

# Backup **PRO**

Backup & Disaster Recover (BDR) Service

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## Abstract

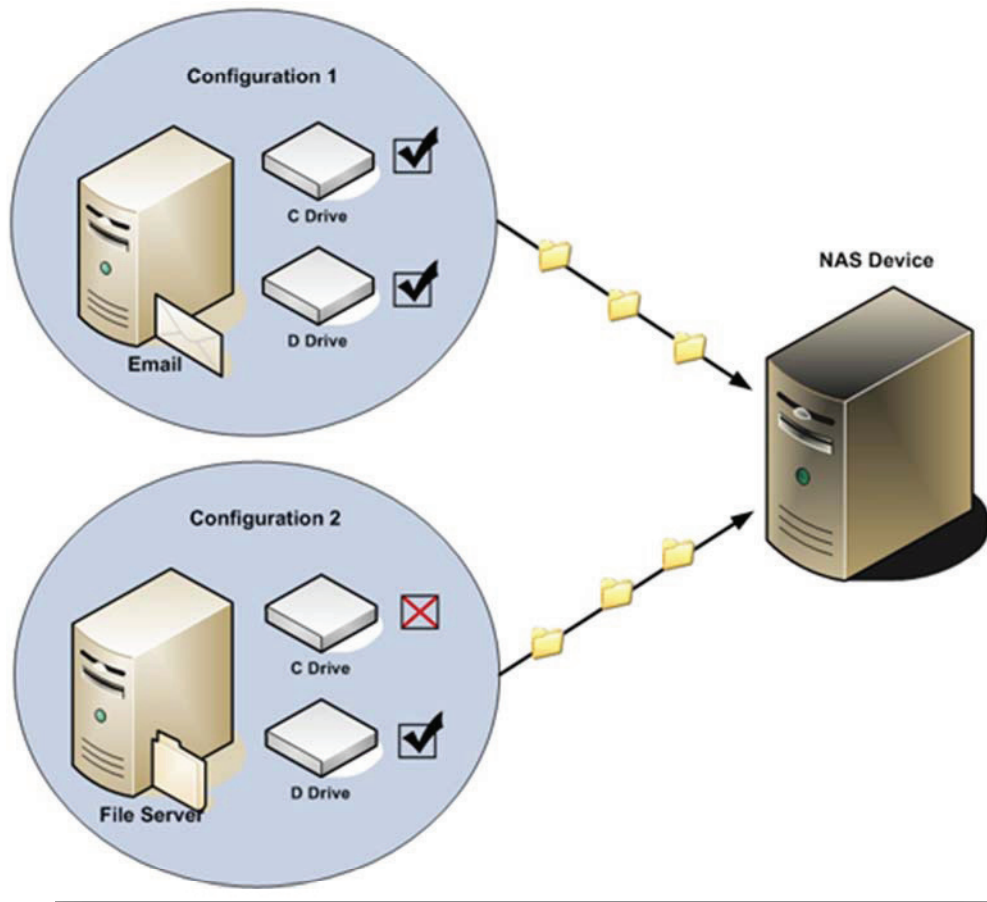
This document provides an overview of how the BackupPro service works.



# BackupPRO: How it Works

## Configuration

The NAS device can be configured to backup multiple Windows 2000, 2003 and 2008 Windows Server and their volumes or logical drives. There are no file or folder level exclusions because a snapshot of the entire volume is taken at the block level or the actual 1's and 0's on the hard drive. In order to take advantage of the virtualization services the operating system drive must be selected. Additionally, the data backup can be scheduled to run during selected times and days of the week as often as every 15 minutes.



## Incremental Forever Methodology

The Incremental Forever Methodology is similar to Incremental Backups where each Incremental performs a backup of all changes since the last backup. Where this technology differs, is that only one full backup or base image is required. This greatly reduces the time it takes to perform backups as each Incremental takes only seconds to complete. As the Incrementals are taken they are collapsed into what we call Synthetic Incrementals. For example, imagine two Incremental backups with the first backup taken at 10:15am and a second taken at 10:30am. When the collapsing process occurs the 10:15am backup is collapsed into the 10:30am backup leaving a single backup as of 10:30am. This is what we call Synthetic Incremental.

The frequency of off-site backups are limited by the amount of available bandwidth at the client site. Limited bandwidth will result in longer transmission periods which means backups may only be done hourly or daily depending on the available internet bandwidth.

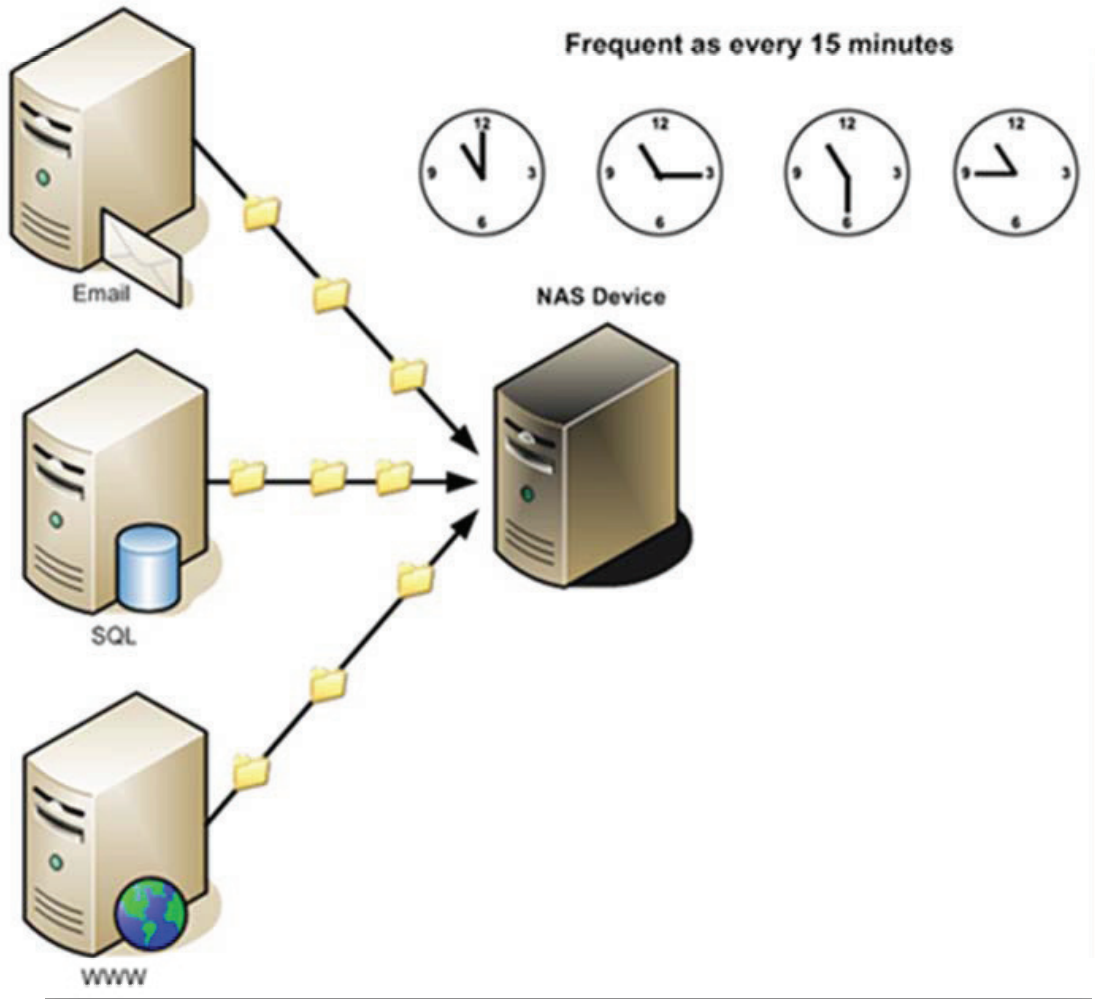
## Base Image

The base image is the first backup that occurs on the server, which is a complete image of the volumes intended for backup. The base image serves as a starting point for all incremental backups. The incrementals collapse into the base image when a restoration is performed providing you with a complete image of the server from the selected point in time.



## Incrementals

The Incremental Backups are the changes on the hard drive since the last backup. For example, the first Incremental will be all of the changes since the Base Image and the second Incremental will be all of the changes since the first Incremental. There are nearly 100 incrementals in a 24 hour period if the backup frequency is set to every 15 minutes.

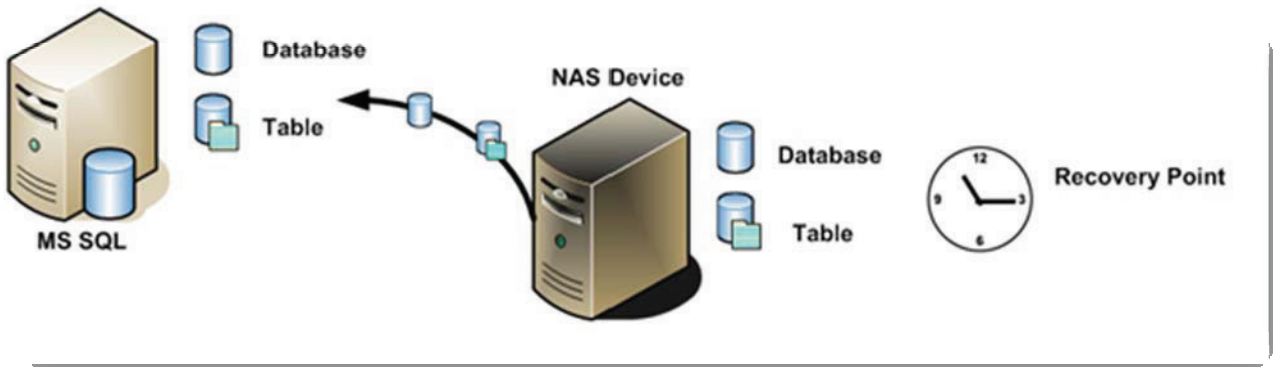
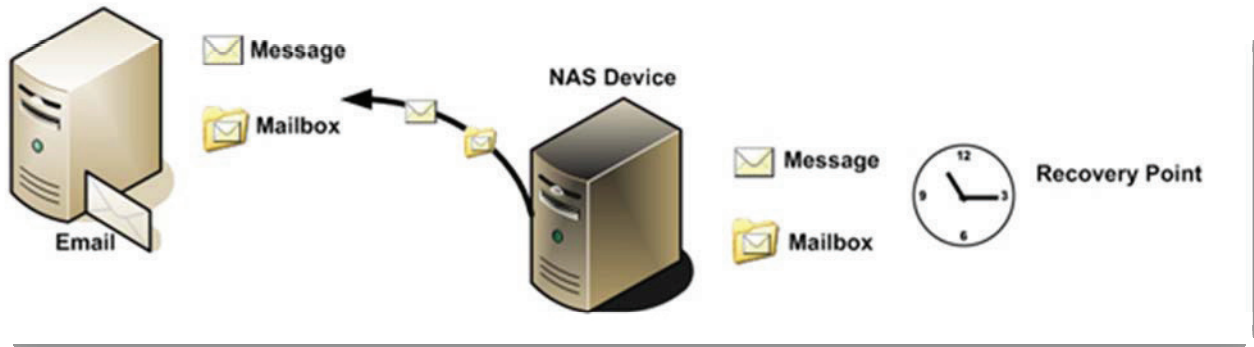


## Synthetic Incrementals

Synthetic Incrementals (SI) are the result of collapsing multiple Incremental snapshots into a single file or Incremental. The Daily Synthetic Incrementals are created at the end of the day or 24 hour period when all of the 15 minute Incrementals are collapsed leaving you with a single recovery point for that day. The Synthetic Incrementals result in a complete archiving solution as each Daily SI is collapsed to create a Weekly SI, each Weekly SI is collapsed into a Monthly SI and finally each Monthly SI is collapsed into a Yearly SI. When recovery from a specific month or a year is needed, we simply join together the necessary incrementals in a chain with the base image to create the desired point in time image. The entire joining process takes a few seconds to complete.

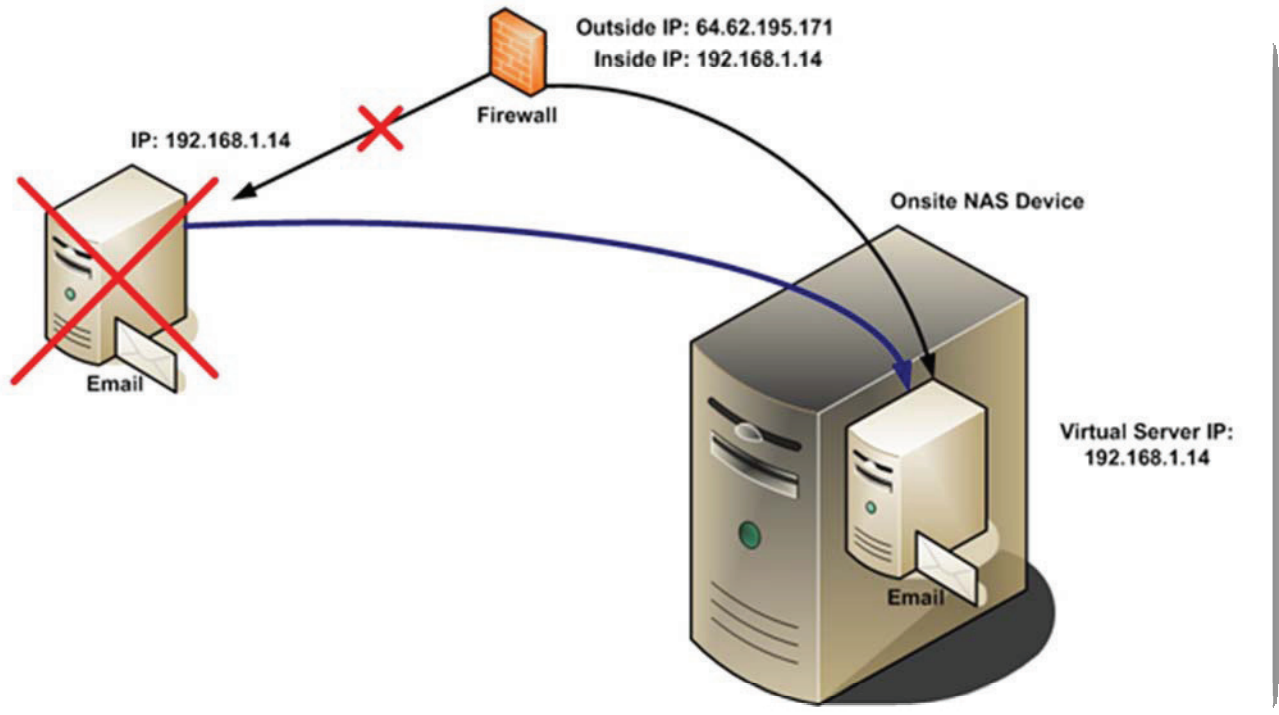
## Recovery Options

Recovering files and folders is a simple process where the entire server is mounted as a volume on the NAS device. The files can then be copied to the destination server over the network. We also provide utilities to our clients so that they can restore files, folders, and Exchange mailboxes or messages.



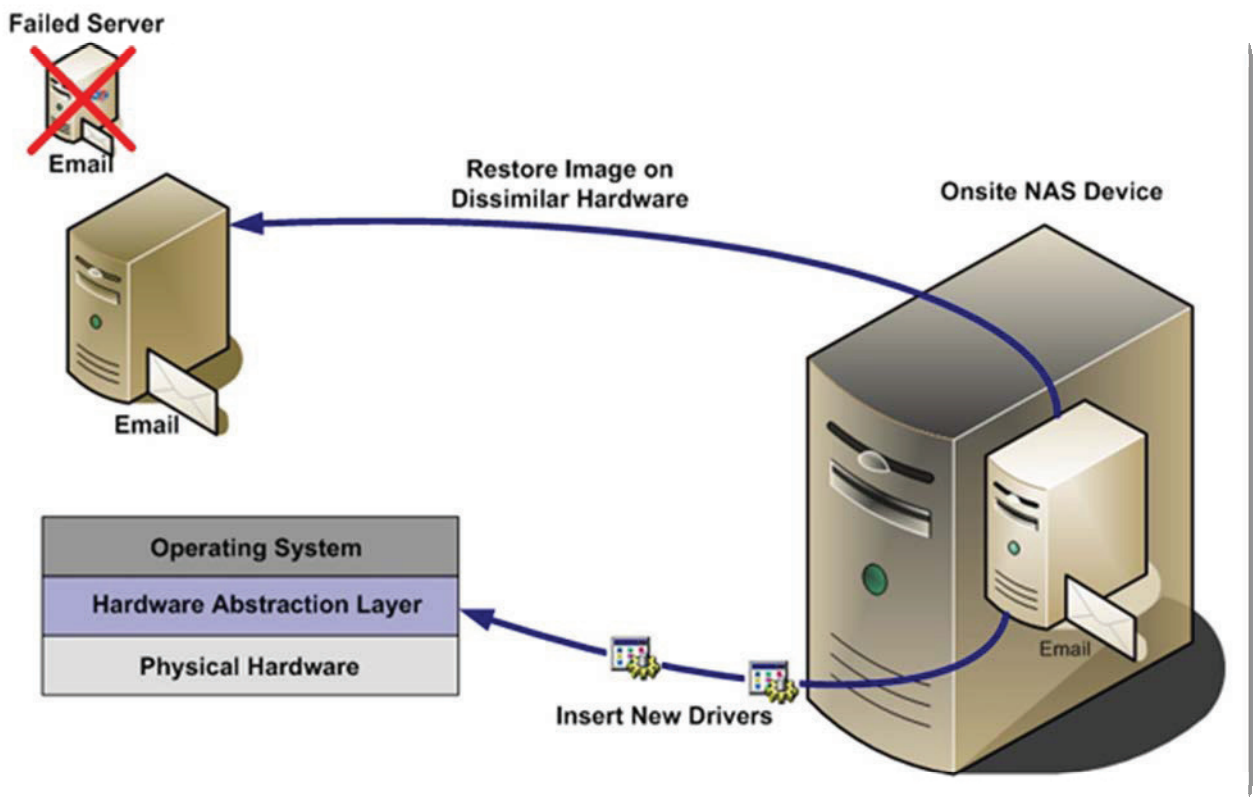
## Virtualization (Physical to Virtual)

The NAS device is capable of virtualizing failed servers while keeping the exact system state previous to the failure. This means there are no configurations necessary as the server retains the same IP address and application state. Once virtualized, the server will resume the same backup schedule previous to the failure. The BackupPro NOC engineers will perform this action for you 24/7 and this service is included.



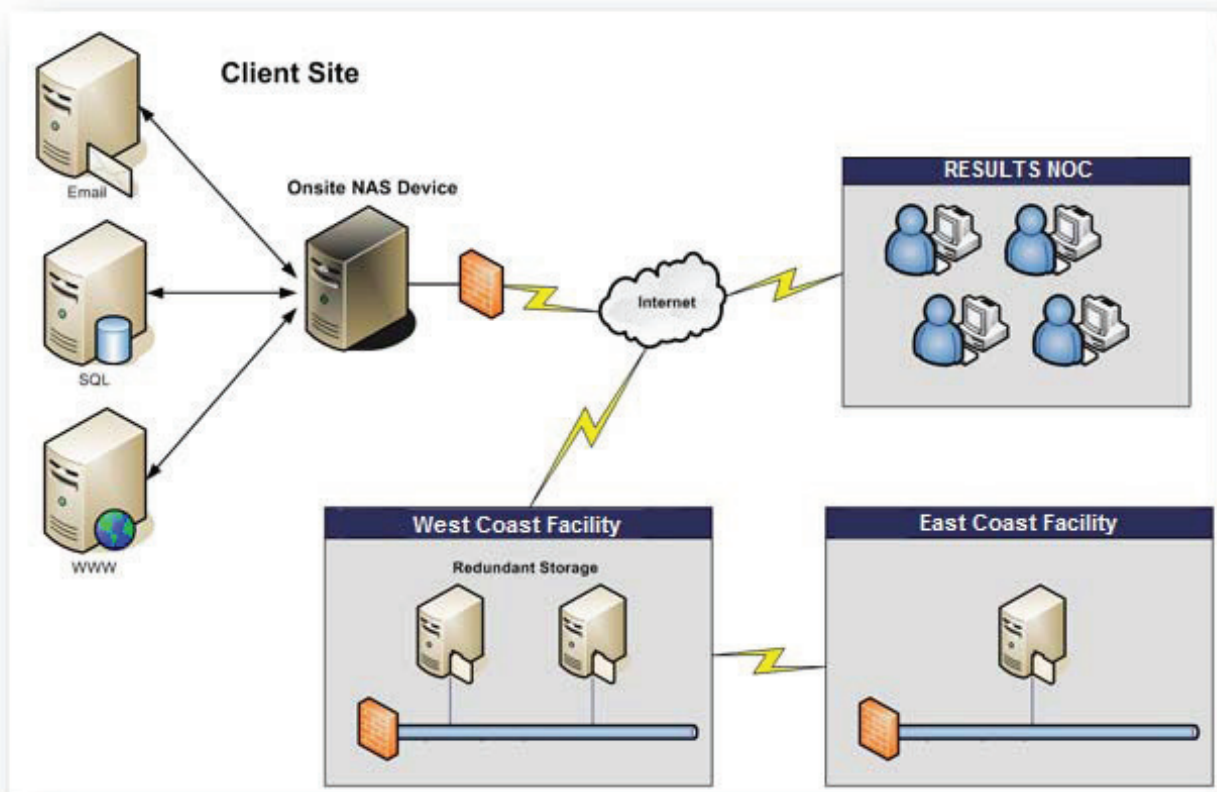
## Bare Metal Restore (Virtual to Physical Recovery)

When it comes time to restore the Virtualized Server back to physical hardware, our Bare Metal Restore process allows restorations to dissimilar hardware. Once the server image is loaded on the new server we can manipulate the Hardware Abstraction Layer by inserting new drivers for the new hardware.



## Implementation, Monitoring and Management

BDR Solution is monitored and managed 24x7x365 by our NOC team. Once the NAS unit arrives it will be added to the LAN, have an internet connection established and our NOC will do the rest of the work. Our set up time is approximately 4 hours per NAS. If an issue occurs during any backup or with the hardware we are immediately notified and can take corrective action based on the problem and the RITA agreement we have in place. Not only do we monitor the entire solution-Servers, NAS and Remote Storage facilities, but we also manage it by performing restorations and virtualization of servers as needed. Your staff will have complete visibility of the verification tests using the same dashboard we currently use for your client site management and our BackupPro Services and engineers performs daily verification tests to verify the integrity of base image and incrementals. Should an incremental have a corruption, Backup NOC engineers copy the corrupt incremental from the offsite co-location facility to the NAS and run the verification again. If this does not solve the problem then corrective action is taken by creating a different image to get the backup to a consistent state.



# Technology & Features

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## Block Level Backups

A NAS must be placed at each location with a Windows 2000 or 2003 server on a LAN. Multiple NAS units can be placed on the same LAN. Each selected Server must be completely imaged. Individual files cannot be added or omitted from the back up. Our solution is a block level backup where we are capturing the entire volume of a server at the 1's and 0's level. Block level data is raw data which does not have a file structure imposed on it. The block-level image is an exact digital duplicate of the on-site server. Database applications such as Microsoft SQL Server and Microsoft Exchange Server transfer data in blocks without having to worry if files are open or being used. Block transfer is the most efficient way to write to disk. This technology allows for complete server restorations using the 'last functioning server system state' before the failure occurred. Bear in mind that the frequency of off-site backups is limited by the amount of available bandwidth at the client site. Limited bandwidth will result in longer transmission periods which means backups may only be done hourly or daily depending on the available internet bandwidth.

## Security

Encryption is an important step in the process of transmitting data between the NAS unit(s) and the remote sites because it greatly reduces the risk of data loss incidents that plague magnetic tape and prevents man-in-the-middle attacks during transmission. We employ the 256-bit Advanced Encryption Standard (AES) algorithm because it has never been broken and is currently considered the gold standard of encryption techniques and renders transmitted data immune to theft.

After imaging the servers to which it is attached, the NAS device creates an independent 256-bit encrypted tunnel and transmits the imaged data to a secure offsite location where it resides in an encrypted, compressed format. That remote site then replicates again to an alternate data center, creating a total of three copies of the data in three geographically distinct regions. Since the data is encrypted and only you have the pass key, no one at RESULTS has access to the data on the NAS or either of the remote storage facilities.

## Smart Data Transport

Data transmission occurs over the client's internet connection and can easily be configured to minimize bandwidth consumption. Our NAS leverages Adaptive Bandwidth Throttling, which allows us to set a limit on outbound bandwidth used. (E.g. assuming the customer has a 768Kpbs outbound connection, adaptive bandwidth throttling can be set with a maximum at 512Kpbs). We can therefore exercise fine control over the data imaging and transmission processes. Bear in mind that the frequency of off-site backups is limited by the amount of available bandwidth at the client site.

We perform packet level verification along with rate adaptive bandwidth throttling. The result is that we can send very large files over the internet without affecting outbound data rates. Additionally, we send data over a secure AES 256-bit encrypted UDP session, which provides significant efficiencies in data transport speeds. If the connection drops at any time the transmission picks up from the last successful packet received. This is a vast improvement over other technologies that use ftp transmission where a connectivity problem results in the entire amount of data needing to be resent. During our internal testing we have successfully transferred 13.6GB of data over a 512K connection within 20 hours.

## **On site and Off site Solution with Multi year Archiving**

Each NAS device, depending on the model, can be configured to backup from one single server up to eight servers. Multiple NAS devices can be placed on a LAN. As each backup occurs the data is securely transferred to the off-site colocation facility so in the event of a complete disaster we are able to ship a new NAS device imaged with the latest client data. Data is transferred to the colocation facility using AES 256-bit encryption and band-throttling software. Multi-year archiving using a combination of daily and monthly synthetic images is set up on the NAS Device and then replicated to the off-site colocation facility.

## **Recovery after a Catastrophe**

In the event of a catastrophe (such as a natural disaster or fire), a new NAS will be imaged with your latest data and sent out next-day business air based on your Disaster Recovery Plan. If you do not have a Disaster Recovery Plan in place, we can assist you in creating and maintaining a plan. Depending on the NAS Model, multiple servers can be virtualized on one NAS while backups continue to be performed.

## **Near line Disaster Recovery and Failover Using Virtualization**

The NAS comes with built-in virtualization software. This allows a server which has failed to be restored on the NAS as a virtual server giving the customer a standby server in less than an hour in most cases. Since the total image of the server is being restored no configuration changes are needed as the virtual server has the same properties, IP address, and NetBIOS name as the failed server. Backups continue to happen while the virtual server is running. When new hardware/spares arrive, the virtual server can be shutdown and the latest backup image can be used to perform a bare metal install on the new hardware.

## BDR Specifications

There are three BDR models; Base, Advanced, & Extreme

Following are the specifics:

- Base Model
  - Base Model can be used to backup up to 3 Servers and is based on the AMD Athlon Dual Core
  - Base Model storage up to 400GB real space provided
  - Base Model is a tower based chassis with hot swappable hard drives (RAID1)
- Advanced Model
  - Advanced Model can be used to backup up to 8 Servers with Dual Core Opteron
  - Advanced Model storage up to 2TB real space provided
  - Advanced Model is a rack based model with hot swappable hard drives (RAID 1 & 5)
- Extreme Model
  - Extreme Model can be used to backup up to 16 Servers with 2xDual Core Opteron
  - Extreme Model storage up to 4.5TB real storage
  - Extreme Model is a rack based model with hot swappable hard drives (RAID 1 & 5)

All models have a Windows Storage Server 2003 R2 Operating System.

All Models can be bundled with offsite storage and can backup 50 to 200 Exchange mailboxes depending on model  
In an emergency 1 to 2 machines may be virtualized depending on model and resources required.

## Frequently Asked Questions

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### **How secure is my data and are there multiple copies of it in the event of a total disaster?**

The data on the NAS device is compressed and encrypted using 128 or 256-bit encryption then transferred over a 256-bit encrypted UDP tunnel to the off-site colocation facility on the East Coast. Once the data reaches the off-site facility it is also copied to a fail over server at the same colocation facility then transferred to a separate colocation facility on the West Coast. In total there are 4 copies of your data if the off-site storage option is selected.

### **How are VSS backups handled?**

When configuring the backup of servers an option to schedule either daily VSS Incremental backups or all backups as VSS Incremental backups is available. When the VSS Incremental backup occurs it shuts

down all VSS aware applications then performs the backup.

**What is the frequency of backups?**

The frequency on incremental backups is configurable on a per server basis and can be as often as every 15 minutes.

**Can I select what files and folders to backup or exclude?**

Backups are performed by server volume. For virtualization you must capture the boot volume and any other volume(s) containing server applications. For example if you install the operating system to drive C and Exchange to drive D, you must have both C and D backed up if you want to virtualize the server.

**Can I restore Exchange Mailboxes?**

Yes, we have a utility that allows the restoration at the mailbox and message level.

**Do you backup workstations?**

We currently do not backup workstations.

**Do you backup UNIX, LINUX or Macintosh?**

We currently backup only Windows 2000, Windows 2003 and Windows 2008 servers

**Do I have to reconfigure my firewall settings and any DNS or MX records if we need to virtualize a server?**

No, the virtualization process keeps the servers system state so no additional configurations are needed. Services will continue to run as they did prior to the server failure.

**If a client has more than 10 servers can we have multiple NAS Device's at the client site?**

Yes, multiple NAS device configurations are possible to deploy to the same client.

**Can I have more than one server running in a virtual state on the NAS Device?**

Yes, depending on the amount of hard disk space, memory and processor a server consumes. The only limitation is the physical hardware of the NAS Device.

**Can I select what volumes on the server to send off-site to the colocation facility?**

Yes both backups and offsite data can be selected at the volume level.