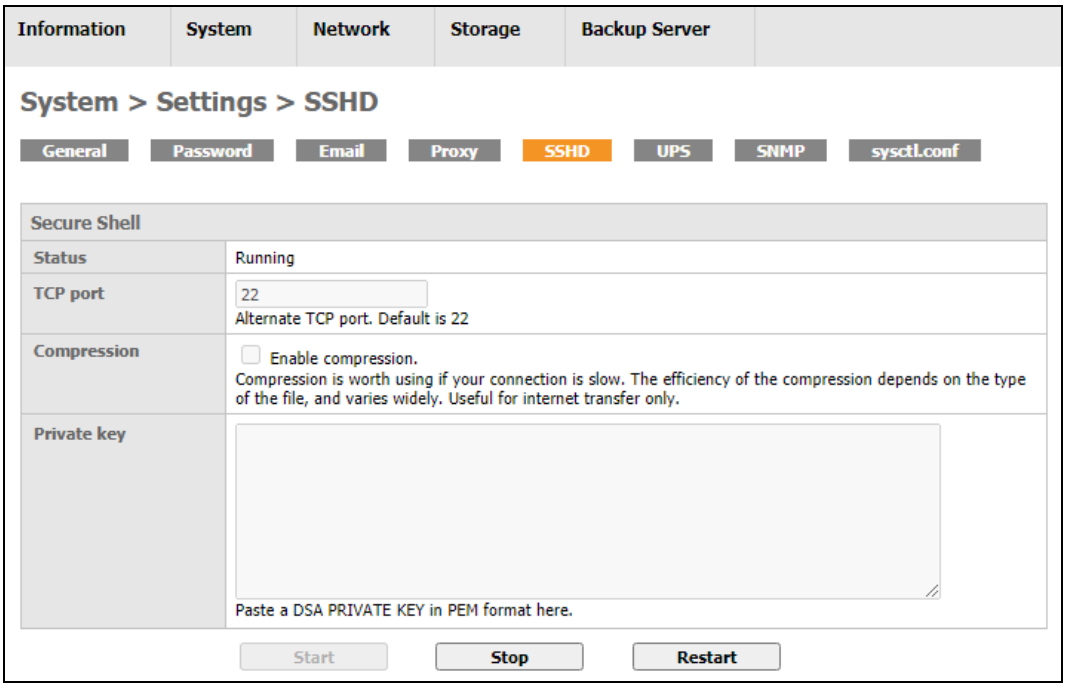
Please click the [Save] button to save the above settings.

NOTE

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

SSHD

SSHD daemon provides remote console access to the AhsayUBS. This feature is designed for troubleshooting purpose only, and not meant for 24x7 access. **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**:
  - Running: SSHD is enabled.
  - 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.

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:

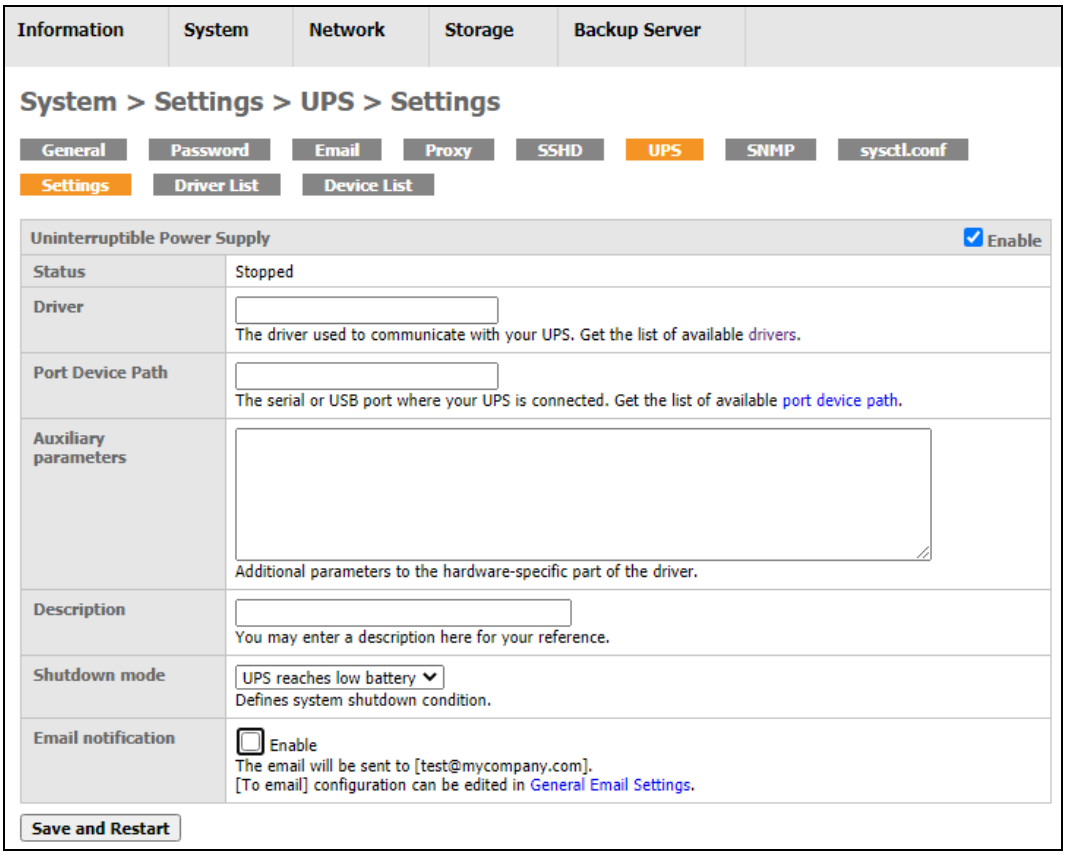
- Initiate AhsayUBS shutdown sequence upon defined UPS power events.
- Monitoring and Log the UPS status [On Line Power / On Battery].

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].

Settings

This is the main page to 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 configuring 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].

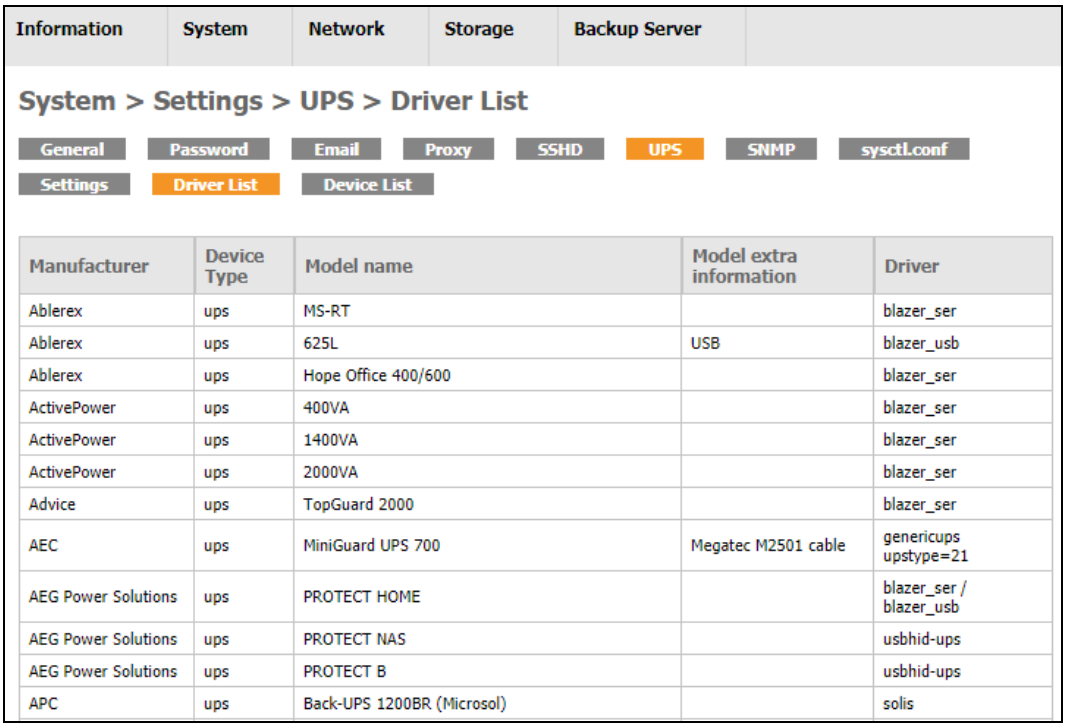
Please click [Save and Restart] button to save the above settings.

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
AEG Power Solutions	ups	PROTECT HOME		blazer_ser / blazer_usb
AEG Power Solutions	ups	PROTECT NAS		usbhid-ups
AEG Power Solutions	ups	PROTECT B		usbhid-ups
APC	ups	Back-UPS 1200BR (Microsol)		solis

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].

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.

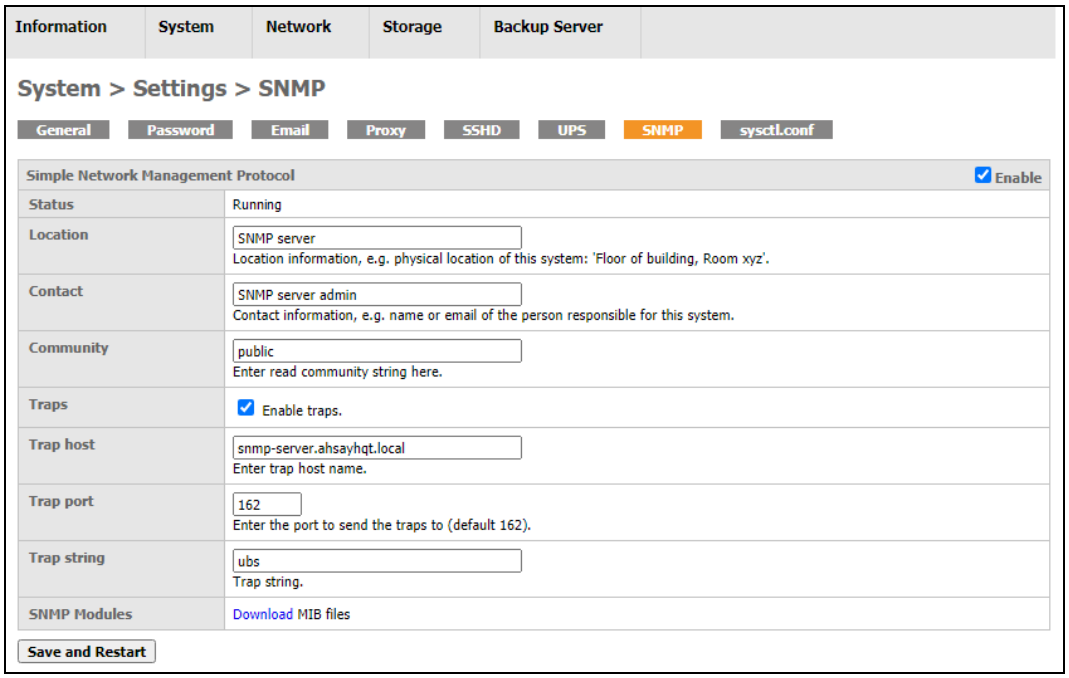
Here are the SNMP modules bundled with the 'bsnmpd' daemon:

- 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].

SNMP Settings

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



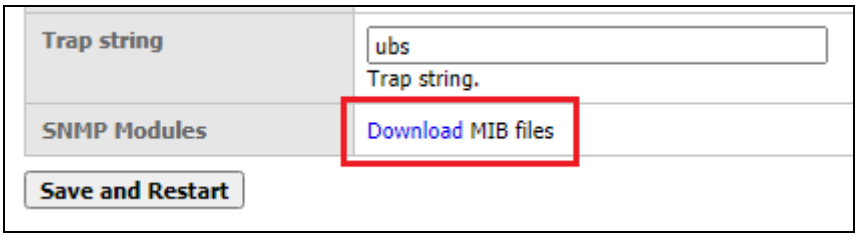
Please enter / select the fields below to configure the 'bsnmpd' daemon:

- 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 the 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.

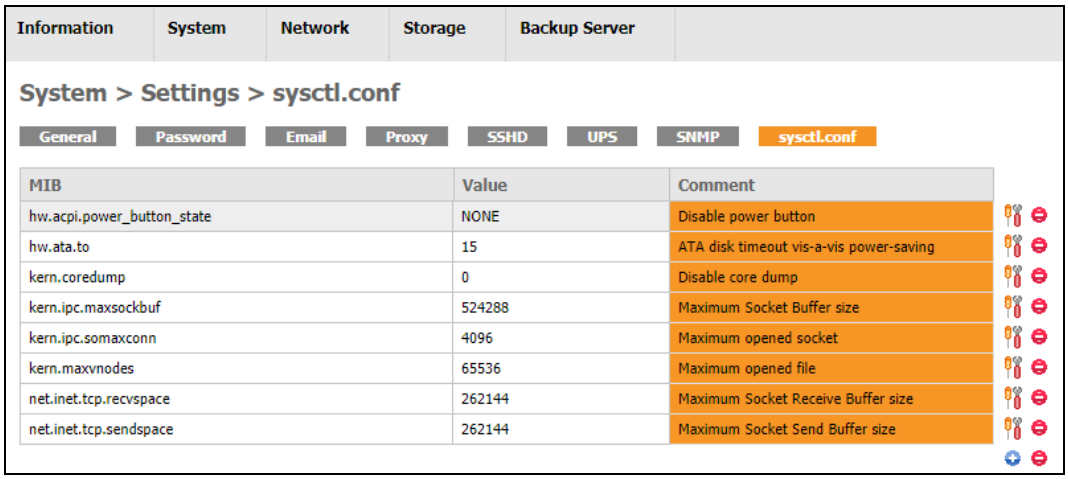
Sysctl.conf

The “sysctl.conf” is located inside the “/etc” which is a configuration file for making changes in FreeBSD (which is the OS of the AhsayUBS). This includes many advanced options for 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.

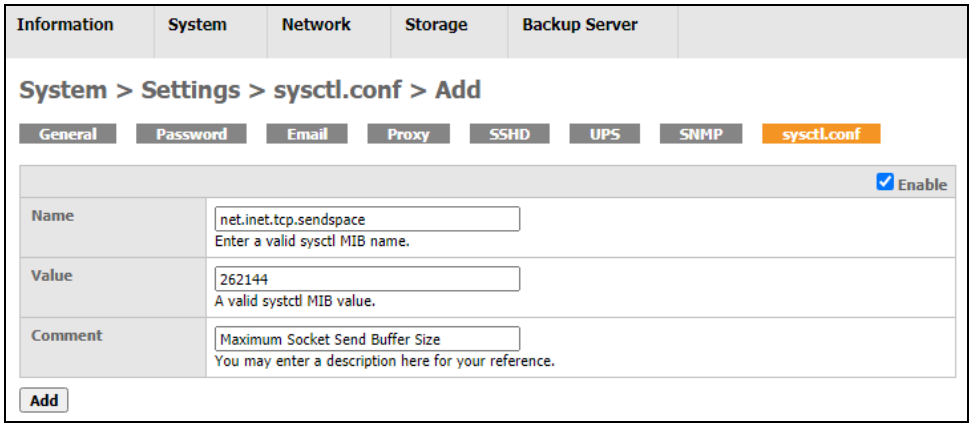
A screenshot of the [System] > [Settings] > [sysctl.conf] is captured below. It shows that all the MIB entries are enabled except the entry “hw.acpi.pwer_button_state”.



Here are the guidelines to make changes in the “sysctl.conf” file in the AhsayUBS.

Add MIB entry:

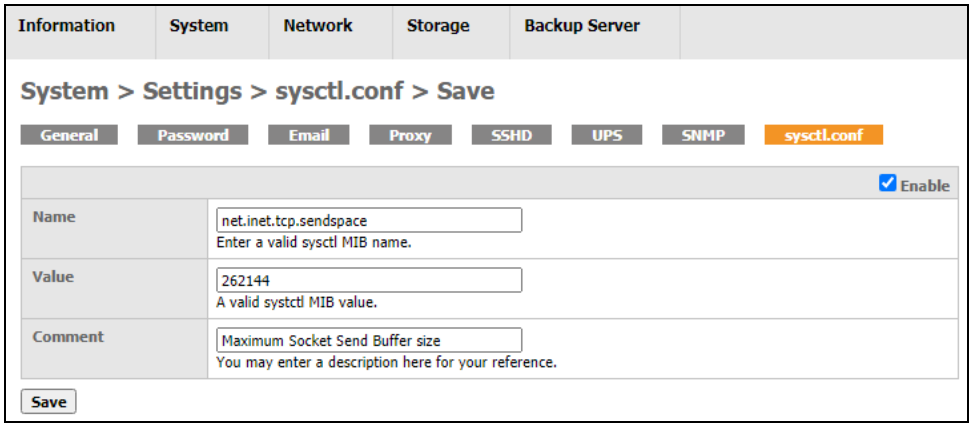
1. Click the ‘ ’ icon.
2. Fill in the required fields in the table. Check the [Enable] checkbox to enable the MID. Leave it unchecked if you do not want the MIB to be enabled after adding.



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

Edit MIB entry:

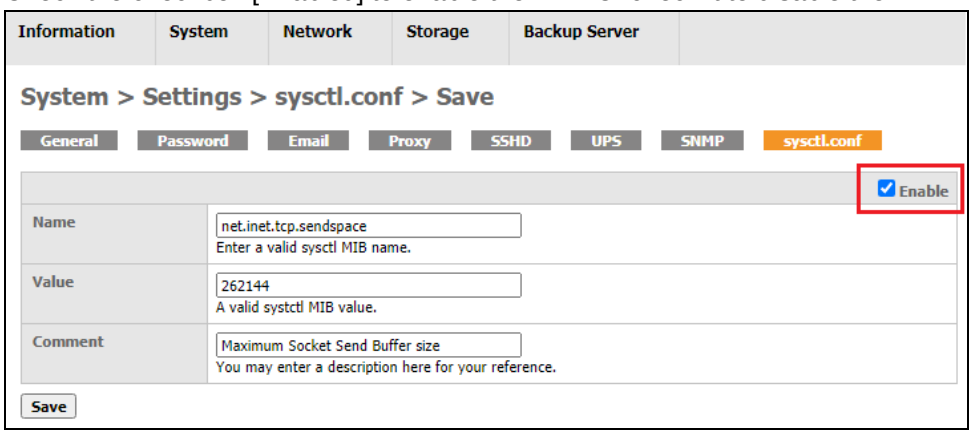
1. Look for the MIB entry to be edited.
2. Click the '  ' icon.
3. Edit the fields in the page.



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 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 MIB entry:

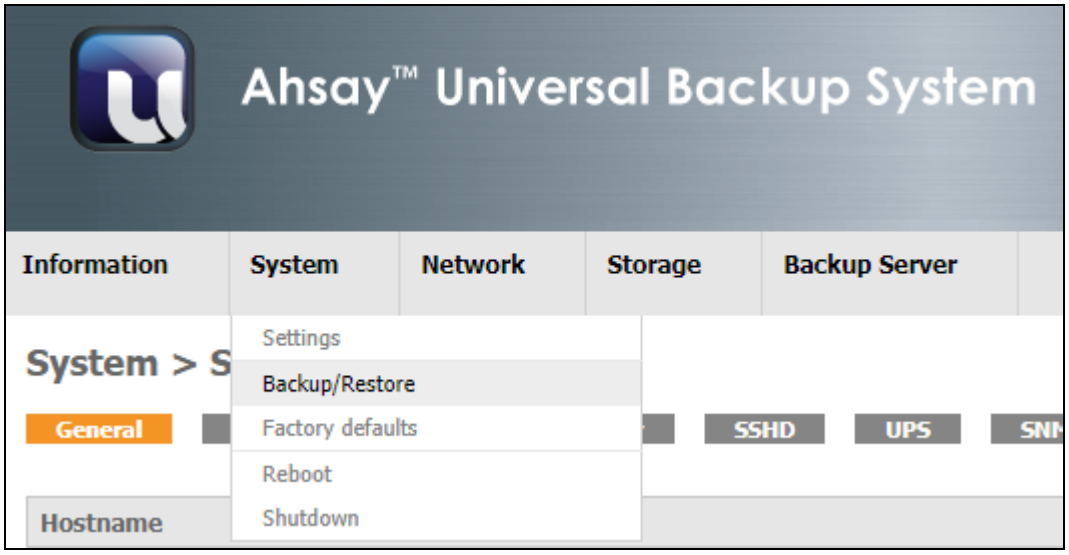
1. Look for the MIB entry to be deleted.
2. Click the '  ' icon at the row that the MIB entry to be deleted.
3. In the alert box, click [OK] to confirm the delete of the entry. Click [Cancel] to abort.
4. Click the [Apply Changes] button.
5. The MIB entry is deleted successfully.

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.

9.2.2 Backup/Restore AhsayUBS Settings

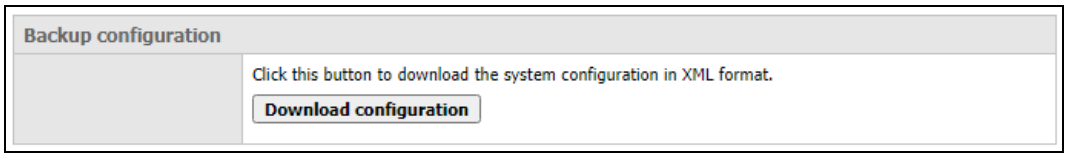
The AhsayUBS runtime configuration is stored as an XML file. The XML file contains all settings information available in AhsayUBS WebAdmin.



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

Backup Configuration

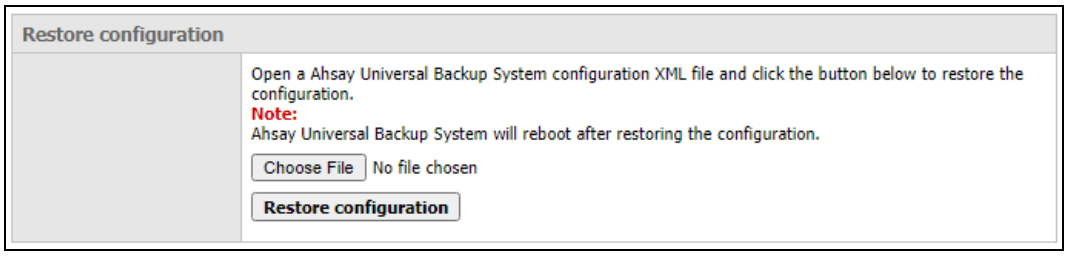
You can download the runtime configuration file of AhsayUBS WebAdmin by clicking the button [Download configuration].



Restore Configuration

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

- Adapted a new AhsayUBS with the same configuration of hardware, IP settings.
- Mistakenly configured anything wrongly in the AhsayUBS WebAdmin.

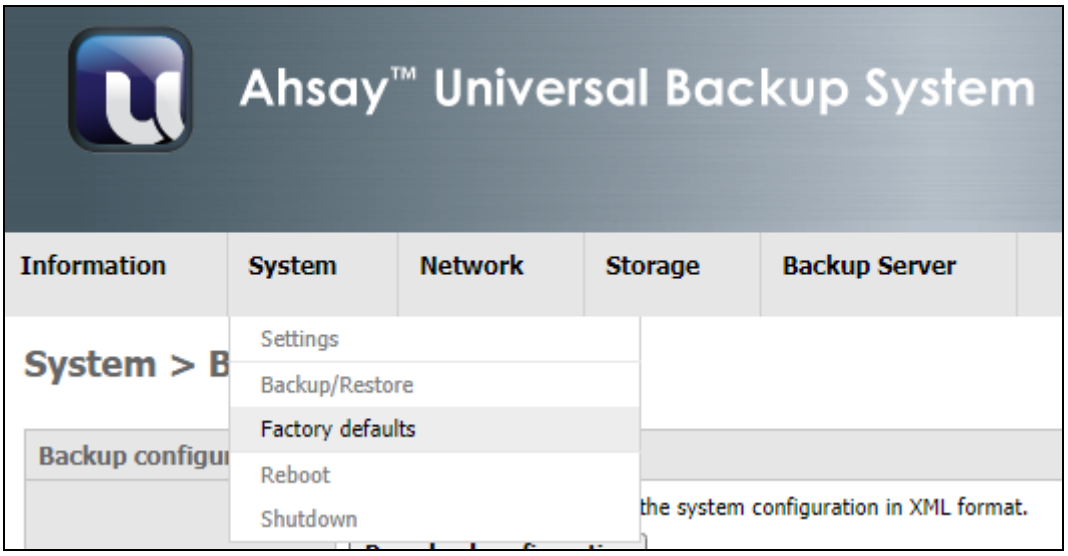


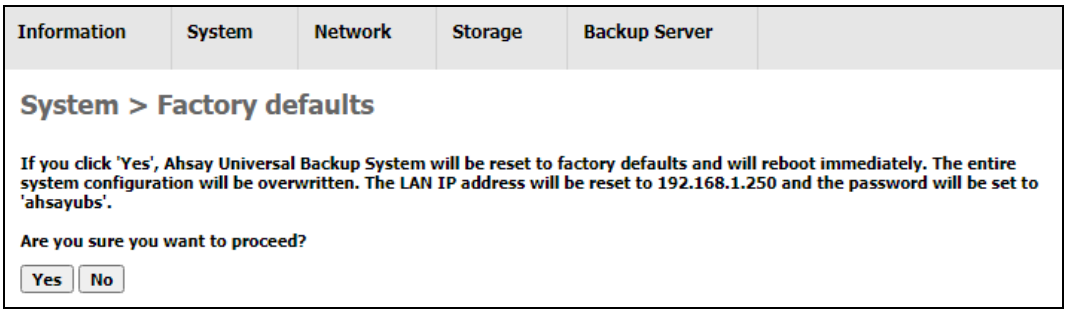
The settings can be restored with your last downloaded configuration file:

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

9.2.3 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.

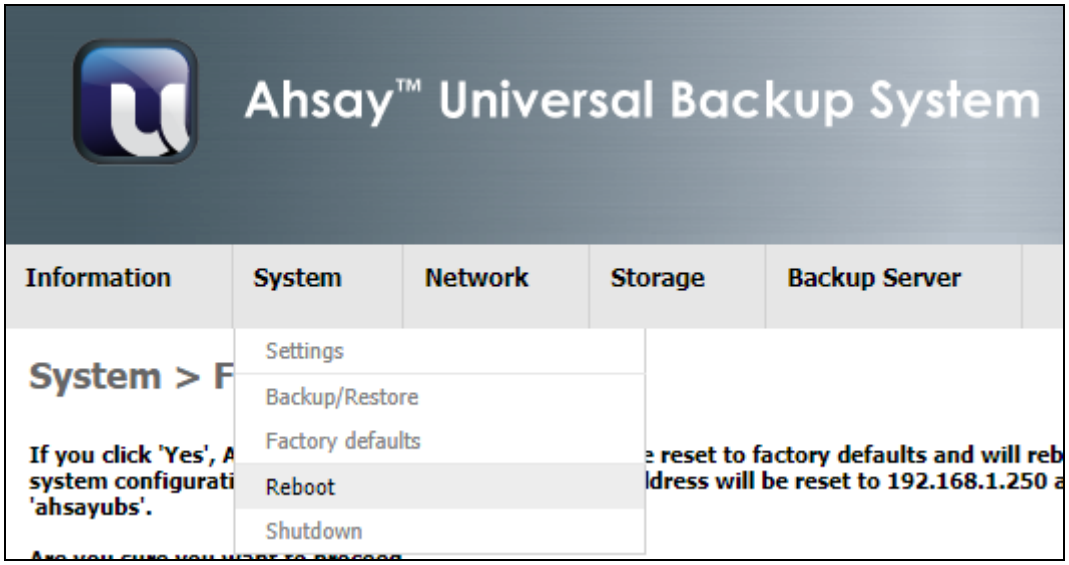
2. You can restore the previous settings in AhsayUBS WebAdmin in the page [System] > [Backup/Restore]. Please refer to the section [System] > [Backup/Restore] for details.

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:

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

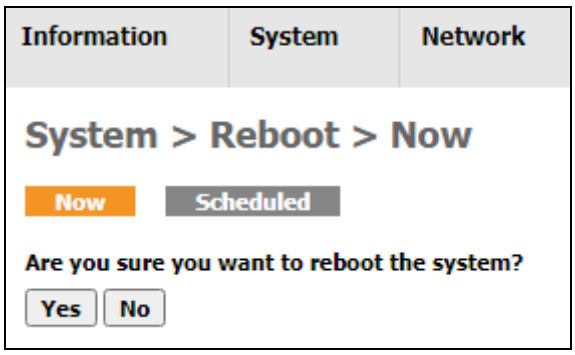
   b. Import the Expandable Storage. Note that the data in the Expandable Storage will not be erased after “factory defaults”. For details, please refer to the [Storage] section.

9.2.4 Reboot



Now

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

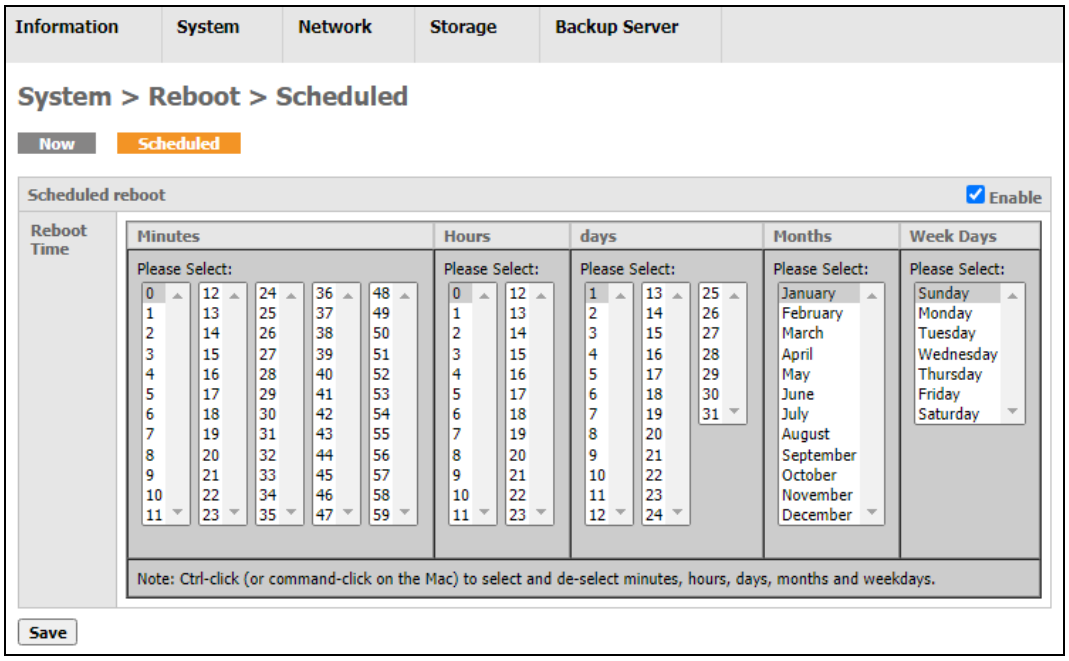


WARNING

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

Scheduled

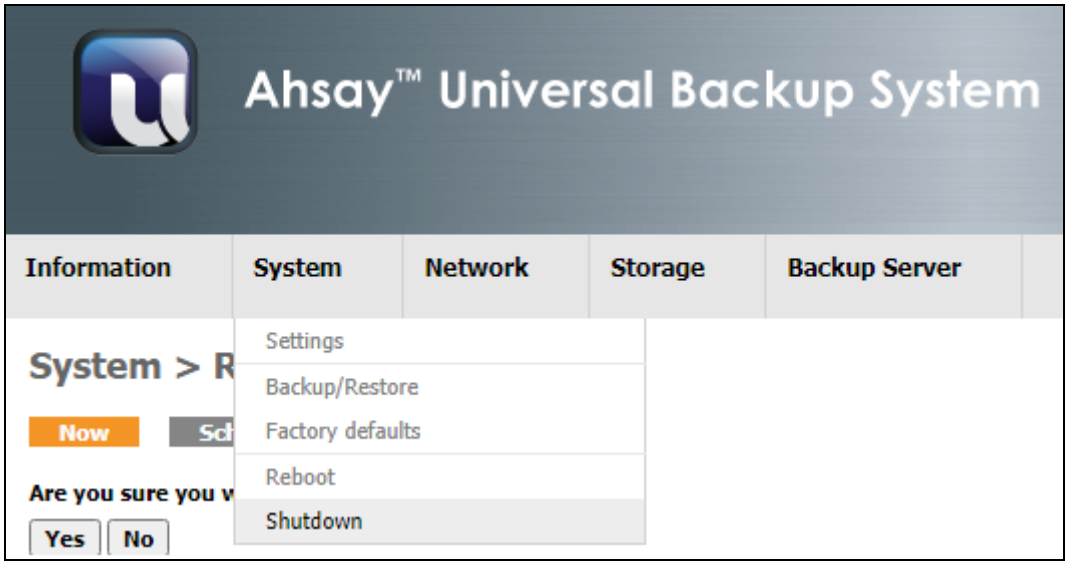
You may check the [Enable] checkbox on the top-right hand corner to enable scheduled shutdown and schedule the shutdown time by selecting the options in the table [Scheduled reboot] and click the [Save] button to save your settings.



WARNING

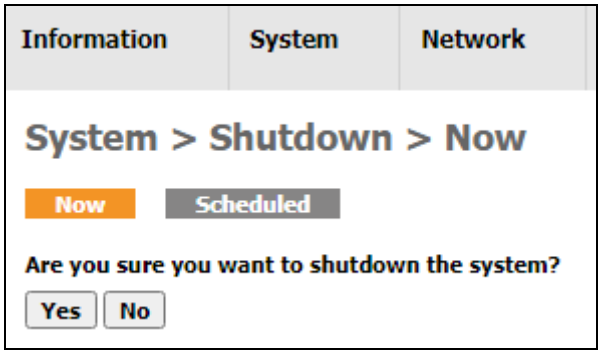
Please do not select ALL the minutes for reboot, otherwise the AhsayUBS may need to restore to factory default for stopping the endless rebooting system!

9.2.5 Shutdown



Now

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

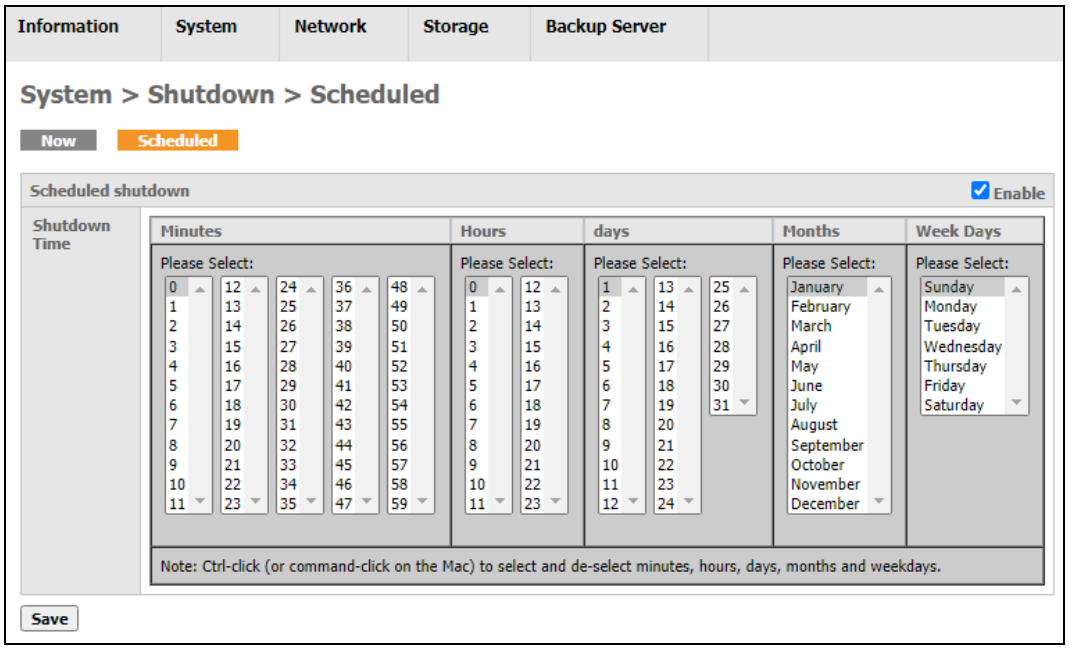


WARNING

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

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.



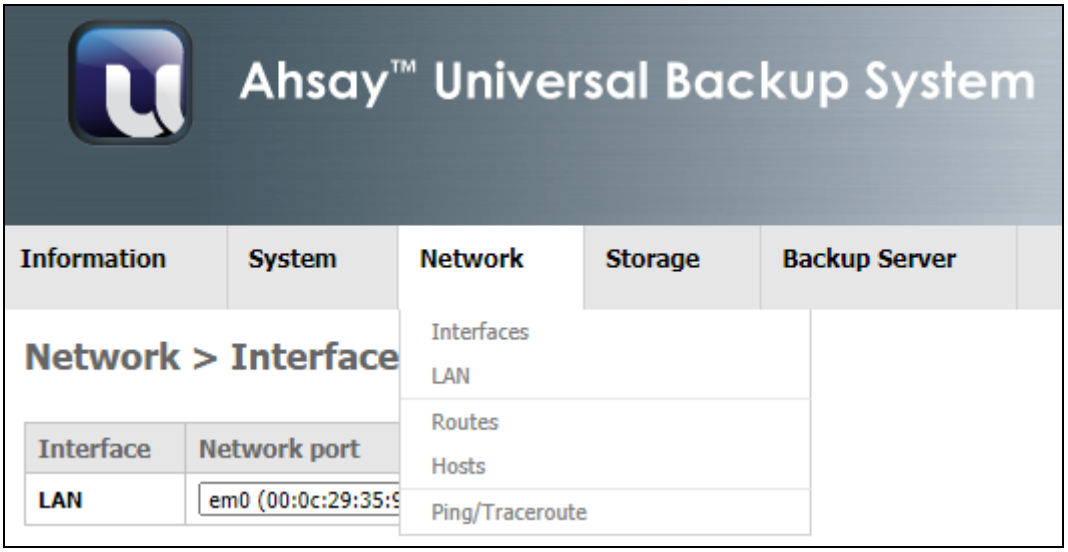
WARNING

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

9.3 Network

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

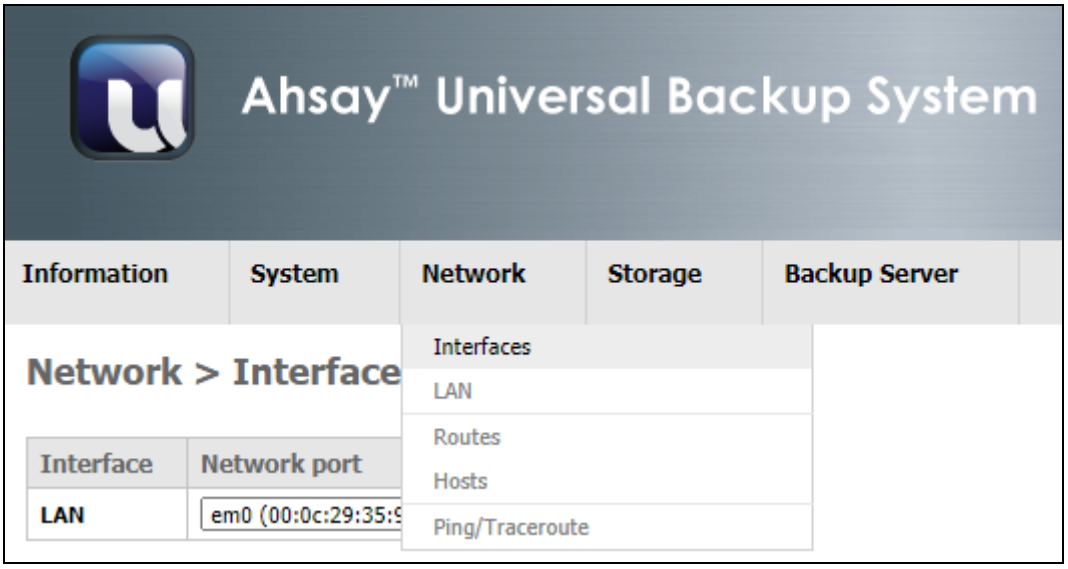
When the mouse cursor is over the word [Network] in the menu bar, the menu will be shown as below:



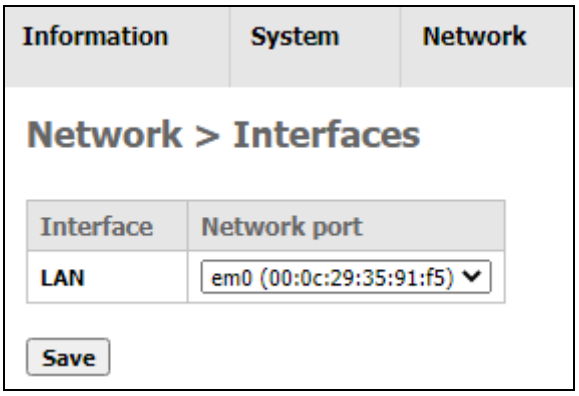
The [Network] menu has been further divided into the following sections:

- 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)
- Ping/Traceroute (Network tools)

9.3.1 Interfaces



This page shows a summary of physical network devices in the 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.

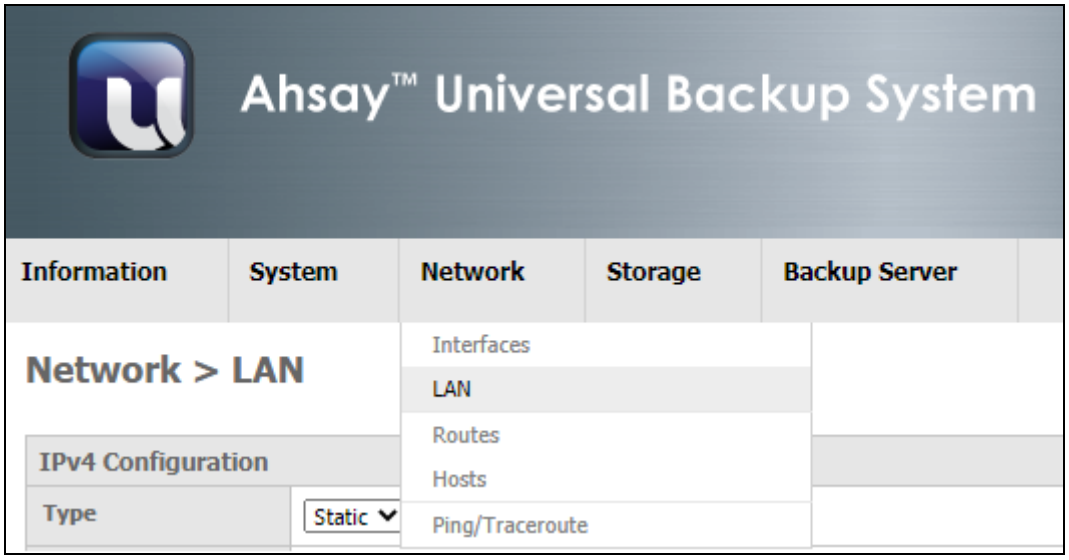
The [Network] > [LAN] denotes the network device configuration for the network device which has been assigned at the [Network] > [Interface] page. Additional network interfaces OPT1 can be configured at page [Network] > [OPT1] which is similar to the [LAN] interface.

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

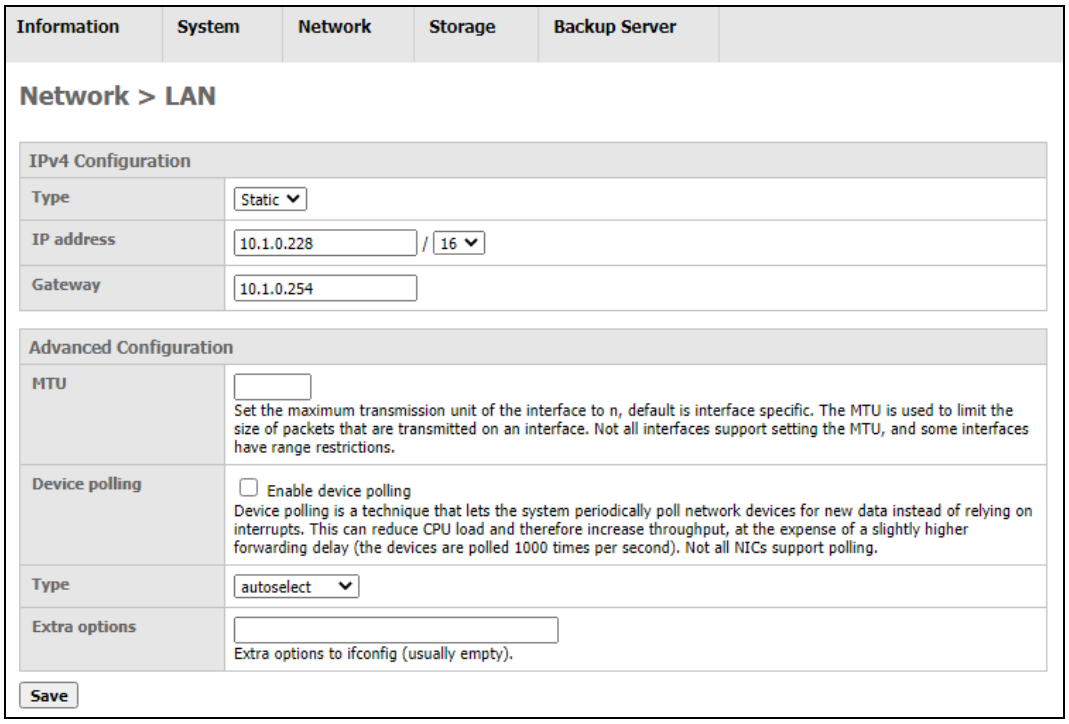
WARNING

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.

9.3.2 LAN



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



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.

Advanced Configuration

The fields in this section are listed below:

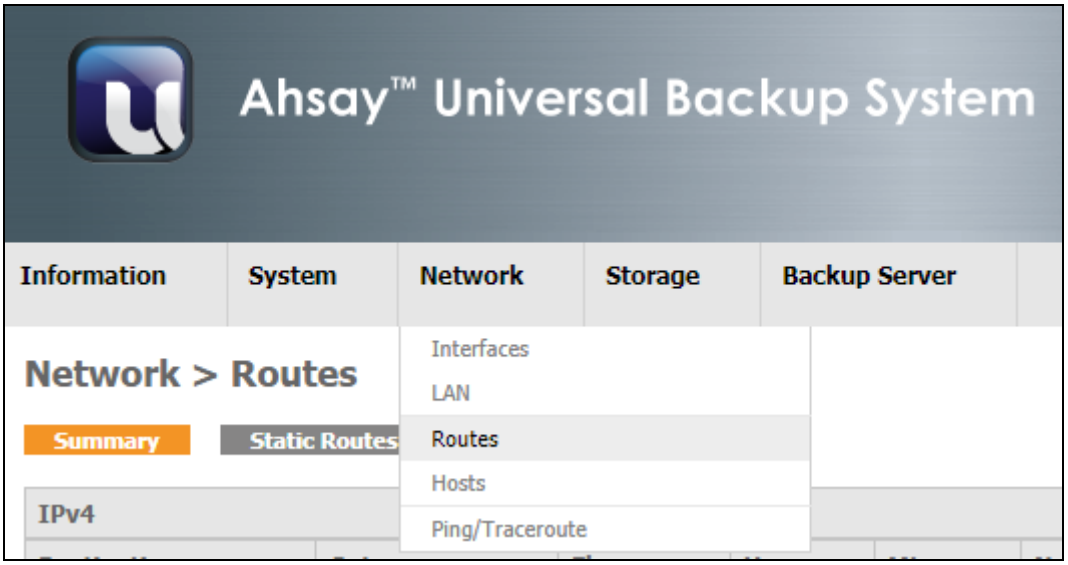
- **MTU:** Set the maximum transmission unit of the interface to ***n***, the default setting is leave to ***n***, default is interface specific (i.e. blank). The MTU is used to limit the size of packets that are transmitted on an interface. Not all interfaces support setting the MTU, and some interfaces have range restrictions.
- **Device polling:** Device polling is a technique that lets the system to 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 on 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

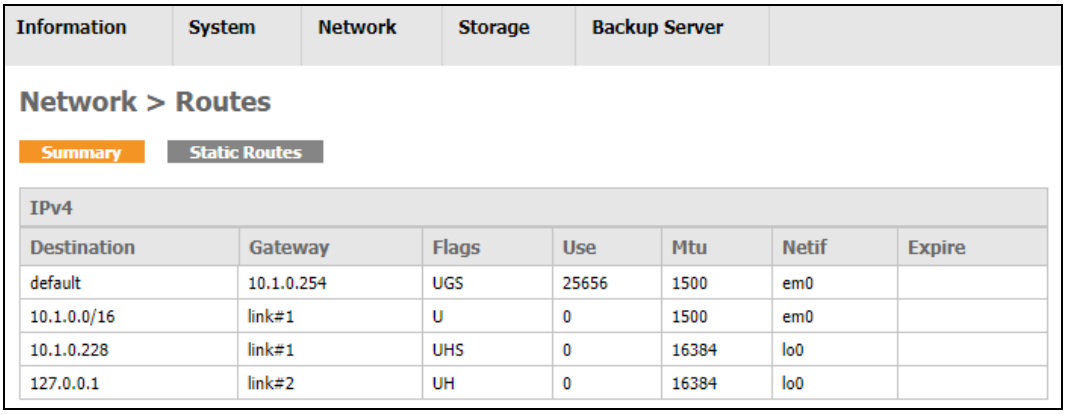
Before rebooting the AhsayUBS, please make sure the network settings (i.e. the IP address and the default gateway) in the above page(s) are correct. Otherwise, the AhsayUBS may be UNREACHABLE by the network after rebooting.

9.3.3 Routes



Summary

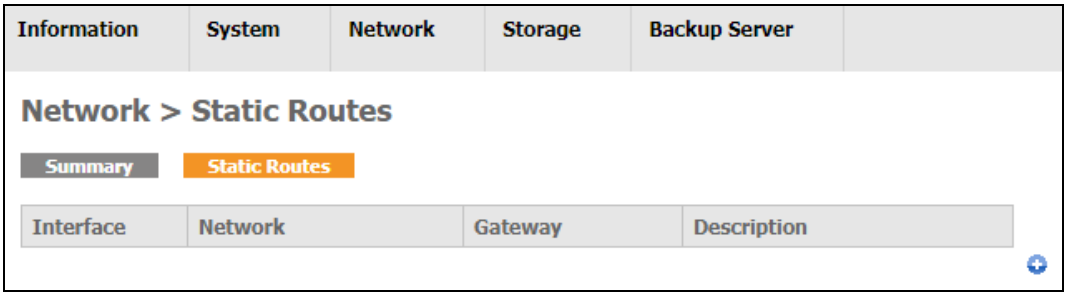
This page shows the routing table of your AhsayUBS which is used to trace the network routing to a target network destination.



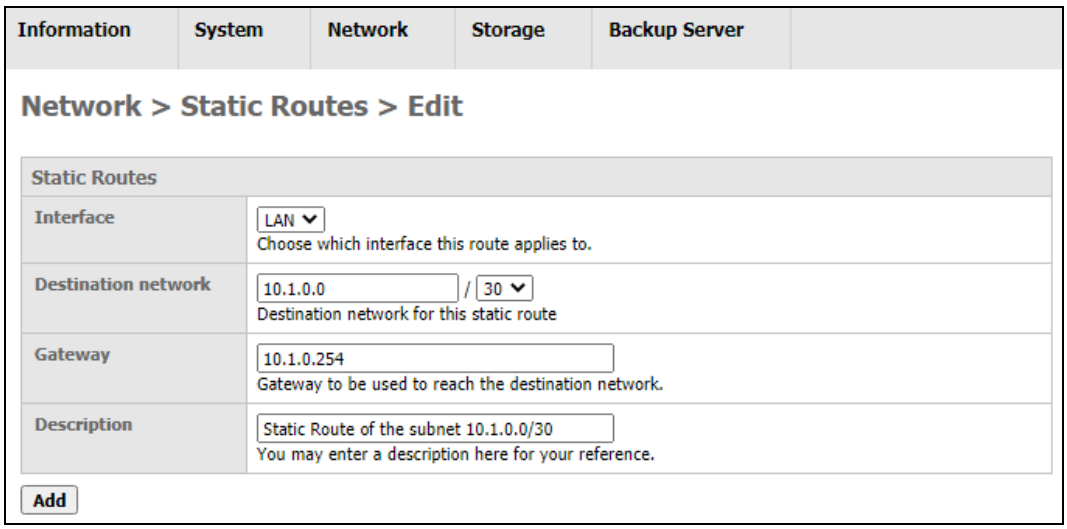
Destination	Gateway	Flags	Use	Mtu	Netif	Expire
default	10.1.0.254	UGS	25656	1500	em0	
10.1.0.0/16	link#1	U	0	1500	em0	
10.1.0.228	link#1	UHS	0	16384	lo0	
127.0.0.1	link#2	UH	0	16384	lo0	

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.



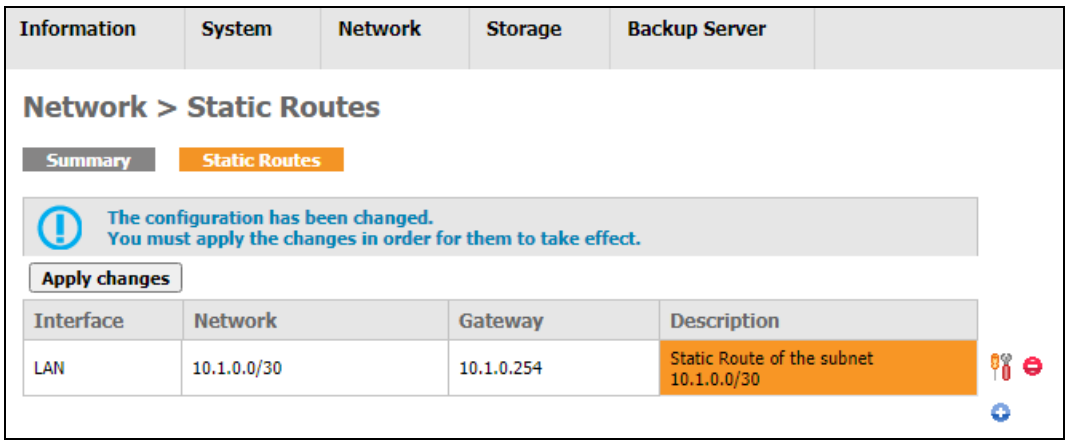
If you want to add a static route, click the ‘ ’ icon to continue.



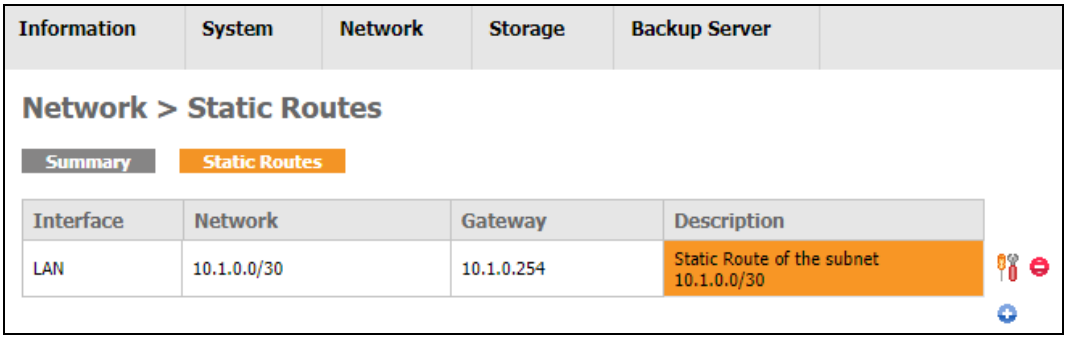
The static routes table will then appear on the browser. Here are the rows that you can configure:

- **Interface:** Select the interface that will be 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, the message “The configuration has been changed.” will appear when the entry is added successfully.



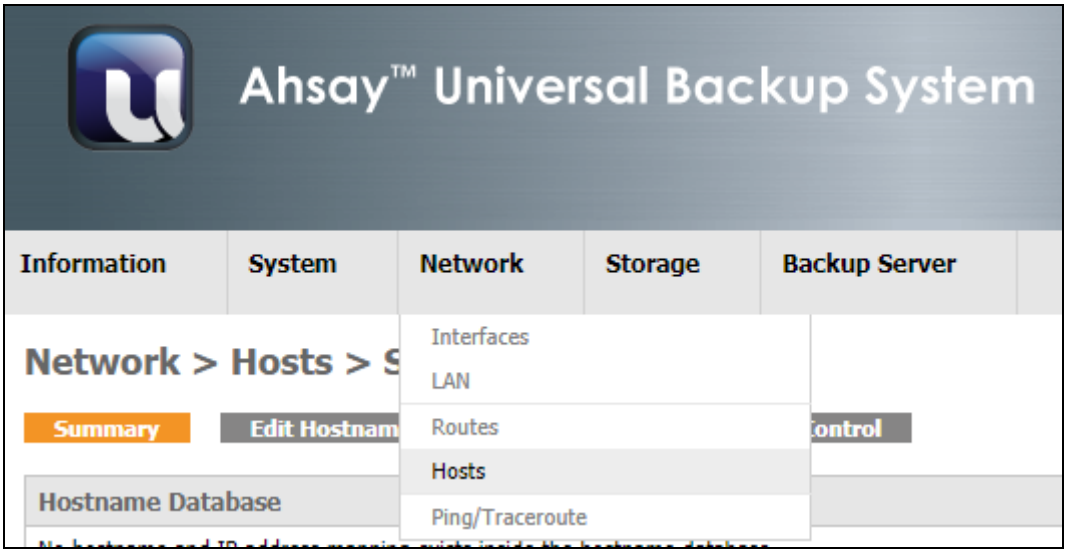
Click [Apply changes] for the changes to take effect.



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

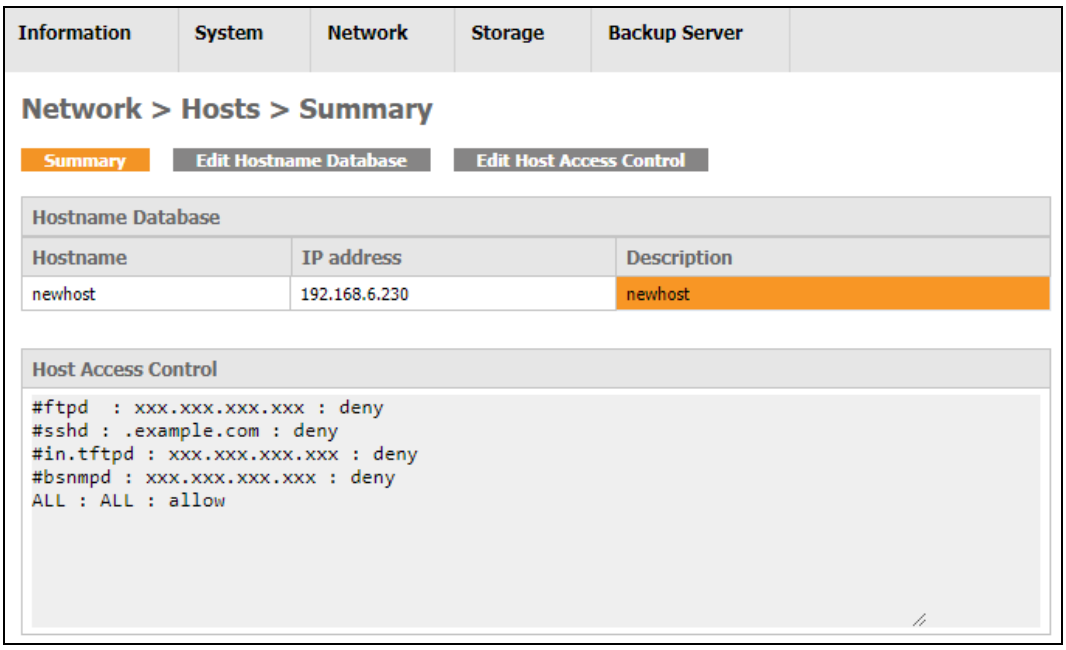
- ‘ ’: Edit the entry and click the [Save] -> [Apply changes] button to save the changes
- ‘ ’: After clicking this icon, a pop-up dialog will appear to confirm the changes. Click the [OK] button to confirm deletion or click the [Cancel] button to abort. After the dialog is closed, the message “The configuration has been changed.” will be displayed. You need to click the [Apply Changes] button to delete the entry.

9.3.4 Hosts



This page is for the customization of hosts settings.

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:

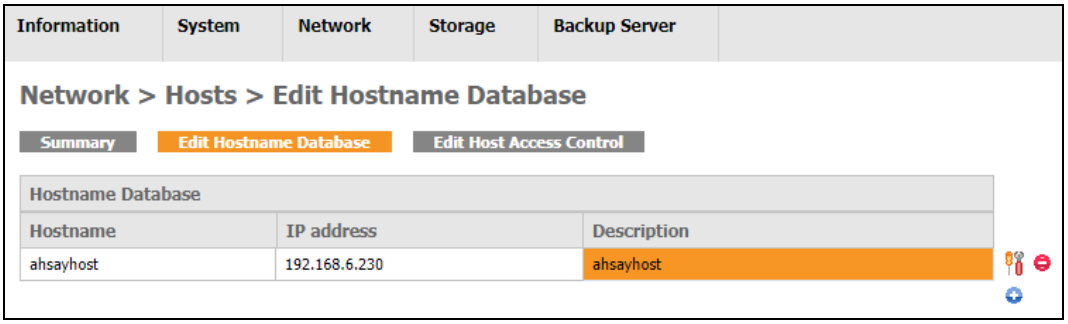
```
#ftpd : xxx.xxx.xxx.xxx : deny
#sshd : .example.com : deny
#in.tftpd : xxx.xxx.xxx.xxx : deny
#bsnmpd : xxx.xxx.xxx.xxx : deny
 ALL : ALL : allow
```

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].

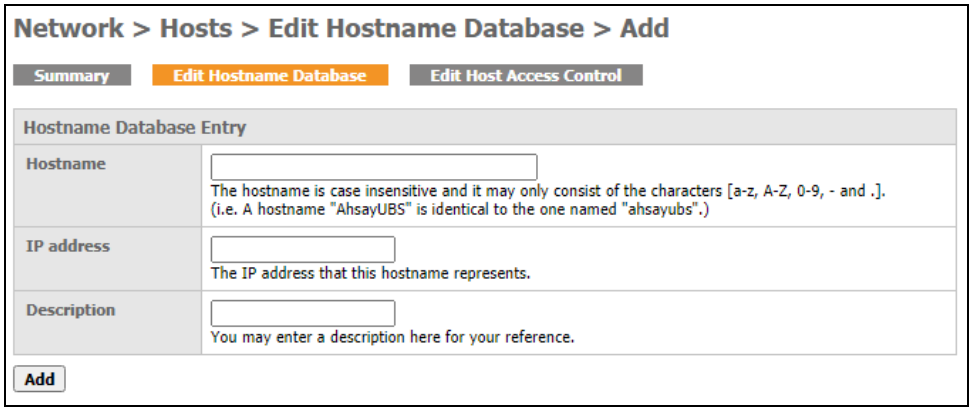
Edit Hostname Database



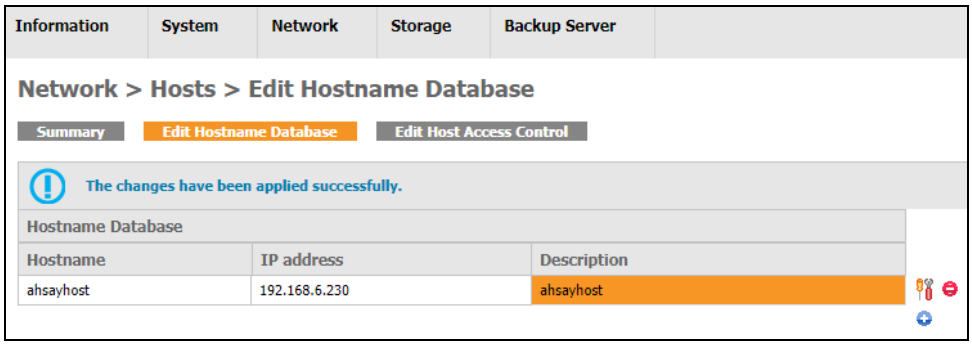
Add a hostname database entry

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

1. (Entry Exist) Click the ' ' icon.
2. Fill in the required fields.



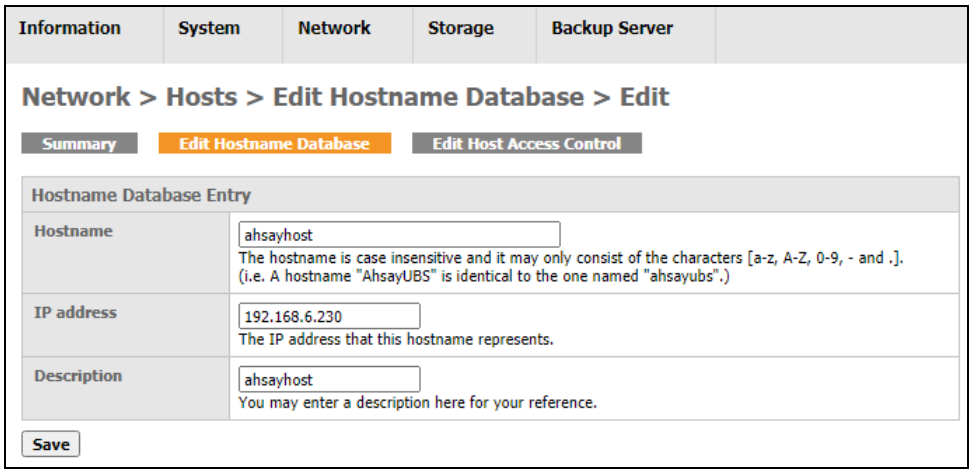
3. Click the [Add] button.
4. A new entry is added successfully into the hostname database.



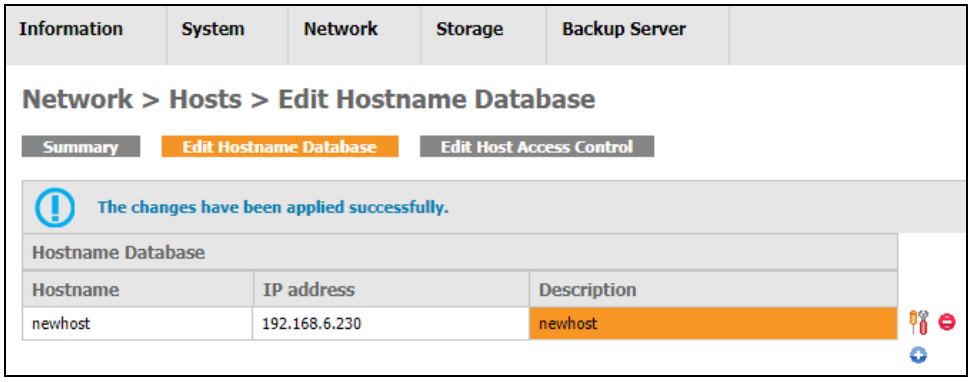
Edit a hostname database entry

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.



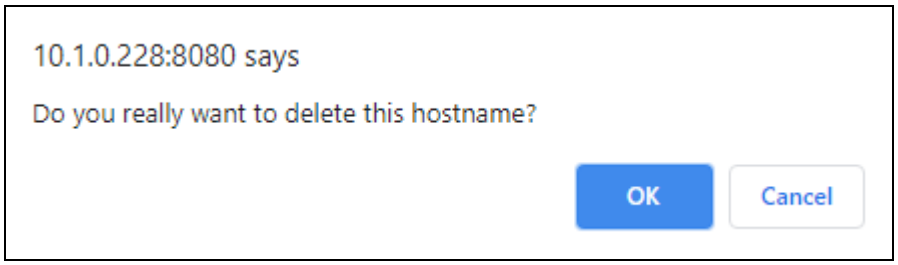
4. Click the [Save] button.
5. The entry is edited successfully.



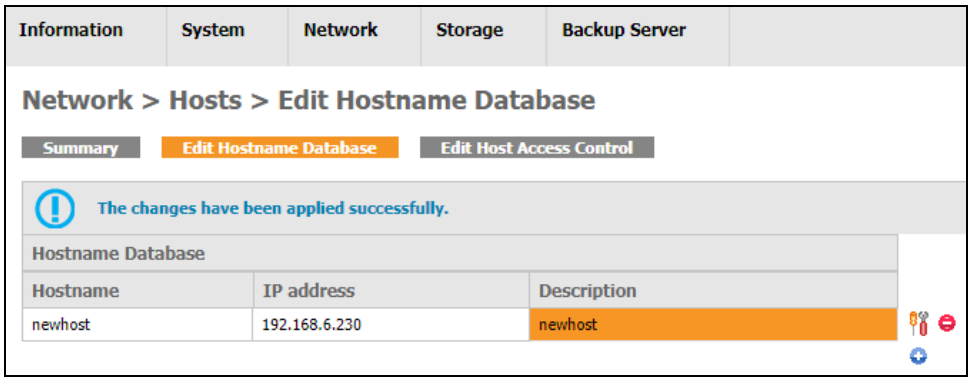
Delete a hostname database entry

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. Click [OK] to confirm deletion.

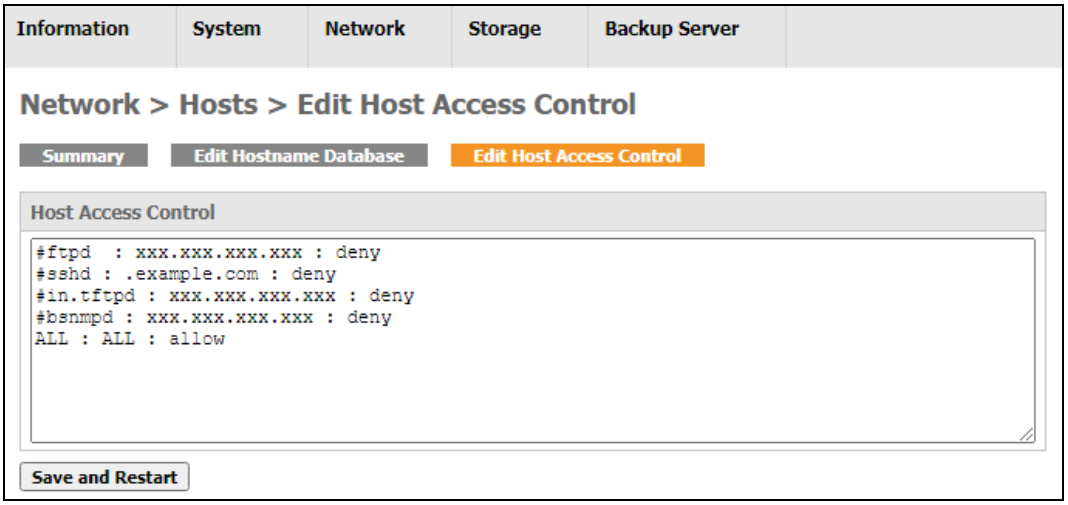


4. The entry is deleted successfully.

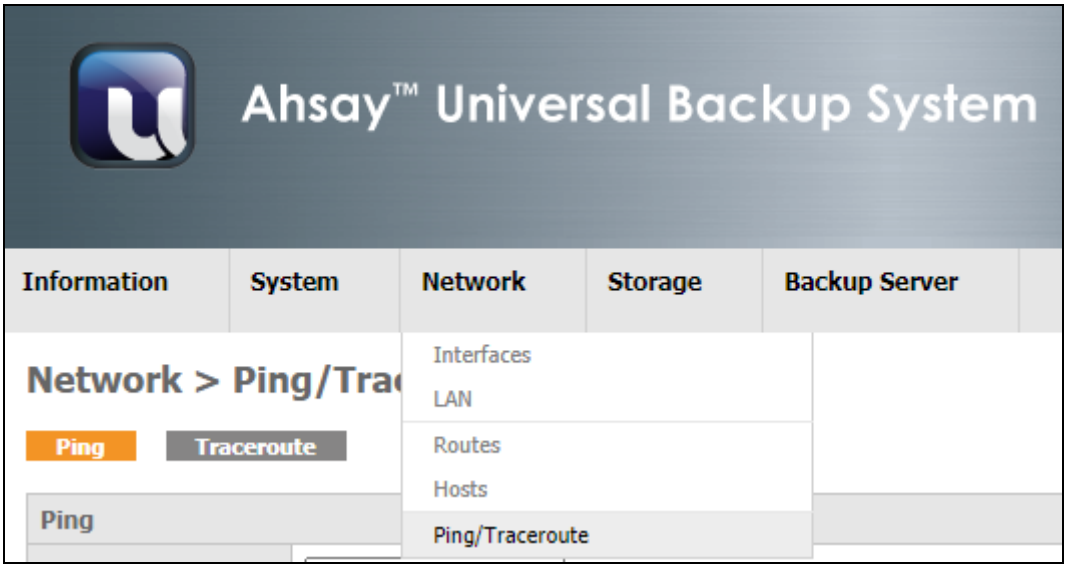


Edit Host Access Control

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



9.3.5 Ping/Traceroute

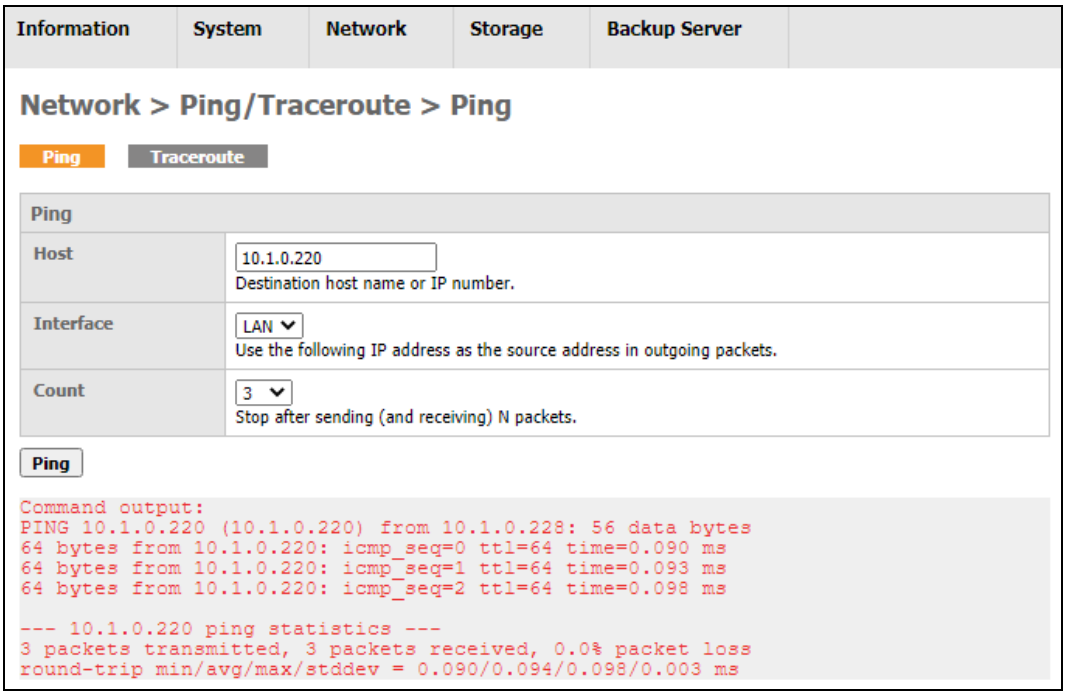


This page contains the network tools: ping and traceroute. The first page contains the ping tool and the second page contains the traceroute tool.

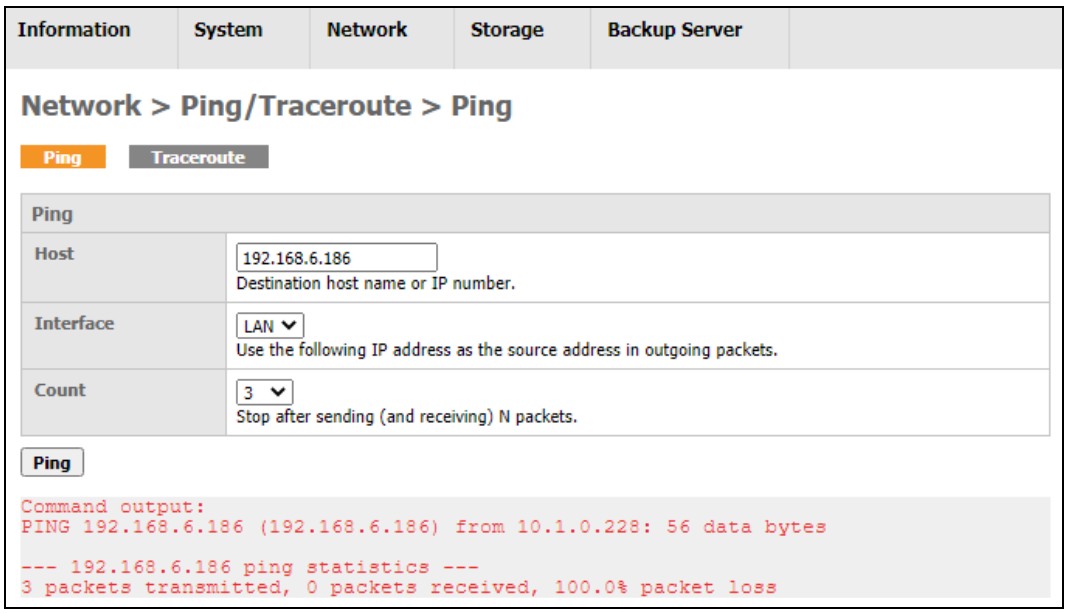
Ping

It is the “ping” command in standard UNIX machines. It tests your AhsayUBS network interface whether it 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.



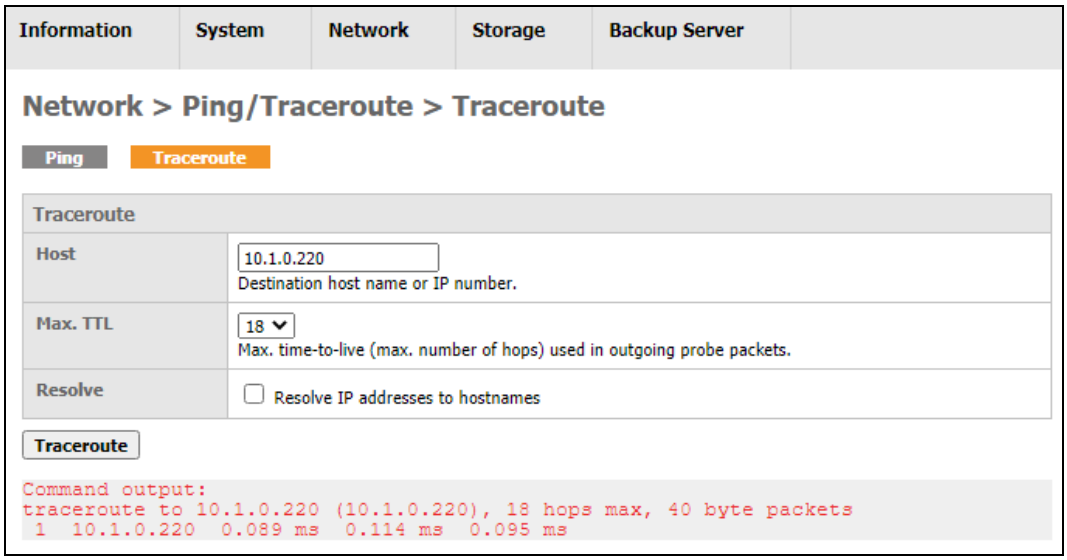
Below is an example that the AhsayUBS failed to reach the destination “192.168.6.186”.



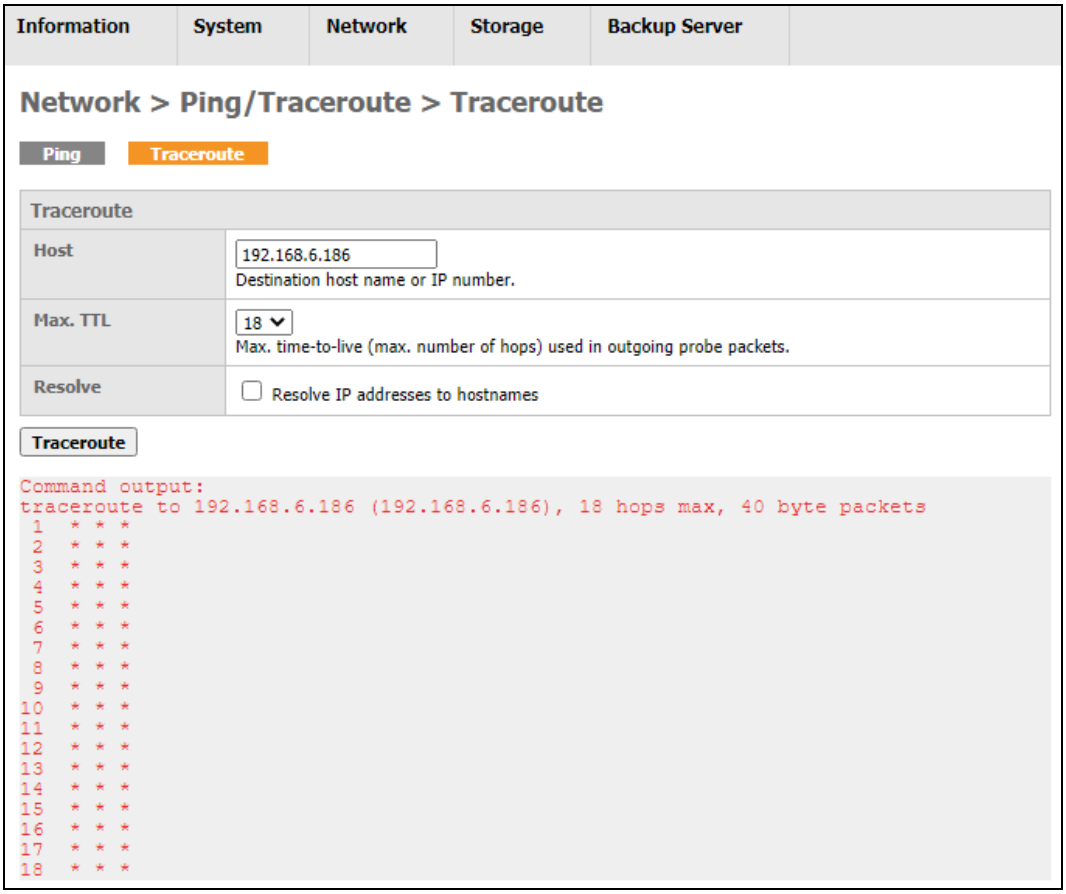
Traceroute

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.

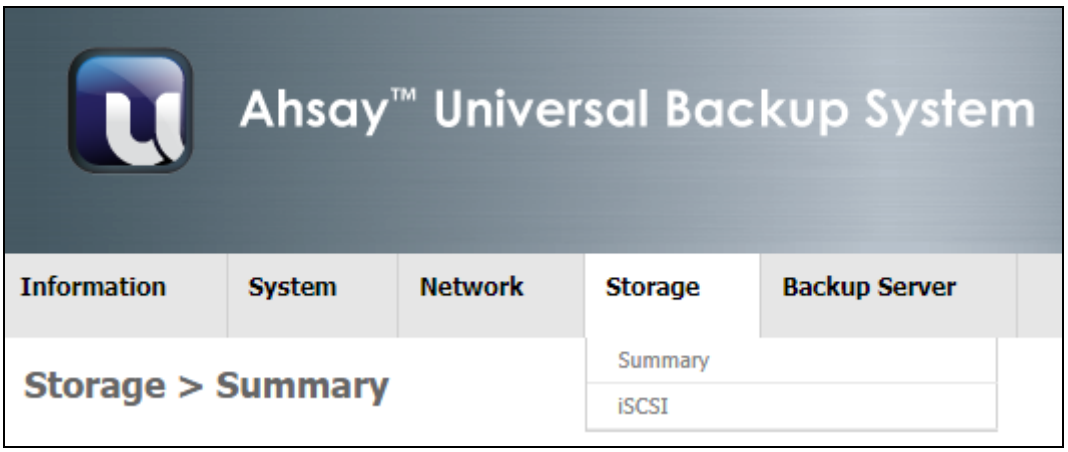


Below is an example that the AhsayUBS failed to reach the destination.



9.4 Storage

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



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

- Summary (Summary of volumes created)
- iSCSI (Summary of iSCSI sessions created)

Overview

The [Storage] > [Summary] page shows a summary of the volumes created in the AhsayUBS.

There are two types of storage volumes defined on the AhsayUBS:

1. **System Storage** – This is the 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.

2. **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 that can be done include:

1. Add or remove an Additional Storage

2. Mount or unmount an Additional Storage

3. Filesystem check on a volume

4. Rebuild degraded LSFW or Additional Storage inside the AhsayUBS

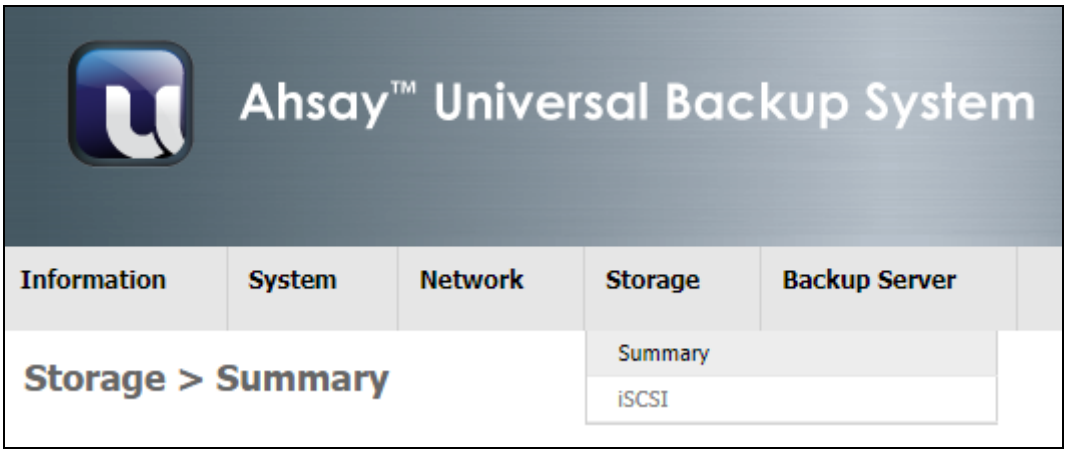
The page [Storage] > [iSCSI] shows a summary of the iSCSI session created in the AhsayUBS. The iSCSI session can be created, information be edited, disconnected and removed in the AhsayUBS in this page.

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

9.4.1 Summary

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:
  - Yellow means the approximate used space in a volume.
  - Blue means the approximate 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:
  - The volume is exported.
  - Some of the providers (block devices or iSCSI session) are missing.

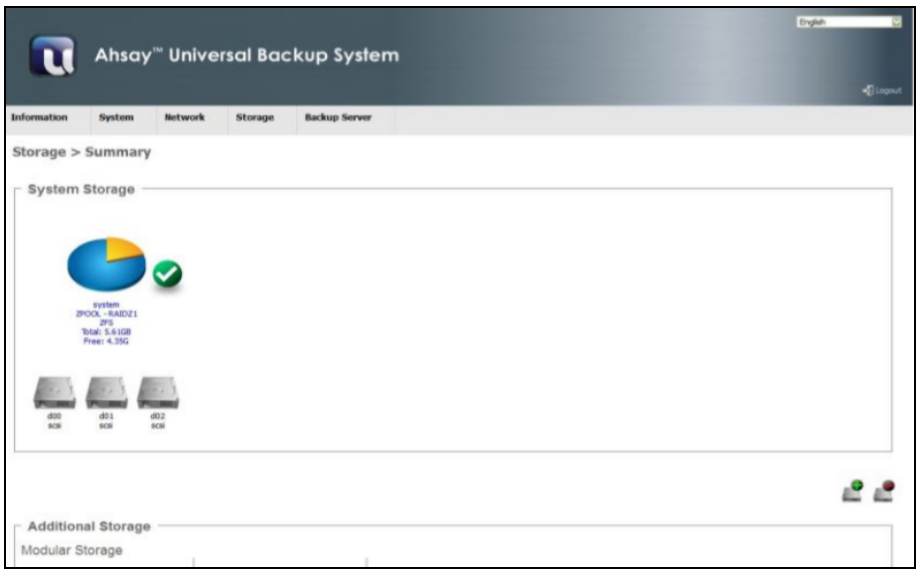
Volume status icons indicate the various statuses of the volume. It is put beyond the volume pie chart.

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 undergoes 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 AhsayCBS 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** 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.



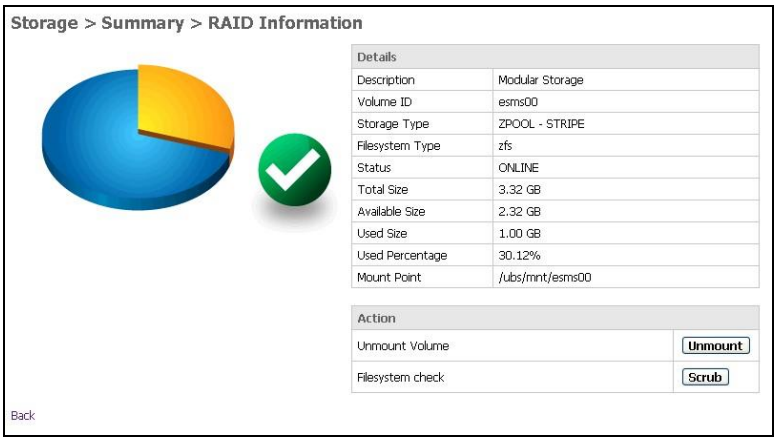
The **hard disk icons** '  ' below the text shows number of the providers for the volume and its status:

	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.

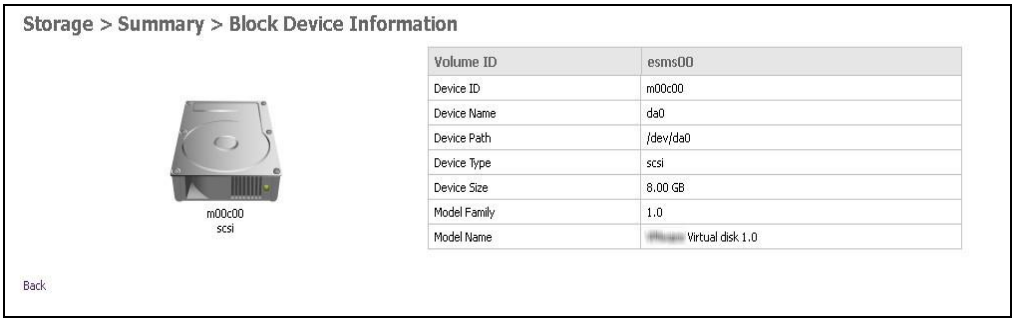


When the **hard disk icon is selected**, details of each provider will be shown. This page is called [Storage] > [Summary] > [Block Device Information].

Some Block Device Information will be shown in this page:

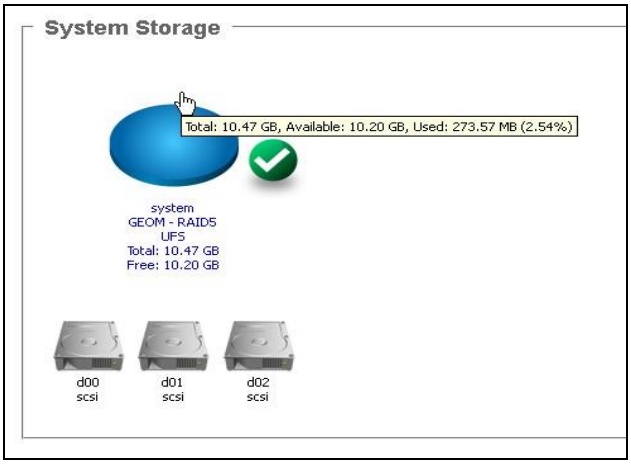
- **Volume ID:** 'system' denotes it is a System Storage provider. Others represent the volume it belongs to.
- **Device ID:** The logical ID that identifies the provider.
- **Device Name:** Physical name of the block device named by the kernel.
- **Device Path:** Block device physical path in the AhsayUBS.
- **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.

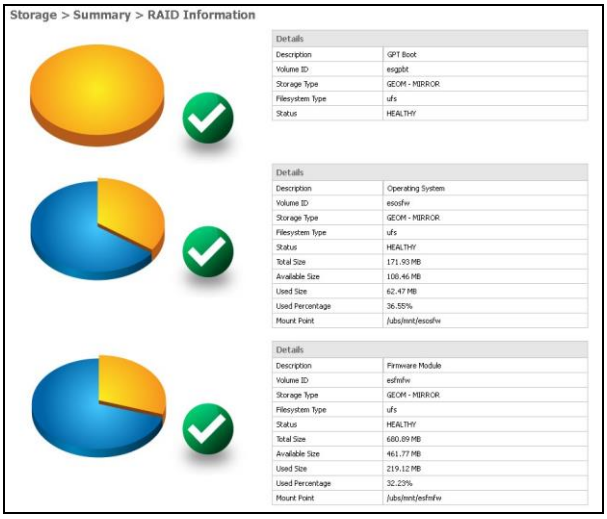


System Storage

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].



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 AhsayCBS in the AhsayUBS.

Supported types of Additional Storage in AhsayUBS:

1. 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.
2. Expandable Storage: Created with an iSCSI initiator session and hardware RAID volumes.

   Only 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.

NOTE

Expanding an AhsayUBS volume is not supported as it will cause some of the volume information to be removed which will result in some mount points such as "/tmp" to not mount properly. The AhsayCBS service will no longer startup.

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:

- Shutdown AhsayUBS and insert the block devices. Power on AhsayUBS on again. or
- 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 the 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.

Create Modular Storage (Physical Block Devices)

1. [Local Storage Provider] Make sure the block devices / hardware RAID volume is connected to the AhsayUBS server. If not, shutdown AhsayUBS. Insert a physical block device(s) / create a hardware RAID before booting 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:

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.

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 box will pop up to show that the volume was removed successfully. The volume will no longer exist in the AhsayUBS now.

WARNING

All data in the Additional Storage will be DESTROYED and CANNOT BE RECOVERED again.

Mount and Unmount Additional Storage

Unmount Additional Storage

NOTES

1. System Storage volume is always in use and it 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 to 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.

Mount Additional Storage

Storage volumes cannot be used by the AhsayUBS or the AhsayCBS when it is not mounted. To use the volume, please follow these steps to 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 if the volume was mounted successfully or not. Click the button [OK] to close the dialog.

Filesystem Check

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

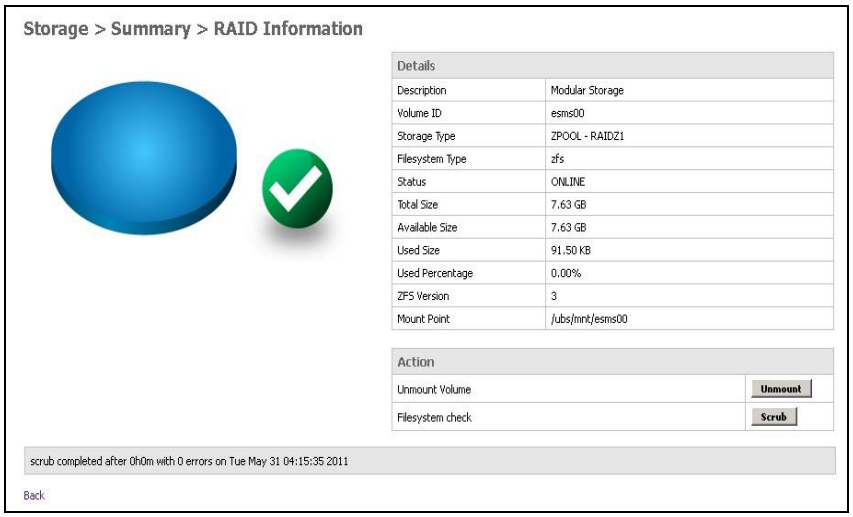
[ZFS] Scrub

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.



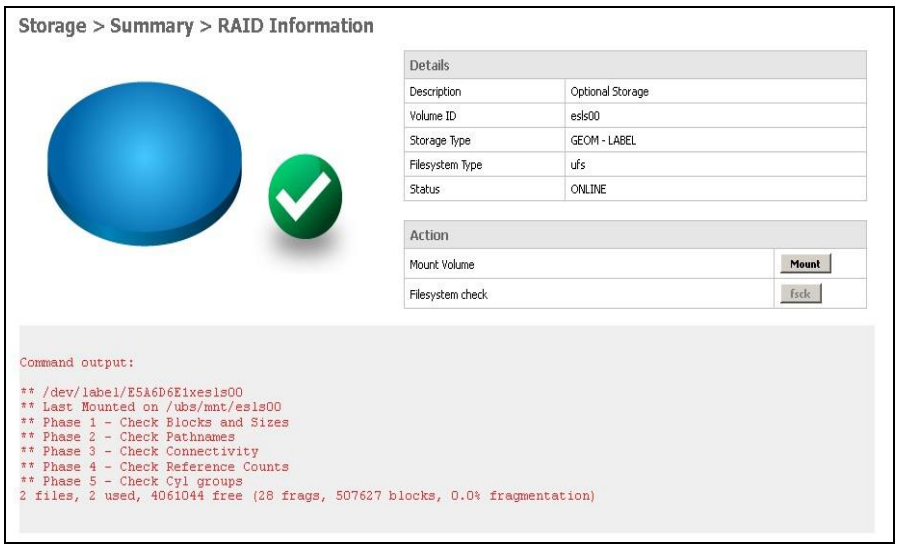
[UFS] fsck

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 AhsayCBS 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.



Export and Import Additional Storage (ZFS)

- When the corresponding block devices or the iSCSI target is undergoing maintenance or
- [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.

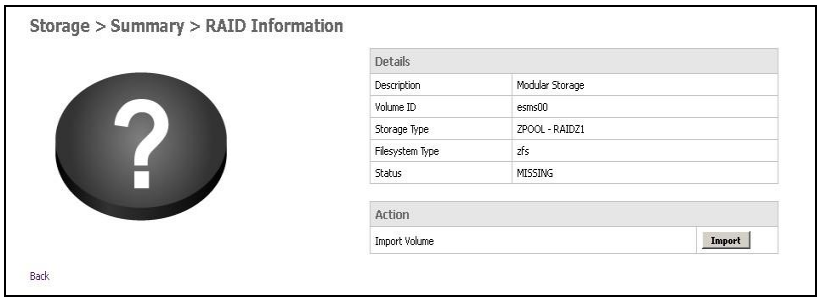
NOTES

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.

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.



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.

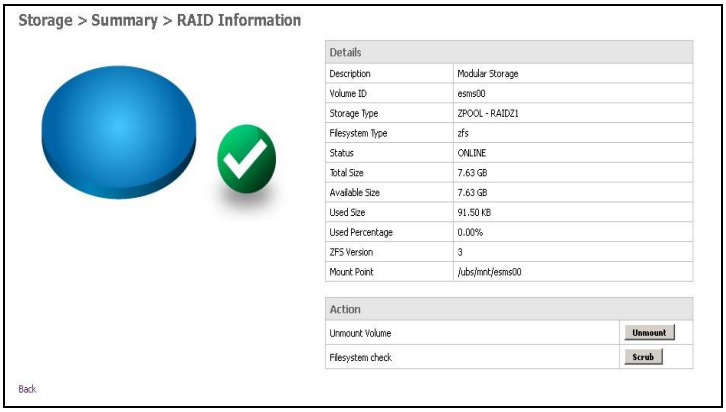
2. Go to the page [Storage] > [Summary].

3. Click the volume pie chart icon which is going to be imported.

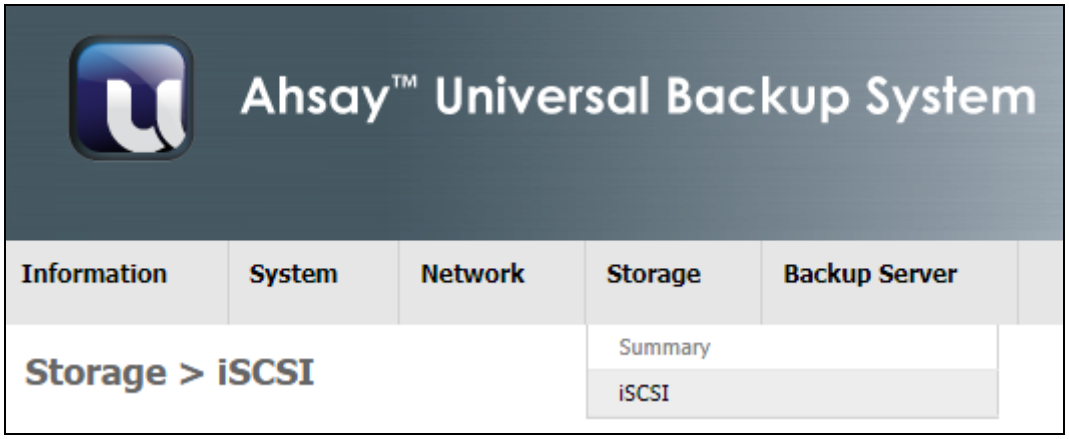
4. Click the button [Import].

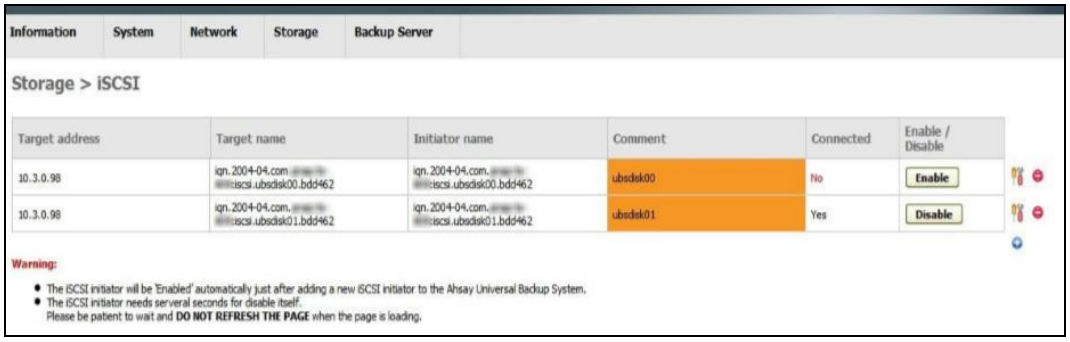
5. The page will be refreshed and a dialog will be shown that the volume is imported successfully. Click [OK] to close the dialog box.

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.



9.4.2 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*** format should be in:
“iqn.<yyyy-mm>.<reversed domain name>:<identifier>”

Rules for enable / disable / delete iSCSI session:

You may enable / disable the iSCSI initiator session for maintenance of the iSCSI target server. When the corresponding Additional Storages are in use, the iSCSI initiator session cannot be disabled.

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:

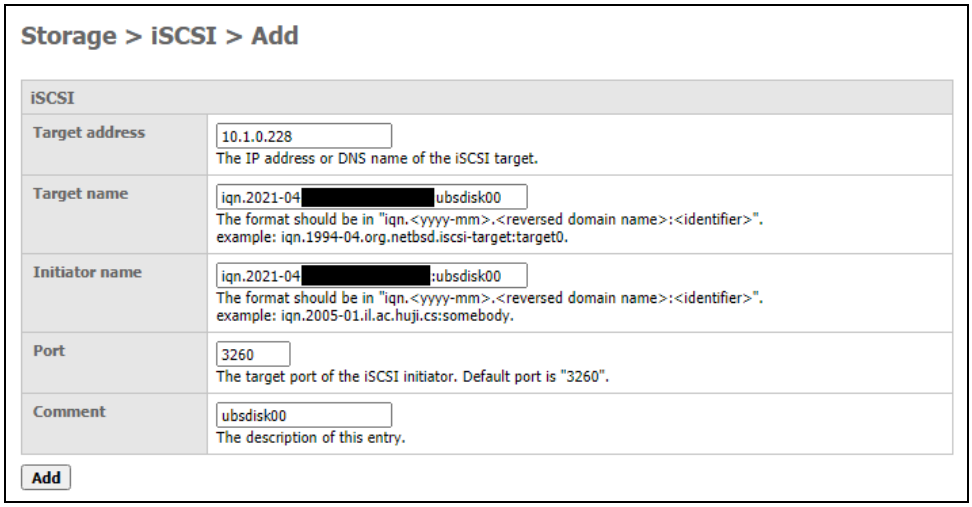
The iSCSI initiator session entry will no longer be used in this AhsayUBS.

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.

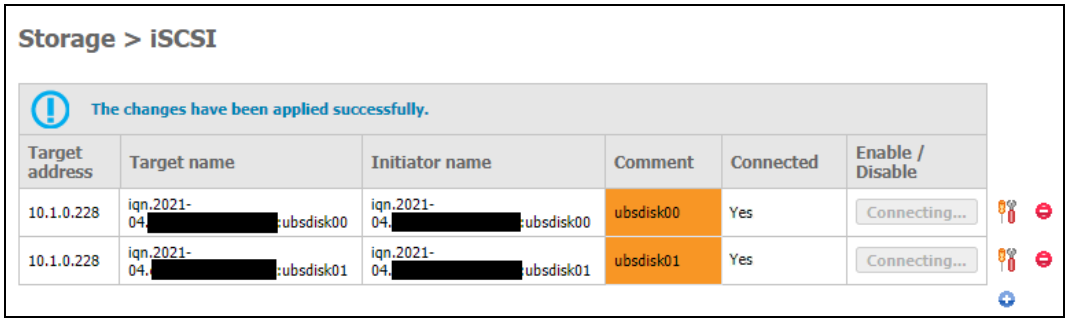
1. Go to the page [Storage] > [iSCSI].
2. Click the ‘ ’ icon.
3. Enter the required information inside the [iSCSI] table.



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 in 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.



Edit the configuration of an iSCSI entry

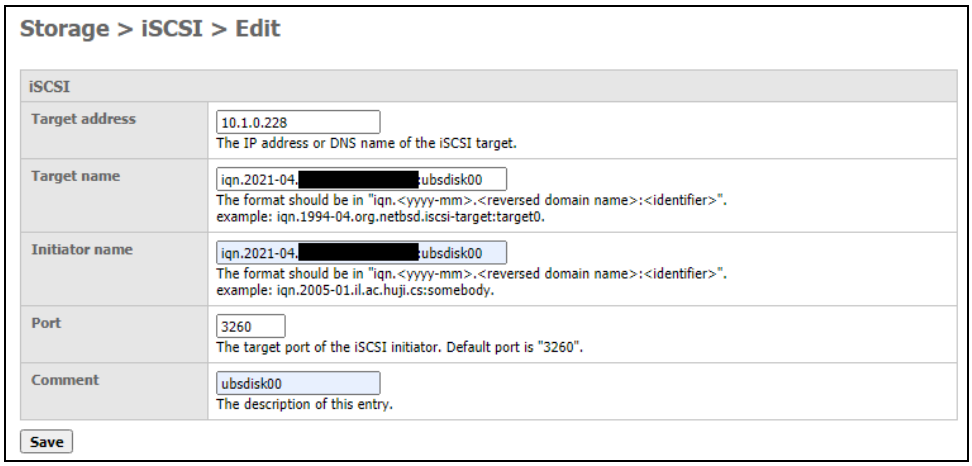
NOTES

1. The corresponding Additional Storage should be *exported* or *removed* before proceeding.
2. *Removing* the Additional Storage will erase all the data in the storage.
3. For steps **to export an Additional Storage**, please refer to the section [Export and Import Addition Storage].
4. 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.

Disable an iSCSI initiator entry

NOTES

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**.

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 accessible again by the AhsayUBS after re-enabling the iSCSI initiator session.

3. For steps **to export an Additional Storage**, please refer to the section [Export and Import Addition Storage].

4. For steps **to remove an Additional Storage**, please refer to the section [Remove Additional Storage].

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.

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 enabled 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].

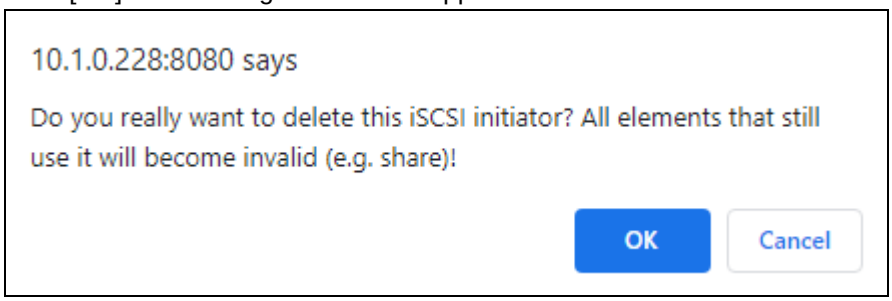
Destroy an iSCSI initiator entry

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 will be deleted.
3. Click the icon ‘ ’.
4. Click [OK] in the dialog box that will appear.



5. The iSCSI initiator entry is destroyed successfully.

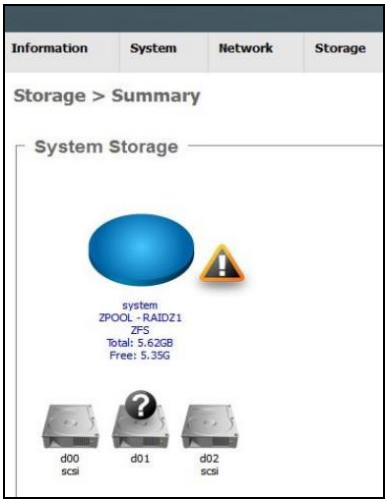
WARNING

On AhsayUBS systems using a software RAID setup, for example a four disk software RAID Z configuration. When a failure occurs on a disk located in slot 1. It is required to shift the rest of the disks in slots 2, 3, and 4 to the position 1, 2 and 3. Otherwise AhsayUBS will not be able to boot up properly until the disk in slot 1 is replaced and the software RAID is rebuilt.

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.

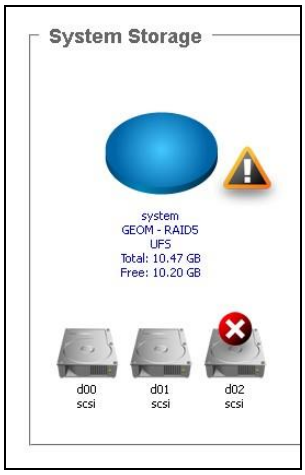
NOTES

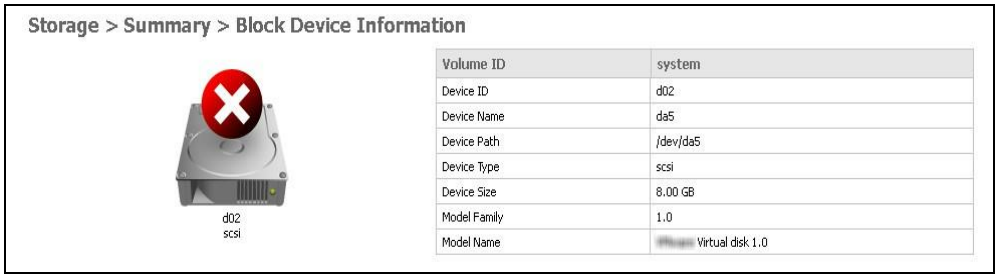
1. The provider which has been used by other AhsayUBS before will not be listed as an empty block device. It should be *zero out* before putting it into this AhsayUBS
2. Only two kinds of degraded storage are supported for rebuilding their volume:
   - System Storage
   - (Additional) Modular Storage

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.



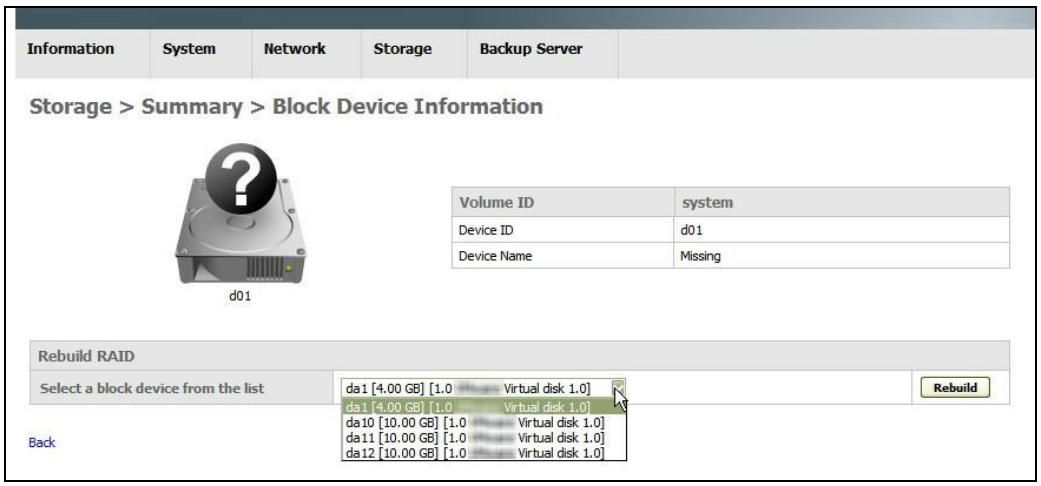


NOTE

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 to rebuild the volume.

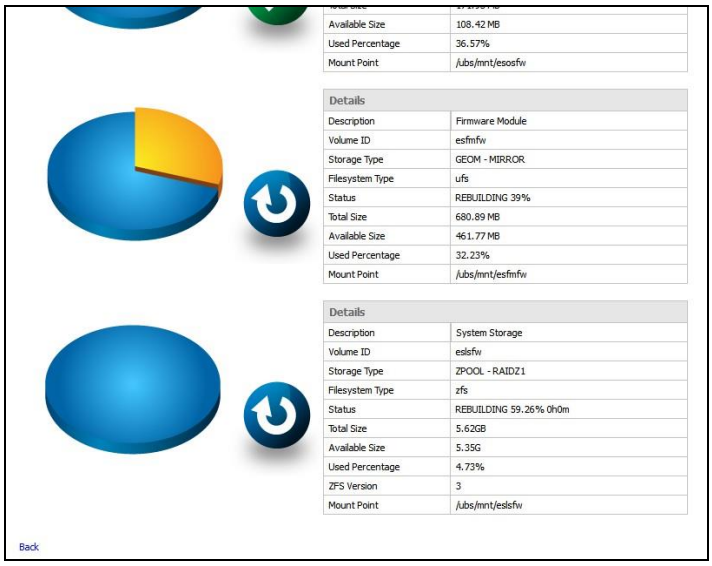


10. Click the button [Rebuild] to start the rebuild volume process.

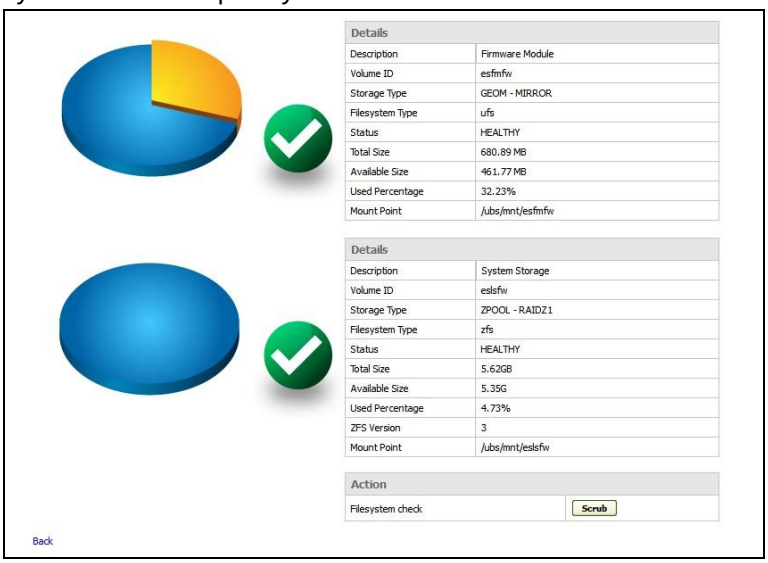
11. Warning message will be shown in the alert box. Read it CAREFULLY before proceeding. Click [OK] button to continue the rebuild process. Click [Cancel] to return to the page.

12. After the rebuilding process is started, the page will be redirected to the [Storage] > [Summary] > [RAID Information] page. A dialog will pop up to show 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.

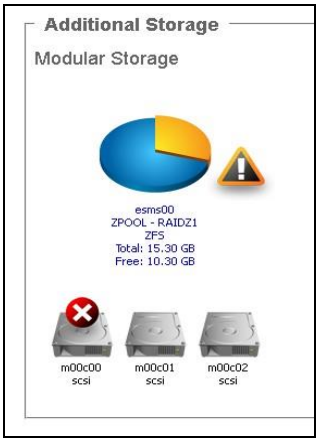


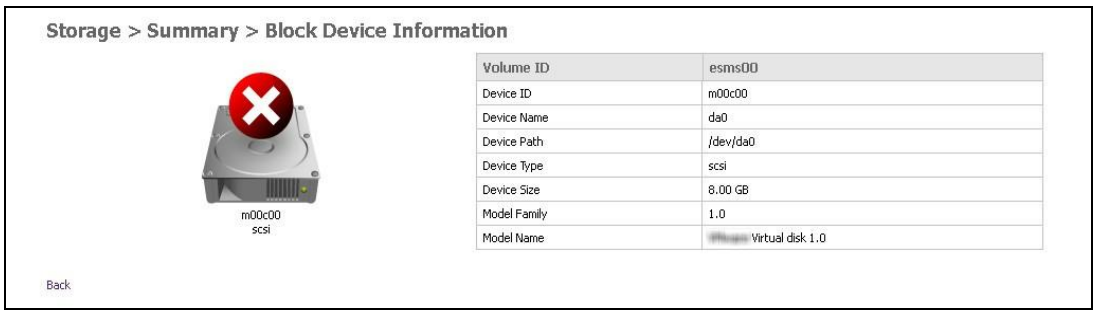
The block device missing icon ‘ ’ will be replaced by the block device healthy icon ‘ ’, since the block device is replaced and it is not missing now.

Rebuild the Modular Storage

To rebuild the volume for [Modular Storage]:

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

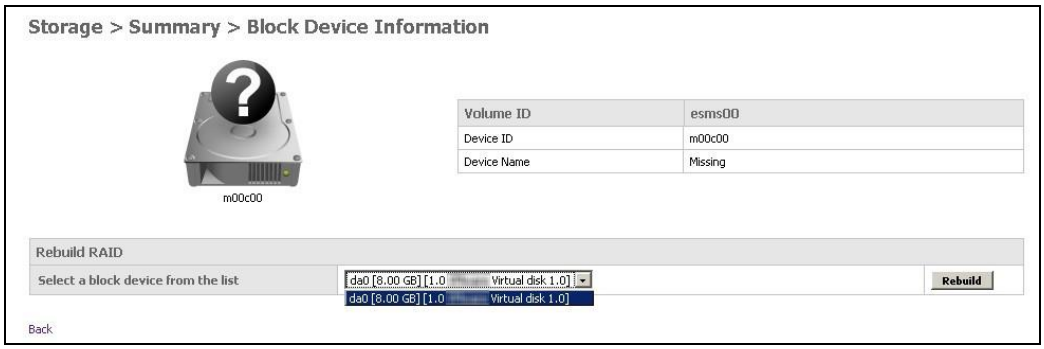




NOTE

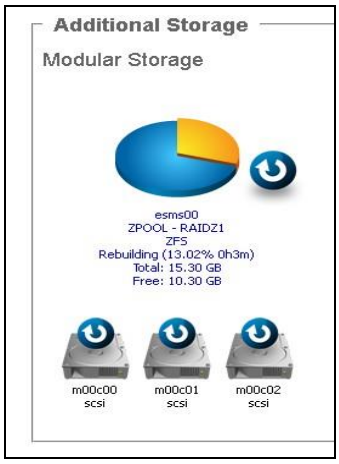
To locate any missing or degraded block devices in AhsayUBS, please refer to [Appendix H – Identifying Physical Local Block Devices on AhsayUBS] for details.

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 to rebuild the volume.

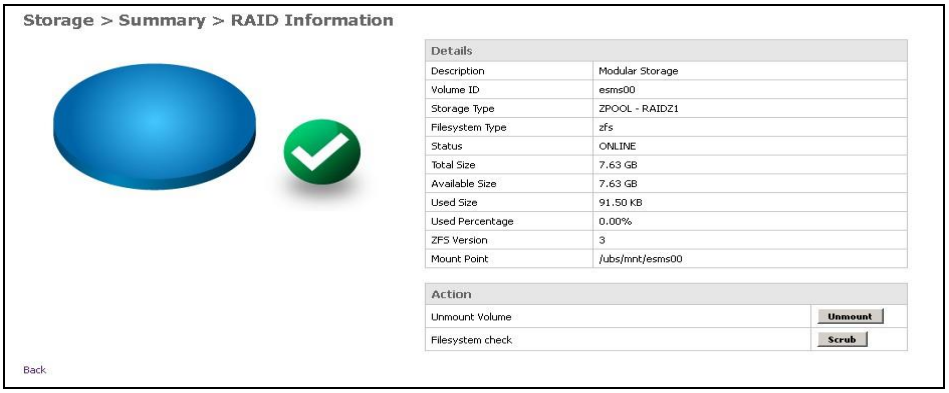


10. Click the button [Rebuild] to start the rebuild volume process.
11. Warning message will be shown in the alert box. **Read it CAREFULLY before proceeding.** Click [OK] button to continue the rebuild process. Click [Cancel] to return to the page.
12. After the rebuilding process is started, the page will be redirected to the [Storage] > [Summary] > [RAID Information] page. A dialog will pop up to show that the rebuild process is started successfully. Click [OK] button after reading the message.

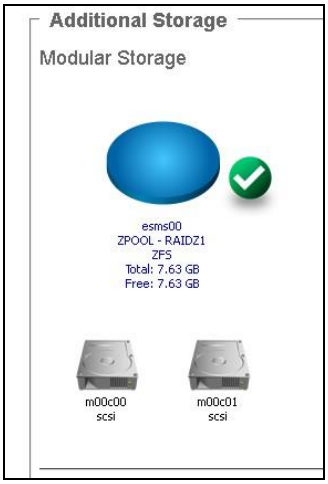
13. When the block device in the volume is synchronizing, the rebuild icon ‘ ’ will be shown in the volume like this:



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.



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 Additional 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:
  - AhsayCBS
  - Share AhsayCBS
- 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 AhsayUBS '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 loss 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.
  - AhsayCBS
  - Share AhsayCBS

Additional User Storage Migration

Introduction

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 AhsayCBS binaries are not supported. After a successful migration, the data on the file system can be used by the AhsayCBS service on the new AhsayUBS server.

Supported Hard Disk Interfaces:

- Local: IDE, SCSI, SATA, Hardware RAID
- Foreign: iSCSI

Supported Additional Storage Types:

- 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*, and *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 migration is in progress.

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.

NOTES

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. Unmount 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 migrating 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.

```
ahsayubs:/# sh /ubs/bin/migrate-storage-single-disk.sh

Loading UBS Framework information, please wait..

The following storage entries have been found available for
migration:
1 : 76E7AAE1xesms00 [ad4]

Please select either one (1 - 1) :
```

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.

```
ahsayubs:/# sh /ubs/bin/migrate-storage-single-disk.sh

Loading UBS Framework information, please wait..

The following storage entries have been found available for
migration:
1 : 76E7AAE1xesms00 [ad4]

Please select either one (1 - 1) :

Confirm you want to migrate [76E7AAE1xesms00] from [ad4] as
[esms00]? (y/n)
```

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.

```
ahsayubs:/# sh /ubs/bin/migrate-storage-single-disk.sh

Loading UBS Framework information, please wait..

The following storage entries have been found available for
migration:
1 : 76E7AAE1xesms00 [ad4]

Please select either one (1 - 1) :

Confirm you want to migrate [76E7AAE1xesms00] from [ad4] as
[esms00]? (y/n) y
```

```
Start migrating modular storage [76E7AAE1xesms00] to
[873391A2xesms00]

ad4p11 labeled

ad4p13 labeled

Completed migrating modular storage [76E7AAE1xesms00] to
[873391A2xesms00]

Successfully updated the profile.ini file on the current system!!!
```

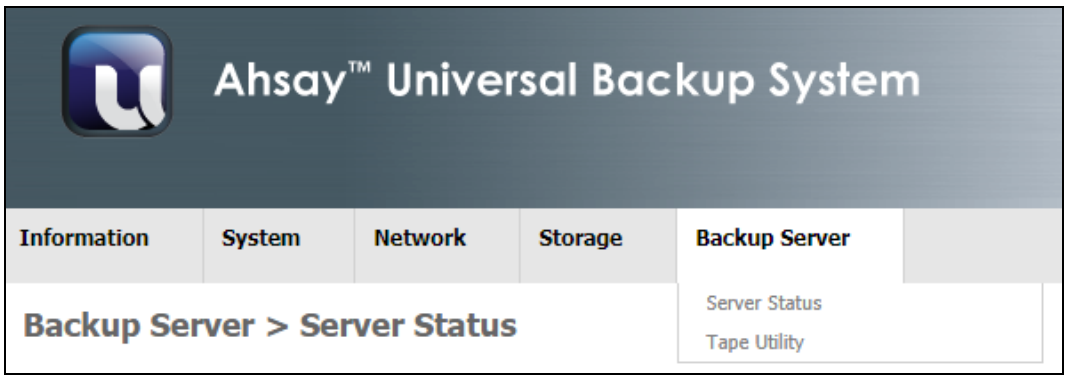
After completion AhsayUBS will automatically mount the migrated volume.

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 AhsayCBS web console.

9.5 Backup Server

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



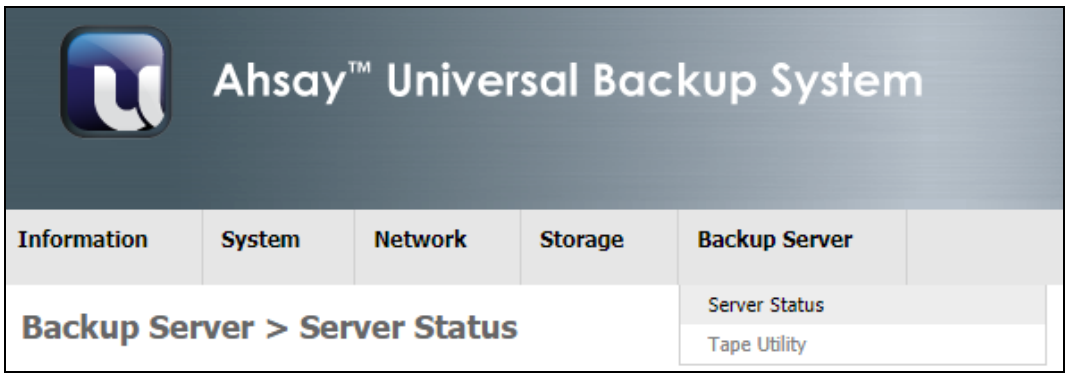
The [Backup Server] menu has been further divided into the following sections:

- Server Status (Start and Stop AhsayCBS)
- Tape Utility (Backup and Restore of tape device)

9.5.1 Server Status

The page [Backup Server] > [Server Status] allows you to:

- Start and stop the AhsayCBS service
- Start and stop the NFS service
- Enable or disable Access Server Files.



Here are the information and settings provided in the table:

- **Status:** Show the service status of the AhsayCBS in the AhsayUBS.
- **Check Storage Connectivity:** The UBS system have included a schedule check on storage connectivity. Upon any disconnected storage scenario, it will shutdown the “AhsayCBS” and “Share AhsayCBS” if this option is enabled.

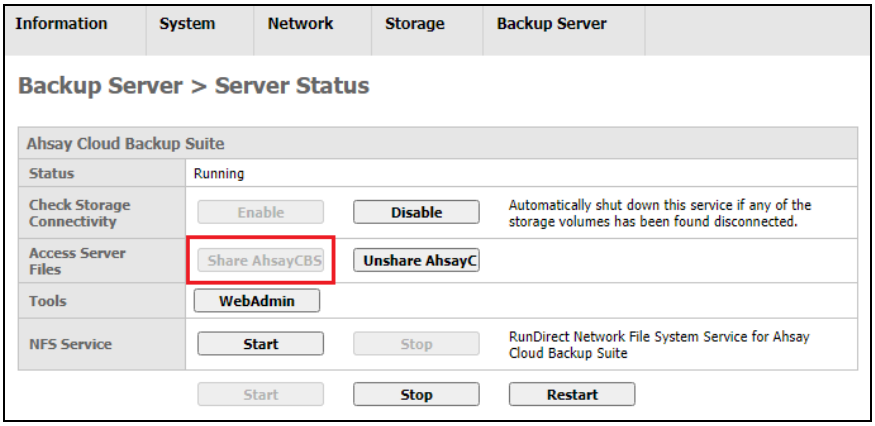
- **Access Server Files:** Allows the AhsayUBS administrator a convenient way to access the file system on the AhsayUBS server. And also gain access to folders/files such as the System and User Home folder from their Windows, macOS or Linux desktop machine. The AhsayUBS folders are shared using SAMBA.

  This is useful on the following scenarios:

  - Copying user data to/from the AhsayCBS user home.
  - Access the AhsayCBS logs folder to view the server logs.
  - Directly access configuration files from the conf folder.
  - Copying AhsayCBS hotfix files to the AhsayUBS server.
  - Copying AhsayOBM/AhsayACB seed load data to AhsayCBS user home. For more information on how to do this please refer to the following articles: https://wiki.ahsay.com/doku.php?id=public:8021_faq:how_to_seedload_to_a_cloud_destination and https://wiki.ahsay.com/doku.php?id=public:8052_faq:how_to_perform_a_seedload_backup_and_import.

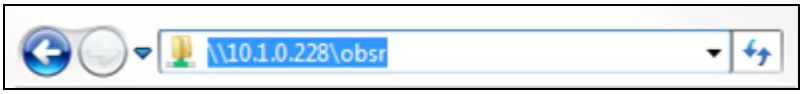
  Please follow these steps to access the AhsayUBS file system:

  i. Click the [Share AhsayCBS] button.

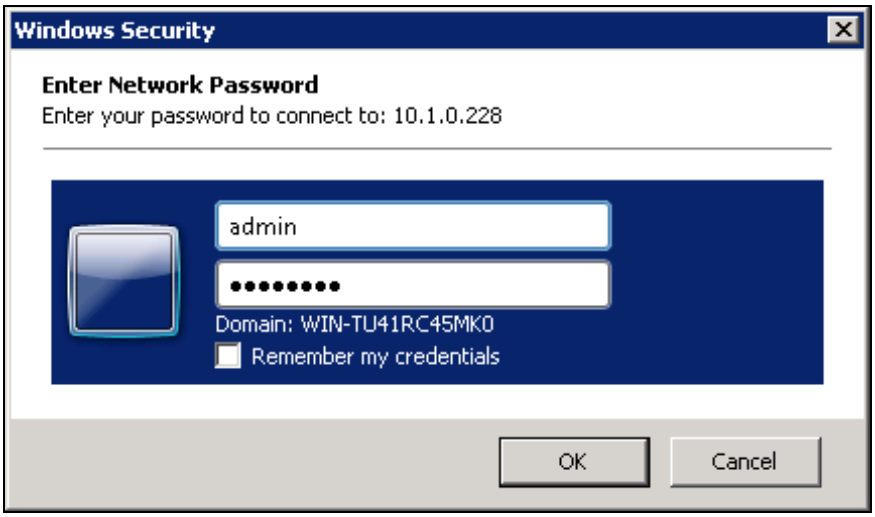


  ii. Connect to the shared directory by using a UNC path `\\server_name\obsr` or `\\IP_Address\obsr`. For a Linux desktop, access the AhsayUBS server folders from the mount point `/mnt/obsr`.

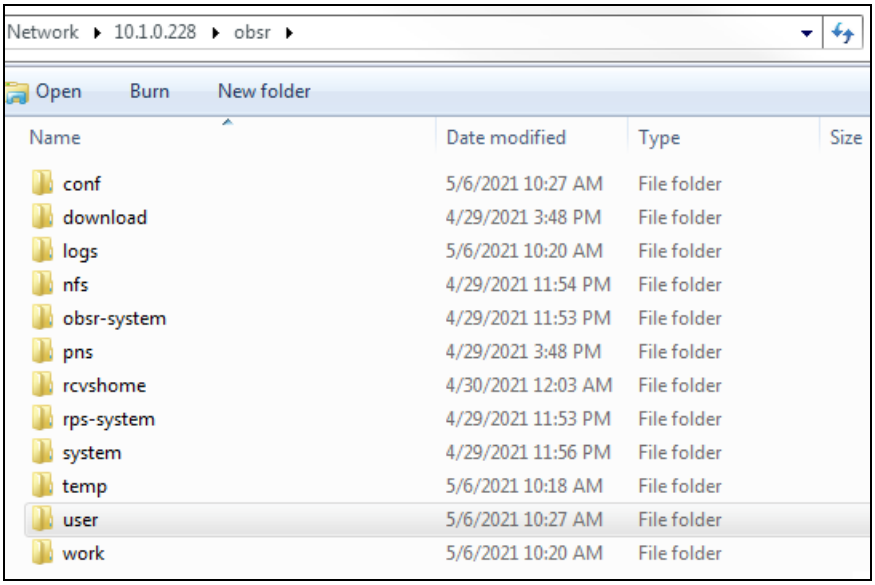
  For example, on a Windows machine to access the AhsayUBS server folders and files where the IP Address of the AhsayUBS server is 10.1.0.228, use Windows file explorer and type "\\10.1.0.228\obsr".



iii. Type the “admin” credentials used for the AhsayUBS WebAdmin (default user is **admin** and password is **ahsayubs)**.



iv. Now you can access the following folders on the AhsayUBS file system.

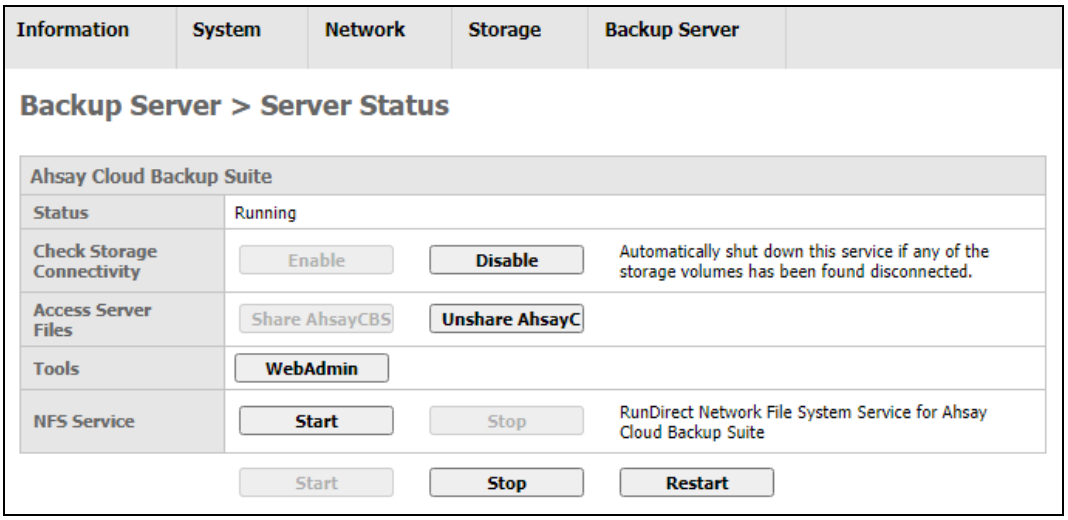


v. For security, enablement should be limited for temporary use, and disabled after use.

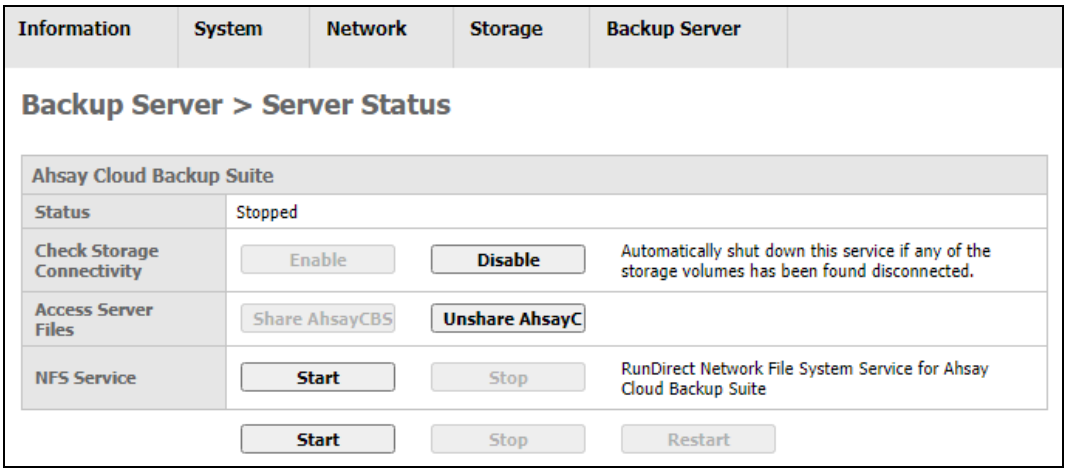
- **Tools (Only shown when AhsayCBS is started):** Click the [WebAdmin] button to open a new window for accessing the AhsayCBS in the AhsayUBS.
- **NFS Service:** To [Start] or [Stop] the NFS Service in AhsayCBS.

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

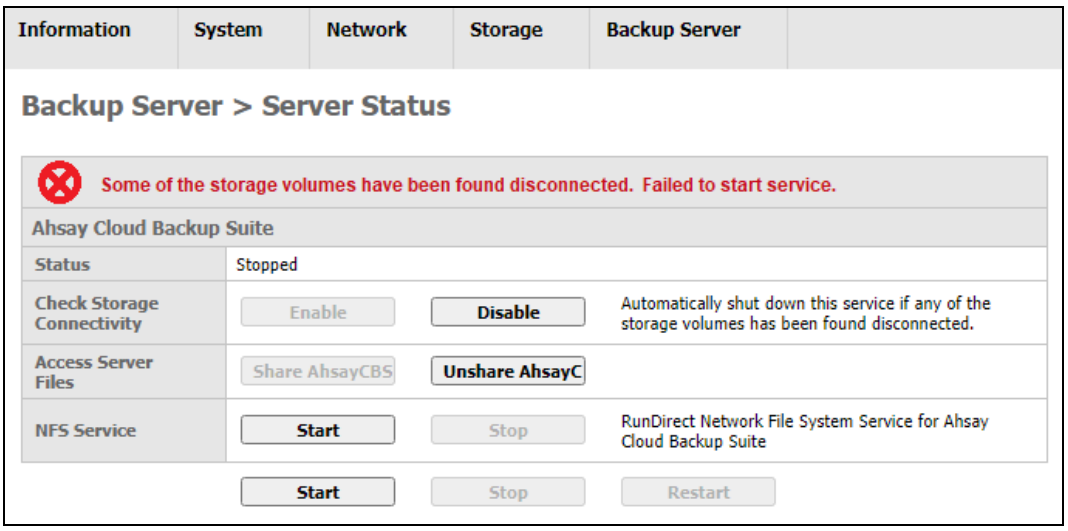
The status when the AhsayCBS service is started.



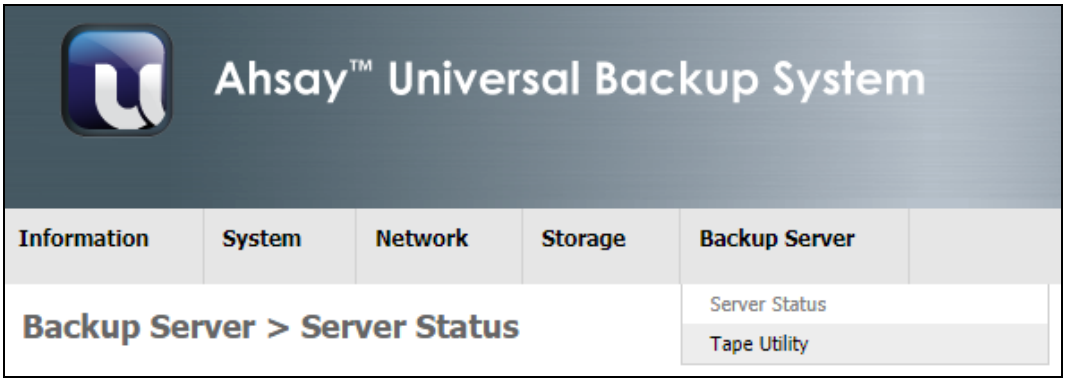
The status when the AhsayCBS service is stopped.



The following is the screen capture of the failed storage dependency during service start of “AhsayCBS” or “Share AhsayCBS” service. It is caused by loss 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.



9.5.2 Tape Utility



Introduction

The Tape Backup Utility will be used to archive the data of AhsayOBM/AhsayACB user accounts hosted on an AhsayCBS server to tape cartridge(s). The AhsayUBS administrator may backup selected user accounts to tape cartridge while the backup server remains online. Therefore, no downtime is required and the backup and restore service is not affected.

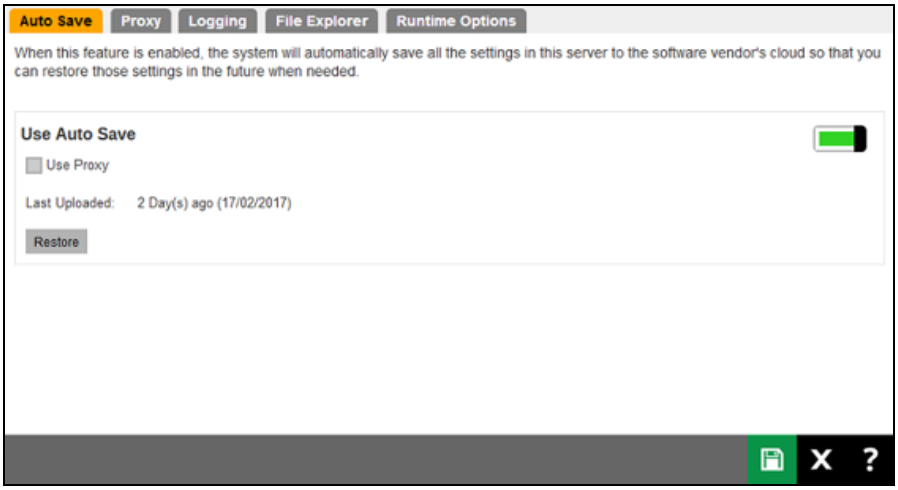
The Tape Backup Utility is integrated into the AhsayUBS which is based on FreeNAS firmware (FreeBSD 11.2). The tape backup and restore operation leverages the FreeBSD 'mt' utility (magnetic tape manipulating program), which is fully managed from within the AhsayUBS webadmin console. The AhsayCBS user account data can be restored to the AhsayUBS server either to the original or an alternate location.

Requirements

- AhsayUBS and AhsayCBS v8.3.0.0 or later
- AhsayCBS Auto Save must be enabled.

  As Auto Save will backup the users.xml file, since this file is required if the archived tape data needs to be recovered:

  1. If the user account has been deleted or
  2. Need to be restored to another AhsayUBS machine



Limitations

- All tape backup jobs must be performed manually through the AhsayUBS webadmin console. **Scheduled tape backups are not supported.**
- No API support for Tape Backup Utility as it is a FreeBSD system level operation.
- Only **one** AhsayCBS 'user home' path can be selected for backup at a time.
- Only **one** tape backup or restore job can be run at a time.
- Both tape libraries and tape changers are not supported, so 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 is full.
- The AhsayCBS service must be stopped prior to a tape restore, if restoring to an existing AhsayCBS 'user home' path.
- If AhsayUBS is running on a VMware host, the tape backup utility is not supported. As VMware does not support Tape Drives connected directly to ESXi 5.x or above. For more information please refer to this article https://kb.vmware.com/s/article/2007904.

Licensing

There are no additional license modules required to use the Tape Backup Utility, as this feature is integrated into AhsayUBS. However, an AhsayUBS license module is required to use AhsayUBS.

'User Home' setting in the Backup Server

For AhsayCBS that stores all user accounts locally under the 'User Home' directories. When a new user account is being created, AhsayCBS 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 AhsayCBS WebAdmin.

Supported Tape Devices and Standards

The FreeBSD 11.2 operating system provides full support for SCSI-I, SCSI-II and SCSI-III tape drives. As AhsayUBS is built using FreeBSD 11.2, all SCSI tape drives are therefore supported. The 'sa – SCSI Sequential Access device drive' will be used for accessing the tape device.

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.

1. DAT - Digital Audio Tape (format: DDS - Digital Data Storage)

2. DLT - Digital Linear Tape (halted development since 2007)

3. LTO - Linear Tape Open

Summary of Supported Standards

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 line	2001	DLT VS80	DLT IV	40	3
	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
	2012	LTO-6	LTO-6, LTO-5	2500	160
	2015	LTO-7	LTO-7, LTO-6	6000	300
	2017	LTO-8	LTO-8, LTO-7	12000	360

Before purchasing a tape drive, please consult your hardware vendor to confirm compatibility of the device with the FreeBSD 11.2 operating system.

The following factors should also be considered:

1. Compatible hardware interfaces with the AhsayUBS machine for connecting tape drive.

2. Tape cartridge capacity for storing user data.

3. Tape transfer rate.

NOTE

Tape backup/restore on AhsayUBS has been developed and tested using the following:

- DELL PowerVault LTO-4 tape drive, connected to a DELL 6GB HBA SAS controller using 800GB LTO-4 tape cartridges
- DELL PowerVault LTO-7 tape drive, connected to a SAS2008 PCI-Express Fusion-MPT SAS-2 Falcon controller using 6TB LTO-7 tape cartridges

Tape Backup/Restore Process via the AhsayUBS WebAdmin

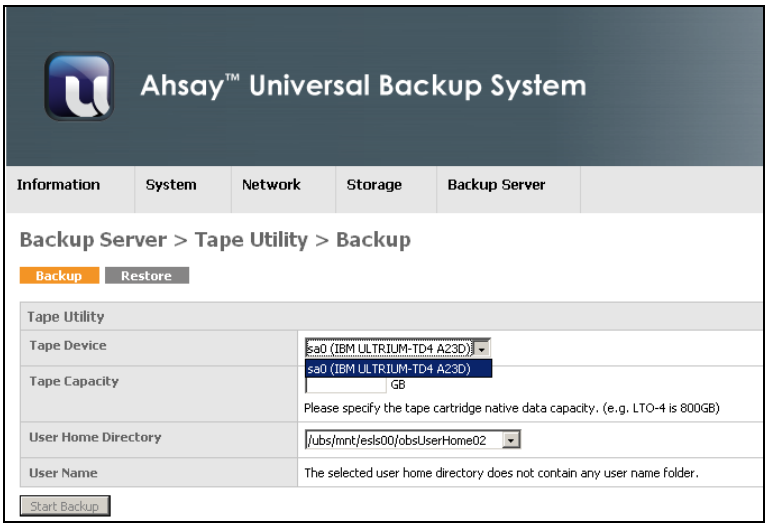
An AhsayUBS administrator may backup/restore User Home data to/from tape cartridges via the AhsayUBS webadmin console [Backup Server] > [Tape Utility] menu option.

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

1. Connected with the AhsayUBS server.

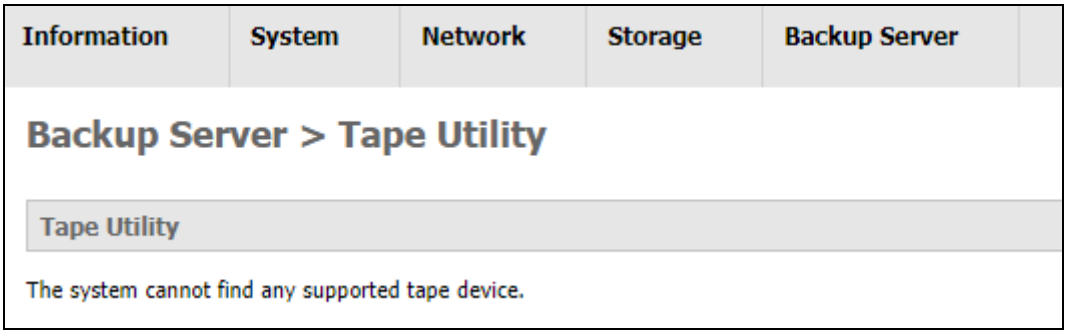
2. The tape device must be powered on.

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).



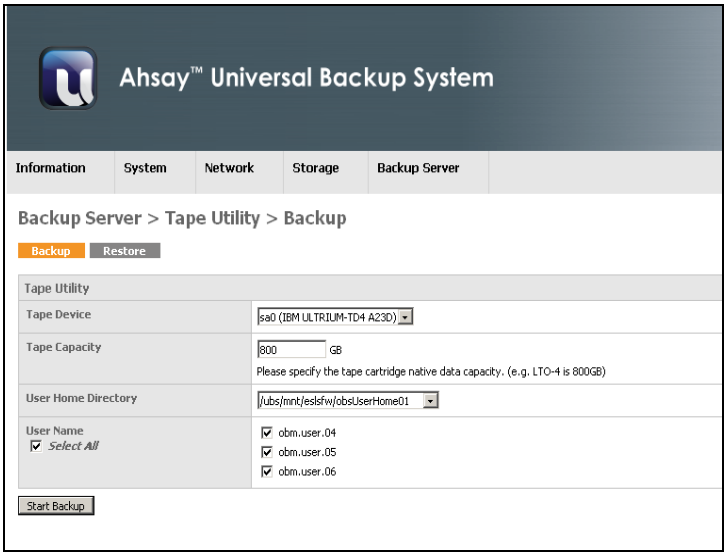
NOTES

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

Tape Backup Process

The Tape Backup Utility supports the backup of AhsayOBM/AhsayACB user accounts either on:

- The entire user home volume to another UBS server
- Selective user accounts on a user home volume to another UBS server



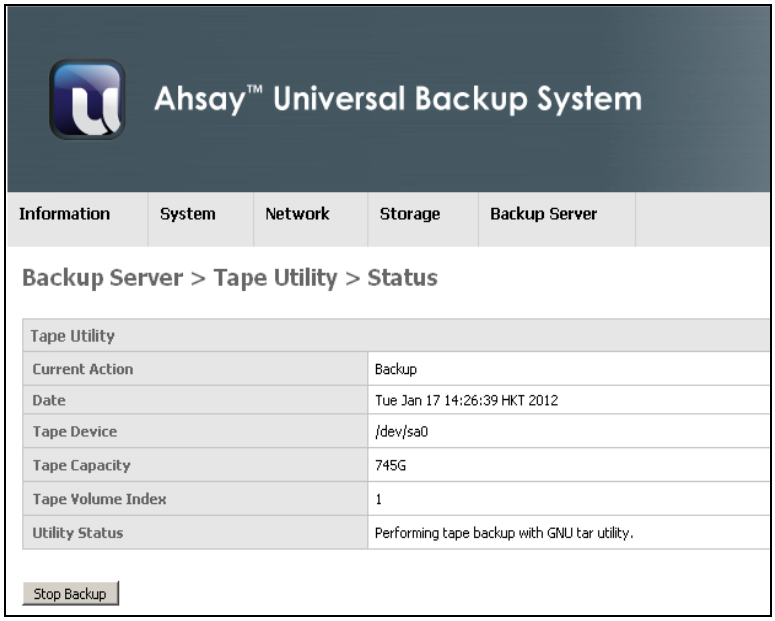
(Example: tape backup using 800GB LTO-4 tape cartridge)

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 AhsayCBS User Home path from the drop-down list.
7. Choose AhsayCBS user names selectively or select all AhsayCBS 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.

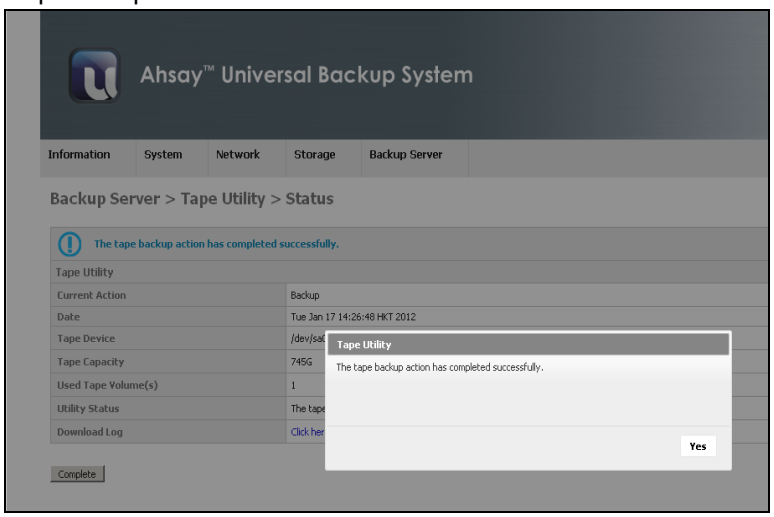
10. When the backup tape cartridge reaches its volume size limit, a [Continue] button will be shown in the [Backup Server] > [Tape Utility] > [Status] page.

11. Eject the existing tape cartridge from the AhsayUBS server and insert a new tape cartridge.

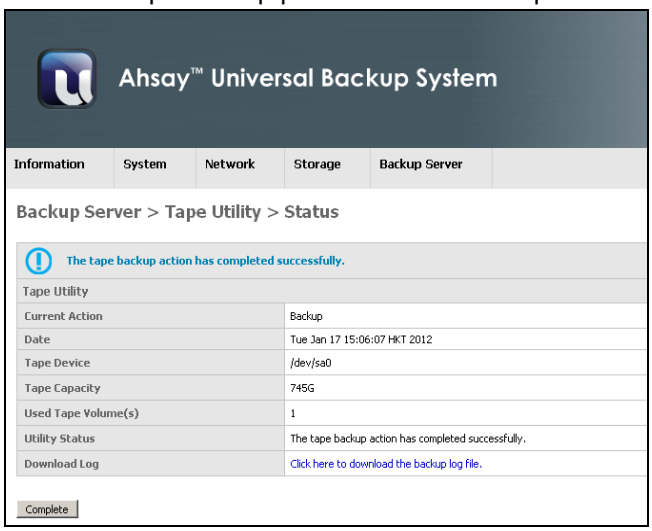
12. Click the [Continue] button on the [Backup Server] > [Tape Utility] > [Status] page.

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.

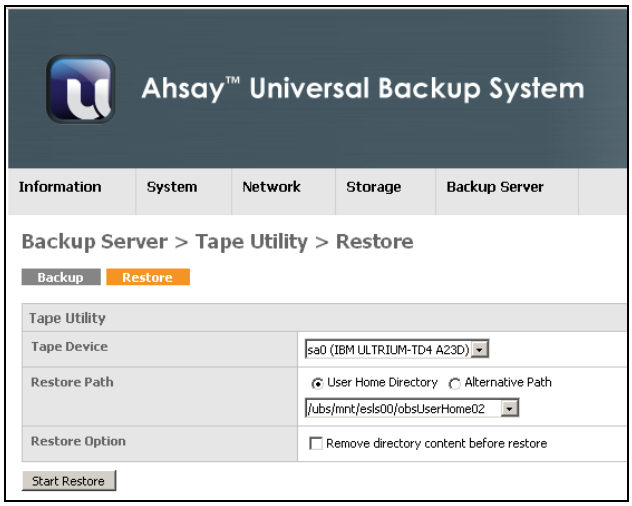
Tape Restore Process

The AhsayOBM/AhsayACB user account data is restored to the AhsayCBS server either to:

- Original user home location
- An alternate user home location
- The data on tape backups can be restored to another AhsayUBS machine

NOTE

Restore of original users.xml file may also be required, if the AhsayOBM/AhsayACB user account and or backup set(s) restored from tape have already been deleted from AhsayCBS.



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 AhsayCBS 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 AhsayCBS 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 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 has started, you will be redirected to the [Backup Server] > [Tape Utility] > [Status] page.

NOTE

If the AhsayCBS service is still running and restore to "User Home Directory" option is selected. The AhsayCBS 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 AhsayCBS service will be automatically restarted again.

NOTE

A tape restore job can be stopped at any time by pressing the [Stop Restore] button.

8. The tape restore process can be monitored from the [Backup Server] > [Tape Utility] > [Status] page.

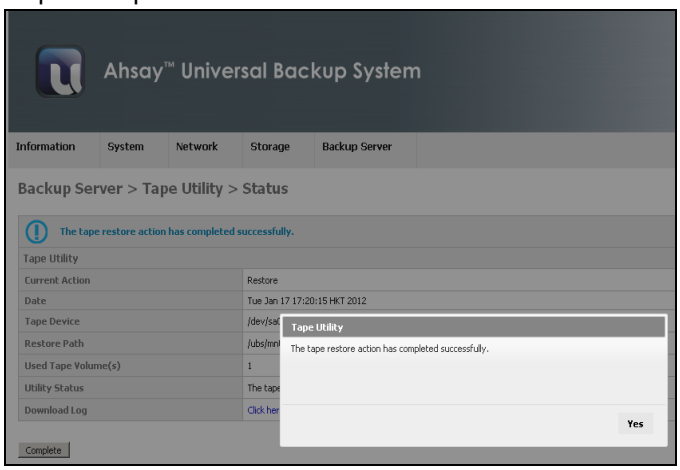
9. When the restore operation on current tape cartridge is completed, a [Continue] button will be shown in the [Backup Server] > [Tape Utility] > [Status] page.

10. Eject the existing tape cartridge and insert the next tape cartridge into the tape device.

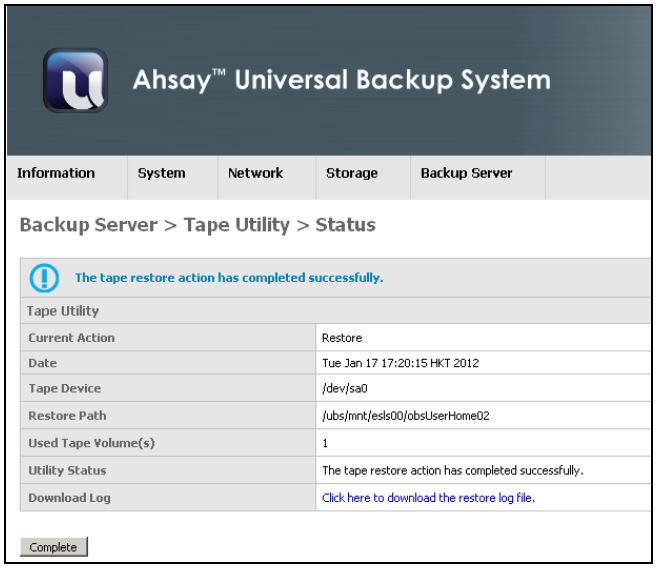
11. Click the [Continue] button in the [Backup Server] > [Tape Utility] > [Status] page.

12. The tape restore process will continue if there are no errors after the next tape cartridge is inserted. The tape restore 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).

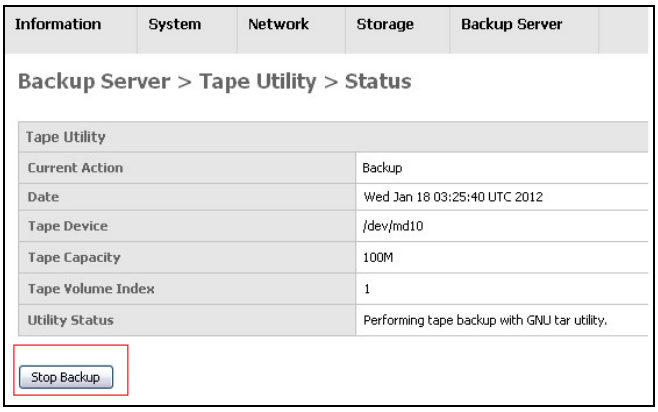
16. Click the [Complete] button to start another Tape Backup / Restore Process.

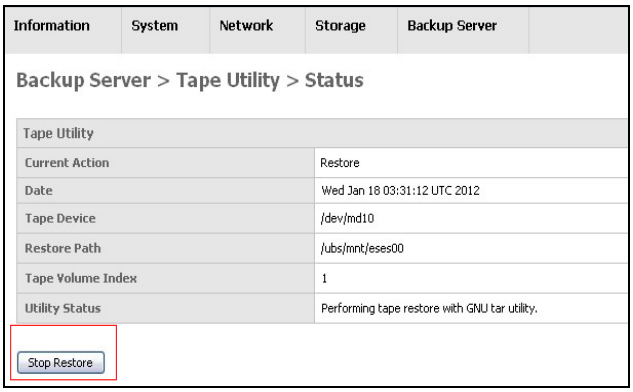
NOTE

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

Stopping Tape Backup and Restore Jobs

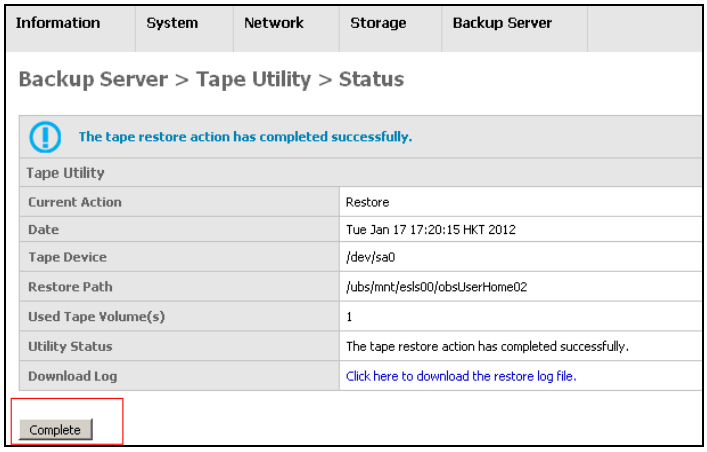
The tape backup/estore process can be terminated at any time by pressing the [Stop Backup] or [Stop Restore] button at the bottom left corner on the AhsayUBS web admin console [Backup Server] > [Tape Utility] > [Status] page.





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

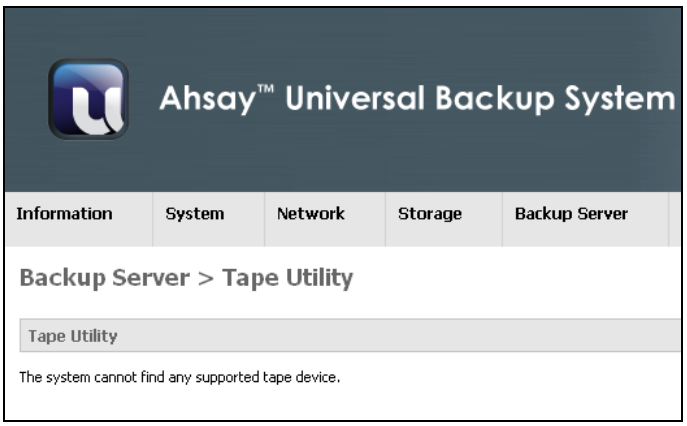
Once the [Complete] button is pressed the last tape backup/restore log files will be cleared.

Monitoring and Reporting

- The backup and restore job status can be monitored using the AhsayUBS webadmin console.
- Each tape backup and restore job will generate a separate log file, they can be downloaded from the AhsayUBS webadmin console.

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.

Tape Cartridge Failure

If the tape cartridge spins continuously and never come to a stop, the tape cartridge may be 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 via the command line 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:

1. Multiple volume tape backup process, it can be continued by replacing the existing cartridge with a new one. After that, you may click the [Continue] button to continue the tape backup process.
2. 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.

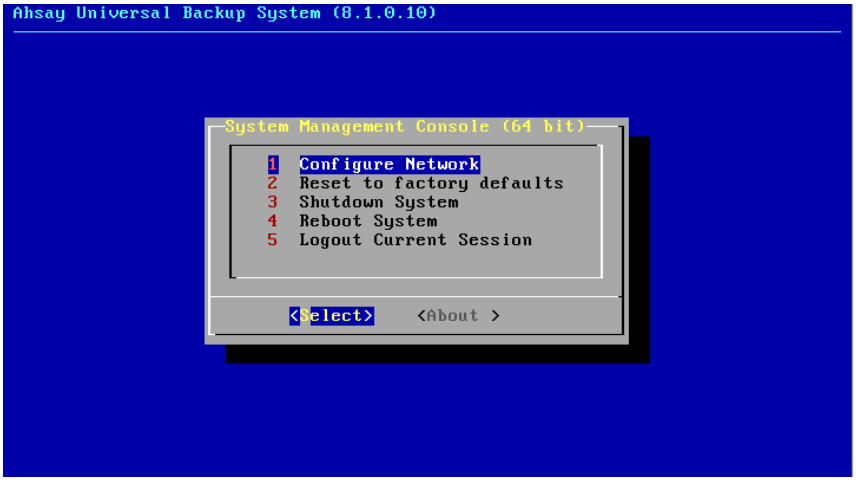
9.6 AhsayUBS Firmware Management Console

(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

Always press [Esc] to return to the main menu when the data is mistakenly entered.

9.6.1 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.

DHCP

1. 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.

2. By default, you can use the address "http://{SERVER_IP_ADDRESS}:8080" to access the AhsayUBS WebAdmin in the browser.

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

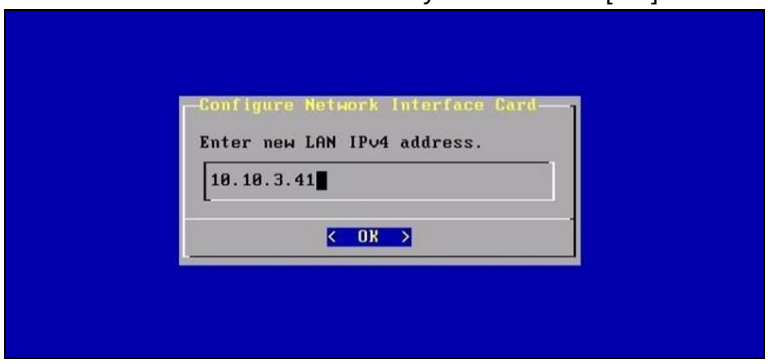
TIP

We do not recommend DHCP, as your client users may not be able to connect to the server, if the IP is reassigned a different IP.

Static IP

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

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

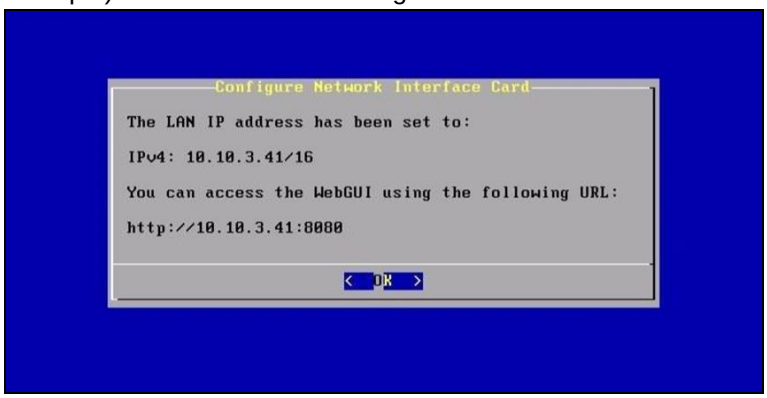


3. Enter the subnet for this IP Address. Choose [OK] to continue.

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

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

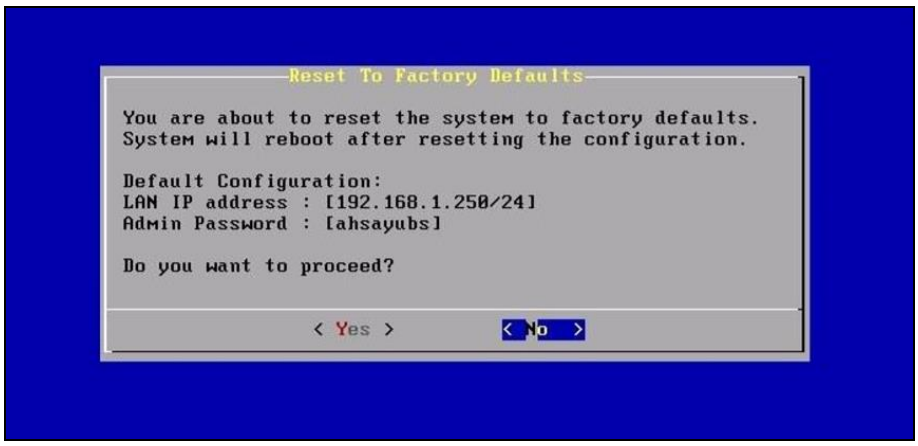
6. After that, the below screen will be shown. Now you can access the AhsayUBS WebAdmin by the URL shown on the screen (i.e. http://10.10.3.41:8080 in this example) for continue other configurations.



9.6.2 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.



NOTES

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.

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

    b. 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.

9.6.3 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 Shutdown 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.

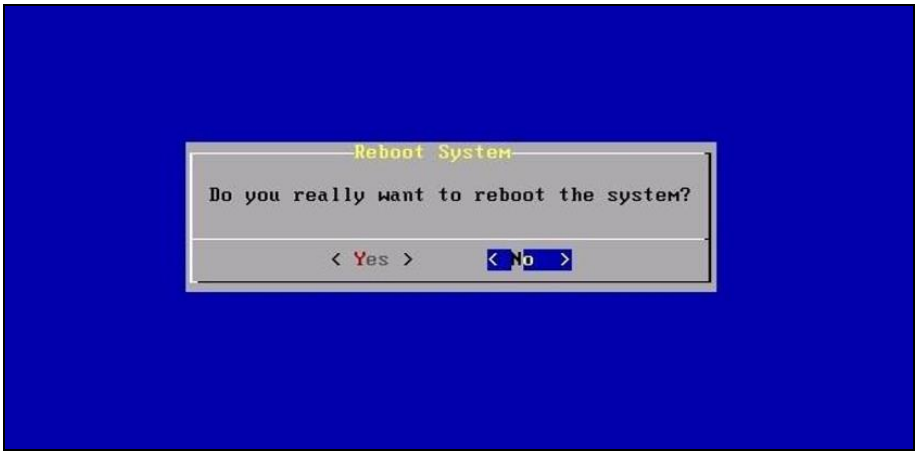
9.6.4 Reboot System

Choose this option for reboot the AhsayUBS.

NOTE

You can also reboot your AhsayUBS in the AhsayUBS WebAdmin. For more information, please refer to Reboot.

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.

10 Customizing AhsayUBS

Customization of AhsayUBS is separated into two sections:

1. Customization of AhsayCBS

   For customization of AhsayCBS, please refer to the AhsayCBS Administrator's Guide.

2. Customization of AhsayUBS Firmware

   For customization of AhsayUBS with AhsayCBS, please refer to the AhsayCBS Administrator's Guide.

11 Contacting Ahsay

11.1 Technical Assistance

To contact Ahsay support representatives for technical assistance, visit the Partner Portal:
https://www.ahsay.com/partners/

Also use the Ahsay Wikipedia for resource such as Hardware Compatibility List, Software Compatibility List, and other product information:
https://wiki.ahsay.com

11.2 Documentation

Documentations for all Ahsay products are available at:
https://www.ahsay.com/jsp/en/home/index.jsp?pageContentKey=ahsay_downloads_documentation_guides

You can send us suggestions for improvements or report on issues in the documentation by contacting us at:
https://www.ahsay.com/partners/

Please specify the specific document title as well as the change required/suggestion when contacting us.

Appendix

Appendix A Supported Processors

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

https://www.freebsd.org/releases/11.2R/hardware.html

For processor type “amd64”, the following processors are supported:

- AMD Athlon™64 (“Clawhammer”)
- AMD Opteron™ (“Sledgehammer”)
- AMD Sempron™
- AMD Turion™
- AMD Phenom™
- 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® Core™ i range of processors
- All Intel Pentium® D processors
- All Intel® Centrino® Duo and Centrino® Pro platforms
- 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 256 virtual processor cores. Please refer to Chapter 5.1 Backup System Requirements for details of processor core configuration.

For processor type “i386”, the following processors are supported:

- FreeBSD/i386 runs on a wide variety of “IBM PC compatible” machines. Due to the wide range of hardware available for this architecture, it is impossible to exhaustively list all combinations of equipment supported by FreeBSD. Nevertheless, some general guidelines are presented here.
- Almost all i386™-compatible processors with a floating point unit are supported. All Intel® processors beginning with the 80486 are supported, including the 80486, Pentium®, Pentium® Pro, Pentium® II, Pentium® III, Pentium® 4, and variants thereof, such as the Xeon™ and Celeron® processors. All i386™-compatible AMD processors are also supported, including the Am486®, Am5x86®, K5, AMD-K6® (and variants), AMD Athlon™ (including Athlon-MP, Athlon-XP, Athlon-4, and Athlon Thunderbird), and AMD Duron™ processors. The AMD Élan SC520

embedded processor is supported. The Transmeta Crusoe is recognized and supported, as are i386™-compatible processors from Cyrix and NexGen.

- There is a wide variety of motherboards available for this architecture. Motherboards using the ISA, VLB, EISA, AGP, and PCI expansion buses are well-supported. There is some limited support for the MCA (“MicroChannel”) expansion bus used in the IBM PS/2 line of PCs.

Appendix B Supported Disk Controllers

For an updated list of supported disk controllers drivers, please refer to the FreeBSD website.
https://www.freebsd.org/releases/11.2R/hardware.html#DISK

Appendix C Supported Ethernet Interfaces

For an updated list of supported Ethernet interfaces drivers, please refer to the FreeBSD website https://www.freebsd.org/releases/11.2R/hardware.html#ETHERNET

Appendix D Supported Languages

Language Code	Language
ar	Arabic
ca	Catalan
cs	Czech
da	Danish
de	German
el	Greek Modern
en	English
es	Spanish
eu	Euskara/Basque
fr	French
iw	Hebrew
hu	Hungarian
id	Indonesian
it	Italian
ja	Japanese
ko	Korean
lt	Lithuanian
nl	Dutch
no	Norwegian
pl	Polish
pt_BR	Portuguese (Brazil)
pt_PT	Portuguese (Portugal)
ro	Russian
sl	Slovenian
sv	Swedish
th	Thai
tr	Turkish
vi	Vietnamese
zh_CN	Chinese (Simplified)
zh_TW	Chinese (Traditional)

Appendix E 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 paste the output in the XML tag "<motd>" in the config file.

Appendix F Supported Time Zones

The following are the supported time zones that can be set in <timezone> XML tag.

Africa	America	America/Mazatlan
Africa/Algiers	America/Argentina	America/Tijuana
Africa/Luanda	America/Indiana	America/Anguilla
Africa/Porto-Novo	America/Kentucky	America/Antigua
Africa/Gaborone	America/North_Dakota	America/Nassau
Africa/Ouagadougou	America/Danmarkshavn	America/Barbados
Africa/Bujumbura	America/Scoresbysund	America/Belize
Africa/Douala	America/Godthab	America/Cayman
Africa/Bangui	America/Thule	America/Costa_Rica
Africa/Ndjamena	America/New_York	America/Havana
Africa/Kinshasa	America/Chicago	America/Dominica
Africa/Lubumbashi	America/Denver	America/Santo_Domingo
Africa/Brazzaville	America/Los_Angeles	America/El_Salvador
Africa/Abidjan	America/Juneau	America/Grenada
Africa/Djibouti	America/Yakutat	America/Guadeloupe
Africa/Cairo	America/Anchorage	America/Guatemala
Africa/Malabo	America/Nome	America/Port-au-Prince
Africa/Asmera	America/Adak	America/Tegucigalpa
Africa/Addis_Ababa	America/Phoenix	America/Jamaica
Africa/Libreville	America/Boise	America/Martinique
Africa/Banjul	America/Indianapolis	America/Montserrat
Africa/Accra	America/Louisville	America/Managua
Africa/Conakry	America/Detroit	America/Panama
Africa/Bissau	America/Menominee	America/Puerto_Rico
Africa/Nairobi	America/St_Johns	America/St_Kitts
Africa/Maseru	America/Goose_Bay	America/St_Lucia
Africa/Monrovia	America/Halifax	America/Miquelon
Africa/Tripoli	America/Glace_Bay	America/St_Vincent
Africa/Blantyre	America/Montreal	America/Grand_Turk
Africa/Bamako	America/Toronto	America/Tortola
Africa/Timbuktu	America/Thunder_Bay	America/St_Thomas
Africa/Nouakchott	America/Nipigon	America/Aruba
Africa/Casablanca	America/Rainy_River	America/La_Paz
Africa/El_Aaiun	America/Winnipeg	America/Noronha
Africa/Maputo	America/Regina	America/Belem
Africa/Windhoek	America/Swift_Current	America/Fortaleza
Africa/Niamey	America/Edmonton	America/Recife
Africa/Lagos	America/Vancouver	America/Araguaina
Africa/Kigali	America/Dawson_Creek	America/Maceio
Africa/Sao_Tome	America/Pangnirtung	America/Bahia
Africa/Dakar	America/Iqaluit	America/Sao_Paulo
Africa/Freetown	America/Rankin_Inlet	America/Campo_Grande
Africa/Mogadishu	America/Cambridge_Bay	America/Cuiaba
Africa/Johannesburg	America/Yellowknife	America/Porto_Velho
Africa/Khartoum	America/Inuvik	America/Boa_Vista
Africa/Mbabane	America/Whitehorse	America/Manaus
Africa/Dar_es_Salaam	America/Dawson	America/Eirunepe
Africa/Lome	America/Cancun	America/Rio_Branco
Africa/Tunis	America/Merida	America/Santiago
Africa/Kampala	America/Monterrey	America/Bogota
Africa/Lusaka	America/Mexico_City	America/Curacao
Africa/Harare	America/Chihuahua	America/Guayaquil

Africa/Ceuta	America/Hermosillo	America/Cayenne
America/Guyana	Asia/Macau	Asia/Kamchatka
America/Asuncion	Asia/Nicosia	Asia/Anadyr
America/Lima	Asia/Tbilisi	Asia/Istanbul
America/Paramaribo	Asia/Dili	Atlantic
America/Port_of_Spain	Asia/Calcutta	Atlantic/Cape_Verde
America/Montevideo	Asia/Jakarta	Atlantic/St_Helena
America/Caracas	Asia/Pontianak	Atlantic/Faeroe
America/Shiprock	Asia/Makassar	Atlantic/Reykjavik
America/North_Dakota/Center	Asia/Jayapura	Atlantic/Azores
America/Kentucky/Monticello	Asia/Tehran	Atlantic/Madeira
America/Kentucky/Louisville	Asia/Baghdad	Atlantic/Canary
America/Indiana/Marengo	Asia/Jerusalem	Atlantic/Bermuda
America/Indiana/Knox	Asia/Tokyo	Atlantic/Stanley
America/Indiana/Vevay	Asia/Amman	Atlantic/South_Georgia
America/Indiana/Indianapolis	Asia/Almaty	Atlantic/Jan_Mayen
America/Argentina/Buenos_Air	Asia/Qyzylorda	Australia
es	Asia/Aqtobe	Australia/Darwin
America/Argentina/Cordoba	Asia/Aqtau	Australia/Perth
America/Argentina/Tucuman	Asia/Oral	Australia/Brisbane
America/Argentina/La_Rioja	Asia/Bishkek	Australia/Lindeman
America/Argentina/San_Juan	Asia/Seoul	Australia/Adelaide
America/Argentina/Jujuy	Asia/Pyongyang	Australia/Hobart
America/Argentina/Catamarca	Asia/Kuwait	Australia/Melbourne
America/Argentina/Mendoza	Asia/Vientiane	Australia/Sydney
America/Argentina/ComodRiva	Asia/Beirut	Australia/Broken_Hill
davia	Asia/Kuala_Lumpur	Australia/Lord_Howe
America/Argentina/Rio_Gallegos	Asia/Kuching	CET
America/Argentina/Ushuaia	Asia/Hovd	CST6CDT
Antarctica	Asia/Ulaanbaatar	EET
Antarctica/Casey	Asia/Choibalsan	EST
Antarctica/Davis	Asia/Katmandu	EST5EDT
Antarctica/Mawson	Asia/Muscat	Etc
Antarctica/DumontDUrville	Asia/Karachi	Etc/GMT
Antarctica/Syowa	Asia/Gaza	Etc/UTC
Antarctica/Vostok	Asia/Manila	Etc/UCT
Antarctica/Rothera	Asia/Qatar	Etc/GMT-14
Antarctica/Palmer	Asia/Riyadh	Etc/GMT-13
Antarctica/McMurdo	Asia/Singapore	Etc/GMT-12
Antarctica/South_Pole	Asia/Colombo	Etc/GMT-11
Arctic	Asia/Damascus	Etc/GMT-10
Arctic/Longyearbyen	Asia/Dushanbe	Etc/GMT-9
Asia	Asia/Bangkok	Etc/GMT-8
Asia/Kabul	Asia/Ashgabat	Etc/GMT-7
Asia/Yerevan	Asia/Dubai	Etc/GMT-6
Asia/Baku	Asia/Samarkand	Etc/GMT-5
Asia/Bahrain	Asia/Tashkent	Etc/GMT-4
Asia/Dhaka	Asia/Saigon	Etc/GMT-3
Asia/Thimphu	Asia/Aden	Etc/GMT-2
Asia/Brunei	Asia/Yekaterinburg	Etc/GMT-1
Asia/Rangoon	Asia/Omsk	Etc/GMT+1
Asia/Phnom_Penh	Asia/Novosibirsk	Etc/GMT+2
Asia/Harbin	Asia/Krasnoyarsk	Etc/GMT+3
Asia/Shanghai	Asia/Irkutsk	Etc/GMT+4
Asia/Chongqing	Asia/Yakutsk	Etc/GMT+5
Asia/Urumqi	Asia/Vladivostok	Etc/GMT+6
Asia/Kashgar	Asia/Sakhalin	Etc/GMT+7

Asia/Hong_Kong	Asia/Magadan	Etc/GMT+8
Asia/Taipei	Europe/Mariehamn	Pacific/Palau
Etc/GMT+9	Europe/Vatican	Pacific/Port_Moresby
Etc/GMT+10	Europe/San_Marino	Pacific/Pitcairn
Etc/GMT+11	Europe/Ljubljana	Pacific/Pago_Pago
Etc/GMT+12	Europe/Sarajevo	Pacific/Apia
Etc/Universal	Europe/Skopje	Pacific/Guadalcanal
Etc/Zulu	Europe/Zagreb	Pacific/Fakaofo
Etc/Greenwich	Europe/Bratislava	Pacific/Tongatapu
Etc/GMT-0	Factory	Pacific/Funafuti
Etc/GMT+0	GMT	Pacific/Johnston
Etc/GMT0	HST	Pacific/Midway
Europe	Indian	Pacific/Wake
Europe/London	Indian/Comoro	Pacific/Efate
Europe/Belfast	Indian/Antananarivo	Pacific/Wallis
Europe/Dublin	Indian/Mauritius	Pacific/Honolulu
Europe/Tirane	Indian/Mayotte	Pacific/Easter
Europe/Andorra	Indian/Reunion	Pacific/Galapagos
Europe/Vienna	Indian/Mahe	SystemV
Europe/Minsk	Indian/Kerguelen	SystemV/AST4ADT
Europe/Brussels	Indian/Chagos	SystemV/EST5EDT
Europe/Sofia	Indian/Maldives	SystemV/CST6CDT
Europe/Prague	Indian/Christmas	SystemV/MST7MDT
Europe/Copenhagen	Indian/Cocos	SystemV/PST8PDT
Europe/Tallinn	MET	SystemV/YST9YDT
Europe/Helsinki	MST	SystemV/AST4
Europe/Paris	MST7MDT	SystemV/EST5
Europe/Berlin	PST8PDT	SystemV/CST6
Europe/Gibraltar	Pacific	SystemV/MST7
Europe/Athens	Pacific/Rarotonga	SystemV/PST8
Europe/Budapest	Pacific/Fiji	SystemV/YST9
Europe/Rome	Pacific/Gambier	SystemV/HST10
Europe/Riga	Pacific/Marquesas	WET
Europe/Vaduz	Pacific/Tahiti	
Europe/Vilnius	Pacific/Guam	
Europe/Luxembourg	Pacific/Tarawa	
Europe/Malta	Pacific/Enderbury	
Europe/Chisinau	Pacific/Kiritimati	
Europe/Monaco	Pacific/Saipan	
Europe/Amsterdam	Pacific/Majuro	
Europe/Oslo	Pacific/Kwajalein	
Europe/Warsaw	Pacific/Yap	
Europe/Lisbon	Pacific/Truk	
Europe/Bucharest	Pacific/Ponape	
Europe/Kaliningrad	Pacific/Kosrae	
Europe/Moscow	Pacific/Nauru	
Europe/Samara	Pacific/Noumea	
Europe/Belgrade	Pacific/Auckland	
Europe/Madrid	Pacific/Chatham	
Europe/Stockholm	Pacific/Niue	
Europe/Zurich	Pacific/Norfolk	
Europe/Istanbul	Pacific/Palau	
Europe/Kiev	Pacific/Port_Moresby	
Europe/Uzhgorod	Pacific/Pitcairn	
Europe/Zaporozhye	Pacific/Pago_Pago	
Europe/Simferopol	Pacific/Apia	
Europe/Nicosia	Pacific/Guadalcanal	

Appendix G 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 H Identifying Physical Local Block Devices on AhsayUBS

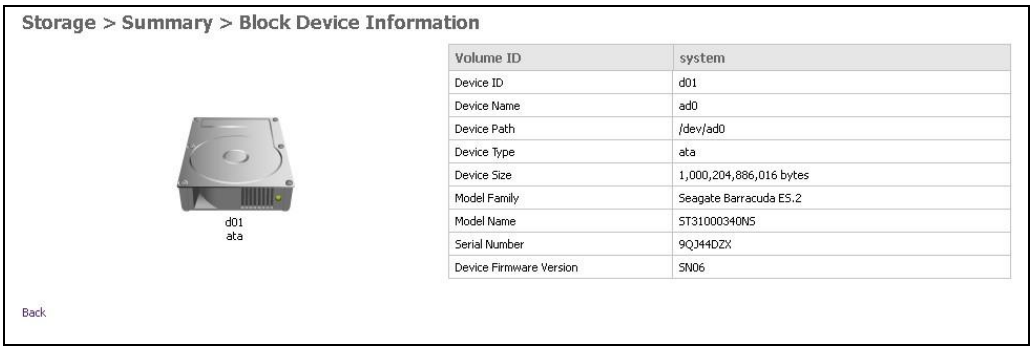
Method 1: Serial Number

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

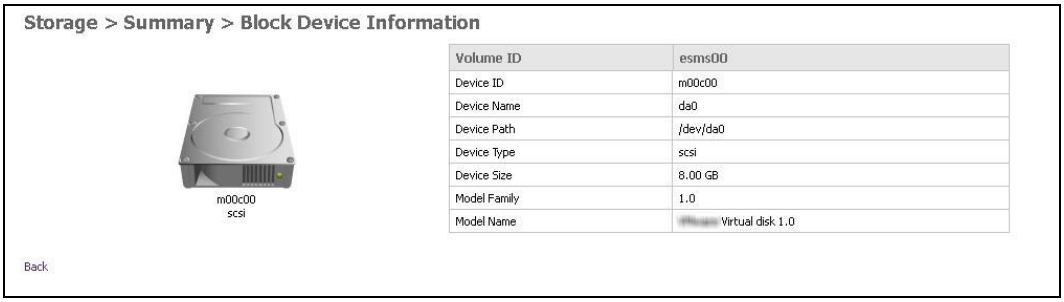
Method 2: Device name

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.



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

Appendix I 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

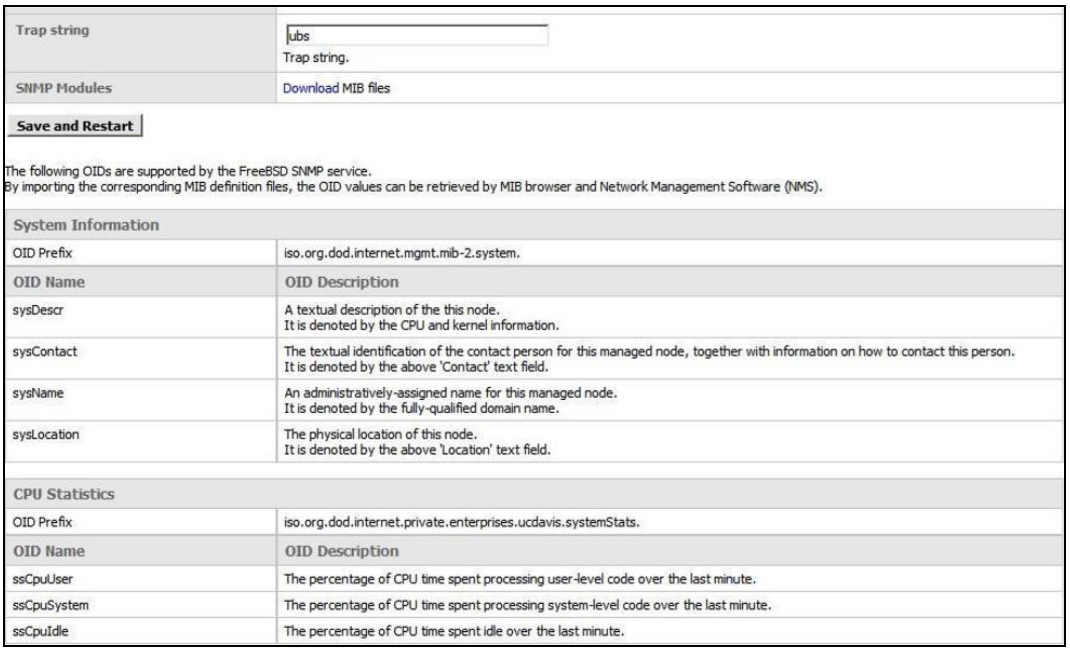
Fokus Begemot (Mib-II)
http://www.freebsd.org/cgi/man.cgi?query=snmp_mibII&sektion=3&manpath=FreeBSD+8.3-RELEASE+and+Ports

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

NOTE

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



Trap string	ubs Trap string.
SNMP Modules	Download MIB files

Save and Restart

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.

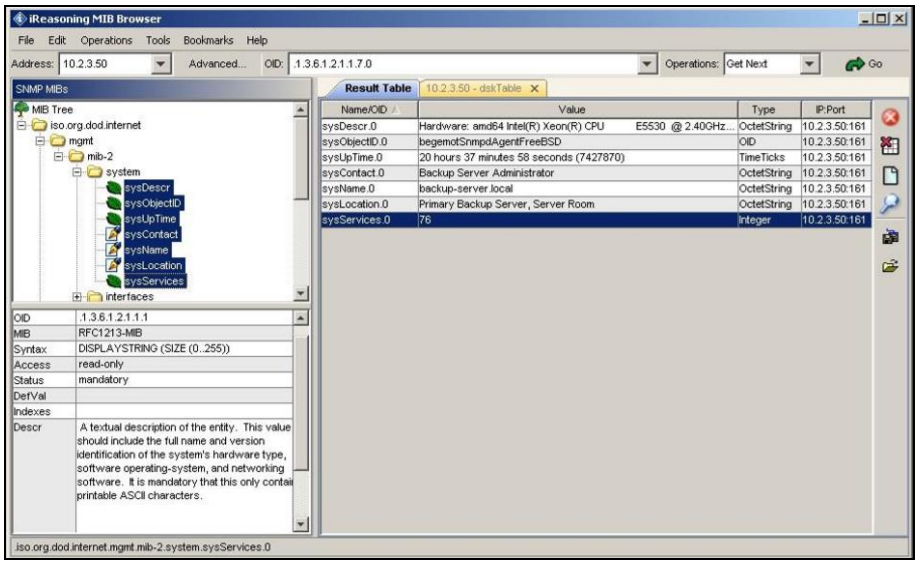
Appendix J MIB Browser

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'.

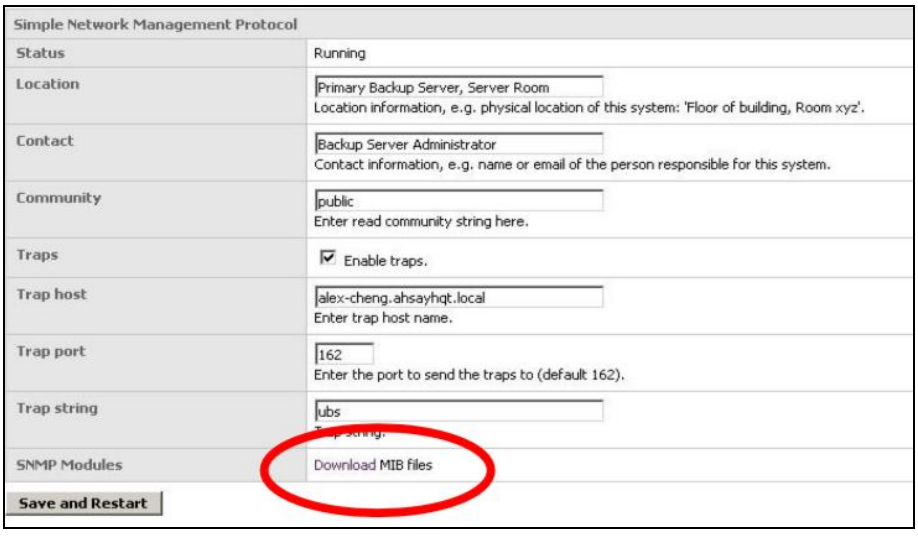
(http://ireasoning.com/downloadmibbrowserfree.php)

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)

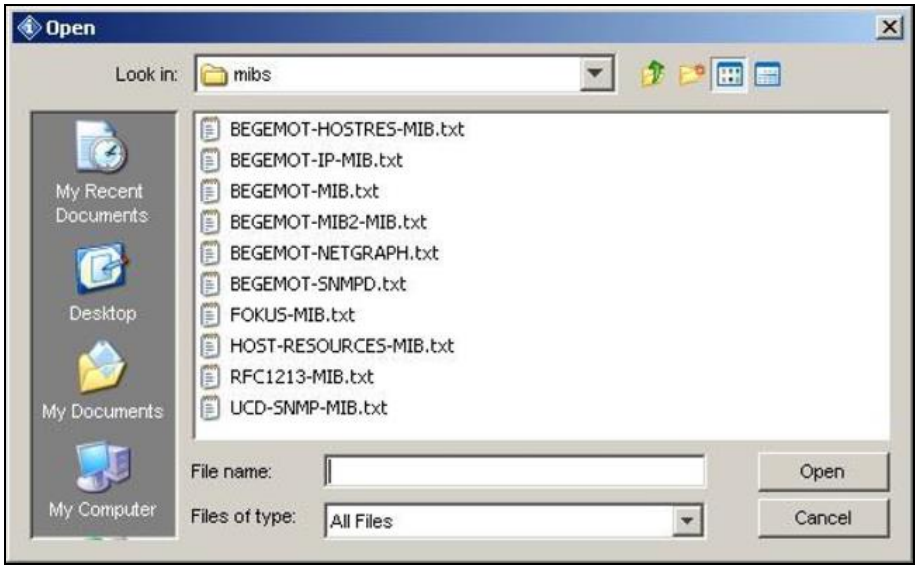


2. Additional MIB definition files can be loaded to the MIB Browser.
   Download and extract the MIB archive from UBS [System -> Settings -> SNMP].



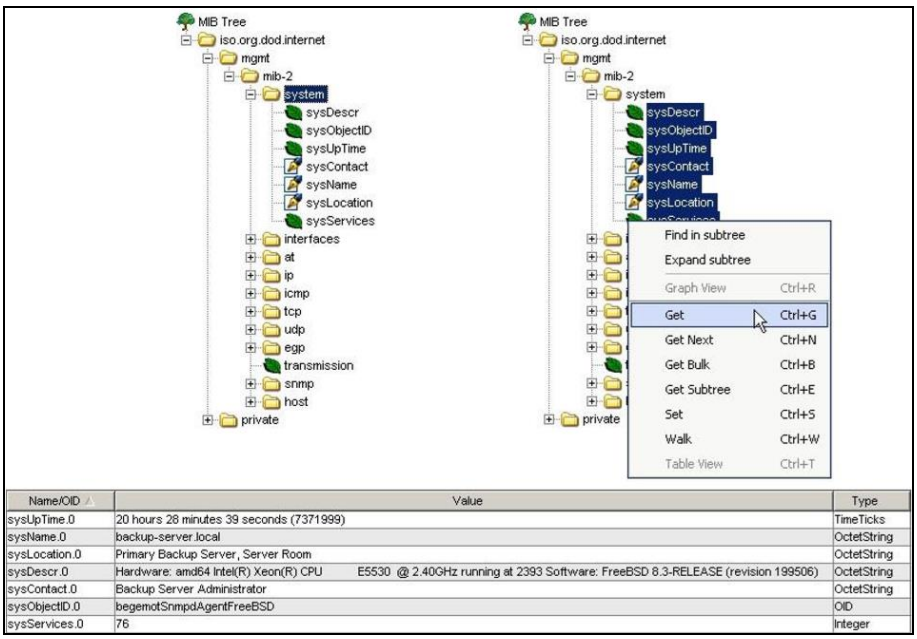
Click on ‘File -> Load MIBs’ to load the following MIB definition files:

- 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

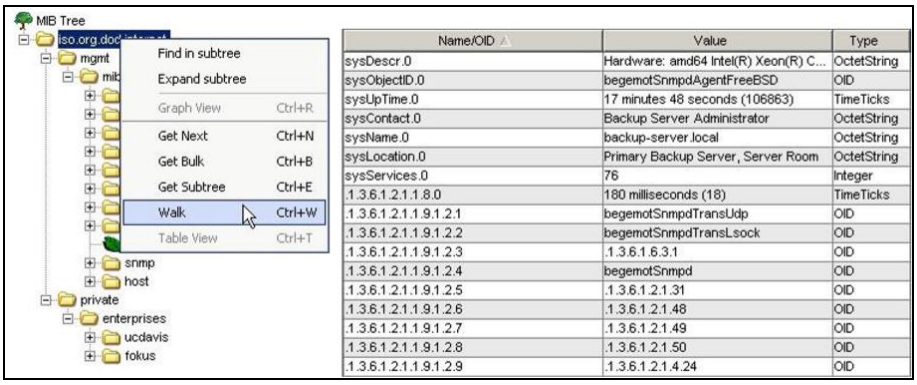


3. SNMP ‘Get’ and ‘Walk’ operation

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.



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.

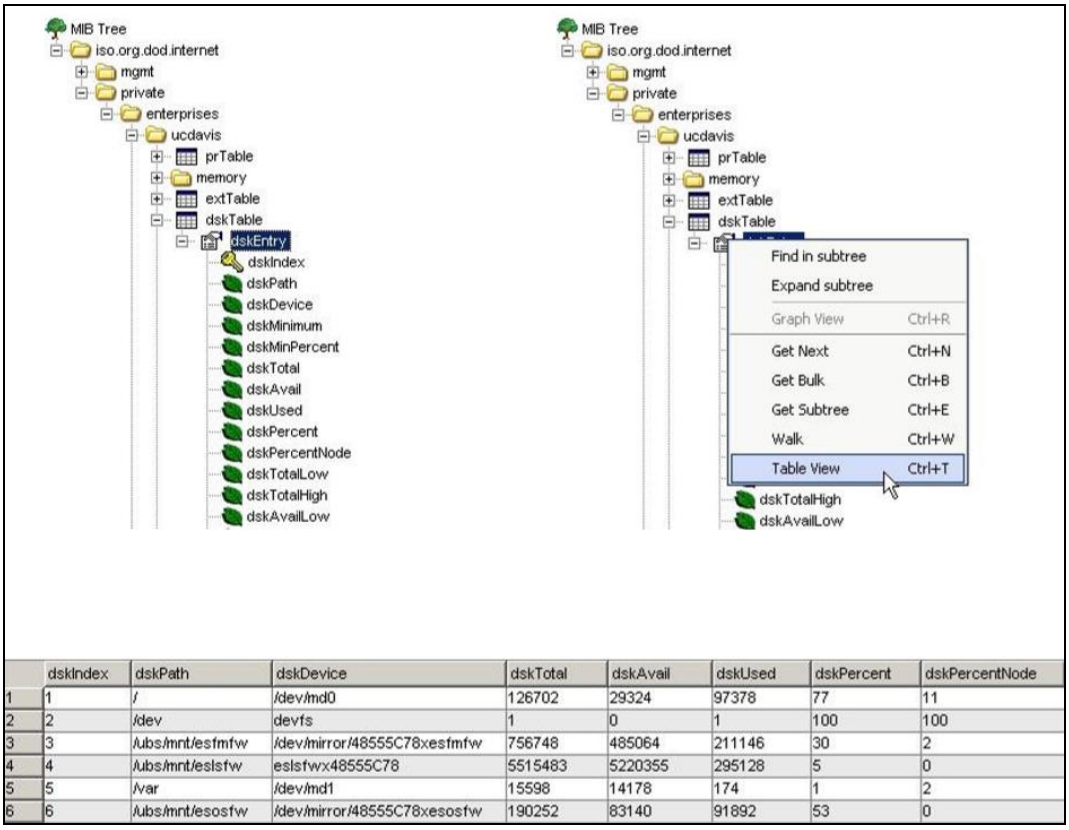


4. MIB Browser Table View

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 K Open VM Tools Support

AhsayUBS includes support for Open VM Tools on FreeBSD.

To check if Open VM Tools is installed and running on AhsayUBS, login to AhsayUBS server using a ssh client and use the **kldstat** or **ps** command.

```
# kldstat
Id Refs Address                Size     Name
 Id Refs Address                 Size     Name
 1   49 0xffffffff80200000 10d1490  kernel
 2    1 0xffffffff812d2000 8cf0     vesa.ko
 3    1 0xffffffff8139c000 17378    ahci.ko
 4    1 0xffffffff813b4000 f108     mvs.ko
 5    1 0xffffffff8c3c4000 7b68     geom_concat.ko
 6    1 0xffffffff8c3cc000 8f60     geom_stripe.ko
 7    1 0xffffffff8c3d5000 25ae8    geom_mirror.ko
 8    1 0xffffffff8c3fb000 25c38    geom_raid5.ko
 9    1 0xffffffff8c611000 221398   zfs.ko
10    1 0xffffffff8c833000 7500     opensolaris.ko
11    1 0xffffffff8c83b000 11150    krpc.ko
12    1 0xffffffff8c84d000 9afc     iscsi_initiator.ko
13    1 0xffffffff8c857000 14bd     splash_bmp.ko
14    1 0xffffffff8c859000 2798     vmmemctl.ko
15    1 0xffffffff8c85c000 23e0     vmxnet.ko
16    1 0xffffffff8c85f000 2cf8     vmblock.ko
17    1 0xffffffff8c862000 2f20     procfs.ko
```

```
# ps -fU root | grep vmtoolsd
 1186  -  S        1:09.43 /usr/local/bin/vmtoolsd -c
/usr/local/share/vmware-tools/tools.conf -p /usr/local/lib/open-vm-
tools/plugins/vmsvc
29990  1  S+       0:00.00 grep vmtoolsd
```

The module is installed in */usr/local/lib/open-vm-tools/*

Appendix L AhsayUBS Tape Drive Commands

Description	Command
Rewind tape	mt -f /dev/sa0 rewind
Check tape status	mt -f /dev/sa0 status
Erase tape	mt -f /dev/sa0 erase

NOTE

Please ensure the tape has been rewinded before use.

Appendix M Miscellaneous Commands

```
Accessing shell from physical console:
        Press ALT+F2  (or "PrtScr" key)
        Login with SSH credentials
```

```
From shell, to check if AhsayCBS service is running:
        #  ps `cat /var/run/obsr.pid`
```

```
From shell, to manually start/stop/restart AhsayCBS service
        # sh /ubs/mnt/esfmfw/obsr/system/obsr/bin/shutdown.sh
        # sh /ubs/mnt/esfmfw/obsr/system/obsr/bin/startup.sh
        # sh /ubs/mnt/esfmfw/obsr/system/obsr/bin/restart.sh
```

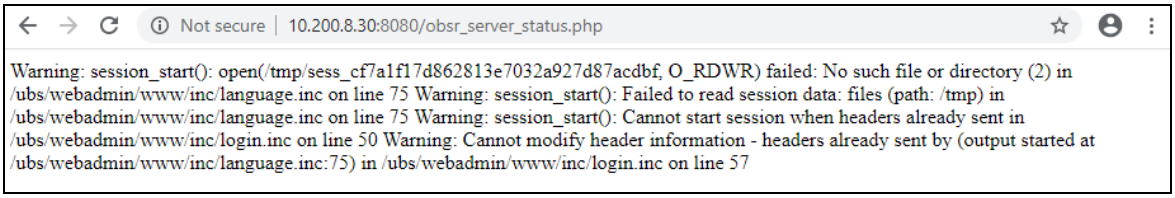
```
From shell, check bootup message:
        # dmesg | more
```

```
From shell, check on FreeBSD version:
        # uname -mrs
```

Appendix N How to repair an AhsayUBS volume after it has been damaged due to expanding the volume

Expanding an AhsayUBS volume is not supported as it will cause some of the volume information to be removed which will result in some mount points such as “/tmp” to not mount properly. As a result the AhsayCBS service will no longer startup.

See error that will be encountered below once you try to access AhsayCBS.



The following instructions will allow the repair of the damaged volume and resolve the missing volume label and failed mount point issue.

1. Check the pool ID.

```
ahsayubs:~# zpool status
  pool: eslsfwxDA5CB17E
 state: ONLINE
  scan: scrub repaired 0 in 0h0m with 0 errors on Sun Sep  8
00:00:39 2019
config:

        NAME                      STATE     READ WRITE CKSUM
        eslsfwxDA5CB17E           ONLINE       0     0     0
          da0p10                  ONLINE       0     0     0
        logs
          label/DA5CB17Exd00p07   ONLINE       0     0     0
```

2. Check the status.

```
ahsayubs:~# glabel status
                  Name  Status  Components
label/DA5CB17Exd00p00     N/A  da0p1
label/DA5CB17Exd00p01     N/A  da0p2
label/DA5CB17Exd00p02     N/A  da0p3
label/DA5CB17Exd00p07     N/A  da0p8
  ufs/DA5CB17Exesosfw     N/A  mirror/DA5CB17Exesosfw
ufs/DA5CB17Exesfmfw      N/A  mirror/DA5CB17Exesfmfw
```

3. Unmount the disk pool for label updates.

```
ahsayubs: :~# zpool export eslsfwxDA5CB17E
```

4. Create label.

```
ahsayubs:~# glabel create DA5CB17Exd00p09 da0p10
```

NOTE

Refer to your normal AhsayUBS to know the correct naming format. In our example, the naming format is **DA5CB17Exd00p**. So DA5CB17Exd00p09 da0p10 was used to create the label.

5. Check the changes made.

```
ahsayubs:~# glabel status
                  Name  Status  Components
label/DA5CB17Exd00p00     N/A  da0p1
label/DA5CB17Exd00p01     N/A  da0p2
label/DA5CB17Exd00p02     N/A  da0p3
label/DA5CB17Exd00p07     N/A  da0p8
  ufs/DA5CB17Exesosfw     N/A  mirror/DA5CB17Exesosfw
  ufs/DA5CB17Exesfmfw     N/A  mirror/DA5CB17Exesfmfw
label/DA5CB17Exd00p09     N/A  da0p10
```

6. Remount the disk pool.

```
ahsayubs:~# zpool import eslsfwxDA5CB17E -d /dev/label
```

7. Check the changes.

```
ahsayubs:~# zpool status
  pool: eslsfwxDA5CB17E
 state: ONLINE
  scan: scrub repaired 0 in 0h0m with 0 errors on Sun Sep  8
00:00:39 2019
config:

        NAME                      STATE     READ WRITE CKSUM
        eslsfwxDA5CB17E           ONLINE       0     0     0
          label/DA5CB17Exd00p09   ONLINE       0     0     0
        logs
          label/DA5CB17Exd00p07   ONLINE       0     0     0
```

8. Manually mount the disk.

```
ahsayubs:~# zfs set mountpoint=/ubs/mnt/eslsfw eslsfwxDA5CB17E
```

9. Confirm if the disk is mounted.

```
ahsayubs:~# zfs get mountpoint

NAME              PROPERTY    VALUE             SOURCE
eslsfwxDA5CB17E   mountpoint  /ubs/mnt/eslsfw   local
```

10. Restart AhsayUBS and manually start AhsayCBS and NFS services.

NOTES

- If the AhsayUBS machine has more than one partition, repeat steps 7 – 10 to map the other mount point(s). Keep repeating this until all the mount point(s) for each partition is mounted.
- It is advisable to migrate to another disk to have a larger storage instead of expanding the current disk. For instructions on how to migrate for additional storage please refer to Additional User Storage Migration.