

## Re: Building a low-power FreeBSD media server

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  - *Date:* Tue, 29 Apr 2008 11:11:50 GMT
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On Wed, 23 Apr 2008 09:27:18 -0700 (PDT), Josh <[josh@xxxxxxxxxxxx](mailto:josh@xxxxxxxxxxxx)> wrote:

I'm planning on building a home file server for serving media files across my home network. I want it to be easily expandable, and am planning on using FreeBSD and ZFS to accomplish this. This question is really more about hardware. Because the server will be running 24/7, and because it won't be doing anything particularly intensive, I want it to be as low power as possible.

If by "low power" you mean low power consumption (as opposed to the processing capacity of the CPU), then you might want to rethink a few things — nothing beats the zero power consumption of a DVD disk while it sits on a shelf, waiting for you to access it. :)

ZFS is nice but, the ratio of memory to storage is roughly 1GB of memory per TB of storage. For 7TB of storage, I don't think I would want to run ZFS on less than 8GB of memory. All that memory takes power to run.

Furthermore, the last set of drives I purchased a week ago, the spec sheet claimed a power draw of 13.5 Watts each. Multiply that by 7 drives, and your server will be anything but low power consumption.

An obvious starting point, therefore is a VIA powered mini ITX board. Since it's just a file server, all I should need besides that is a bunch of hard drives, and a case to hold everything. This is what I've come up with so far, but I'd be interested to hear if anyone has any criticisms/suggestions:

For FreeBSD, unless you are absolutely certain that it will run out of the box on the hardware you select, or are willing and able to do the programming it takes to make it run, you would be wise select hardware from the more mainstream manufacturers:

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Motherboard: ASUS/Intel/Gigabyte  
CPU: AMD/Intel

I've had problems running FreeBSD on hardware made by manufacturers not mentioned above. Obviously, things change and your mileage may vary.

The JetWay J7F5M1G2E-VHE-LF motherboard (VIA C7) will give me a low power processor, gigabit ethernet, two SATA ports, 1 PATA port, and a PCI expansion slot which will allow me to add 4 more SATA ports. So for about \$350 plus the cost of a case, power supply, HDDs, and RAM, I should be able to put together a pretty low power file server with upwards of 6 TB of raw storage.

I've had good success in building small servers using the following hardware:

Motherboard: ASUS M2NPV-VM  
CPU: AMD/64 Dual Core Athlon 3800+ or higher  
Memory: Buffalo Firestix 2x1GB PC2-6400 DDR2-800  
Drives: 4x1TB gives 2TB RAID1 storage using gmirror(8)

Note:

The board claims to support 8GB of memory, but gets tempermental when

- a) More than 2GB of memory is installed
- b) All four memory slots are populated and
- c) Is fussy about the brand of memory you use.

This kind of quiriness is not unusual when using a consumer grade board in a server application -- its where reality meets marketing hype. I suspect that the memory issues in this case are due to the amount and quality of power the board is able to supply to the memory banks. Two GB in two slots seems to be the limit for reliable operation as a server and the rest is marketing hype that might be good enough when running that other operating system.

The reality is that if you want a server with more storage capacity than this, and want to run ZFS, you will have to start looking at server grade boards that can support the amount of memory you need.

The only real issue remaining is finding a case that's big enough to hold 6 HDDs (maybe 7 if I decide to use that PATA port for the system drive) and has the mountings for a mini ITX mobo.

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You have to keep in mind that consumer class computer cases are designed to evacuate heat generated by high end video graphics cards that may be installed in the case, with little thought given to cooling the lone disk drive in the typical consumer system that sits in a corner of the case with little air flow.

In contrast, server class cases are designed to dissipate heat generated by high density arrays of disk drives installed in the case. If you expect your disk drives to give you any sort of reasonable service life after you stuff that many into a case, you would be wise to select a case designed for keeping disk drives cool.

For applications where using a server class case is too expensive for the tiny server I might be building, I've had good success in using the following drive bay in consumer class computer cases:

Product Code: KF-3000BK from: <http://www.servercase.com/>

The built-in fans keep the disk drives nice and cool.

Does anyone see any problems or room for improvement with this plan?