

Network Attached Storage

NAS devices aren't dumb boxes full of hard drives—they're smart servers that can handle data in game-changing ways. Let's take a look *By Alan Dexter and Simon Crisp*

Storage isn't the sexiest topic, we admit, but that doesn't stop it being important. After all, you need somewhere to put all those lovely programs you use on a daily basis. You need space for all those videos, photos, games, and documents you've spent so long working on. So while graphics cards and processors get most of the tech love, there's something fundamental about storage that ensures it's a major part of our computing lives, even if it doesn't tend to set the heart aflutter.

Of course, storage solutions have changed quite a bit recently, thanks to the emergence of the SSD. Storage is no longer something that is measured purely in capacity. Performance is now also a factor. On the flip side, reliability has reared its head as well—early adopters of SSDs will be painfully aware of the downsides of the first batch of drives. This, coupled with the fact that everyone could do more to ensure they have a safe backup, brings us neatly on to the topic of this month's round-up: NAS devices.

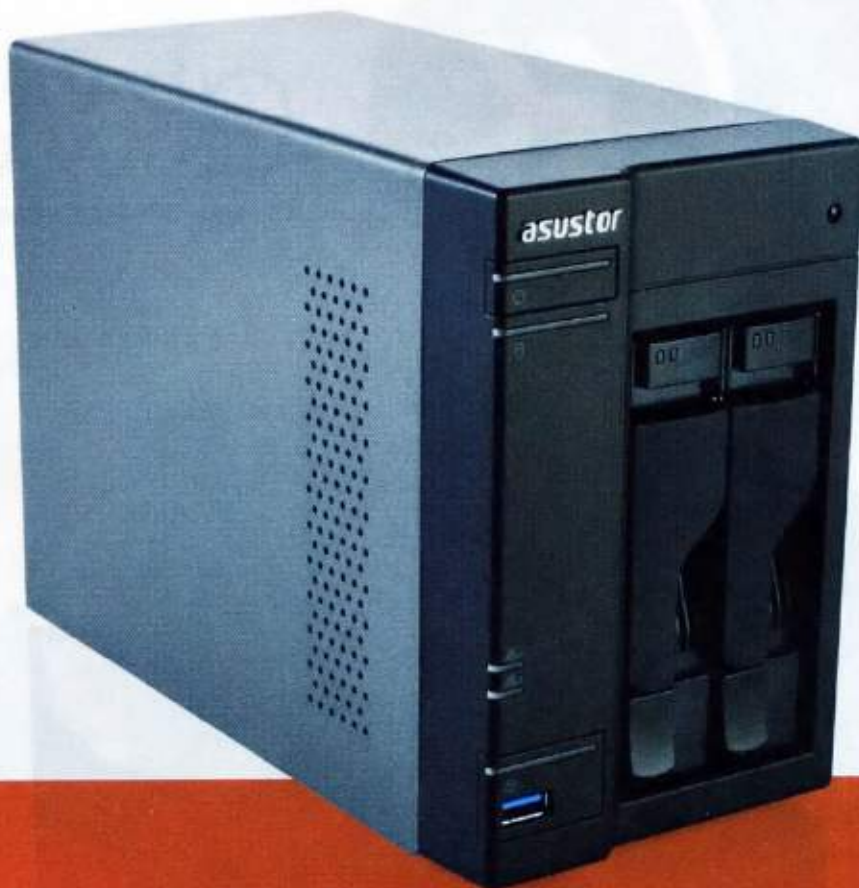
Network attached storage used to be the exclusive domain of business types, but as the data needs of all of us have increased, so the NAS has migrated into the home. The good news is that the smarter side of these devices has made

the transition, too—these aren't simply dumb devices that look after your files 24/7; they can act as media streamers and torrent servers, and offer up your files for external access as well.

We've looked at high-end NAS devices before, so for this group test we've gone back to the basics—focusing on more affordable, consumer-grade NAS devices. These are the kind of boxes you should look at if you haven't already got a NAS. They're affordable, capable, and expandable. Note that if your data is really important—if it's your livelihood, say—we recommend going up a level in both performance and redundancy, to make sure that your data is indeed safe and secure.

Whatever sort of NAS you go for, let's just reiterate that you need to have a proper backup scheme in place. Having a NAS gives you options, but it isn't the answer in and of itself. A NAS can act as a backup target, but ideally it should be seen as a device that enables you to organise your data. See it as a centralized storage space. A space that is easy to access from any of the machines on your network. Importantly, this is a space that is easy to back up as well. So make sure you do. And so, it's time to look at the state of the current entry-level NAS, see what it offers, and which device is right for you....





And the winner is... **ASUSTOR AS5002T**

ALTHOUGH FOUR-BAY UNITS are making steady inroads into the home, the two-bay NAS is still the weapon of choice for a great number of people in the SOHO (Small Office Home Office) market, especially because the likes of the Asustor AS5002T, QNAP TS-231+, and Synology DiskStation DS215+ support the latest 8TB hard disks.

All the NAS units here, with the exception of the D-Link DNS-327L ShareCenter+, could be used in either the home or the office. The DNS-327L ShareCenter+ just doesn't have the power to be able to deal with the demands an office environment would place on it, and it has a very small list of apps to work with. It isn't a bad place to start if you don't need anything too complex for the home, but there are better offerings out there. Synology's DiskStation DS215+ is the next one you can pass on—it's actually a great NAS, but unfortunately it's yet another unit for which the memory can't be upgraded, despite its hefty price tag.

The Netgear ReadyNAS RN202 is interesting because it's the only NAS in this roundup not to use the EX4 file system, instead using the Btrfs system, which opens up a whole new level of data protection for business use. WD's My Cloud

Business DL2100 is, as the name suggests, an out-and-out business NAS, and although it performs well, we can't get over the noise our model made. The Milestone ARCUS software is a very useful inclusion, mind you, which turns the DL2100 into the control center for a pretty impressive surveillance system with its 16-camera support.

QNAP's TS-231+ runs the Asustor AS5002T close, but once again the memory isn't upgradable, and although the OS supports some impressive tools, it doesn't offer the same hardware connectivity to external devices that the AS5002T does. But it does have a very large number of downloadable apps to support it.

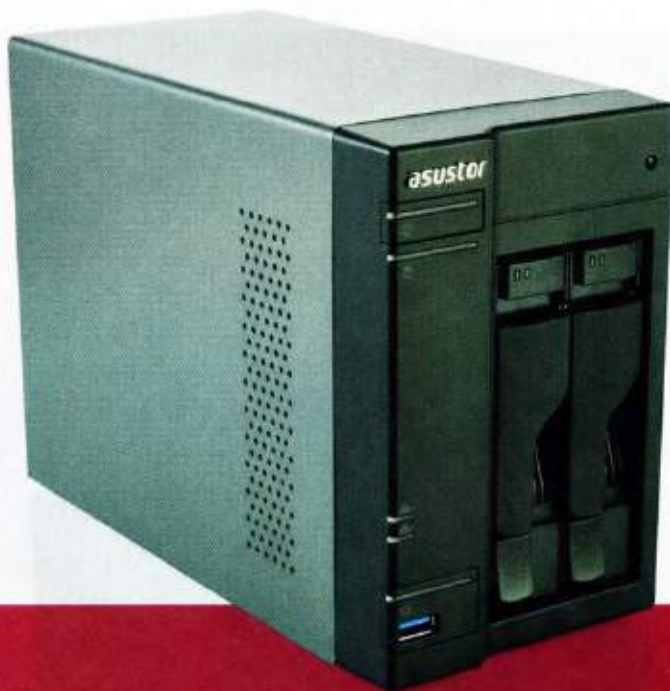
Ultimately, it's the Asustor AS5002T that gets our vote. It's a powerful NAS, and although Asustor markets it as a

home/power user two-bay device, it would equally serve as the storage backbone in a small office without any problems. This is especially true as the memory can be upgraded to help keep up with the demands of a growing office. The Asustor Data Master OS is just superb, easy to use, and navigate, and its heavy use of icons makes it pleasing on the eye.

The fact that it has an HDMI port so it can connect to a TV and, by using home theater software, be turned into a fully functioning 1080p media center is another string to an already impressive bow. With the support of a huge store of downloadable apps behind it, the great thing about the AS5002T is that it can be tuned and customized to fit anyone's personal needs, and that's what makes it a great all-rounder. 



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More ports than you can shake a stick at.

ASUSTOR AS5002T

Meaty two-bay NAS for home or office

ASUSTOR HAS A NUMBER of two-bay NAS units under various guises in its lineup. This model, the AS5002T, sits very near the top of the tree when it comes to both performance and feature set, and although it's aimed at the home/power user, it wouldn't be out of place in a small office.

It certainly doesn't lack for power, as at its heart lies an Intel 2.41GHz (2.58GHz Burst) dual-core Celeron J1800 backed by 1GB of DDR3L memory. There are two easily accessed SO-DIMM slots, allowing the memory to be expanded to 8GB if needed. Straight out of the box, the performance is pretty impressive, with the possible exception of its 4K read performance; however, the 4K write performance is strong in both RAID 0 and RAID 1.

The two drive trays support both 3.5-inch and 2.5-inch drives (including SSDs—ADM 2.4 onward supports the SSD Trim command), although, unfortunately, you'll need a screwdriver to fix them in place. By using 2.4 and above versions of the ADM OS, drives up to 8TB are also supported, making for some hefty storage options.

If you are used to looking at the rear panel of a NAS box and seeing nothing but an Ethernet port, and maybe a USB port, the rear of the AS5002T will certainly get your attention. It's loaded with ports to connect it with any other devices that might be available. There are two Ethernet ports, which support link aggregation for faster transfer speeds and better load balancing, and a couple of USB 3.0 ports—there's a

third in the front bezel. The front one can be used for one-touch backups to an external drive. The rest of the ports comprise a pair each of USB 2.0 and eSATA ports, a single HDMI 1.4a output, and last but not least, an S/PDIF port. That's plenty of options.

Once the drives are installed, it takes very little time to set up the unit and load the ADM (Asustor Data Master) software. ADM (at the time of review, it was version 2.4.2) is one of the best GUIs out there, being both graphically rich and easy to navigate—which is good, as there's a lot going on.

OUT AND ABOUT

Need to hook up to the AS5002T on the move? Not a problem. Asustor's AiMaster is its NAS management app, which enables control of the NAS from a mobile device. The unit can be set up, managed, backups performed, files accessed, and even surveillance feeds monitored, all from your mobile device. The app also sends real-time event messages, should problems occur with the NAS.

Remember that HDMI port? Well, by connecting to a TV and using the Kodi 14.2 XBMC home theater software, the AS5002T turns into a media center, supporting up to 1080p output. One nice feature is the ability to preview video files when browsing content with the ADM File Explorer.

As well as all those ports to use to back up data on an external device, the AS5002T also supports the Rsync (Remote Sync) function. This means data can be

programmed to automatically back up to another Asustor NAS, or indeed any other Rsync supporting NAS on the network. And with over 100 apps in Asustor's App Central, covering pretty much everything from backups to web hosting, you can customize the AS5002T to your own needs.



Asustor AS5002T

■ **MEATY** Performance; feature set; ADM OS.

■ **VEG** Drive bays not tool-free.
\$298, www.asustor.com

SPECIFICATIONS

CPU	Intel Celeron
Cores	2
Speed	2.41GHz
Installed memory	1GB DDR3L
Memory upgradable	Up to 8GB
OS	ADM 2.4.2
USB ports	3x USB 3.0, 2x USB 2.0
HDMI ports	1x 1.4a
Ethernet ports	2x Gigabit
Others	1x S/PDIF, 2x eSATA
Warranty	2 years

HOW WE TESTED

To test these two-bay NAS devices, we used a pair of 4TB Red Pro drives built into RAID 0 and RAID 1 arrays. The latest firmware was installed where possible, and the latest version

of the OS installed. To test for outright speed, the latest 3.05 version of the ATTO benchmark was used, and to test how the NAS dealt with the small 4K files of everyday use, they were

tested with the 4K read/write test in Crystal Disk Mark 5.0.2. Intel's NASPT was used to give a better idea of the multimedia performance, as well as the write to/read from the NAS of a

file directory. Finally, we tested the real-life performance of the NAS by writing a 50GB (36,601 files) folder to and from the NAS using the FileCopy app to give a MB/s figure and the time taken.

BENCHMARKS RAID 0

	Asustor AS5002T	D-Link DNS-327L ShareCenter+	Netgear ReadyNAS RN202	QNAP TS-231+	Synology DiskStation DS215+	WD My Cloud Business DL2100
ATTO 3.05 Read	118	116	118	118	118	118
ATTO 3.05 Write	105	95	97	118	118	117
CrystalDiskMark 5.0.2 4K Read	6.803	6.357	9.485	5.058	9.290	8.407
CrystalDiskMark 5.0.2 4K Write	9.496	5.208	9.566	9.775	9.804	10.03
Intel NASPT HD Playback	108.8	71.2	105.5	99.0	105.5	103.9
Intel NASPT Directory Copy to NAS	10.3	4.0	8.8	14.9	9.7	9.3
Intel NASPT Directory Copy from NAS	14.2	5.3	10.9	13.4	14.0	13.0
Intel NASPT Photo Album	12.3	7.8	11.0	11.6	9.4	9.5
50GB Write to NAS (MB/s)	62.49	43.55	48.73	61.23	61.84	61.31
50GB Read from NAS (MB/s)	48.43	30.46	49.76	48.18	50.57	50.56

BENCHMARKS RAID 1

	Asustor AS5002T	D-Link DNS-327L ShareCenter+	Netgear ReadyNAS RN202	QNAP TS-231+	Synology DiskStation DS215+	WD My Cloud Business DL2100
ATTO 3.05 Read	118	115	116	116	118	117
ATTO 3.05 Write	116	97	97	118	117	114
CrystalDiskMark 5.0.2 4K Read	3.783	5.556	8.930	4.801	8.601	6.231
CrystalDiskMark 5.0.2 4K Write	9.355	5.843	7.223	7.112	9.687	5.261
Intel NASPT HD Playback	105.4	84.6	105.2	100.8	93.3	92.0
Intel NASPT Directory Copy to NAS	10.5	3.8	8.6	12.9	9.4	9.4
Intel NASPT Directory Copy from NAS	12.5	4.7	11.3	11.2	13.5	13.0
Intel NASPT Photo Album	9.9	8.2	9.9	10.4	11.2	8.8
50GB Write to NAS (MB/s)	61.72	42.32	48.75	62.11	62.26	62.59
50GB Read from NAS (MB/s)	44.63	30.04	41.89	45.33	49.43	48.41