STORAGE IN A BOX

Four NAS drives, two hard disk drives, two terabytes of storage, and 8 reasons why the general home computer user should consider picking up a NAS solution today.

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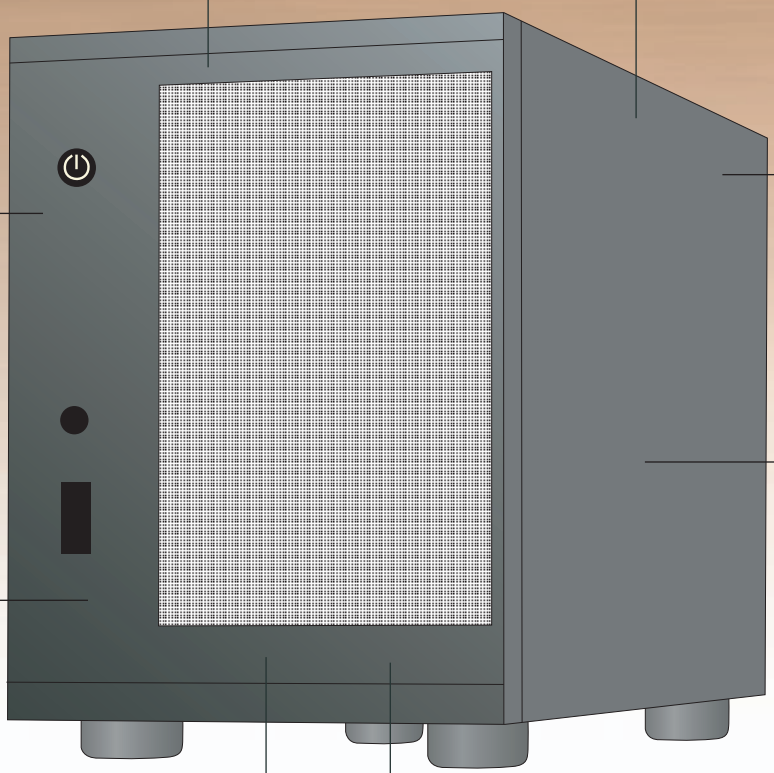
By the time you've gotten past the introductory blurb, the really hardcore among us would have probably simply flipped the pages towards the conclusion of this article, to find out which one's the best value for money, and which one is the fastest of the lot. After all, the really powerful NAS drives typically use four hard disk drives or more, and aren't exactly aimed at the general computer users.

If you, like some of us here at HWM, have a stash of digital photos, videos, music and other miscellaneous files that take up a sizeable chunk of hard disk space amounting to the hundreds of gigabytes, it makes more than a little sense to move that data into a location less vulnerable than your oft-used desktop PC, especially if most of that data is accessed every once in a while, but too valuable to simply delete and remove from existence. If you happen to have a home network going on, a solution worth considering would be a network-attached-storage (NAS) device.

With NAS devices now priced well within reach of the general consumer's grasp, this is a good time as any to check out some of the latest NAS drives out on the market geared at the general consumer. What's more, 1TB hard drives are also remarkably affordable these days, depending on the brand you prefer.

With that in mind, our shootout is aimed strictly at dual-bay NAS devices. Whether the regular home user with a penchant for maximizing their broadband connection 24/7, or the SMB setup that would appreciate a simple yet affordable file storage solution, it's as good a time as any to get a NAS of your very own. Would one of these tickle your fancy? Read on to find out.

8 Reasons Why a NAS Makes Sense



1 No additional software costs

The operating systems on almost all consumer NAS drives these days are built around a Linux (or even Windows) kernel, and come pre-installed on the device. More often than not, the base functions of the NAS work right out of the box.

2 Don't have to build an additional PC

You don't need to round up the various parts to build a secondary PC to function as a file server. All you need is the NAS device and a couple of hard drives.

3 Redundancy

A two-bay NAS should at least support RAID 1 (drive mirroring); giving you a backup to restore from should one drive fail. NAS drives supporting three or more disks typically come with RAID 5 support too.

4 Network access

Like the name says, network-attached-storage means the same data is accessible to all the computers on your network at any time.

5 Affordable Terabytes

With 1TB hard drives putting together a multi-terabyte NAS setup is so much easier on the wallet than ever before.

6 Power efficiency

Versus a fully built-up PC with the same number of hard drives, a NAS requires a whole lot less power to operate, not to mention takes up a lot less room too. Hard drives in a NAS spin down when unused, only waking back up on any LAN event; over time, the savings adds up.

7 Speed

Let's face it, copying over gigabytes of data takes time. Moving all that data through Gigabit Ethernet is a heck of a lot faster as compared to USB2.0 or even FireWire 800.

8 Turn off that PC

With built-in FTP, iTunes server and even BitTorrent capabilities on many consumer NAS devices today, you can leave your file serving and downloading to your NAS device, saving your PC for the things that really matter, like gaming.

POINTS TO CONSIDER

From the consumer's perspective, and especially those who aren't all that keen on a complicated setup process, sometimes less can be more, especially when it concerns extensive feature sets that only see occasional use at best. With that in mind, our evaluation process is going to be rather straightforward, taking into consideration how easy it is to set up and start using these NAS drives, actual features that would come in handy for the home user (and possibly the SOHO setup) as well as the overall cost incurred versus the build quality, feature set and overall performance of the device in concern.

The Contestants Exposed

	D-Link DNS-323	NetGear ReadyNAS Duo RND2000	QNAP TS-209 Turbo Station	Synology Disk Station DS207+
				
Memory	64MB, 8MB flash	256MB DDR (upgradeable up to 1GB), 64MB flash	128MB DDR2, 8MB flash	128MB DDR, 4MB flash
USB2.0	1x	3x	3x	3x
eSATA	N/A	N/A	N/A	Yes
Management	Web UI	Web UI	Web UI	Ajax-based Web UI
Print Server	Yes	Yes	Yes (Windows only)	Yes
Photo Server	N/A	Yes	Yes	Yes
Web Server	N/A	N/A	Yes	Yes
Download Functionality	P2P BitTorrent	P2P BitTorrent	P2P BitTorrent w/ remote DL	P2P BitTorrent w/ bandwidth control
DDNS Support	N/A	No	Yes	Yes
Multimedia Server	N/A	Yes	Yes	Yes
PHP/ SQL	N/A	N/A	Yes	Yes
Disk Management	RAID 0/1, JBOD, Standard	NetGear X-RAID	RAID 0/1, JBOD	RAID 0/1, JBOD
USB Copy	N/A	Yes	Yes	Yes
Dimensions (WxHxD mm)	101x127x198	101x142x222	175x115x214	88x128x160
Other	Hot-swappable	Smart UPS monitoring, Hot-swappable	Hot-swappable	IP camera support

The full specifications list of these NAS drives are a little too much to list here in their entirety, though we've tried to include as much pertinent information as possible. Further complete specifications, can be found on their respective product pages on the manufacturer's websites. Later on in this article, we'll also go through some of the more pertinent features of the NAS devices, in the grand scheme of use in the home or SOHO environment.

Buffalo LinkStation Mini

The Buffalo LinkStation Mini offers the same 2-bay (RAID) option as the other NAS available here but with one difference – it uses notebook (internal) drives instead. This makes it the only compact 2-bay NAS available in this list and a handy option if you're tight on space or simply want something handy to bring around. It offers a Gigabit (1Gbps) port, as well as USB 2.0, and supports up to SATA2 (300MBps) drives. It supports RAID 1 for mirroring (backup), but by default, it comes with two 250GB drives making for a RAID 0 striping (speed) volume of 500GB. You can also use the USB port for printer, another drive, digital camera, USB flash drive, or memory card reader.

ECS Astar Sdn Bhd (03) 7804 5808
www.buffalo-asia.com

Cisco LinkSys NAS200

Coming from Cisco, the LinSys NAS200 is a 2-bay (RAID) device which supports up to 1.5TB (via dual 750GB drives in RAID 0 striping single-volume mode). Up to SATA2 (300MBps) desktop (internal) drives are supported, and there's USB 2.0 as well as a one-click backup button. The FTP function allows you to access this NAS anywhere in the world there's an Internet connection, while external USB flash drives and external USB drives are supported as well. Based on a 2-hour HD video (720p or 1080i), you can store about 45 of them on a 1.5TB volume, and 15 of them on a 500GB (2x 250GB) volume.

Cisco Systems (Malaysia) Sdn Bhd (03) 7723 8733 • ECS Astar Sdn Bhd (03) 7804 5808
Ingram Micro Systems Sdn Bhd (03) 7952 8188
www-my.linksys.com

AdvanceNet Technology Sdn Bhd
(03) 8070 3633
Ingram Micro Systems Sdn Bhd (03) 7952 8188
SiS Distribution (M) Sdn Bhd (03) 5569 8878
www.dlink.com.my

D-Link DNS-323

D-Link's entry into this month's NAS shootout is a little different than the other three, for the simple fact that the DNS-323 hits the pocket book at half the price of the others. Other than that however, it fits perfectly into the basic requirements of the shootout.

Aside from the Synology Disk Station DS207+, the DNS-323 is remarkably compact; users with not much desktop space should sit up and take notice. The device is equally remarkable in that the initial setup took mere minutes, including the time taken to install the hard drives, put on the front cover, hook up power and Ethernet cables and load up the web-based administration interface. You can choose to set up the hard drives within as separate drives, one big linear storage drive (i.e. JBOD), mirrored (RAID 1) or striped (RAID 0). Depending on your choice and the final storage capacity available to use, the next step of formatting the drive takes anywhere from minutes to an hour or two. Once done, all that's left to do is setup user accounts, folders and preferences. All but the most novice of users shouldn't find trouble with any of this, considering also that the web interface is well designed and simple enough to use and understand without being too cluttered.

Feature-wise, the DNS-323 does have its plus points such as built-in iTunes server, support for uPNP and FTP, but otherwise, the other NAS drives in the shootout offer more. One example is the USB port, which only supports the USB print server function and nothing else; no external add-on drives, no IP cameras etc. Of course, given the price point, you won't find us arguing with that. At the very least, users will appreciate that the DNS-323 supports hot-swappability, allowing hard drives to be replaced without having to first power down the drive, though we recommend only doing that if your hard drives are set up in mirrored mode. In addition, the DNS-323 also supports BitTorrent functionality, a boon for heavy downloaders who aren't too comfortable with the idea of leaving their main desktop computers on for extended periods of constant downloading.

In actual use, the DNS-323 ran without much noise, with the only audible sounds coming from the hard disks going through our benchmarks. This drive will fit in nicely into anyone's computing environment, without being too obtrusive. In addition, with support for SMB/CFS network filesystem protocol, machines running operating systems other than Windows are also able to access the DNS-323.

The rear of the DNS-323 is where all the connectors are; USB, power and Gigabit Ethernet. The hard drives are pushed out of the device using the pair of latches, while a fan provides ventilation for the circuitry and hard drives within.

Installing the hard drives is really simple; simply slide the front fascia upwards to unhook it from the main body, slide in the hard drives, and replace the front cover. No screws, no drive trays, no nothing.

The web-based user interface is simple enough; with enough detail to thoroughly configure the different functions on the DNS-323, but laid out in an easy-to-understand manner.

Kaira Technologies (M) Sdn Bhd
(03) 2026 1669
Techdata Systems Sdn Bhd (03) 8070 1633
www.netgear.com

NetGear ReadyNAS Duo RND2000

While NetGear's entry into the shootout is by definition a NAS drive, we think that it's more like a tank, by virtue of its solid build and substantial heft. From an aesthetic point of view however, NetGear doesn't cut corners with the ReadyNAS Duo, with a magnetic latched door over the hard disk drive bays, and its serious black look.

NetGear offers the ReadyNAS Duo with or without hard disk drives, with the latter featuring configurations starting from a single 500GB drive all the way up to a pair of 1TB drives. On the other hand, that doesn't mean that you actually get up to 2TB of storage capacity on the ReadyNAS Duo, as the device offers no option other than their proprietary X-RAID technology, which works similarly to RAID 1 (mirrored) functionality. So, if you pop in a pair of 1TB drives, you'll get 1TB worth of storage, with one drive taking up redundancy duties. For the user who's concerned about ease of use and security however, this isn't all that big an issue. What's more, the X-RAID functionality happens automatically once a pair of hard drives is installed; there's no need for any user intervention.

In terms of features and functionality, NetGear is adamant that the ReadyNAS Duo is anything but your run-of-the-mill file server, and we'd tend to agree. Users with large caches of multimedia files (audio, video etc) will be glad to find that the ReadyNAS Duo stores and delivers multimedia files over your network to various different players. For example, SlimServer functionality streams music to Squeezebox music players, and an iTunes Streaming Server takes care of delivering your music to your iTunes app on computers connected to the same network. uPNP capability also means that DLNA compliant devices and network-enabled players will be able to access and play media files over your network. Add in USB print server, photo sharing (using the ReadyNAS Photos addon) as well as BitTorrent, and you've got a pretty stacked machine.

Unlike the D-Link DNS-323, aside from just printers, the USB ports on the ReadyNAS Duo support USB flash drives and digital cameras. You can also hook up a compatible uninterruptible power supply (UPS), which enables graceful shutdowns during power outages, thus ensuring your hardware and data remain safe; something that no other NAS drive in this shootout is able to do. In addition, the 256MB of memory on the ReadyNAS Duo is upgradeable.

Drives are installed using drive trays, which are then latched in place. Being hot-swappable, the drives sit behind a mesh door, which helps give the unit a more uniform appearance. Installation is straightforward, but takes more than a couple of minutes. There is a USB port up front as well.

The cooling fan is rather large, but relatively quiet during operation. You can also see a pair of USB ports right next to the Gigabit Ethernet jack.

Web-based by nature, the administration interface is straightforward, allowing access to functions including media server configuration, user permissions and hard disk setup.

Build Technology Supply Sdn Bhd
(03) 7955 3699
www.qnap.com

QNAP TS-209 Turbo Station

A closer look at the QNAP TS-209 Turbo Station will reveal that it's not your average NAS drive, but rather more of a home media server, web server and file server all rolled into one. SOHO users will appreciate the file server and FTP server capabilities, as sending out large files via email can sometimes be a troublesome process. If you feel like setting up a simple webserver for a blog, online store and the like, the TS-209 supports PHP, MySQL and SQLite.

For the home users, uPNP media streaming server functionality through a built-in TwonkyMedia Server works with DLNA compliant devices on your network to deliver your photos, music and videos for easy enjoyment. If you happen to be an iTunes user, a built-in iTunes server also comes with, while sharing photos with family and friends is made easier with a photo server. You are able to hook up a USB printer to share on the network, but unfortunately that's only usable by Windows machines on the network. On the other hand, file sharing via the TS-209 is open to both Windows and Mac machines. BitTorrent users will also find the TS-209 enables P2P downloads without the need for a PC, with options including bandwidth control measures and download task management.

The front of the device features a series of status LEDs and a USB port, which allows users to copy data from devices such as a digital camera of flash drive, direct to the TS-209 at the touch of a button. The rear USB ports on the other hand, can be used to hook up the likes of USB printers or even additional external USB storage.

Like the other NAS drives in this shootout, the TS-209 accepts a pair of SATA hard drives, which are secured using drive caddies locked in place by thumbscrews. Despite the relative inconvenience of getting access to installed hard drives, the TS-209 supports hot-swap ability, so you can still easily remove and replace faulty drives without having to power down, with the data rebuilding process running in the background with zero downtime involved.

In terms of design, the TS-209 is probably the best looking of the bunch, and would look very much in place sitting in your living room as part of your home entertainment setup. In addition, the large fan at the rear ensures more than sufficient cooling for the hard drives within without an inordinate amount of noise.

The hard drives are first screwed onto the caddies, which are then secured to the main chassis of the TS-209 using large thumbscrews. Of course, all that requires removable of the plastic faceplate beforehand.

The rear is pretty much unremarkable, showing a pair of USB ports, the Ethernet jack as well as the plug for the external power adaptor. Of note is the ability to make use of a Kensington lock; at least you can prevent others from simply picking up and walking off with the compact and sleek TS-209.

The interface takes some getting used to, as the primary navigation bar shows only icons. Nonetheless, just like all the other entrants in the shootout, the web interface provides all the options you need to properly set the TS-209 just the way you like it.

Build Technology Supply Sdn Bhd
(03) 7955 3699
www.synology.com

Synology Disk Station Manager 2.0 Released!

September's firmware update introduces new business features and software enhancements.

- Supports MPEG4 Megapixel IP camera
- Supports RAID 6
- Supports drive SMART alert
- Supports multiple backup tasks
- Limits maximum connection from each IP
- Supports UTF-8
- Dual-Port Link Aggregation for Load Sharing and Failover
- Integrated Network File System (NFS)
- Host up to 30 Web sites via Virtual Host
- Download Station 2 supports BitTorrent partial file download
- Audio Station supports Web streaming

Synology Disk Station DS207+

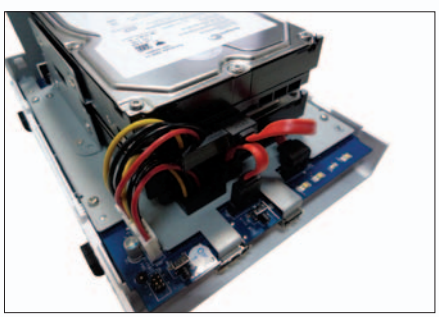
Going strictly by the requirements of this shootout, the Synology Disk Station DS207+ does fulfill the base criteria (dual-bay and priced within reach), but it has the apparent advantage of boasting features that would come in great handy not just for the SOHO setup, but also for the SMB environment. This is thanks to Windows ADS Domain integration, which enables Windows users to access shared data on the DS207+ after passing Active Directory authentication. What's more, data transmitted is encrypted whether FTP over SSL, HTTPS or even through encrypted network backups. With its built-in Surveillance Station functionality, you can even hook up IP cameras to form the basis of a simple network video recording solution; something that none of the other entrants in the shootout offer. Also unique is the inclusion of an eSATA port, something none of the others have.

Just like the QNAP TS-209, the DS207+ is also able to serve webpages through built-in PHP and MySQL. Similarly, the DS207+ is also geared as a multimedia hub, with uPNP multimedia service support, built-in iTunes server and other applications such as Photo Station (for sharing and archiving photos), Audio Station and Download Station (FTP, HTTP as well as BitTorrent download scheduling and management etc).

Of special note is the management software used by the DS207+, dubbed Disk Station Manager 2.0. Built using AJAX, the interface is laid out in a logical manner, and doesn't take a rocket scientist to figure out where particular configuration options are. Granted, the interface is a little crowded, but there's more than enough detail there to placate even the nitpickiest of NAS-savvy users.

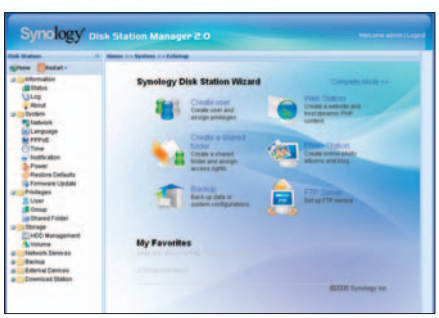
With all that in mind, the DS207+ does have a couple of noticeable quirks. First off is the fact that installing the hard drives takes quite some time, as you not only have to screw the drives into the drive cage, but also connect both power and data cables between the NAS and the hard drive. This also means that hot-swap ability isn't present on the DS207+. If your drives decide to fail, be prepared to spend some time up close and personal with a screwdriver.

Not only that, but the aesthetic of the DS207+ is a little farther away from the norm, as it comes all decked out in glossy white plastic, as compared to the black color theme of the other shootout entries. Nevertheless, it's a refreshing change to see from something that's supposed to be quite the serious piece of equipment.



Installing the hard drives on the DS207+ isn't anywhere as simple as the other NAS drives in this shootout, as you need to not only screw the drives in place, but also manually hook up the Serial ATA data and power cables too. Obviously, hot-swap capabilities aren't exactly present in this scenario.

The ventilation fan at the rear did its job just fine, and the white plastic outer shell gives the DS207+ a whole different aesthetic compared to the predominantly black color choice of this shootout.



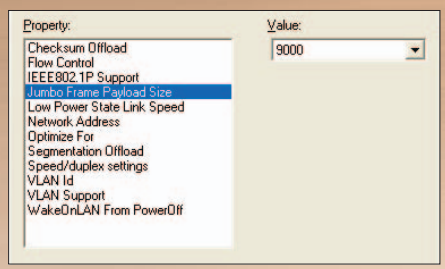
The user interface is dubbed the Synology Disk Station Manager 2.0, and is built using AJAX. Though cluttered, we daresay that this is probably the most user friendly, while also being the most thorough – something the more hardcore users would appreciate.

How We Tested

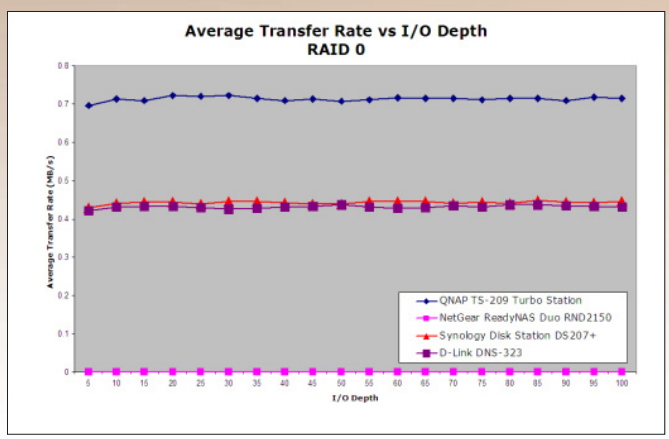
Testing was done using a standalone network consisting of the NAS device in question, a standard 10/100/1000 switch, as well as a PC containing the necessary benchmark applications. The PC's pertinent components include an AMD Athlon64 3500+ processor, 1.5GB of DDR memory, Gigabit Ethernet capability, as well as Windows XP Pro SP2. The Jumbo frame payload size on the onboard Gigabit Ethernet was set to 9000, with the same done on the respective NAS drives being tested whenever possible. Where the NAS drives didn't support the 9000 payload size, the maximum available setting was used. As for the actual hard drives, Seagate graciously provided a pair of Seagate Barracuda 7200.11 1TB hard drives.

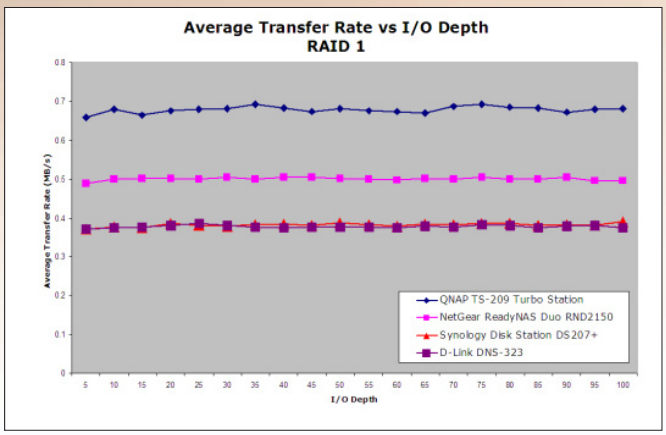
The benchmark applications used were Iometer's File Server test starting from 5 to 100 I/Os, as well as CrystalMark 2004R3 v0.9.26.410's HDD test using a HDD size of 1024MB. Iometer gives a better idea of the various drives' performance under varying workloads, while CrystalMark gives us an idea of how fast the average read and write speeds are when transferring data to and fro.

Wherever possible, testing was done in both RAID 0 and RAID 1, with the exception of the NetGear ReadyNAS Duo which only supports their X-RAID technology; similar to RAID 1. Testing was done three times for each benchmark per NAS drive, with the end results averaged for a final score.

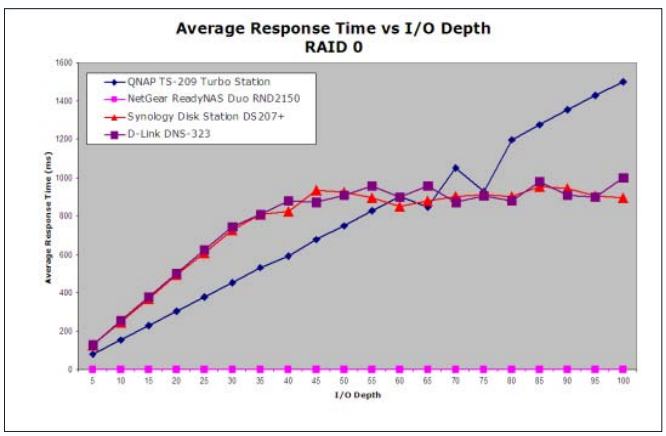


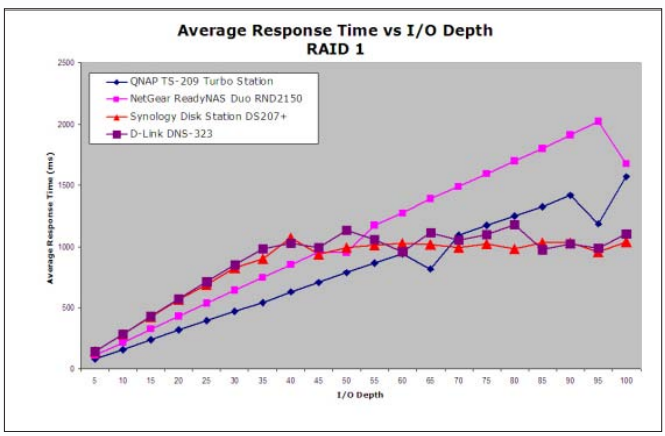
Performance Evaluation



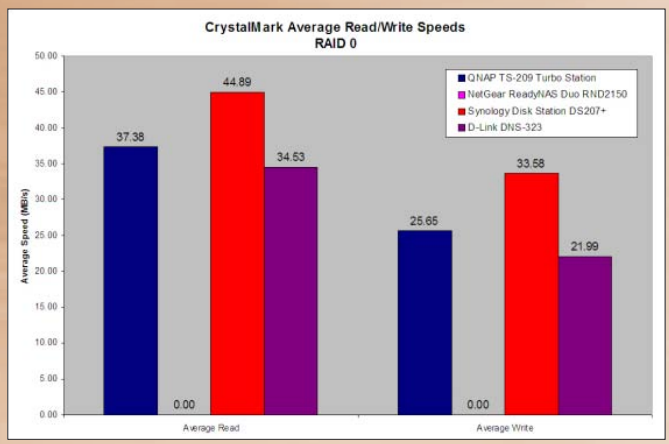


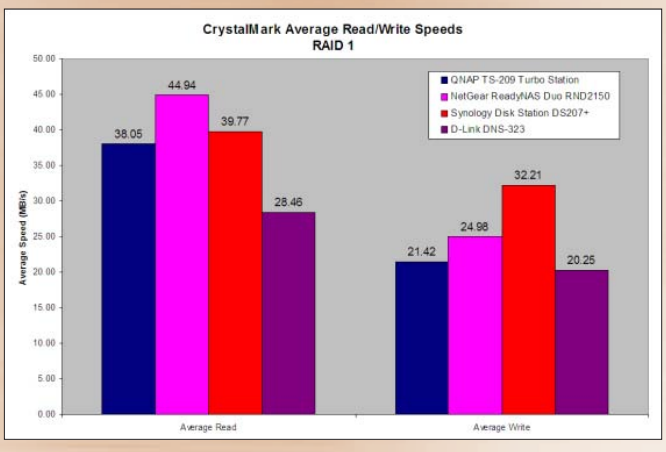
First off, note that the NetGear ReadyNAS Duo flat-lined the RAID 0 portion simply because the device only provides for RAID 1. That said however, you can see that no matter the NAS device, performance stays pretty much the same whatever the load, whether 5 or 100. The only difference here is that the QNAP TS-209 does much better; nearly twice as fast in RAID 0 as compared to the Synology Disk Station DS207+ and D-Link DNS-323 which perform about the same. In RAID 1 however, the NetGear ReadyNAS Duo shows its stripes, coming up in between the QNAP TS-209 which still sits in the lead. Just like in RAID 0, both the Synology Disk Station DS207+ and D-Link DNS-323 are neck and neck, but ranking below the other two.





When it comes to the average response time in RAID 0, the Synology Disk Station DS207+ and D-Link DNS-323 begin to plateau off around the 40 to 50 I/O depth mark, with the QNAP TS-209 scaling steadily slower with ever deeper I/O depths. Coming to RAID 1, we see the NetGear ReadyNAS Duo continue to display higher response times with correspondingly deeper I/O depths, while the other three NAS drives all begin to taper off midway through.





In CrystalMark, the Disk Station DS207+ begins to show its mettle in RAID 0, though the NetGear ReadyNAS Duo steps up once RAID 1 is in the picture, at least where average read speeds are concerned. The D-Link DNS-323 on the other hand, continues to chase from behind at all times, though at half the asking price of every other NAS drive, we're not too concerned. As for the QNAP TS-209, the drive returns solid numbers throughout.

Final Analysis

D-Link DNS-323 – This device doesn't profess to provide everything but the kitchen sink, and rightly so, since the performance and feature set are pretty much balanced with the asking price. If you're keen on an entry-level NAS that's easy on the pocketbook, and aren't too fussy about the feature list, the DNS-323 is the one to pick.

NetGear ReadyNAS Duo RND2000 – NetGear's entry into the comparison is certainly interesting, combining a solid physical design with a respectable feature set and performance. The UPS monitoring and upgradeable memory is undoubtedly useful, but some of the more adventurous users might find the lack of RAID 0 (or even standard) support a turnoff.

QNAP TS-209 Turbo Station – This particular entry comes packed to the gills. Webserver, music server, multimedia server; you name it, the TS-209's got it. Well, except maybe not Windows ADS Domain integration, though that's a feature aimed more towards the SMB and SOHO setup. On the performance front, the TS-209 ranks in the upper tier among the competition along with the ReadyNAS Duo. For the discerning home user looking to explore the many things a NAS can do, the TS-209 is certainly a good choice.

Synology Disk Station DS207+ - Being the sole white sheep in a herd of black, the DS207+, Synology's entry stands out in more ways than one. Not only does it have the same extensive multimedia-centric feature set as the QNAP TS-209, but it's also geared with security features useful for SOHO and SMB outfits; making it perfect for both home and small office use. What's more, the asking price of nearly S$100 less than its closest rival tips the scales in Synology's favor, even if hot-swap capabilities aren't available. If performance and feature set are important to you, the DS207+ is more than value for money.

Concluding Thoughts

For the more hardcore computer users among us, setting up a separate PC as a file server is an option, but that involves a certain level of complexity. For starters, you'd need to build a PC, populate it with a bunch of hard drives, install an operating system, and depending on if you have a dedicated RAID card, configure the RAID array, make sure the cooling is sufficient, find a place to put the whole machine; the list goes on and on. Truth be told, that's all a lot of work that could be avoided by simply picking up a NAS box.

Something to look out for in the coming months would be more affordable NAS drives that offer more than two drive bays. Candidates include the Thecus N3200 for some 3-drive RAID 5 action, and the Thecus M3800 featuring a total media storage and playback solution, as well as D-Link's upcoming DNS-343 which comes with a whopping four bays. Combine those with the newfangled 1.5TB hard disk drives coming soon from Seagate, and the storage junkies in all of us should be kept appeased for just a while longer.

The Thecus M3800 features a HDMI port, so you can directly play your movies, videos and music right on your big-screen LCD TV!