

Infrant Technologies™ ReadyNAS™ NV+ With Expandable RAID

REVIEWERS GUIDE



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Infrant Technologies, Inc. ReadyNAS NV+ Reviewers Guide

About this Document

Welcome to the Infrant™ Technologies, Inc. ReadyNAS™ NV+ Reviewers Guide. This guide provides information, suggested testing methodologies and data to help you understand and evaluate the ReadyNAS NV+ – the World’s Most Advanced Network Attached Storage Device for Home and Small Office use.

Contact Information

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General Overview of the Infrant ReadyNAS NV+

The ReadyNAS NV+ is the latest addition to the award-winning ReadyNAS family of products. The NV+ builds on the pedigree of the ReadyNAS NV and brings several design improvements to Network Attached Storage (NAS) devices and is specifically designed for home, small office home office (SOHO) and small-to-mid-sized businesses (SMB).

NAS devices are meant to store massive amounts of data locally on your network. Infrant defines NAS as a reliable simple-to-use device, designed to store, serve and protect all of your valuable digital assets.

“People are beginning to rely on digital storage for their invaluable photos, music, and personal records. A compressed audio player can hold almost \$15,000 worth of purchased songs, and a PC hard drive may contain a lifetime of memories in digital photos and video.” – IdaRose Sylvester, IDC

Infrant Technologies has brought a myriad of enterprise-level technologies resulting in one of the most advanced NAS units on the market today. The NV+ is one of the few consumer NAS devices on the market that includes a built-in, fully automated RAID array, which virtually eliminates the worry of ever losing valuable data again. It serves files easily, allows users to backup data effortlessly, stream music and video quickly and share printers painlessly.

Today’s consumers find that the sizes of digital images, large MP3 collections, digital video and the like are taking up massive amounts of space on their local hard drive. Even if a consumer has enough space to meet these growing needs, what happens in the case of a catastrophic disk failure? They can spend around a thousand dollars to a third-party data recovery specialist and keep their fingers crossed that their data can be recovered. Or, they can avoid this problem and buy a ReadyNAS NV+ and know they never have to worry about losing their data again.

This becomes even more important for SMB users. Many stories have been written about a company losing all of their data due to hard drive failures. The ReadyNAS not only protects a user's data, it can protect ALL of the data on the network. The device can store up to 3 Terabytes, given the size of today's hard drives.

In the past, hard drive manufacturers have been able to introduce larger capacity hard drives at a pace which has traditionally outpaced consumer demand. Thus a single drive was usually adequate for most consumer needs. However, with the explosion of digital media, we are beginning to get more and more consumers who need more space than what is available from even the highest capacity single drives (currently 750 GB).

Multi-drive solutions are beginning to trickle into the high-end consumer market, propelled by the fact that digital still cameras and video cameras are becoming more and more ubiquitous in everyday life. The digital files that these devices produce consume much more space than the traditional data that had been stored on consumer hard drives. In addition, the very nature of this data dictates a much more proactive solution to data protection.

The need for increased storage space and the need for data protection are combining to make multi-drive RAID solutions necessary in the consumer market. However, cost has been one of the primary barriers to widespread adoption. How many people want to buy multiple hard disks at once? With Infrant's patent pending Expandable RAID technology, consumers no longer have to make this investment. Users can start with one hard disk and add more as their needs or budget allows. There is now an easy way to go from 1 to 4 drives within a single redundant RAID array.

Six years ago, Infrant Technologies identified this need and set about to engineer a product specifically for this market space. Taking into account factors such as cost, convenience and capability, Infrant engineers worked tirelessly to create a product that would provide an acceptable balance between these three factors.

After carefully researching what was available at the time, Infrant decided that it would have to engineer all the pieces from the ground-up: from the CPU, to the system board, to the Linux based operating system, and finally the external chassis. The result is the Infrant ReadyNAS NV+, the most advanced NAS for small office and home users.

Considerations

Target Market

The ReadyNAS NV+ addresses the needs of the small office and home office markets, as well as home networks. It is ideal for backup and storage applications including Digital Photo Storage, Digital Video Surveillance, Digital Video Editing (DVE), High Definition Personal Video Recorder (HD-PVR) and for Home Media Centers.

ReadyNAS NV+ Features

The ReadyNAS NV+ has many compelling features typically not found in consumer-level NAS devices:

- New front-mounted LCD status panel for easy to understand status updates
- New quieter design for a reduced noise footprint
- Widest range of DMA compatibility on the market for consumer-level NAS Devices
- Four lockable hot-swap SATA trays and hardware RAID, which simplifies servicing the unit and drastically reduces downtime and increases security
- Patent Pending X-RAID technology facilitates easy scaling from 1 to 4 HDD
- Setup Wizard to get the NAS configured quickly and easily
- EMC Retrospect is bundled with the unit for Fast Backups and Smart Restores™, including four user licenses – a \$150 (USD) value
- Infrant's custom IT3107 NSP. The IT3107 is essentially a NAS-on-a-chip and provides approximately a 20 percent increase in performance over the previous version processor
- Maximum power draw of 60W for super low power consumption
- Power Saving mode with additional scheduled startup and shutdown
- Automatic online firmware updates
- Programmable back-up button
- Cable lock for additional security
- A carrying handle for easy transport. If you are facing an emergency, you can just grab the NAS and go, saving all of your valuable data
- Ultra-compact design (8"Hx5"Wx9"D)
- Intelligent monitoring of battery backup devices

Specific Applications

Perfect NAS for Small Office and Home Office

- Self-monitoring, self-managing system
- Provides simultaneous access, virtually a necessity in any office
 - Networked
 - Multiple clients
 - External USB storage support
- Enterprise-level data protection against hard disk failure
 - Hot swap drives simplify servicing
 - Enterprise-proven RAID operation eliminate downtime
- Back up and recover data effortlessly
 - Bundled EMC Retrospect (Backup, protect, restore, everything, anytime, with a click of a button)
- Also an Integrated Server-side Backup Manager
 - Programmable backup button
 - SnapShot support
- Secure
 - Three security modes
- Access files when traveling

Ideal Home Media Server

- Centralize and organize all your data
 - A main repository for all your digital data

- Class leading performance supports multiple HD content streams to simultaneously serve music, video or pictures to multiple devices
 - HD support
 - UPnP AV support for a wide variety of Digital Media Adapters
 - (i.e. Dlink, Buffalo, IODATA, SONOS, NeoDigits)
 - (Optional) Twonkymedia UPnP AV server for a richer experience and XBOX360 Support!
 - Embedded Slimserver supports Squeezebox and Transporter network music players
- An “always-on” device to ensure on-demand access
 - Reliable (designed to business server class standards)
 - Energy efficient (consumes only 50-65 watts!)
 - Robust operating system
- Share media with friends and family across the Internet
- Never worry about losing precious data to HDD failures again
 - Irreplaceable personal photos or videos
 - Purchased videos or music

Expandability

One of the problems as you shop around for a NAS device, is that you find the price of a good 4-disk NAS might be a tad beyond what you might want to spend so you look around and find a one- or two-disk NAS device, and you wonder how quickly it'll end up with your other hi-tech junk closet. Some 4-disk NAS devices might not be that future-proof either if you cannot replace them with larger disks. So you contemplate...

- Buy a 1- or 2-disk NAS, but know that it's useful life will be limited
- Plunk down a big part of your paycheck for a 4-disk NAS
- Do nothing and keep using a single disk

RAID configuration

Number of disk Installed	RAID 0	RAID 1	RAID 5	X-RAID
1				
2				
3				
4				

- Legend:
- Redundancy against single disk of failure.
 - X-RAID auto volume expansion.
 - Storage capacity.
 - Default RAID setting depending on number of disk drive installed.

X-RAID is Infrant Technologies patent-pending Expandable RAID technology, allows users to add drives at their leisure. Start with one disk or add a second disk to gain disk failure protection. Add a third to automatically double the capacity while maintaining protection. Finally, add a fourth disk to triple the protected capacity, all without reconfiguring the system and without having to shuffle data in and out of the device.

- 1 Drive = NAS
- 2 Drives = NAS + RAID Protection
- 3 Drives = NAS + RAID Protection + Double Capacity
- 4 Drives = NAS + RAID Protection + Triple Capacity

Not only that, as larger and larger disks become cheaper and cheaper, you can replace all four disks (one by one), and your capacity grows even greater -- all

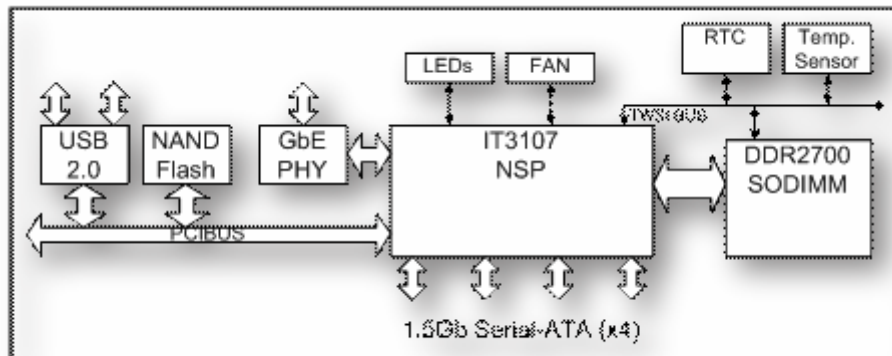
the while letting X-RAID do all the RAID level and data migration in the background so you still see just one volume with all your data intact, just with more free space.

In addition, the ReadyNAS NV+ has 3 USB 2.0 ports that support external USB HDD's and Flash devices. Simply plug in any USB HDD and the ReadyNAS will automatically detect them. Obviously, the external HDD will not have any RAID redundancy like the internal hard drives, but the ReadyNAS X6 can also share the space on these external devices.

Performance

Infrant's Network Storage Processor (NSP), supporting multiple Serial ATA hard disk interfaces, Gigabit Ethernet, and Hardware RAID 0/1/5 redundancy, addresses the emerging network storage appliance market for file sharing, backup, and digital media applications. The highly integrated system-on-chip architecture of the IT3107 aims to enable simple and powerful network storage solutions to a broader market such as departments, workgroups, offices, and home networks.

- Network Storage Processor (NSP) specifications:
- 32-bit RISC CPU, supporting up to 280MHz
- Four (IT3107) Serial ATA Channels
- Hardware RAID 0/1/5 and XRAID
- Gigabit Ethernet MAC supporting Jumbo Packets
- 64-Bit DDR-SDRAM Interface
- PCI Host Controller
- DataJunction™
- Diskless Boot using NAND Flash
- TWSI Interface
- JTAG Boundary Scan
- 449-pin Pb-free PBGA
- 1.5V Core, 2.5V DRAM, 3.3V IO



The RAIDiator™ embedded operating system used by the Infrant ReadyNAS NV+ can be optimized depending on your NAS needs. The ReadyNAS NV+ outperforms all other entry-level NAS Devices. Performance tweaks, such as Write Caching, Data Journaling, Jumbo Frame Support, and OS specific optimizations, are all user selectable.

Protection/Redundancy

Full data protection or redundancy is automatically achieved when you have at least 2 Hard Disks installed in your ReadyNAS NV+.



RAIDiator 3.0 – Simple and Powerful OS

Infrant's ReadyNAS NV+ is completely set up and administered via a browser-based interface. The device is as easy to use as a home-networking router, perfect for consumers and SMBs alike. Feature-wise, the embedded RAIDiator OS provides a myriad of advanced features, from built-in media server capabilities to auto shut-down options.



Next-Generation Integrated Technologies

An integrated advanced architecture is key to both system reliability and system performance. The ReadyNAS NV+ provides the perfect solution by offering a multi-disk, full-featured NAS solution supporting the most advanced technologies including 4 hot-swappable trays that use Serial ATA disks, hardware-accelerated RAID5, Gigabit Ethernet, and the patent pending Expandable RAID Technology.

Low Cost

By integrating NAS hardware functions into a single NSP, the ReadyNAS NV+ offers many benefits, including higher reliability, lower cost, smaller size, lower power consumption, and quieter operation.

With the explosion of data storage requirements, SMB customers are forced to look for the best storage solution for their limited budget and IT customers look for NAS solutions that are easy to deploy yet light on the budget. Infrant's ReadyNAS NV+ brings powerful hardware and expandability features into an integrated, reliable solution. With the increasing user demands placed upon network storage, many SMB and IT customers are including the ReadyNAS NV+ as part of their growing storage needs.

Infrant RAIDiator™ Embedded Operating System

The original features of the ReadyNAS RAIDiator™ firmware helped establish the ReadyNAS as the NAS of choice for the office. Now with the new integrated backup and media streaming capabilities, a ReadyNAS with RAIDiator 2 can go from your office to your home without skipping a beat. The ReadyNAS is clearly now the most versatile NAS in the world!

With the built-in FrontView™ Setup Wizard, whether a ReadyNAS box is being used by an advanced IT wizard or a novice home user, setting up the ReadyNAS is a breeze. Follow through a few steps to fit your network environment, and when done, click on the Advanced Control to check out all the potential of the RAIDiator 3.0-driven box.

Media Server

Stream, stream, stream...

Take for instance, the capability to stream your favorite personal videos, music, and pictures straight from the ReadyNAS, without ever needing to turn on your PC or Mac. If you have one of those hot new networked DVD or a Windows Media Connect-compatible player, simply drag & drop your media files to the ReadyNAS and these files will show up automatically on your player, ready to stream straight to any TV in your house.

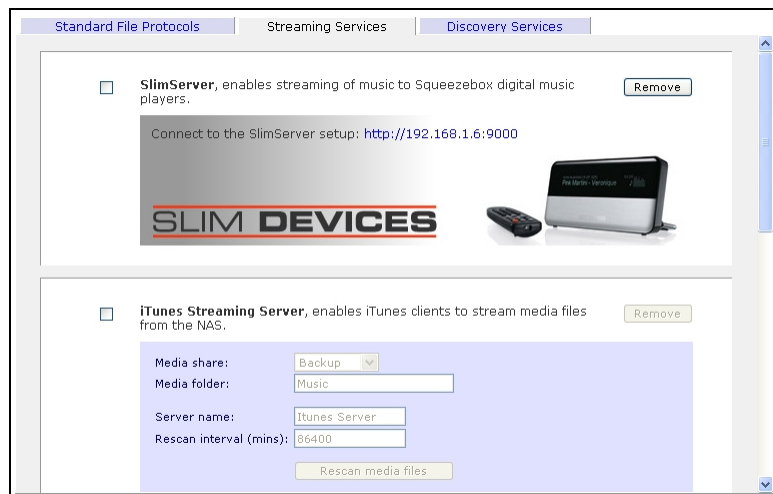
Extend your ReadyNAS with Add-ons

RAIDiator 3.0 now supports Add-ons. Update your ReadyNAS with an Add-on, and suddenly, your ReadyNAS becomes infinitely extendable. Why would you settle for a typical storage appliance now that you know ReadyNAS can do so much more?

Squeezebox

For those who clamor for the Squeezebox digital music streaming player, we listened. You no longer need to keep your PC on to enjoy your awesome sounds. Simply install the Slimserver Add-on to the ReadyNAS and let the ReadyNAS serve all your Squeezebox players in your home.

Embedded Server Software used to stream videos, music, and pictures to most networked DVD players such as Momitsu and IOData. Also supports all compatible UPnP AV Devices. The ReadyNAS comes with a reserved media share that is advertised and recognized by the players. Simply copy your media files to the Videos, Music, and Pictures folders in that share to display them on your player.



TwonkyVision

A version of TwonkyVisions DLNA Certified Media Server is available for the ReadyNAS family of devices, which enables users to share all of their music, pictures and videos with standard UPnP-enabled client devices throughout the home. **This is a superset of the UPnP features already built-in to the ReadyNAS NV+.** Additional information can be found at www.twonkyvision.com.

A REALLY big digital wallet for your digital camera

Digital cameras are getting smaller but with each new camera, the mega-pixels files they create are increasing getting bigger and bigger. You already know the ReadyNAS can store your pictures, but with RAIDiator 2, simply connect your camera or flash reader to the ReadyNAS when you've filled up your memory card; instantly, your pictures will be uploaded and be instantly sharable with other PCs and streaming players on the your network, without ever needing to turn on your computer. It'll even sort it into a time-stamped folder so your new pictures will not overwrite your existing ones.

Transfer your data to and from USB disk

If you've been using a USB hard disk to backup or transfer data, RAIDiator 3.0 now allows your disk to be connected to the ReadyNAS. Your disk will immediately appear as a share that you can make available to anyone (or no one if you choose) on the network. If you have multiple partitions on the disk, no matter. Each recognized partition will become a share.

Restoring a deleted file is now easy

Windows users are used to the Recycle Bin, and being able to recover data that was inadvertently deleted. Unfortunately, Recycle Bin typically does not exist with network shares, until now. With RAIDiator 3.0, you now have the option of enabling a Recycle Bin on each of your shares, so you now have an extra level of protection on top of your ReadyNAS RAID.

Integrated Backup Manager simplifies automatic backups

Just like most of us now wear seatbelts, eventually most of us will learn to do proper backups. With drive sizes at three-quarters of a terabyte today, and soon to be much larger, a one-disk failure can be very catastrophic. With the new integrated Backup Manager in RAIDiator 3.0, you now have a choice of either performing backups from the client or initiating backups from the ReadyNAS. The latter is the better choice to avoid multiple network hops -- for instance in the case of a client system running a backup application that performs backups from another box to the ReadyNAS. Another advantage to performing the backups from the ReadyNAS is that you now would have a centralized management screen to initiate and view backup schedules and logs.

Backup just about anything

The ReadyNAS has truly become a backup appliance. With the Backup Manager, you can now choose your backup source from a variety of system types. For instance you can backup a web server, perhaps your Intranet or your company website. While you're at it, you can backup all the important files you make available on your company FTP site. Then you can backup the NFS servers used by your Linux and Unix users. And don't forget the Windows clients and servers. You can even backup remote Rsync servers on the Internet. And if you wish you can go in the reverse direction, and backup shares on your ReadyNAS to remote locations.

In fact, if you wish, you can set up your backup schedule to perform delayed mirroring to a secondary ReadyNAS device. Utilizing quick incremental backup strategy in this scheme is a great way to protect your data against viruses and other unexpected errors.

Snapshot backups are now a snap

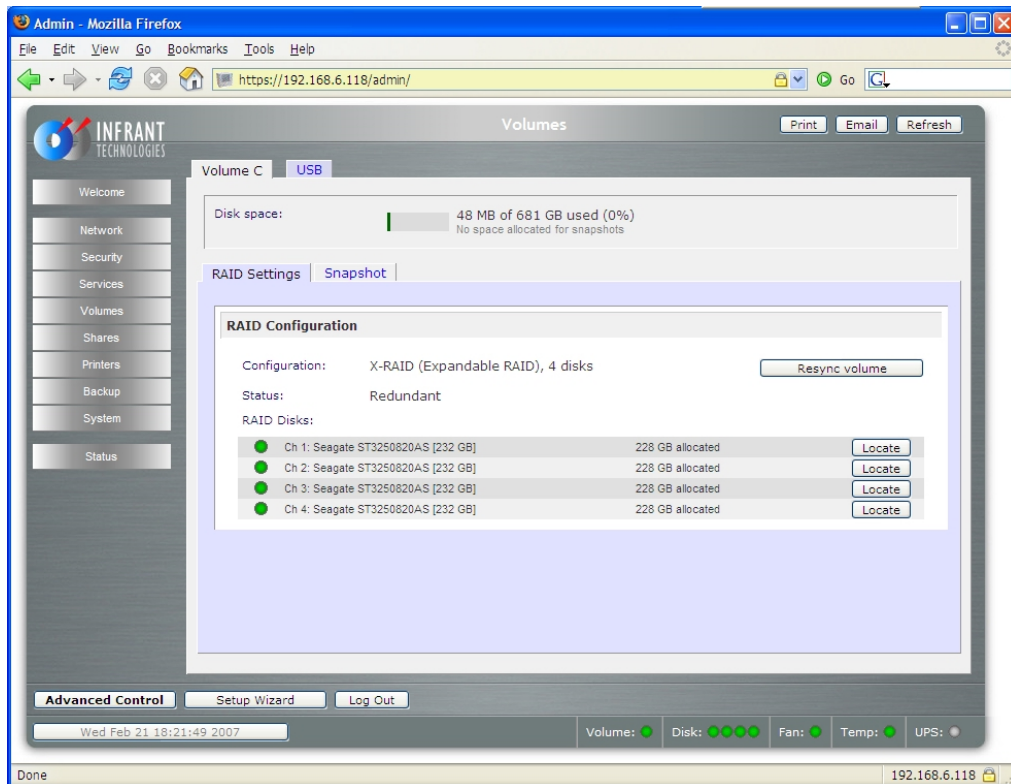
The snapshot feature, available since RAIDiator 1, allows you to schedule a snapshot of the volume at a specified interval. Why would you want to do that? Well, imagine one morning a couple workstations get infected with a virus, and the virus spread to the files on a share on the ReadyNAS. If you had scheduled a daily snapshot at midnight, you can go back to the snapshot of the share and restore to the version of the files as of midnight.

While you have a snapshot, you can schedule a backup of it. Rather than backing up live shares from the ReadyNAS while file contents are changing, you can backup the snapshot instead, where you know things are frozen in time. If you coordinate your backup program to start 5 minutes after your snapshot is taken, even if the backup process is still running into the day, you won't have to worry about backing up potentially inconsistent and outdated data.

With the Backup Manager in RAIDiator 3.0, backups of snapshots can be much quicker as you can now copy the snapshot directly to the remote destination.

Flexibility to select different RAID level

From the onset, you can be sure the RAID level selected for you by RAIDiator is optimized for your ReadyNAS configuration, so you don't need to hassle with knowing all the details about RAID. However, you can elect to reconfigure the default volume and select a different RAID level. For instance, if you want pure write speed or you want the highest capacity from your disks, you can select RAID level 0. RAID level 0 allows data to be striped across disks but is only recommended for environments where you may have other means of protecting your data in case of disk failure.



If you wish to have your primary data disk mirrored to one or more disks, you can select RAID level 1. With RAID level 1, when one disk fails, data access continues on the unaffected disk. If you have 3 or more disks and want a balance of performance and capacity utilization while retaining protection from a disk failure, you can select RAID level 5.

For even better redundancy, you can assign a hot spare

If you are in an environment where you want to minimize the amount of time your ReadyNAS spends in degraded (non-redundant) mode after a disk failure, you may want to reserve a disk as a hot spare. Let's say one of the disk fails. In the normal case, you will replace that disk as soon as you can so that the volume on the ReadyNAS can return to a redundant state. However, until you replace that disk, the ReadyNAS will be in a degraded state, meaning an additional disk failure would render the volume dead and your data lost. There's a chance that

two disks can die at about the same time, although the chance of that is remote. With a standby hot spare, as soon as a disk dies, data from that disk is rebuilt onto the spare, and the ReadyNAS volume returns to a redundant state.

Background RAID sync gets you going fast

There's no need to wait for RAID sync process to complete before using the volume. It's all done in the background so you can start using your new volume quickly after creating it. Without background sync, you may have to wait several hours before being able to use it.

Smart "sync resume" feature used to be available only with enterprise-level RAID. Now it's available with RAIDiator. If you have ever brought down a RAID system either voluntarily or involuntarily (perhaps due to a power outage) during RAID initialization or parity resync process, you know how time-consuming it is to have to resync the RAID volume from the beginning. With the sync resume feature, the sync process continues right where it left off, when the NAS was shutdown. The less time a RAID spends in degraded mode, the better.

Life-support mode prevents accidental 2nd drive failure

With Infrant's RAID life-support mode, an accidental removal of a 2nd drive from a RAID volume does not mean the RAID is now dead. Simply shutdown the ReadyNAS, re-add the drive, and power it back on. Your RAID volume will resume where it left off. We don't recommend you try this with other RAID systems.

Shutdown on disk failures.

RAIDiator is designed to keep the ReadyNAS going even with a disk failure. But with RAIDiator 2, you now have the option to automatically shutdown the device if a disk failure is detected. Just another peace-of-mind feature to prevent the ReadyNAS from encountering a 2nd disk failure until a replacement disk can be added.

And what about disk quota?

So now that there's a brand new ReadyNAS with hundreds of gigabyte of storage. How do you make sure the kids don't fill it up with all of his downloaded games, or your Multimedia class students with all their videos? You can set disk quota. Depending on the security mode you select, you can limit disk usage on a per-share basis or on a per-user or group basis.

Talk about security modes, there's one to fit every situation.

RAIDiator supports three modes. In very easy terms, there's one called "Share". In this mode, security is granted on a per-share basis. This means access to the ReadyNAS is limited based on who has the share password. What this really means is you can prevent little Tommy from accessing Mom and Dad's Quicken's share by not telling little Tommy the share password. The Share mode is sufficient for a home or a small office environment.

The second mode is "User". In this mode, a larger number of users may exist, with users perhaps grouped into functional groups, such as Sales or Accounting. This mode requires an explicit login using a user id and a user password to access the ReadyNAS. Once logged in, the user can access only the shares that

the user or the group that he or she belongs to are given access to. For instance, a user from the Sales group may not necessarily be given access rights to a share meant only for the Accounting group. This security mode does require a little more maintenance because user and group accounts must be maintained on the ReadyNAS using FrontView.

The last security mode is "Domain". This mode is very similar to the second mode, however, instead of using accounts on the ReadyNAS, accounts from the company's central Windows domain controller (often referred to as the Primary Domain Controller, or PDC) or the Active Directory Service (ADS) server, are recognized instead. In corporate environments, having a central server such as this allows for reduced overall maintenance.

Supports All Clients

What would a NAS be if it supported only Windows? The advantage of a NAS is that data can be shared amongst many people. In that regard, RAIDiator supports Windows, plus Mac, Unix, Linux, and anything else that has a web browser or a FTP client.

Save money on print servers

Why spend money on print servers when there's one built-in to RAIDiator? With RAIDiator 3.0, you can now connect up to two printers directly to the built-in USB ports, or connect more with a USB hub. Just plug in the printers, and they'll be recognized automatically in FrontView, and the print shares will be automatically created. Also with RAIDiator 3.0, you now have print queue management. So now if the printer is stuck or out of ink, you can now delete all the duplicate print jobs that users are sure to make when they don't see their printouts.

Fully integrated with smart UPS monitoring

Ever thought what would happen when the power goes out for a little too long and the UPS battery is exhausted? RAIDiator continually monitors the UPS over USB and sends alerts whenever a power outage occurs and the UPS battery takes over. When the battery runs low, RAIDiator gracefully shutdowns to avoid potential file corruption.

Definite advantages to data journaling

Let's say little Tommy trips over the ReadyNAS power cable and accidentally powers off the terabyte ReadyNAS. How long does it take it bring the ReadyNAS back online? Without journaling, it can take hours. With RAIDiator data journaling, usually just a few seconds longer than the normal power-up time.

Automatic time synchronization

System clocks tend to wander sometimes. There's no need to worry about that because RAIDiator has a built-in NTP client. What this means is you can specify a NTP server (or use the default one) and not ever have to worry about setting the ReadyNAS clock. It'll always be accurate to within a fraction of a second.

Wireless ready

Because an ReadyNAS solution can be typically smaller and more portable than comparable NAS, you may have a tendency to take it with you to show off your new collection of games, music, pictures, or videos. Why carry a cable with you

and be restricted to putting the ReadyNAS close to a switch, away from the action? Carry a USB wireless controller and cut the cord, because with RAIDiator, the ReadyNAS can be wireless.

DHCP-ready even if your network isn't

Most of us know the advantage to having a DHCP server on the network. There's no need to enter a static IP, netmask, gateway, and DNS -- everything is automatically done for you. Simple plug-and-play. No DHCP server, you say? Well, with RAIDiator, the ReadyNAS can become one. It's as easy as setting up the ReadyNAS for a static IP and enabling the DHCP server service. In no time, other PC's on your net can join in on the 21st century.

RAIDiator speaks five languages

That's more than what most of us speak. Just set your browser to English, Japanese, Traditional Chinese, Simplified Chinese, or Korean, and run FrontView in your native language.

Convenience of online updates

RAIDiator comes integrated with online update support. No more going to a website, downloading a file, and uploading it to the device. Click once to check if there's an update, and click a 2nd time to perform the update. That's it. And with RAIDiator 3.0, you'll be automatically informed of new updates, and you have the option of automatically downloading the image. All you'll need to do is reboot to set your system with the latest features and bug fixes.

RAIDiator keeps you informed

NAS devices often act too much like an appliance. It's quiet when it's working and it's dead silent when it's not. Well, RAIDiator does the first, but it definitely is not silent when unexpected things occur. You'll get email alerts for out of disk space, disk quota violation, disk failure, update status, UPS warnings, RAID status, etc. Never anything not useful, but RAIDiator definitely will keep you in check with what's happening. No more coming in the morning with a ton of angry voicemail and yellow stickies.

Secure logins

You never know who might be sniffing network packets, even behind the firewall. Rest assured that all logins to the RAIDiator OS are encrypted whenever possible, including the login to the FrontView Setup Wizard and Advanced Control management tools.

Hardware Features

Infrant IT3107 NSP (32-bit RISC CPU)

- This second generation NAS Specific Processor provides a 20 percent performance boost over its predecessor. The IT3107 is a SPARC based RISC CPU with integrated Hardware RAID, Gigabit Ethernet MAC, 4 Channel SATA controller, 64-bit DDR SRAM controller, DataJunction™ DMA, 3 DES encryption/decryption engine and a PCI host controller/USB interface.

4 Channel Serial ATA Controller

- Integrated directly into the NSP

Hardware RAID Accelerator

- Integrated directly into the NSP. XOR engine accelerates Parity Bit Calculations.

Gigabit Ethernet

- With Jumbo Frame Support

64-bit DDR-SDRAM Controller

- System Memory and Caching, support for 256MB to 1 GB of RAM.

PCI Expansion Slot

- For future expandability

Three USB 2.0 Ports

- Currently supports Printers, External USB HDD's, USB Flash Devices, UPS Monitoring, and Wireless USB LAN Adapters.

OS loaded onto Compact Flash

- By loading the OS and management application into flash memory, firmware updates can be easily administered.

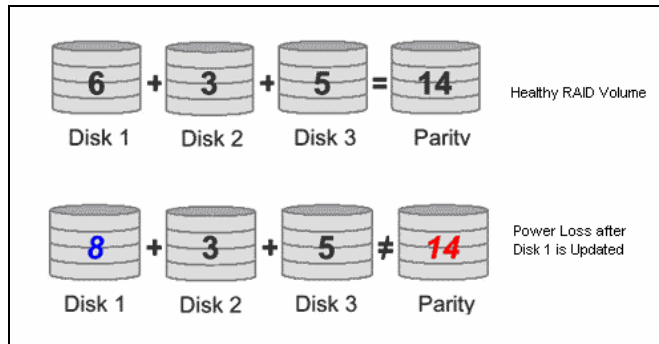
180 Watt Power Supply for lower power consumption

- Probably the lowest power consuming NAS with SATA. At idle, the system draws ~50 Watts, while under full load, the system draws ~60 Watts.

Tuning Performance & Protection

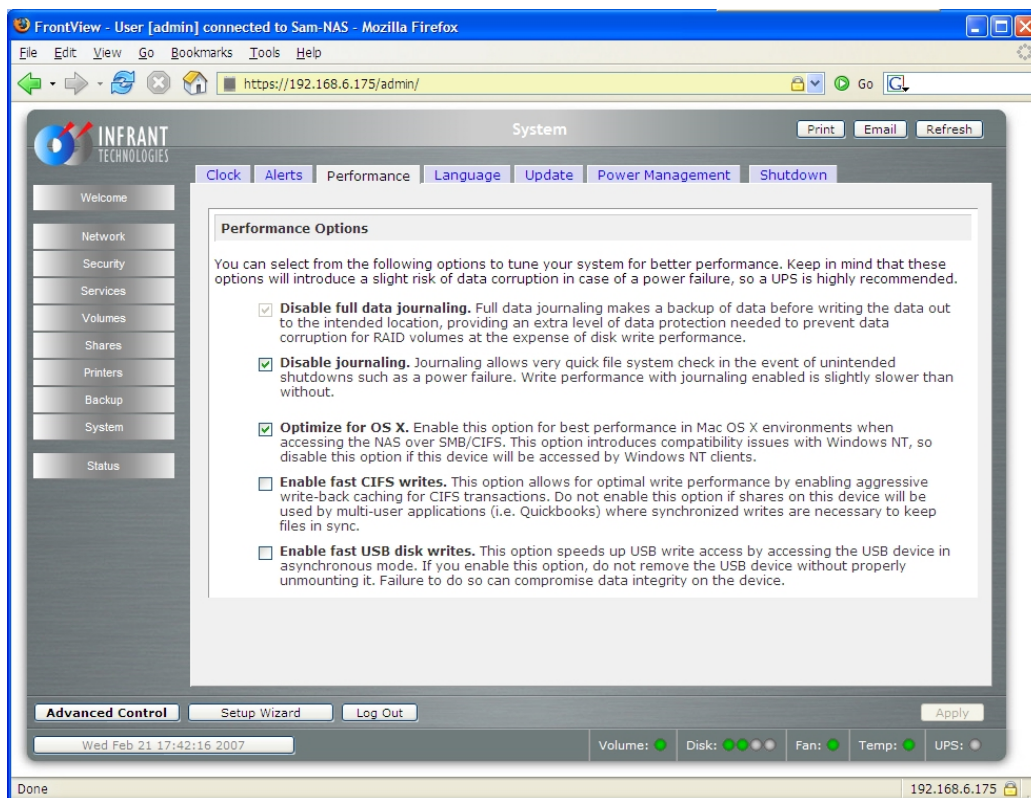
Many of Infrant's engineers have a strong background in Enterprise level NAS & RAID devices. As a result, Infrant has a very strong focus and passion for maintaining DATA integrity. This focus becomes evident when Infrant implemented its file writing procedure for the ReadyNAS devices. RAID inherently protects against hard drive failures, however, what about sudden power failures? If the device is executing a read procedure during the power failure, it's not a big deal. But if the device is executing a write, a loss of data integrity and corruption of the RAID volume is very possible.

When writing a file to a RAID device, special consideration must be made to ensure that the original file is indeed intact and coherent after it has been broken up and distributed across multiple hard drives. A unique and critical situation arises when a portion of the file has been written to some of hard disks, but for one reason or another, such as a power failure, the remaining portion of the file never gets written to the rest of the hard disks. This results in a file that may be corrupt and unusable. This phenomenon has been known as the "RAID Write Hole". It is situation that is very well understood by the high-end enterprise NAS manufacturers, where such a loss of data integrity is absolutely unacceptable.



Most low-end RAID devices choose to ignore this potentially data damaging situation because the probability of such an occurrence is relatively low and the problem difficult to address. At the same time, it can negatively impact the write performance of the device. At Infrant Technologies, we give end users a choice: If data integrity is of utmost importance while running in RAID mode, it is best to configure the device in “Safe Write Mode” as described below. By sacrificing some write performance, the “RAID Write Hole” will be eliminated. Otherwise, if performance is more important and a slightly increased risk of data loss is acceptable, you can begin checking the appropriate performance options that you would like enabled. Of course, connecting a UPS device to the NAS will eliminate these problems altogether, and allow you to safely enable all of the performance options.

Below is a description of the performance tuning options for “Write” performance:



Disable Full Data Journaling – As mentioned above, with this option, you run the risk of the RAID Write Hole, where a portion of the data is written, but the rest is not, and the parity bit is incorrectly calculated.

Disable Journaling – This feature is merely for speeding up the disk and volume check procedure when the device recovers from a sudden power loss situation. It does not enhance data integrity in any way. Such a check can be quite lengthy depending on the amount of data you have stored on the device.

Optimize for OS X – For Macintosh users using the latest operating system from Apple. Enabling this option will enhance transfer performance. However, please make sure you do not have any Windows NT 4.0 clients that need to access this NAS device. This feature does not affect the data integrity.

Enable Fast CIFS Writes - It is more accurate to say 'Force Fast CIFS writes' - essentially we force the CIFS connection to always perform in 'writeback' mode as opposed to 'writethrough' mode. If this option is not enabled, we leave it up to the OS or Application to decide which mode the writes should operate in.

Enable FAST USB Disk Writes - again, the only danger occurs if you are constantly plugging and unplugging USB drives into the USB ports. The safe way to unmount is to go into frontview->Shares->USB and select unmount. If you prefer not to unmount every time, it is recommended that you leave this option unchecked, at the cost of some USB write performance.

Enable Jumbo Frames (Located under “Network -> Ethernet” Settings) – For transferring files over 5 Megabytes in size, enabling Jumbo Frames can substantially improve performance because it essentially lowers the TCP/IP overhead by utilizing larger size packets. Again, this feature does not affect data integrity.

JUMBO Frame support is as follows: On the receiving end (write performance), we will auto-detect the frame size (up to 8K) and adjust accordingly. Please set your NIC to use 8K packets (or something larger -- during the negotiation process, the client/NAS will communicate at the lowest common denominator) in order to realize the best performance. On the send side (Read Performance), we are not using Jumbo Frames yet. We did this in order to minimize compatibility issues as things can get tricky if you have multiple clients on a network and only some support Jumbo Frames.

Expected Performance Numbers

In the chart below you will find the expected performance numbers for the ReadyNAS NV+. If your results vary greatly from these numbers, please contact us so we can work with you to figure out why you are getting a disparity in the results.

Activity	Jumbo Frames	Full Journaling	Partial Journaling	Megabyte/Sec
Read	Enabled	Disabled	Disabled	32.0 MB/sec
Write	Enabled	Disabled	Disabled	22.5 MB/sec
Write	Disabled	Disabled	Disabled	16.5 MB/sec

“Safe Write Mode”

Enable Full Data Journaling. This will provide the maximum level of data protection, should something happen to the ReadyNAS while it is writing data to the disks (Jumbo Frames support will not affect data integrity and can be set if your client and router support this feature).

More Performance

If you are storing non-critical data, or have a UPS connected to the NAS, then you can safely disable Journaling all together.

Warranty and Pricing Information

The NV+ comes with a standard 1-year warranty including parts and labor. The ReadyNAS NV+ family includes various SKUs to meet the wide range of storage needs from consumers and SMBs. Pricing ranges from US\$650 (MSRP) for the core “diskless” unit to US\$2,999 for the 3TB version. ReadyNAS NV+ units are currently available; please go to www.infrant.com for additional information.

Specifications

General	Infrant 3107 Network Storage Processor 4 Serial ATA disk trays Hot swappable and lockable trays Compatible with SATA I 1.0 1.5Gbps and SATA II 3.0Gbps disks 10/100/1000 Ethernet LCD Display 3 USB 2.0 ports 256MB PC2700 DDR-SDRAM SO-DIMM Embedded 64MB flash memory for OS Compatible with Windows, Mac, UNIX, & Linux DHCP Server and Print server
RAID	Hardware RAID0, 1, 5 or X-RAID Hardware X-RAID Auto Single Volume Expansion New disk must be equal or larger in size Original disks are replaceable with larger disks one by one for unlimited volume expansion Multiple Volume support for RAID 0, 1, 5 Disk capacity supported: 80/120/160/200/300/400/500/750GB
Volumes	Volume Management Single Volume auto expansion (X-RAID) Journal and non-Journal Mode User, Group and Share-level Quotas
Network File Services	CIFS/SMB for Windows AFP 3.1 for Mac OS 9/X NFS v2 / v3 for Linux and UNIX HTTP/S for Web Browsers User-Level and Anonymous FTP
Media Streaming	UPnP AV SlimServer Network DVD Players compatible Windows MCE Compatible
Network Security	Selectable Share, User, Domain/ADS Modes Windows ACL

	Encrypted Network Logins Share Access Control Secure Socket Layer (SSL)
Network Options	DHCP or Static IP WINS, NTP
Infrant Integrated Backup Manager	Backup Button for USB Drive or Backup Jobs Backup to/from CIFS/NFS/FTP/HTTP & RSYNC Backup to/from USB disks
Bundled Backup Software	EMC Retrospect Professional for Windows (5 User Licenses) EMC Retrospect Desktop for Macintosh (5 User Licenses)
System Management	Performance Options Device Status Email Alerts Event Logs SNMP
USB Devices Supported	USB Disks and flash Printers UPS Monitoring and Auto Shutdown Wireless Network Adapters
Web Browsers Supported	Internet Explorer 6.0+ Netscape Navigator 7.0+ Opera 7.0+; Safari 1.22+ Mozilla Firefox 1.03+
Languages	Management UI: English, Japanese, Chinese and German File Name: Unicode
Electrical	Fanless Server-rated AC Power Supply Input: 100 ~ 240 VAC, 50/60Hz
Power Consumption	55W typical (with 4 x 250GB drives) Power Saving Mode
Thermal	92mm Ball-bearing Chassis Cooling Fan Fan Failure Email Alert High Temperature Email Alert with Auto-shutdown Option
Operating Environment	0°C - 40 °C 20 - 80% Humidity (non-condensing) Safety and Environmental FCC, UL, CE, C-tick, RoHS Compliance
Physical	Kensington Lock Security Hole Height: 7.9 in (200 mm) Width: 5.2 in (132 mm) Depth: 8.7 in (222 mm) Weight: 10 pounds (4.6 Kg) without hard disks
Optional Spare Parts	Lockable Disk Tray 92mm Chassis Fan AC Power Supply

Corporate Backgrounder

Infrant Technologies (www.infrant.com) is dedicated to bringing enterprise-level storage technology to the masses at affordable prices. The company offers a host of network attached storage (NAS) products and technologies for small businesses, consumers and makers of storage appliances. Infrant's offerings range from the world's first network storage processor (NSP) to a family of ReadyNAS™ appliances ideal for small business and home use.

Infrant's products address the various growing needs of both small businesses and consumers. For small businesses, Infrant offers a variety of cost-effective solutions that store and protect critical data easily, efficiently and intelligently, simplifying the backup

process. Infrant's solutions can also be used as part of a video surveillance system, as they allow streaming data to be stored. All you need to do is add video cameras.

For consumers, Infrant's products can store digital pictures, music files or any other kind of data. The ReadyNAS can also be used with any network-enabled home theater device, allowing users to back up HDTV programs, stream audio and video throughout the house or edit and archive home video.

Infrant was founded in March 2001 by a team of highly regarded specialists in the field of microprocessor and storage technologies. Their first goals were to create the most advanced NSP on the market and make it affordable for small businesses. Today, the company continues to drive innovation in the storage microprocessor arena as well as in the exciting and emerging market for NAS appliances. According to industry analyst firm Gartner, Inc., the total NAS market is projected to grow at an 8.8 percent compound annual growth rate in revenue terms from 2004 through 2009. The market is projected to grow from \$1.4 billion in 2004 to \$1.5 billion in 2005 and \$2.2 billion in 2009.

In 2004, the company introduced the ReadyNAS full network storage solution and subsequent family of NAS products to fulfill emerging market needs. The ReadyNAS IT71004 network storage controller was built from the ground up, and integrates hardware RAID technology, multi-channel Serial ATA (SATA), Gigabit Ethernet, a Linux-based operating system and NAS management software provided by the NSP.

Infrant continues to revolutionize the consumer and SMB markets with innovative solutions. It is the ideal technology partner for OEMs looking to bring network storage products to market in an expedient manner. Infrant's progressive approach allows OEMs to engage at the chip, system board, chassis or software levels.

Management

Paul Tien – President, CEO and founder

Steve Wang – Vice president of Worldwide Sales and founder

Alex Win – Vice president of Software Engineering

Jim Lo – Vice president of Operations

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