

Infrant Technologies
ReadyNAS Products

ReadyNAS™ **NV+**
NAS for Home and Small Business



ReadyNAS™ **1100**
The Ultra Efficient 1U NAS



What is RAID?

RAID (Redundant Array of Independent Disks) arrays allow multiple individual hard disks to be combined to perform as if they were one larger disk. The effect is to spread and replicate the data across the multiple disks (redundancy). That, in turn, reduces the risk of losing data if one drive fails. In short, RAID combines the capacity of multiple, independent hard drives into one while providing protection against data loss.

RAID at a Glance

What is the easiest way to get RAID?

Many Network Attached Storage (NAS) devices use RAID technology to provide a large amount of storage with a level of fault-tolerance through redundancy. Although RAID in the past was reserved for enterprise companies, gone are the days when RAID comes at a high cost and requires IT specialists to manage it. RAID is now available in affordable solutions made specifically for home office and small business.

Do RAIDs make data safe?

Depending on how they are configured, RAID arrays can provide a good level of data protection through redundancy. If a single disk fails in the array, all the data will remain intact and accessible, and you will be given time to buy a replacement drive. No single drive solution offers data redundancy, so when the drive fails, all data is lost. In that case, the only option is to find a firm that specializes in data recovery and there is no guarantee that all of the data will be recovered. Even if it is, it will end up costing far more than it would have if you had used a RAID array in the first place.

Quick Glossary

Striping:	The splitting of data evenly across two or more disks
Mirroring:	The creation of an exact copy of a set of data on two or more disks
Redundancy:	Duplication of data which provides fault-tolerance in case of disk failure
Read performance:	The speed at which a file can be transferred from the disks on the NAS to a client computer
Write performance:	The speed at which a file can be transferred from a client computer to the disks on the NAS
Parity Data:	Redundancy information stored to the disks and used to reconstruct the data after drive failure
Parity Drive:	A drive in the RAID array dedicated to storing parity data

RAID Level	Function	Benefits
RAID 0	<ul style="list-style-type: none"> • Data striping • No redundancy • Requires at least 2 drives 	<ul style="list-style-type: none"> • Best performance but no fault-tolerance • Disks are dependent on one another for data integrity • Best performance
RAID 1	<ul style="list-style-type: none"> • Disk mirroring, no striping • Read performance improved; either disk can be read at the same time • Write performance same as single disk 	<ul style="list-style-type: none"> • Best fault tolerance in a multi-user system • No capacity increase with 2nd drive
RAID 2	<ul style="list-style-type: none"> • Uses bit-level data striping • Stores error checking and correcting info 	<ul style="list-style-type: none"> • Repairs and replaces corrupt data • No advantage over RAID 3 • Method not currently used
RAID 3	<ul style="list-style-type: none"> • Uses byte-level data striping • Dedicates a drive to parity information • Embedded error checking information to detect errors 	<ul style="list-style-type: none"> • Best for single-user systems • Any I/O operation requires activity on all disks • Cannot service multiple requests simultaneously
RAID 4	<ul style="list-style-type: none"> • Uses block-level data striping • Dedicates a drive to parity information • Can read records from any single drive • Requires at least 3 disks 	<ul style="list-style-type: none"> • Services multiple I/O read requests simultaneously • No I/O overlapping for write operations, requires update to parity drive • Offers no advantage over RAID-5
RAID 5	<ul style="list-style-type: none"> • Uses block-level striping with parity data distributed across all member disks • Stores parity data across disks, but not redundant data (although parity information can be used to reconstruct data) • Requires at least 3 disks 	<ul style="list-style-type: none"> • Low cost of redundancy • Read and write operations can be overlapped (limitation in RAID-4) • Best balance of performance, protection and capacity
X-RAID™	<ul style="list-style-type: none"> • Proprietary expandable RAID from Infrant Technologies • Automates volume expansion • Manages RAID details for you 	<ul style="list-style-type: none"> • Can expand from 1 HDD to 4 HDD • Can replace disks for higher capacity • Equivalent to RAID 5 in performance, protection and capacity • Offers fast sequential read and write operations
RAID 6	<ul style="list-style-type: none"> • Block-level striping • Extends RAID-5 by adding a second parity block that is distributed across drives 	<ul style="list-style-type: none"> • Offers extremely high fault- and drive-failure tolerance • Write operations slower due to dual parity • Can protect against 2 HDD failure but is really only suitable for 8+ drive systems • Rare in market
RAID 10	<p>Combination of RAID-0 and RAID-1 Two subtypes:</p> <ul style="list-style-type: none"> • RAID-0+1, data is organized as stripes across multiple disks, then striped disk sets are mirrored • RAID-1+0, data is mirrored and the mirrors are striped 	<ul style="list-style-type: none"> • Higher performance than RAID-1 • Much higher cost • Requires 2X the capacity for redundancy

