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Revision History

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Make Your Own Network Attached Storage Solution!

Mark Pickavance explains how to take an old PC and turn it into a network file server in a few simple steps.



NAS or networked attached storage is a very attractive idea if you have a home or small office network with a handful of users that share files.

The usual solution to this is a file server, but there are a significant number of issues with having a Windows Server system - not least the cost of the OS. Buying a copy of Windows Server 2003 isn't cheap, and it also isn't straightforward to administer and configure. To make things even worse it's also a drain on time and effort to maintain, and a nightmare if anything breaks or hacks in.

The alternative I suggest is a NAS box where all the OS worries are hidden away from sight in an embedded solution. It's a shame they are so expensive, or are they?

In this project I'm going to show you how to make your own NAS box, using bits many of you already have, at a fraction of the cost.

But first we need a NAS operating system, and one that can't easily be hacked We're talking Linux.

NASLite+

I'd been thinking about building a NAS box for a while, because I've got a file server which is used for print management, mail serving and web development. In fact it does too much, so I've been looking to take the serving of music and video away to a new solution, a NAS file server.

Now it's entirely possible to do this with virtually any free copy of Linux, as you can install the OS and activate Samba so that the network shares are accessible by Windows machines. It's straightforward enough, especially if you've used Linux previously. But I wanted something even simpler that could be installed by anyone, even someone as stupid as me.

Enter stage left NASLite+, a complete Linux installation designed specifically for the task. The first NASLite (before it got a plus sign) was made to boot off a floppy disk, the enhanced NASLite+ is a slightly more rounded solution weighing in at 2.8MB and is designed to run from a CD-ROM. For the princely sum of \$24.95 (£13.95 roughly), they will provide you with a download of the tiny ISO file which you can then burn to a CD.

Using it is incredibly simple. You just boot off the CD-ROM and configure any hard drives you have to become part of the system, up to a maximum of four which must be IDE. Booting can be from an IDE CD, SCSI CD, USB CD, or USB Flash key.

Configuration files are stored on a floppy disk, and you can configure the IP and machine name to suit your current setup.

So what sort of PC are we talking about? Well, the basic requirements are:

- 486DX or better processor
- PCI bus
- 32MB or more of RAM
- One to four IDE fixed disk drives
- Bootable CD-ROM drive
- Conventional floppy disk drive
- PCI or on-board network interface adapter

Being realistic I'd suggest that this project is ideal for a Pentium 2 300MHz or better, and if you're going to use big hard drives (200GB) then you might want to fashion it with 256MB of RAM. Less ambitious intentions require much less memory and for most purposes 128MB is plenty.

For many people this represent a piece of equipment that is sitting in the garage or attic gathering dust, when by using this is could be of use again. To turn one of those redundant computers into a NAS box will cost (including NASLite+) about £100, including the purchasing of a single 200GB hard drive to give you some proper capacity. It's entirely possible to have 1TB file server using this technology for about £400, which compared with bought NAS solutions is a bargain.

1. The case

It's a fact that occasionally things I get sent are broken in the post, and that's what happened to this lovely Chenbro Hornet. So it's missing the stylish fascia that wouldn't stay in position when all the plastic lugs on it got snapped off. On the upside it's a nice Micro ATX form factor, with space for at least two hard drives and has a small integrated PSU. No one is actually going to see this computer, so it's an ideal choice for the project.

2. Missed opportunity

In my original plan for the NAS box this was my motherboard, the amazingly petite and silent VIA EPIA C3 board. It was perfect in almost all respects, using old style memory and having a 533MHz C3 CPU. There was only one major snag - it didn't have a floppy disk or any cheap way to attach one. I wrestled with many ideas of how to resolve this issue, but chose instead to just use something else.

3. The Motherboard

My alternative to the EPIA was this Jetway JV2DP, an AMD Socket A design. To make a working system I combined it with a 256MB stick of DDR266 memory and an AMD Duron 700MHz. In performance terms this is probably complete overkill for this project, but I had it spare and this seemed a valid use for it. Pentium II, III, Celeron and slower Athlon chip systems all make good donor gear for NAS.

4. Floppy Drive

In my other systems I've almost given up including a floppy drive, as I never use them to transport files between machines. But for this system one is vital, as NASLite+ uses the floppy to store vital configuration data. On the Hornet case the floppy is held in place by sprung metal clip as this is a screwless design.

5. Cooling

Because this box is going to be running 24 hours a day, then it needs to avoid overheating. This is a

very nice 80mm Tek-Chain Titto fan, which I've mounted on the CPU cooler, it's got an in-built speed adjuster - so I was able to get it spinning at the perfect speed to keep everything chilled. The blue light is a nice addition as the Hornet's side has a clear panel through which it can be seen.

6. Storage

On shelves and in draws I have a number of old hard drives, but nothing of any significant capacity. If I did want to make this for almost nothing I could have used these and had a four-drive system with 8GB in total, but I thought something bigger would be more useful. This is a Seagate ST3200822A, a 200GB IDE hard drive which cost about £75 when I bought it. The grey triangle on it is part of a quick install bracket that the Chenbro case uses.

7. NASLite+

My inspiration for this project, the Server Elements website (www.serverelements.com). Here after paying some money I was able to download the NASLite+ ISO, which is a commercial product. As such it isn't like other Linux implementations where you can hand copies to friends, under the license agreement you can only use one copy per PC. With a total size of just over 3MB it didn't take long to download on broadband.

8. First Boot

I attached a CD-ROM and set the machines' BIOS to boot from that. The first run must be done without a floppy disk in place. Once everything is running you can put a floppy in and save settings. To add each hard drive you must login as admin and initialise them. Be warned this erases the disks! So unless you have a utility that can convert FAT32 or NTFS to a Linux partition layout then anything that was on them will be removed. In doing this you can ask for a bad block check, but this can take a very long time on a large drive.

9. Telnet

Once the IP number of the NAS box was in the range of my network it was possible to access the

machine remotely using Telnet. In this way when the box is deployed to the attic (where it will live I've decided) there is no need for either a monitor or keyboard to be attached to it. To do this you simply open a command prompt and enter Telnet 10.0.0.25 (or whatever IP you gave yours). You then be asked to login.

10. Web Server

Amazingly in this very small Linux distro Server Elements have included a web server, which you can access using a browser to see the status of the system and the individual drives. You can also access the logs for various network activities, such as those in SMB/CIFS used by networked Windows machines. Personally, I'd like this to be expanded to include the admin functions, so you can configure the box as per Telnet.

11. Enhancements

The system seems to be running okay, so how can I make it better? For starters I'm not too excited about using a useful DVD-ROM that only gets used once when the system starts. Where it lives could also be used for another hard drive, so out it comes. So how do I get it to boot from a CD without actually having a CD? Tricky, but not impossible.

12. Bootable Flash

This is a Compact Flash module given to me by a friend, because 8MB isn't much use when you have a Nikon D70 camera and only three pictures can fill it. But for my purpose it's ideal, after it's been attached to the gizmo in the picture. This is a IDE/CF adapter, which allows the compact flash to act like a hard drive. Now all I need to do is work out how to get NASLite+ on to it.

13. NASLite+ to Flash

To do this I needed two pieces of software and a Flash card reader to access the card. I formatted the card as FAT and then loaded 'Magic ISO' (30 day trial version) and opened the BOOT.IMG file from the NASLite+ CDRom and copied the files in there onto the Flash. The final step was to make it

bootable which I did by writing a standard Linux Boot Block using the free 'SysLinux' utility. Within minutes I had a CF drive that could boot NASLite+.

14. Drive Tray

After I'd got rid of the need for a CD-ROM I reused the space by inserting an IDE removable drive tray in its place. This was another old part which gives me the capability of adding a drive without opening up the PC. Currently NASLite+ doesn't support hot swappable drives, RAID or SATA, but it might do in the future so it's good to be ready, I think. With this attached I've now got space for three hard drives inside the Hornet case.

15. Teething Troubles

I had only one issue with my system, which was to do with S.M.A.R.T., the hard drive self test system. When you first run the system to protect you from failure NASLite+ asks any S.M.A.R.T. capable drives to self test. Unfortunately this impacts performance for the first hour on my 200GB, after which it runs perfectly. Server Elements have now decided to make this optional on future releases of the software.

16. Hornet NAS

I don't need to be convinced that this isn't the most elegant PC I've built for Micro Mart, but that misses the point I'd suggest. What we have here is a 200GB NAS box that was built almost entirely from junked/unused parts that can rival an expensive dedicated solution in almost all respects. As you might expect from me, this version is completely over-specified, and the same functionality could be had with Pentium II class hardware.

More NAS Thoughts

My NAS server has been in operation for some weeks now, and I can't help but be impressed by the speed of its file delivery, which can utilise up to 89% of network bandwidth. There are only a few things I'd change, and I may make some of these modifications in the future.

In my finished NAS box I used up one of the IDE connections with the IDE/CF adapter. As neat a solution as this is, it stops me putting 4 IDE drives in the box, as does the physical presence of the floppy drive.

I've already succeeded in removing the need for the IDE/CF device by booting successfully from a USB key, but I still require the floppy to store the configuration.

Tony Tonchev, responsible for creating NASLite+ has promised that within a few months a new product will be released that can access a USB flash device for storing the system configuration, at which point the system will boot and all four drive locations will be available, should I have the drives to fill those spaces. Longer term it looks like SATA, RAID backup and user security might be introduced with additional products. It looks like NASLite+ could quickly become a family of NAS products, ranging in price and capability.

Along the road I may completely rebuild the NAS box using a VIA EPIA board, which I couldn't use because of the floppy drive issue. As this is an entirely fan-less processor it will make a NAS box that is both quiet and cool, a Mini-NAS to keep the Hornet company. The only other thing I'd consider is making a solution that supports 1Gbit Ethernet, which should fly!

So what are you waiting for? Dig out that old PC, find some hard drives, and spend £14 on making your own NAS server.

Software you need

NASLite+

Cost: \$24.95 (paid with Paypal)

WWW: www.serverelements.com

Magic ISO

Cost: 30 Day evaluation (or \$29.95 if you want it)

WWW: www.magiciso.com

SysLinux 3.07

Cost: Free (but accepts donations of hardware or money)

WWW: syslinux.zytor.com

Turn any PC into a NAS

Use NASLite to configure a dedicated storage server in less than five minutes (by Sanjay Majumder)



Are you looking for low cost and lightweight network storage for your office? NASLite offers a solution. It lets you create a NAS box out of your old hardware. You can even use a 486 machine, 16 MB RAM, floppy drive, one to four IDE hard drives and a network card for it. A floppy-based Linux OS called NASLite, can convert any PC into a dedicated file server. It's available in various flavors, which let you to create a dedicated SMB server, NFS server, HTTP server or FTP Server. Here, we'll show how you can create a NAS with SMB shares.

We've given a zipped floppy image of NASLite v1.x on this month's PCQEssential CD. Connect all the IDE drives on the machine, which you want to transform in to NAS box, and then connect it to your hub or switch. To create the NASLite-SMB floppy use a Linux machine and open a command terminal. Copy the NASLite floppy image on to the hard disk. For this, issue the following commands.

```
# cd /media/recorder
# cp /linux/ NASLite-SMB.img.gz /root
# cd /root
# gunzip NASLite-SMB.img.gz
```

Insert a floppy disk and issue the following commands to create the NASLite-SMB floppy.

```
# fdformat /dev/fd0u1722
# dd if=NASLite.img of=/dev/fd0u1722
```

If you don't have Linux handy then you can use a simple shareware utility, WinImage, available at WinImage.com, to copy the image to the floppy disk. To configure it boot the NAS box with the floppy. At the login prompt, give the username as 'admin' and password as 'nas'. From the Options menu, select the fourth option to configure the disks for NAS and then select the 'Primary Master' drive. Read the warning and press 'Y' to continue. Follow this process for all the connected drives. Now, select the first option and give the IP address (mentioned in the box) to the NAS box. Then select the second and third options to change the name and

workgroup respectively. Press '9' to save the configuration and reboot the NASLite-SMB box. To access this network storage, go to any Windows machine and click on Start>Run. Type in the IP address of the NASLite-SMB file server. Windows Explorer will show you 'Network Storage' with pre-created network share (Disk1, Disk2, Disk3 and Disk4). On the security front-remember you cannot create any users or assign quotas. Anyone on the network can access this storage. It shows server configuration and disk utilization on a Web browser when you type the IP address of the NASLite box. So, if you want a data dumpyard on a network then go for NASLite-SMB.

Einfacher Dateiserver (Simple File Server)



Original Text

NAS-Lite ist ein Network Attached Storage (NAS) Server-Betriebssystem, das einzig und allein dazu da ist, Festplattenplatz via Samba ins Netzwerk zu exportieren. Das ganze System findet auf einer Diskette Platz.

Nach dem ersten Booten gibt der Administrator menügeführt Server-Name, IP-Adresse des Servers und der Name der Arbeitsgruppe ein. Dann erfolgt, ebenfalls menügeführt, die Partitionierung der eingebauten Festplatten. Die maximal vier möglichen Partionen exportiert das System via Samba. Die Namen der Partitionen lassen sich nicht ändern.

Grundsätzlich haben alle Mitglieder eine Arbeitsgruppe uneingeschränkte Lese- und Schreibrechte auf die Partitionen. Die Administration des Servers geschieht über Telnet. Ein 1,72 MByte großes Disketten-Image steht auf der NAS-Lite-Homepage zum Download bereit.

Die Distribution ist interessant für diejenigen, die schnell einen Dateiserver aufbauen möchten, der Arbeitsgruppen einen gemeinsamen Zugriff auf Daten ermöglicht. Die Wartung des Servers über Telnet ist allerdings nicht besonders sicher. (Frank Wieduwilt/agr)

English Translation

NAS-Lite is a network Attached STORAGE (NAS) server operating system, that exists specifically to export fixed disk space via Samba on a network.

The whole system is located on a floppy disk. On initial boot, the administrator uses the configuration menu to configure the server name, the IP address of the server and the name the workgroup. Then, again using the configuration menu, the fixed disks are partitioned. The system can export a maximum of four partitions via Samba. The names of the partitions cannot be changed.

All workgroup users have unrestricted reading and write rights to the partitions. The administration of the server is performed over TELNET. A 1.72 MByte floppy diskette image is available for download on the NAS-Lite homepage.

The distribution is interesting and makes it possible for one to quickly build a simple workgroup file server. Maintenance of the server over TELNET hoever is unsafe. (franc Wieduwilt/agr)

Turn Your PC Into: A Home Network Server

In the final part of this series, **Mark Pickavance** looks at what it takes to make your PC into a centralised home network server.



I know lots of people who when a PC comes to the end of its life just dump it in the attic, or garage, or on an elderly relative (no, not literally). Based on the sort of equipment it is, that might be a sound plan, but often they miss a valuable opportunity to make best use of that kit.

One excellent job for an old PC is as a server for other PC equipment in the home, which can all access it as a centralised repository for music, videos and pictures.

To do this you will either need to have, or have plans for a network to connect the machines. This isn't difficult, and we often revisit the hardware and methods needed to do this in the pages of Micro Mart.

By definition a server needs to run quietly, for long periods and avoid overheating. So noisy and hot systems aren't suitable, but quiet cool ones are. Beyond that, virtually any PC can be a home network server, with a relatively small amount of effort. So what do you need to do to convert your old PC into a server?

Scenario 1:

**Intel Pentium PIII 500MHz, 16MB TNT2 Video.
128MB RAM, 20GB HD, CD Writer**

Making a games machine or a media playing computer out of this is very difficult, but it's also perfect for a server. Being 'slow' by modern standards also means that it runs cooler and uses less power. Relatively little needs addressing, and it will be ready to rock.

Minimum Changes: £25

You may be surprised to know this, but this configuration is capable of running as a server with just two simple additions. The first is a network adapter, a 10/100 model will cost you less than £10 and will get the box connected. The only other item it needs is an operating system that can serve, and make the most of the hardware.

I recommend Linux, in particular a product called NASLite+, which runs off CD and can function well in this sort of hardware. It costs just £14 to download the 3MB ISO files, which you then burn to disc and can use to boot the PC. Because it doesn't install to the hard drive this leave the entire 20GB for your files.

Realistic Changes: £80-£90

Spending a little more money can elevate this solution from 'interesting', to genuinely useful. The biggest issue is disk space, because in this day and age 20GB isn't a huge capacity, irrespective of what the salesman told you when you bought it. More space is especially important if you want to serve video files, as they usually take up 700MB or more for two hours playback.

Upgrading by another 120GB will cost you less than £50, and it can be added to the existing 20GB, giving a total of 140GB. Alternatively you could ask

around other people who have junk machines and find some more 20 and 30GB drives which are unwanted. If you put NASLite+ on a USB key you can use all four IDE drives, so you could make a bunch of drives add up to something more substantial. To make this work better you need a little more RAM, maybe another 128MB, to oil the flow of data in and out of the computer. If you can get that for about £15, then the whole bill, including 'Minimum Changes' will be around £80-90.

Scenario 2:

**Duron 1600MHz, 32MB Geforce 440MX Video.
258MB RAM, 40GB HD, CD Writer, 10/100 LAN
card.**

If anything this system might be overpowered in some respects for our requirements, but we can fix that. What it does have, and we can utilise, is a punchy processor and a good amount of RAM. What it lacks most is a large helping of hard drive space.

Minimum Changes: £50-£74

Assuming again that we use an embedded Linux, as in the first scenario, there are only two changes needed to turn this into a great serving suggestion. The first is more drive space, and adding a 160GB drive should only cost £60, and brings the total system to a healthy 200GB.

The other change is actually taking something out, bizarrely. With no games to play the GeForce 440MX is a pointless heat generating accessory, and could be used elsewhere. If you want to do this very cheaply then find a friend with a decent PC bits box and borrow any old PCI video card you can. It doesn't really matter if it only has 2MB of RAM, or worse, because NASLite+ runs in text mode.

This way you can find a good home for the GeForce, or even sell it. Combining the cost of the OS (£14) and the hard drive (£60) gives us a total of £74, but you could spend less by using smaller drives.

Realistic Changes: £160-£185

With such a relatively powerful processor on hand it seems a mistake to not utilise it more. One way to do that is to increase the throughput of the system, buy adding a 1Gbit network adapter (£20). To make

full use of this you will need a 1Gbit five port hub (£50) and your other PCs will all need 1Gbit adapters (2 x £20). Although the suggestion is that 1Gbit should be 10 times faster, it's actually only about 2-3x, but it's quicker. With those increases their will be more data flowing in and out of the PC, which will need processing to reach its ultimate destination - the hard drives.

That's a bill of £110 to turn a three PC network from 10/100 to 1Gbit, which when added to your minimal changes brings us to roughly £185.

Other considerations: £185-£230

If you want to get more serious about your server you might want to add a wireless network adapter, so that you can connect wirelessly to the data. A cheap 802.11 PCI adapter, like the WMP11 by Linksys, costs less than £25. This however, is only a 'b' class card. One capable of 'g' class communication for the faster speeds will cost you around £45. To make the most of this you'll need a Network Access point, preferably one that also works as an ADSL modem or Cable router.

Scenario 3:

Intel Pentium 4 2.4MHz, ATI Radeon 9600se Video. 258MB RAM, 120GB HD, DVD Writer and 1Gbit LAN card.

If anything this is just too powerful, and it would concern me that it would use too much power and produce excessive heat for the purpose of serving. But it also has the potential to make a mighty server, with some minor modifications.

Minimum Changes: £30

If we dump the ATI video card for something more suitable, then we have a ready made a server for absolutely zilch. But being concerned about heat I'd consider getting some more fans and maybe a better cooler, to keep things from cooking too much.

Spending £30 on making sure things don't overheat is a good investment.

Theirs enough power in this machine that we can use the desktop OS it has to server, so Windows 98,

2000 or XP are all good enough. If you use Linux here then this will be a very rapid server indeed.

Realistic Changes: £170-£180

We have the potential for a 'super server' here, so how do we realise that? What we need to do is maximise the throughput the server can handle, and to achieve this we will use a multi-pronged attack. The first bottleneck to overcome is the LAN adapter, although this machine already has an onboard 1Gbit LAN. If you use a 1Gbit Switch instead of just a hub then it's entirely possible to put two network adapters in the PC and double the bandwidth to 2Gbit down to the switch.

If the switch has at least a 2Gbit backbone then this setup could theoretically serve two PCs at maximum speed. A typical hub that meets this criteria is the Netgear GS108, which has a 16Gbit backbone and cost just £90-100. Adding another 1Gbit adapter to that adds another £20 in cost. If you follow this through then another 256MB of RAM (£30) would be advisable, as the more files you have the more caching of the files system you really need.

Other considerations: £500-£650

If you're going to have server this fast then you need some file space to serve, and drive performance to handle the demand. A RAID 5 drive configuration will give you the speed but protect you from drive failure. To handle this you'll need a RAID 5 card and a minimum of three drives. A good choice for ATA drives is the Highpoint Rocket RAID 464, which costs in the region of £110. These are good if you already have the drives, if you don't then a SATA solution like RocketRAID 1640A (£110) is ideal.

To get RAID 5 operational you'll need three or four drives, which for 240GB of usable space will cost you between £140 and £160.

Once you have a server running nicely then the primary objective is to keep it that way. One way they can go wrong is if the power is cut while data is been written to the hard drives, causing corruption. The simplest way to avoid this is a UPS or uninterruptible power supply. The cost of a UPS depends on how big the batteries in it are, and therefore how long they'll keep the system going once the mains is removed. In urban areas most people only suffer occasional lower loses during thunderstorms and high winds, but those in more

remote areas might want a UPS that can keep a system going for a couple of hours. Prices range from £65 to £200, but a good basic solution is the APC Back-UPS CS 500 which is £64. It has the advantage of being connected to the PC by USB or Serial, so that in the case that the power outage last longer than the battery the PC can sense this, and shut down before all power is lost.

NASLite Review (tvharmony.com)

By Will Wagner
October 04, 2004

Since my windows file server had an unrecoverable crash last week, I've been looking for a good inexpensive solution for storing all our video content. I recently found NasLite 1.x, from ServerElements.com. NasLite is a very simple file server linux distribution that fits on a single floppy. If you have some old computers laying around, NasLite can bring them back to their old glory.

NasLite lets you take any old computer (486DX and above) and turns it into a simple file server. Since file serving takes up very little processing speed as opposed to network speed or hard drive speed, almost any old computer will work. It just needs support for PCI and IDE, and since it uses a floppy to boot, you can toss your CDROM drive and attach 4 disk drives to be served. You need to place a Ethernet card on the PCI bus, but NasLite supports many of the common brands out there.

Almost miraculously, NasLite can cope with new large hard drives that typically can't be supported by older machines. NasLite bypasses the bios and talks directly with the drive, so that old Pentium machine can serve a terabyte of video without much of a fuss. Once I got the floppy created, it literally took less than 5 minutes to set up the system.

NasLite has three variants which can serve up data in three different ways. For Windows users, Samba is the way to go since it will make your NasLite server look like a typical windows server. If you are using Linux, you could also use NFS, or if you prefer, you can set up the server to use FTP. You can administer the server using telnet (or directly from the machine itself) and it also comes with a web server so you can access the logs for errors and usage.

There are definitely limitations to the software. There are absolutely no security features so anyone can add, view, or remove data from the server, making it is a lousy solution for businesses. NasLite only supports ext2 file format (don't worry if you don't know what this is) which means if the server goes down unexpectedly, the next time it boots it will check each disk for errors easily taking a couple hours if you have 4 large disks. It also serves up the drives as four separate shares instead of one big one, so you'll have to structure your video library accordingly. Finally, NasLite uses some older technology and you are limited to a file size of 4gig or less, which can be a problem if you are storing large MPEG2 video files.

I had a few problems setting the thing up. The biggest trick for Windows users is creating the bootable floppy. NasLite uses a floppy format that can pack in 1.7Megs into a 1.44Meg floppy, but even though I googled up some suggestions that certain tools would work to create the floppy, I had little success. I ended up booting my computer with Knoppix, which is a bootable version of Linux that fits on a CD, and then creating the floppy that way. You have the option of ordering a floppy or you could pay to download a CD creator app, both of which are very reasonably priced options.

If you do use Knoppix, click on the terminal icon on the bottom bar and type the following (assuming you want the smb version):

```
cd /tmp
wget http://www.serverelements.com/bin/NASLite-SMB.img.gz
gunzip NASLite-SMB.img.gz
fdformat /dev/fd0u1722
dd if=NASLite-SMB.img of=/dev/fd0u1722
```

I had some problems with NasLite finding my Ethernet card, and I believe the problem was that the card wasn't in the first PCI slot. If you have a problem with NasLite finding the card, I'd recommend juggling the PCI cards to make it the first one.

I found my oldest computer a little slow for my taste. My network is all 100Mbit, and with my Pentium Pro 32Meg system, I was able to download movies at 500KB speeds (5Mbit) which is adequate for serving one large video feed, but I wanted to make sure I could serve at least two movies simultaneously and 5Mbit is pushing it.

I tried NasLite on a Celeron 500 system with 512Meg of RAM, and was able to get much better

speeds: 3MB (30Mbit). I think the difference between the two systems was likely memory instead of CPU, but I didn't look into it any further. Upload speeds are about the same, although it bounces between really fast and really slow and it looks like it doesn't do a good job caching, but from reading their forums, it looks like they are working on a better solution.

If you have an old computer lying around, I'd highly recommend NasLite. It can give that old clunker a new life, and with hard drive prices so low, you can build a terabyte server for next to nothing.

Review: NASLite+ v1.x (ehomeupgrade.com)

**By Will Wagner
March 02, 2005**

Do you need to build a file server on a shoe string budget? If you have an old PC (we're talking original Pentium old) lying around with an ethernet card, then NASLite+, the new offering from ServerElements, may be the best way to build a big file server for very little money. I've used the original, free, NASLite for quite a while now, and having tried NASLite+, it is well worth the \$24.95.

Both NASLite and NASLite+ seem to do the impossible of reading big new drives that weren't originally supported in the hardware. The software bypasses the computer's bios and reads the drives directly, making it easy to build up to a terrabyte server on that antique sitting in the corner of your office. NASLite and NASLite+ contain both operating system and server software, so you basically insert the CD (for NASLite+) or floppy (NASLite), reboot and the PC magically turns into a dedicated, monitor-optional, file server.

NASLite+ appears to work with any old PC (486 DX or higher) with an IDE interface, any old graphics card, an ethernet card, a CDROM and a working floppy drive. Typically that means you can connect up to 3 hard drives to it (all four if your PC Bios can boot to another interface like SCSI, FIREWIRE, or USB). It also supports most popular 10Mbit, 100Mbit, and GigaBit ethernet cards, so it can keep up with the speed of your home network. For building a big file server with an old PC that already has these components, it's as simple as installing a couple of big IDE hard drives.

NASLite+ is well worth the upgrade price in my opinion. The original NASLite took some finagling to create the floppy properly on a Windows machine and made you choose one of a variety of server protocols (SMB, NFS, FTP, HTTP) and network card speeds (Gigabit, 100Mbit, 10Mbit). Install is a snap with NASLite+ and it runs all four protocols simultaneously. An even more important reason to upgrade to NASLite+ is the speed, literally 4X faster on my home network.

Upgrading from NASLite to NASLite+ was trivial, and more importantly, all my data remained intact. I ran into a slight glitch with a new unformatted drive that I added to the PC, but a new version of NASLite+ (v1.1) has already been released that fixes the problem in its tracks. To set up a NASLite+ server software, you simply create a CD from the downloaded ISO, boot your server with the CD, follow a few quick configuration screens to setup an administration password, the IP settings, configure each disk, and within a few minutes the system is up and running.

Once NASLite+ has been set up, you can disconnect the monitor from your file server and connect and manage the server remotely. Via telnet, you can access all the administration functions from another computer. Additionally, it has a nice web interface built in, so you can check on the server using a web browser. To aid running the server without a monitor, NASLite+ also plays a particular beep sequence through the built-in PC speaker during boot if everything is functioning normally, and a more ominous beep if something is amiss (NASLite will also monitor each drive if they support S.M.A.R.T).

NASLite has been rock solid in my basement, running for months at a time without having to reboot. In the three weeks I've tried NASLite+, it's been just as dependable. As host to our family's DVR, MP3, and video library, it has gotten a pretty good workout, and I'm happy to report no wife annoyance, the true test for a married geekster like myself.

Like all products, there are a couple of features that could add value to NASLite+ in the future. For instance, there are virtually no security features included like password protection, so while it works fine for the home environment, you might not want to archive your corporate financial data on a NASLite+ server. Using the SMB protocol (for Windows users), there is a 4Gig individual file size limit, which one

can bump into if you are saving large video files. It would be nice to support additional IDE and Firewire cards, allowing someone to add more than the four original IDE drives for storage (you can boot off of a firewire device, but you cannot use a firewire drive as part of your storage). If you don't have any other bios boot options (eg a SCSI or USB bootable bios), your server can only serve up three hard drives with the CDROM booting NASLite+.

I raved about the original NASLite last Fall, but NASLite+, with its superior performance and easier setup, is an even better product. If you have an old computer sitting around doing nothing, it's the most economical way to build a home file server and there's a certain satisfaction in making that trusty old Pentium PC useful again after years of neglect.

NASLite (michaelhorowitz.com)

NASLite is a \$16 program that converts an old computer into a file server.

**by Michael Horowitz
July 22, 2004**

Overview

Dealing with an old computer can be difficult. Before it leaves your possession you should securely wipe the hard disk of *all* data, something Windows can not do. Although there is free software for this, tracking it down can be time consuming. Then, do you throw out the machine and feel guilty about disposing of something with toxic waste or do spend the time, effort and money to try and recycle it or donate it.

You can avoid this and turn an old computer into something useful with NASLite, a \$16 program that makes a file server out of pretty much any computer. Think your computer is too old to be a file server? NASLite works on a 486 with as little as 16 MB of ram.

Everyone knows to backup, backup backup. After all, there is so much that can go wrong with personal computer. So very much. A network accessible file server is an excellent repository for your backup files. The fact that you can now do this for \$16 is remarkable.

You access files on a file server (any file server) using standard, ordinary Windows file sharing. The file server appears to your computer to be just another disk drive letter. You read and write to files on this drive letter exactly the way you do with the C disk.

The pre-requisites for this are a Local Area Network (LAN) and, of course, the old computer needs a network card. If you don't have a LAN, the hardware to set one up is fairly cheap (less than \$100 to network a handful of computers) but not the subject at hand. Note that NASLite only supports internal network cards. It does not support external USB based models nor PCMCIA based ones for use with laptop computers.

NASLite runs off a bootable floppy disk, it does not get installed on the hard disk. When you buy NASLite, they send you the floppy disk. The boot floppy contains Linux, networking software and a web server. Quite a feat.

The fact that NASLite is Linux does not matter to your Windows computers. Linux computers can share files with Windows computers using the exact same rules and interfaces that Windows computers use to share files with each other.

Update: As of December 2004, there are three versions of NASLite: SMB, NFS and FTP. This write-up is about the SMB version. The NFS version is for use in a Linux environment and the FTP version is completely different type of file server.

Hard Disks

Old computers have relatively small hard disks, but NASLite supports up to four internal disks. For very little money you can add a new internal hard disk to the computer.

Old computers also have problems (due to BIOS limitations) accessing newer large capacity hard disks. However, NASLite does not depend on the BIOS but accesses the hard disks directly on its own and thus can read the latest large capacity hard disks, disks that Windows on the same computer could not handle.

Being Linux, NASLite requires a Linux file system, specifically ext2. When faced with a brand new hard disk, NASLite will format it for its own use. When faced with a hard disk with nothing but Windows on

it, NASLite will again reformat the disk and all your previous files will be lost.

If you have partitioning software, such as Partition Magic from Symantec, then you can create an ext2 partition for use by NASLite and keep Windows in another partition. In this case, NASLite sees the ext2 partition, uses it and ignores Windows. You don't even have to make the ext2 partition the active, bootable partition. This way, the computer will boot Windows when the NASLite floppy disk is not present and boot NASLite when it is. A most unusual dual-boot setup.

Of course an old version of Windows could, on its own be used as a file server. However:

- Windows will be limited by the BIOS and thus may not be able to deal with newer, large capacity hard disks
- Windows needs a monitor, keyboard and mouse. NASLite does not.
- You can run NASLite "headless" which means there are only two wires connected to the file server: AC electricity and the Ethernet network. If and when you need to run the NASLite administration utility, you can do so remotely via the tried and true Telnet utility. When you first set up NASLite however, a monitor and keyboard are handy. After it's working though, they are superfluous.
- Windows is harder to configure for networking than NASLite
- Locking down Windows (making it as secure as possible) is not a trivial undertaking
- Windows is chock full of well known bugs. Using it obligates you to be on constant watch for bug fixes
- Old versions of Windows are no longer supported, thus known bugs don't get fixed. In fact, the existence of bugs is not even checked for.
- NASLite needs less hardware horsepower
- Setting up a web server under Windows is much more involved than with NASLite
- Anyone can log on to an old version of Windows. NASLite is protected by a password.
- Remote access to the file server for administrative purposes is much easier with NASLite
- Old versions of Windows were never intended to be a file server

- Windows limits the number of connected users that can access a shared directory. With Windows XP and 2000 the limit is 10 (I'm not sure about other flavors of Windows). In contrast, NASLite has no inherent limit on the number of connected users. According to the company, each connected user is allocated about 2 megabytes of dedicated RAM. A Pentium-200 with 128 MB of ram should have the horsepower to handle 50 concurrent users. If you need to handle more concurrent users, throw hardware at the problem.
- Running a whole operating system on a floppy disk is just plain cool :-)

Using It

The first time NASLite runs you need to run the text-mode Administration utility to configure a workgroup name. you might also want to change the IP address and subnet mask (it defaults to 192.168.1.1), the password for logging in to the Administration utility itself and the name used by the file server on your network (it defaults to Naslite-smb).

Once NASLite is up and running, you remotely access the hard disks under its control using normal Windows shared files and directories. You can also access files and reports on the NASLite server via HTTP. Some of the web page based reports can be quite interesting, for example, the SMART report (a hard disk self reporting standard) shows how many hours the hard disk has been in use. Being Linux, NASLite also supports telnet access to the file server, logging in lets you run the NASLite administration utility.

NASLite is limited to: TCP/IP networking, hard disks (no CDs or DVDs), IDE (no SCSI or Serial ATA), internal disks (no external USB hard drives) and peer-to-peer workgroup networks (no Windows domains). It also does not support user level security or file compression. If, for example, a NASLite server is shared by a family, the parents would not want to store files on the server that they wouldn't want the children to see. Let's not forget though, the entire system fits on a single floppy disk.

NASLite can be downloaded for free, but creating the boot floppy disk from the downloaded file is complicated. The floppy is 1.72 MB, not the normal 1.44 MB, so Windows can't deal with it. If you have a copy of Linux, the vendor (Server Elements)

provides instructions for creating the boot floppy. If you only have Windows you can try using a program called rawwrite. You have to judge the time and effort involved in dealing with rawwrite vs. the \$16 price of convenience.