

All NASs big and small

Nathan Taylor tests a bevy of the latest two-, six-, seven- and eight-bay network-attached storage boxes.

With all the stuff we're downloading these days, most of us need a little extra storage capacity. Sure, you can crack your PC and install extra hard drives, or start attaching USB drives, but eventually you run out of room. A NAS is frequently a better investment, making downloaded media, personal photos and videos, and other shared media accessible to all. Given their inbuilt support for RAID, they also make excellent platforms for securing your data against drive failures.

Most NASs these days also offer a lot more than file sharing. They're fully-fledged server platforms, capable of transcoding video on the fly, serving web sites, automatically managing and recording feeds from IP cameras and even in some cases, being platforms for virtualisation.

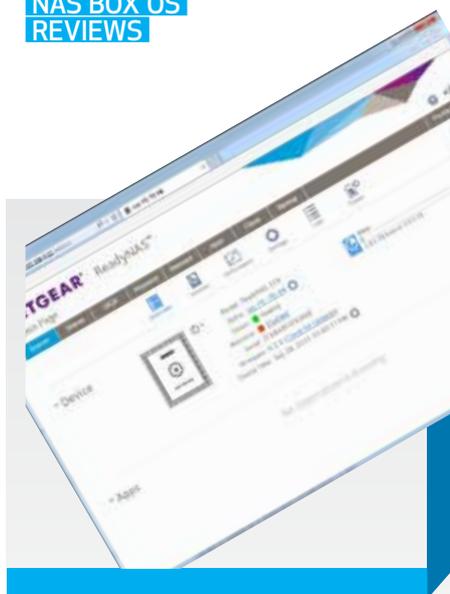
This month we've taken a look at two-bay NASs as well as six-, seven- and eight-bay monsters – for people who need either a little extra storage or a whole lot. But before we do that, we're going to take a quick look at the operating systems they use.

HOW WE TESTED

For each device, we performed a simple copy test and measured both the write and the read speed, in megabytes per second (MB/s). All tests were performed using Seagate NAS HDD 4TB drives.

In the two-bay devices, we tested the devices in RAID 1 (mirrored) mode. For the six- to eight-bay devices we created a RAID 5 setup comprising three drives. Because we used different RAID types, the results aren't directly comparable between the two and six+ results – although in most cases the differences are academic. An awful lot of the NASs have reached the point where they effectively max out a Gigabit Ethernet link at just over 100MB/s.

NAS BOX OS REVIEWS



USED IN: NETGEAR NAS BOXES

Netgear ReadyNAS OS 6.2

Netgear's ReadyNAS OS sits somewhere between the extreme flexibility of QNAP and the simple interface of Seagate. It uses a straightforward tabbed interface, although it's not as accessible as these platforms. There's an expectation that you know a little about networking and user and volume management, and it's not the friendliest platform for new users.

On the other hand, it does have something of the extensibility of QNAP and Synology's OSes, with a wide variety of installable apps, including TV servers, download managers, streaming apps and an IP camera surveillance manager, which is weaker than QNAP and Synology's alternative.

There is some good stuff here – not as much as QNAP, but worth adding in. Its true strength is in its cloud and backup support. Netgear's cloud access apps for mobiles are excellent, and it has a VPN access service baked into the OS for secure access to your NAS from anywhere. The automated backup apps are also best in class.

Overall, it's an OS that could be better designed, but it's certainly not lacking in features.

Verdict



USED IN: QNAP DEVICES

QNAP QTS 4.1

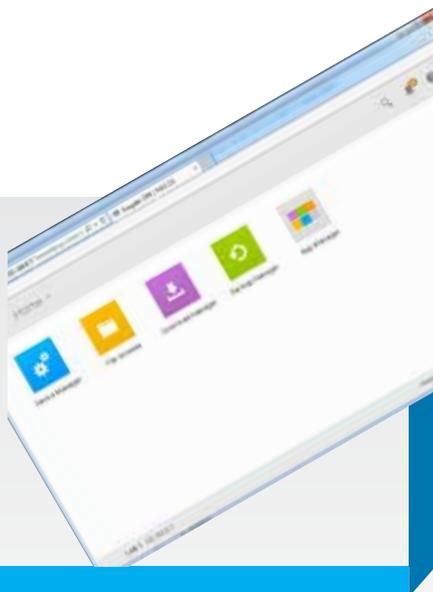
QTTS remains hands down our favourite NAS OS, rivalled only by Synology. It's powerful and feature-rich, but manageable for those with no networking experience.

Running on Linux, QTS presents to the user as an operating system within your browser, with movable and resizable windows and all. Components are logically arranged into windows: one for volume management, for example, and another for apps. That last is the real strength of QTS. There's a huge array of application modules that you can install into the operating system. Every type of server app you can pretty much imagine (and many you can't) is there. Adding them is simply a matter of browsing the app menu and installing the ones you want. Installed apps can be enabled or disabled at will.

The first party apps are very strong as well. Video Station (which offers live transcoding) and Surveillance Station (for viewing and managing live IP cameras) are particular highlights. For high-end boxes, there's even a virtualisation platform, into which you can install client OSes and run them through a browser or directly if the NAS had an HDMI port.

Verdict





USED IN: SEAGATE NAS DEVICES

Seagate NAS OS 4

Another OS built on embedded Linux, the Seagate NAS OS focuses more on ease of use than flexibility, with an extremely simple interface compared to the windowed options you find in QNAP or Synology devices. It's not built for someone who wants to run a million apps; it's made for people who just want a file server.

The list of installable apps is extremely short for the platform. At the time of testing, there were just 10, including Plex, a surveillance manager, along with several sync and online backup apps.

The OS supports RAID levels up to 6, as well as Seagate SimplyRAID model, which is essentially a variation on RAID 5 with extendable flexibility. Volumes can be encrypted, although you do take a performance hit, of course.

To go along with the OS, Seagate also provides Sdrive for desktop and mobile platforms. This uses Seagate's cloud service to access the contents of your NAS from anywhere. It's a somewhat raw app, but it works well.

Verdict



USED IN: SYNOLOGY AND IOSAFE NASS

Synology DiskStation Manager 5.2

Built on the same foundation as QNAP's OS, DiskStation Manager (DSM) wears its Linuxness on its sleeve. As with QNAP, when you log on you literally get a full desktop interface, with windows and all.

Its strength is a combination of flexibility and ease of use. Synology walks you through the basics and makes adding and managing add-ons easy. And there are lots of add-ons to explore, from surveillance systems, to IP PBX managers, web servers, video transcoders, streaming servers, peer-to-peer (P2P) downloaders, antivirus scanners and more. It doesn't seem to have quite QNAP's range of first-party or third-party add-ons, but it has most of it.

The interface itself is easy to navigate, with common tool tips and live help as well as a highly customisable appearance. Notifications can be configured and current load and volume usage is readily visible.

Verdict



USED IN: WD NAS DEVICES

WD My Cloud OS

Like Seagate, WD focuses on simplicity over extensibility. The core interface is a simple and attractive tabbed affair as opposed to the virtual desktops of QNAP and Synology, and the entire management process is guided by wizards and help systems. Indeed, it hasn't really changed all that much since the days of the original ShareSpace, and that's not really a bad thing. It's just easy.

A number of core extras are built into the OS. There are P2P downloading tools, cloud access for remote and mobile users, backup services to cloud and USB, and user and volume management. There are also a small handful (13 at the time of writing) of third-party apps you can install on the platform – Plex, a few P2P apps and a couple of streaming apps. There are a few useful things in there, but nothing that will blow your socks off.

If you prefer to manage your NAS through simple switches and on/off options, WD My Cloud OS gets it done. If you want a million apps, you won't find them here.

Verdict



LABS TEST RESULTS

	WRITE (MB/S)	READ (MB/S)
PERFORMANCE RESULTS	55.4	84.9

	WRITE (MB/S)	READ (MB/S)
PERFORMANCE RESULTS	94.2	107.3



\$170 (DISKLESS) | WWW.DLINK.COM.AU

Bays: 2; Processor and memory: unspecified (ARM-based); Connectivity: one Gigabit Ethernet port, one USB 3.0 port; OS: D-Link ShareCenter OS

TWO-BAY NASs

D-Link Share Center DNS-327L

A basic, affordable NAS.

The DNS-327L is made of very light plastic, which makes it more portable but substantially less durable than most. It's also quiet and relatively easy to install drives into — you just pop the top and slide them down. Getting drives out isn't so easy, however, and you risk the very existence of your fingers when you try.

The hardware is on the minimalist side. There's a single Ethernet port and a single USB port, which can be used to connect a shared printer or serve as a UPS monitoring system.

Compared to the elaborate OSes offered by some of its competitors, the firmware is a simple tabbed affair, covering mostly the basics with some useful help text and guide wizards. We wouldn't be looking to do much more than file serving with this device, and there's not much available in the extra apps department.

Essentially, what you get in the box is what you get. Still, the user and volume management is capable and comprehensive, and there is some useful surveillance, backup and automated download software built into the core OS.

This is a device that's made to be affordable. There are no bells and whistles here, just a device for putting your hard drives on the network, either striped for speed or mirrored for security. If you want apps, and fancy services like surveillance recording or video transcoding, it's not going to have what you need. It performs OK, doesn't cost too much and works well for the basics.

Verdict

It's cheap and good enough for file sharing on a home network. Just don't expect miracles.



\$1050 | IOSAFE.COM

Bays: 2; Processor and memory: 1.06GHz Dual-Core ARM, 512MB RAM; Connectivity: one Gigabit Ethernet port, two USB 3.0 ports, one USB 2.0; OS: Synology DSM

ioSafe 214

Physical security for peace of mind.

Where most NASs have some features built in for data security, ioSafe appliances are also built for physical security. Like an airplane black box, the ioSafe 214 is built so that it can come through fire and water exposure without harming the drives inside. If the NAS is destroyed, ioSafe's recovery service can still grab the data off the drive. In addition, it's resistant to fire up to 850° and water submersion up to 3m.

We'd venture that it's also theft-proof, given that no thief would bother carrying away this immensely heavy 13kg tank. Or maybe they would, given how valuable the ioSafe 214 is. You're looking at roughly five times the cost of other common two-bay NASs. The internal specs of the ioSafe certainly don't justify this price — it uses a very modest processor and 512MB of memory.

On the upside, it does use Synology's excellent DSM operating system, and configured in Synology's Hybrid RAID (SHR) mode, the drive essentially maxed out the Gigabit Ethernet network on both read and write operations, which is an excellent. But we're not sure it has the horsepower to run some of Synology's more resource-heavy apps.

While the asking price of this NAS is very high, if you can bear the cost, it does provide incredible physical security for your drives. Just one warning, though — changing drives is a major operation, and this is not a product to get if you plan to be swapping drives in and out!

Verdict

If you can get over the price (and weight), the ioSafe is fast and offers excellent physical security.



	WRITE (MB/S)	READ (MB/S)
PERFORMANCE RESULTS	75.5	95.7

	WRITE (MB/S)	READ (MB/S)
PERFORMANCE RESULTS	80.5	93.4



\$300 (DISKLESS) | WWW.NETGEAR.COM

Bays: 2; Processor and memory: ARM Cortex A15 1.4GHz Dual-Core with 2GB RAM; Connectivity: two Gigabit Ethernet ports, three USB 3.0 ports, one eSATA port; OS: ReadyNAS OS



\$190 (DISKLESS) | WWW.QNAP.COM

Bays: 2; Processor and memory: Marvell 6282 1.6GHz and 512MB RAM; Connectivity: one Gigabit Ethernet port, one USB 2.0 port and two USB 3.0 ports; OS: QTS 4.1

Netgear ReadyNAS RN202

Not one for network novices.

Like the six-bay RN31600 on page 60, the Netgear RN202 was a bitch to get up and running. It didn't like our hard disk – and unlike the RN31600, there was no error code on display to let us know where to look for a solution. It just didn't work with the pre-used hard drive we were deploying for testing, which will no doubt send an awful lot of users back to the shop.

Thanks to our experience with the six-bay device, however, we had a solution (a factory reset) and had it up and running without too much time wasted.

There's certainly some solid hardware in play here, especially with respect to memory, which puts it in good stead for running multiple server apps. With 2GB of RAM available – compared to the 512GB or 1GB you usually get – you can reasonably expect to be able to run a number of memory-hungry server apps

on the Netgear without sending it into meltdown.

It was fast enough in our tests, and the OS is very flexible with respect to additional apps and features beyond file sharing. User and volume management is fine-grained enough to satisfy any network manager, and the cloud and mobile access features are first-class.

However, as we noted earlier in our look at the Netgear ReadyNAS OS, it's not a tremendously friendly platform for consumers, so if you're not a technical type you might want to shy away from this device, especially when the setup is so finicky.

Verdict

A little more expensive and a little more powerful than your entry-level models.



QNAP TS-212P

Not as powerful as some.

Plasticky, cheap-looking and using screw mounts (yuck), the TS-212P from QNAP is clearly made to be as inexpensive as possible. The outsides are reflected on in the insides, with a relatively low-end processor and small amount of memory driving the TS-212P.

While our love for QNAP's OS remains undiminished, the TS-212P doesn't have the horsepower to drive its more extravagant apps. Compared to the much more powerful TS-851 reviewed on page 61, the operation of the TS-212P was considerably more sluggish, and we wouldn't want to have to tax it too much with, say, Surveillance Station or Video Station.

Still, it's enough for less demanding tasks like background download, file and media service, backup services and really anything that primarily involves file operation. It's also capable

of serving media to and grabbing pictures from QNAP's mobile applications, Qfile and Qmanager.

Its performance in our disk tests was solid enough and comparable to most of the other two-bay devices here. It was quiet during all operations, even intense writing, which speaks well of the inbuilt fan.

Ultimately, we weren't in love with the design or build quality of this QNAP – though it is light at less than 1kg – but the QTS operating system and all the flexibility it provides remains a selling point. Just don't ask too much of it in this case.

Verdict

Ugly and cheap physical design, but the OS remains a selling point.



LABS TEST RESULTS

	WRITE (MB/S)	READ (MB/S)
PERFORMANCE RESULTS	53.1	91.3

	WRITE (MB/S)	READ (MB/S)
PERFORMANCE RESULTS	103	110.2



SSD

\$200 (DISKLESS VERSION) | WWW.SEAGATE.COM

Bays: 2; Processor and memory: 1.2GHz ARM and 512MB RAM; Connectivity: one Gigabit Ethernet port, two USB 3.0 ports; OS: Seagate NAS OS

Seagate NAS 2-bay (STCT300)

Easy, affordable file sharing.

Using the same elegant screwless case design as the NAS Pro line, the lower-end NAS line from Seagate doesn't offer the flexibility of some of its competitors, but works well as a plug-and-go file server.

The difference between the Seagate NAS and NAS Pro (which we reviewed on page 61) lines seems largely to be in the underlying processor and memory configuration. Where the NAS Pro line has Intel x86 multi-core processors, the NAS devices like the STCT300 have 1.2GHz ARM processors and just 512MB of memory, which is less than a low-end smartphone. The power consumption is correspondingly low, requiring just 16W even in full flight, which made us wonder why it has such a powerful (and often too loud) fan built in.

The low-end processor didn't hurt the STCT300's file performance too much,

although the write speed was comparably slow. The read speed was more than decent over Gigabit Ethernet, however.

As with other Seagate devices, if you're looking for much beyond file sharing, you're likely to be disappointed. It's not the app-toting powerhouse of QNAP or Synology. It doesn't have a million options, and it doesn't have the power to run them if it did. However, it's very easy to use, simple and quick to set up, and does what it sets out to do — file serving — very capably.

Verdict

Affordable and simple, for people who want nothing more than file sharing.



\$440 | WWW.SYNOLOGY.COM

Bays: 2; Processor and memory: Annapurna Labs Alpine AL-212 dual-core 1.4GHz and 1GB RAM; Connectivity: two Gigabit Ethernet ports, two USB 3.0 ports; OS: Synology DSM

Synology DiskStation DS215+

Great performance and features.

Synology seems to have a knack for getting the best out of the installed hard drives. Even though this is only a mid-range product (it's technically part of Synology's business line, although the OS is the same as the consumer products), it produced the best performance results of any of the two-bay NASs here.

It's not just drive performance that the DS215+ has going for it, either. Like all Synology devices, it runs the outstanding DSM OS, with its many add-ons, ease of use and flexible interface. It comes with two camera licences for the excellent Surveillance Station app, which manages and records feeds from IP cameras.

On the hardware side, it runs on a dual-core ARM processor (similar to the one used in the physically identical DS715 reviewed on page 62, but with two rather than four cores) with 1GB of

memory. We had no problem running multiple apps at once, including Surveillance Station, without redlining the CPU or memory or causing the interface to become sluggish.

That said, we're not sure that the performance and two Ethernet ports of the DS215+ really justify the fact that it costs more than twice as much as the QNAP and Seagate devices. Maybe if you really do want to push the performance (especially with Surveillance Station), it may be worth it, but for pure file sharing most users will probably pass.

Verdict

It's expensive, but it's got it where it counts.



	WRITE (MB/S)	READ (MB/S)
PERFORMANCE RESULTS	67.1	85.8



\$580 | [WWW.WDC.COM](http://www.wdc.com)

Bays: 2; Processor and memory: Intel Atom C2350 1.7GHz and 1GB RAM (expandable to 5GB); Connectivity: two Gigabit Ethernet ports, one USB 3.0 port, one USB 2.0 port; OS: WD My Cloud OS.

WD My Cloud DL2100

Expensive for what's on offer.

Part of WD's 'business' range of NAS appliances, the My Cloud DL2100 is differentiated from the consumer options largely by the inclusion of a second Ethernet port, a second power port (for reliability) as well as iSCSI and UPS support. It also boasts a slightly more powerful processor than most of the ARM-toting consumer appliances – it runs on a 1.7GHz Intel Atom with 1GB of memory (upgradable to five). Still, those upgrades probably don't justify the price premium for most users.

During testing, the device suffered from weird and inexplicable pauses on the copy operations, which drove down its average transfer times. When it was at full flight, it would essentially max the Ethernet link, but then it would pause and the average speed would drop. Still, the DL2100's final test

results are competitive despite that.

Running WD's My Cloud OS, it's extremely easy to set up and manage, even if it doesn't have the kind of options you'll find in the more Linux-ish competitors. If you're primarily interested in file sharing, this is a good option. But as we noted earlier, the add-on options for WD NASs are a little anaemic, with only a handful of third-party tools available (and some of those are seriously outdated).

If you want more than a device that does file sharing and media service, then you may be better off looking to a NAS with a more extensible OS.

Verdict

It may have a few extra business-friendly capabilities, but they don't really justify the price premium.



Four- and five-bay NAS boxes: what to buy

Two-bay too small and six-bay too big? Here are our mid-range NAS recommendations.

For readers thinking our focus on testing two-bay and six-or-more-bay NAS boxes this month leaves a somewhat sizeable hole in the picture, APC did a roundup of four- and five-bay NASs just two months back (see 'Mega media storage boxes' on page 72 of the July issue), so we didn't want to go over old ground. In the interests of saving space, here's a very quick summary of that feature and what we thought was worth buying in this space.

ASUSTOR's four-bay AS5004T at \$550 was our overall top recommendation, scoring 4.5/5 and thus winning our coveted 'Hot product' award. It impressed us in almost every area. It's got very good core hardware in its dual-core 2.4GB Celeron, 1GB of DDR3 memory (upgradable to 8GB) and dual Gigabit Ethernet ports, plus an excellent range of features (hot-swappable drive bays, three USB 3.0 ports, link aggregation) and great overall performance; it had the highest read speed of the bunch at 108.4MB/s and was only just pipped in write speed by the WD My Cloud EX4100 in write speed (109.2MB/s vs 110.8MB/s). It was particularly strong with media-centric features, with both HDMI video and S/PDIF audio outputs in the back, and an IR receiver in the front, which allows you to use it from the couch via a remote control.

But it wasn't the only product that scored an award, however — five other vendors also had pleasing products that gained our 'APC recommends' award. Here's a quick rundown of what those are, and the pros and cons of each.

NETGEAR READYNAS RN10400

\$250 | www.netgear.com.au

This is an attractive little four-bay unit that, while not the fastest (with reads and writes at 90.4 and 80.8MB/s, respectively), offers a huge range of software features and enough hardware options to suit most users. Great bang for buck.

QNAP TS-451 4G

\$720 | www.qnap.com

It's a little more pricey, but QNAP's four-bay NAS has some unique top-shelf features, like support for IP camera recording, 265-bit AES drive encryption and the ability to record TV if you plug in a USB tuner. And performance was solid, too.

SYNOLOGY DS415PLAY

\$605 | www.synology.com

The DS415play is aimed at media aficionados, with its flagship feature its ability to transcode 1080p video on the fly. Its hardware features are adequate, although it only has a single Gigabit Ethernet port; however, that didn't really affect its transfer speeds in our testing.

THECUS N5810PRO

\$1,200 | www.thecus.com

With a dual-core Celeron processor, 4GB of RAM and five Gigabit Ethernet ports (yes, really), plus a built-in UPS, HDMI output, IP camera support, encryption, virus scanning and more, the N5810PRO may cost more, but it's basically a full-featured server suitable for demanding multi-user home or work environments.

WD MY CLOUD EX4 PERSONAL

\$500 | www.wdc.com

You can get the EX4 with up to 16TB of drives included, has automatic backup software, cloud storage syncing and excellent easy-to-use mobile and desktop apps.

LABS TEST RESULTS

	WRITE (MB/S)	READ (MB/S)
PERFORMANCE RESULTS	96.7	99

	WRITE (MB/S)	READ (MB/S)
PERFORMANCE RESULTS	97.9	101.2



\$970 (DISKLESS) | WWW.ASUSTOR.COM

Bays: 8; Processor memory: 2.41GHz Celeron and 1GB RAM; Connectivity: four Gigabit Ethernet ports, three USB 3.0 ports, two USB 2.0 ports, two eSATA ports, HDMI; OS: ADM 2.0

SIX- AND EIGHT-BAY NASs

ASUSTOR AS5008T

Generous on the connectivity.

Atad larger than it needs to be, the AS5008T arranges its eight drives in twin stacks. Combined with the screwless clip-in trays, this configuration makes it very easy to install and swap drives – a nice change from some of the more finicky NASs we’ve looked at here.

This is a device that’s bustling with ports. There are no less than four Gigabit Ethernet ports with load balancing across them, two eSATA ports, an HDMI port and five USB ports. Internally, its specs are very similar to the QNAP TS-851: a 2.41GHz Celeron combined with 1GB or memory that’s upgradable to 8GB.

That’s not the only similarity. ASUSTOR’s ADM OS is built on the same backbone as the QNAP and Synology Oses, and it shows in both the interface and the array of installable apps from the App Central interface. It’s an excellent

platform, functionally and aesthetically similar to the QNAP and Synology Oses and very flexible when it comes to configuration and apps. ASUSTOR doesn’t have quite the array of first-party tools that those platforms do, but it’s still very capable, with surveillance, media streaming, downloading, backup and many more tools available.

Its performance was excellent in our tests, managing to achieve very close to 100MB/s for both read and write operations to a RAID 5 setup. That, combined with all its ports and extensible software, makes this one of our top picks in the eight-bay space. A good buy.

Verdict

Affordable, flexible and with ports coming out the wazoo. Worth it.



\$900 | WWW.NETGEAR.COM.AU

Bays: 6; Processor and memory: Intel Atom 2.1GHz dual-core with 2GB RAM; Connectivity: two Gigabit Ethernet ports, two USB 3.0 ports, one USB 2.0 port, two eSATA ports; OS: ReadyNAS OS

Netgear ReadyNAS RN31600

Complicated initial setup.

Looking all swanky in with its open-door case, LCD screen and touch controls, the new Netgear RN316 was slow to boot, but did it look fancy when it did. This six-bay appliance is certainly larger than it needs to be, but you may not care when it looks this funky.

There’s certainly a lot to recommend it. The OS is speedy and flexible, with excellent cloud access support – either through Netgear’s own service or via direct VPN connection. The hardware is certainly capable, with a 2.1GHz processor and 2GB of memory built in. Even in RAID 5, it hit our Gigabit Ethernet limit, and there’s plenty of memory for additional services to run. Unlike WD and Seagate, Netgear does indeed have quite an extensive array of additional first- and third-party apps available, so there’s plenty to tinker with here.

The initial setup of the ReadyNAS wasn’t much fun at all, though. Apparently it didn’t like that we’d used the disks before, and gave an inexplicable error message to that effect. We had to dig deep through the Netgear help system to find how to fix the problem (which involved holding down the reset button while booting to get to the boot menu). It was silly, and not a problem any other vendor had.

Setup problems aside, we were impressed by the ReadyNAS. It could have made more and better use of its on-box controls, and the OS could be easier to use, but you’re not missing out on anything once you get it running.

Verdict

The OS isn’t the best, but the hardware is capable and looks funky.



	WRITE (MB/S)	READ (MB/S)
PERFORMANCE RESULTS	95.7	88.8

	WRITE (MB/S)	READ (MB/S)
PERFORMANCE RESULTS	85.7	108.3



\$1050 | WWW.QNAP.COM

Bays: 8; Processor and memory: Intel Celeron 2.41GHz Dual-Core, 1GB RAM (with two additional upgrade slots); Connectivity: two Gigabit Ethernet ports, three USB 3.0 ports, two USB 2.0 ports, HDMI; OS: QTS 4.1

QNAP TS-851

Good performance and features.

Plain and unadorned by fancy LEDs and such, the TS-851 delivers good performance and supporting multiple running apps, but isn't enough to support some of the more extreme features that are technically available in the OS, like 4K transcoding and virtualisation (though the latter might be possible if you upgrade the memory using the two internal memory slots).

The strength of QNAP's operating system is on display here, with its easy setup and configuration combined with nearly limitless customisation. The Surveillance Station and Video Station are particular highlights, and the Intel Celeron processor that drives it makes the operation of the OS very snappy. It certainly could have used more memory in the default configuration, but it's possible to buy an

additional memory card for the unit (a version with 4G is also sold directly by QNAP).

It proved extremely capable as a file server, coming fairly close to the practical limits of our Ethernet network. Weirdly, its read speed was slightly lower than its write speed, but both were more than fast enough.

For a little over a grand for a very capable eight-bay device, the QNAP TS-851 is a very good deal indeed. Whether you just want a file server or a capable application server, it gets the job done and is among our top picks for large NASs.

Verdict

Snappy and extremely capable, it offers a tremendous feature set and good performance.



\$910 (DISKLESS) | WWW.SEAGATE.COM

Bays: 6; Processor and memory: 1.7GHz dual-core Intel, 2GB RAM; Connectivity: two Gigabit Ethernet ports, two USB 3.0 ports, one USB 2.0; OS: Seagate NAS OS

Seagate NAS Pro 6-Bay (STDF300)

A good-looking NAS for file serving.

Compact and elegant in piano black, with an information LCD embedded in the front, this is certainly one of the most attractive NAS devices we looked at here. It's also very easy to set up, with readily accessible screwless drive bays and a wizard that will walk NAS beginners through the basic setup process.

Managing the NAS during operation is also breezy, since Seagate's OS is more user-friendly than pretty much any other NAS OS we've seen. Where some of the competitors like to pack in features, Seagate has deliberately kept things lean. It doesn't do so much, but what it does, it does well.

Internally, the NAS Pro runs on an unspecified Intel 1.7GHz processor and 2GB of memory, which isn't quite the powerhouse that some of the competitive NASs can boast, but also makes the STDF300 affordable. It's more than enough to for file

sharing and the limited array of apps that Seagate offers, and it certainly didn't hurt the performance of the write operations. According to Seagate, it burns about 85W of power with six drives in full operation.

It supports your regular RAID levels as well as RAID 6 and 10. We tested using a share created on a three-drive SimplyRAID setup, which is a scalable variation on RAID 5. And it was very fast, writing data at nearly 86MB/s.

As you'd expect with a device from Seagate, you can buy the NAS with disks built in, but a diskless version is also offered.

Verdict

It's fast and it's simple. If you don't need much beyond file sharing, it's a very good buy.



LABS TEST RESULTS

	WRITE (MB/S)	READ (MB/S)
PERFORMANCE RESULTS	101.1	107.6



DS715, \$560; DX513, \$565; \$1,125 FOR BOTH
WWW.SYNOLOGY.COM

Bays: 2+5; Processor and memory: Annapurna Labs Alpine AL-314 quad-core 1.4GHz and 2GB RAM; Connectivity (DS715): two Gigabit Ethernet ports, two USB 3.0 ports, eSATA port (used to link to DX513); OS: Synology DSM

Synology DS715 + DX513

A fast, spacious combo.

On its own, the Synology DS715 wouldn't fit into this section of the review. After all, it only has two drive bays. But when you combine it with the DX513 drive expansion, you get something much more – an effective seven-bay NAS device.

The DX513 is an example of an eSATA extension box. It's essentially a passive device, relying on a host system (in this case, the DS715) to manage it. Meanwhile, the DS715 is a NAS with enough horsepower and the right software to manage seven drives. It supports RAID 6, and all seven drives can be placed in a single array.

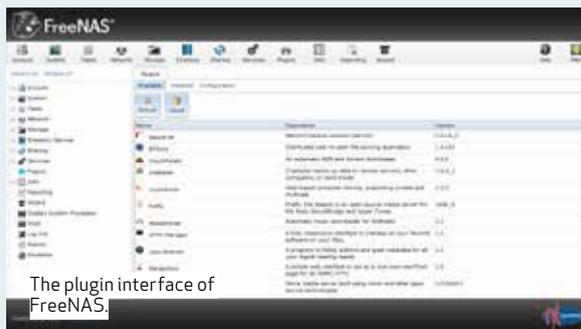
On both the main box and expansion box, drives are installed using a screwless tray arrangement with individually lockable bays. Thankfully, Synology maintains a consistent aesthetic design, so the devices actually look pretty

good together (if that kind of thing matters to you).

We built the RAID 5 setup in the DX513 to see how that might affect the performance of the system. Even though the drives were housed in an external box, it had no apparent impact on the copy performance of the Synology in our tests. With the quad-core processor in the D715, the volume blazed at top speeds for both read and write operations. Ethernet was the limiting factor here, as it was in so many of the NAS servers we tested.

Verdict

A combo that gives you seven drives in total. It's very fast and extremely capable.



The plugin interface of FreeNAS.

Roll your own NAS server

If you're the tinkering type who prefers to make their own stuff, then you really don't have to buy a packaged NAS.

You can very well make your own — after all, a NAS is really just a PC with a customised OS and lots of hard drive slots, and there are some excellent specialised versions of Linux for doing just that.

The two most notable are FreeNAS (www.freenas.org) and Amahi (www.amahi.org), both of which are designed to operate as 'headless' (no monitor) NAS operating systems. Once installed, they're controlled by a tabbed web interface.

Of the two, Amahi is the easier to use and has the greater variety and number of plug-ins/apps for additional features beyond basic file serving. It's beginner-friendly and its deep bench of easily installed apps is pretty darn great. Some of those apps do cost money, however (typically a small fee).

FreeNAS is better suited to serious business environments, with greater reporting and fine-grained control over NAS features as well as volume encryption. Its plug-in suite is much more limited than Amahi and if the thought of ever having to use Linux shell commands terrifies you, it may be best to stick to Amahi.

RAID beyond level 5

Once you get to devices with six or more bays, you may start encountering new RAID levels.

The basic RAID levels are RAID 0, which is striping data across multiple drives for extra performance; RAID 1, which mirrors drives; JBOD which concatenates drives into a single volume; and RAID 5, which adds parity data so that one drive in the array can fail without you losing data.

But as we get to larger drive arrays, new possibilities arise. First up, there's RAID 6, which is like RAID 5, except that two drives can die without you losing any data. The cost is the capacity of two drives. For example, a six-drive array made up of 4TB drives in RAID 6 would have a storage capacity of 16TB. And calculating and writing the extra parity data does cause a performance hit during write operations.

Then there's nested arrays. Let's say you had a six-drive NAS and instead of one array you made two RAID 5 arrays of three drives each, then you put those two virtual volumes in a RAID 0 setup in order to improve their performance. You'd have a configuration known as RAID 5+0, or RAID 50. Likewise, RAID 6 arrays nested in a RAID 0 array would be RAID 60. There's even RAID 10 (mirrored volumes arranged in a stripe) and RAID 100 (mirrored drives arranged into RAID 0 stripes, which are in turn striped again).

The permutations actually become quite mind-boggling when you get up to this level. Ultimately, even if your NAS supports it, we'd suggest most users stick to the non-nested RAID levels: RAID 5 for a four-drive NAS, RAID 6 for six or more bays. It keeps things simple, and for most people, write speed isn't that important.