



FreeNAS 8

DIY Network RAID Storage

Problems and Solutions

Problem: Files stored in multiple places, or on a single disk, prone to failure.

Solution: Have a network attached hardware solution that everything writes to/reads from.

Have a filesystem that supports software RAID, replication, encryption, and snapshots (ZFS).

Hardware/Software Alternatives

Synology, Drobo, QNAP, etc are hardware vendors that sell NAS ranging from ~\$630 to \$1200 dollars for a 6 bay NAS. Not including HDD's. Let's build our own.

Pros: Usually more "bang for buck", more RAM, better processor.

Replace parts as they break/get old with new.

Usually can integrate custom hardware/software much easier

Cons: No individual HDD lights, usually better hardware design, easy to add/remove HDD.

The Hardware

LIAN LI PC-Q08B Mini-ITX Tower	\$80
Antec NEO ECO 620W	\$30
Asus C60M1-I Mini ITX mobo - 1GHz Dual Core	\$80
16 Gig PC3 1066 DDR3 RAM (2x8)	\$106
4xWD 2TB NAS HDD (\$117/drive with \$50 rebate)	\$420
4Gig USB Drive (to boot from)	\$5
No CD/DVD drive (not needed)	

Total Cost (w/ 4x2TB drives) \$721

Cost w/o HDD \$301

Note: ZFS prefers no Hardware RAID Card (or JBOD)



Hardware/Software Caveats

- My CPU was NOT powerful enough!
Tested SMB at about ~30 MB/s either way.
Had to install a PCI-E Gigabit network card to get my speed up to around 50 MB/s.
- It is a TIGHT fit with a PSU as you will see in the pictures, may take some finagling to get it all connected.
- Make sure your PSU/mobo has all the power/data connections needed if you are doing all 6 disks!
- Make sure you CPU will fit in ITX case.. must be slim profile/fanless to not bump into PSU
- FreeNAS DOES NOT support hot swap, just hot plug.





FreeNAS 8 Features

ZFS Filesystem:

- Replication of file system to remote location with incremental updates.
- Data Protection with RAID-Z Software RAID
- Encryption
- Snapshots of the file system on a cron job or one time basis
- Storage Pools
- De-duplication

WebUI:

- Easy to use web interface.
- Install/Manage plugins from WebUi
- Setup/Manage shares (CIFS/NFS) from WebUi

FreeNAS 8 Features (cont.)

Plugins:

- Using a "jail" (essentially a VM of BSD, in BSD)
- MiniDLNA, Transmission, and Firefly are plugins provided by FreeNAS.

File Sharing:

- Supports CIFS/SMB, NFS, AFP, and FTP by default
- Support AD/LDAP authentication

Misc:

- Supports Rsync for linux/unix backup
- Supports UPS monitoring for auto shutdown
- Nic Aggregation (if switch supports)

My Current Setup

ZFS RAID-Z1 (1 disk failure recovery)

ZFS Pool is 5.18TB

CIFS Sharing to Proxmox Servers/XBMC/Desktop at
~50MB/s

Bacula Plugin Installed, hope to setup later