

A decorative graphic on the left side of the page, featuring a large yellow arrow pointing right, followed by three smaller yellow diamonds arranged in a horizontal line.

## Nirix Remote Backup Agent V5.0 Hosted Backup – Backup Speed White Paper

# Technology Today Utility Tomorrow

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### ABSTRACT

This document contains results of the tests on backup speeds for the backup operation between Nirix Remote Backup Server (RBS) and Nirix Remote Backup Agent (RBA). It serves as a reference for partners and customers in planning their hardware and network capacity.

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## Hardware and Software Setup

The list of hardware and software is shown in the following table:

	Hardware	Software
Backup Server (Backup destination)	- Intel Xeon 2.8GHz CPU - 2GB of RAM	- Red Hat Enterprise Linux AS4 - Nirix Remote Backup Server v.5.0.1.4
Client Workstation (Backup source)	- Intel Pentium Dual Core CPU 3.2 GHz - 2GB of RAM	- Windows 2003 Server - Nirix Remote Backup Server v.5.0.1.4

## Test Scenarios

### Overview

In the test, there are 4 file backup sets, each contains files of different numbers and sizes as described in the following table:

File Backup Set	Average File Size	Total # of Files	# of Folders	Total Size (GB)	Compressed Size (GB)
Small-files	2 Kb	1,903,685	1,007	2.45	1.96
Medium-files	200 Kb	10,000	1,010	2.38	1.90
Large-files	20 MB	100	10	2.44	1.95
Huge-files	200MB	10	1	2.44	1.95

### Test Cases

All the 4 backup sets are with the following settings:

- Transfer block size is 128kb
- "In-File Delta" option is turned off
- Encryption is enable (AES – CBC mode)

We have tested with different network bandwidths (uplink) for each of the backup sets. The network constraint was achieved by limiting the bandwidth of the particular backup account with the following assumptions:

1. ADSL and SDSL have a down/up bandwidth up to 1.5Mbps/640Kbps and 2Mbps/2Mbps respectively. From trace route, they have gone through 12 routers/networks before reaching the Backup Server.
2. T1 has a bandwidth up to 1.544Mbps.
3. LAN has a bandwidth up to 100Mbps.
4. The average compression ratio of the files is only 80%. And the results are outlined in the next section.

### Upload Times

The table below shows the time required for the backup operations with different network bandwidth settings (**NOTE:** Times include the time required to compress AND encrypt the data BEFORE being sent to the remote backup server):

Test Case	Network Bandwidth (down/up)	Actual / Compressed Size (GB)	Time Taken (HH:MM:SS)	Transfer Rate (MB/Min)
Small-files (2Kb)	ADSL (1.5Mbps/640 Kbps)	2.45 / 1.96	15:12:17	2.2
	SDSL (2Mbps/2Mbps)	2.45 / 1.96	5:22:41	6.22
	T1	2.45 / 1.96	5:22:09	6.23
	LAN	2.45 / 1.96	5:21:38	6.24
Medium-files (200Kb)	ADSL (1.5Mbps/640 Kbps)	2.38 / 1.90	13:04:31	2.48
	SDSL (2Mbps/2Mbps)	2.38 / 1.90	04:23:38	7.38
	T1	2.38 / 1.90	03:10:22	10.22
	LAN	2.38 / 1.90	00:49:37	39.21
Large-files (20MB)	ADSL (1.5Mbps/640 Kbps)	2.44 / 1.95	13:12:23	2.52
	SDSL (2Mbps/2Mbps)	2.44 / 1.95	04:29:07	7.42
	T1	2.44 / 1.95	03:05:14	10.78
	LAN	2.44 / 1.95	00:31:24	63.6
Huge-files (200MB)	ADSL (1.5Mbps/640 Kbps)	2.44 / 1.95	13:38:22	2.44
	SDSL (2Mbps/2Mbps)	2.44 / 1.95	04:25:11	7.53
	T1	2.44 / 1.95	03:12:11	10.39
	LAN	2.44 / 1.95	00:59:57	33.31

Based on internal testing, the following are some of the observations we can make.

For backup sets with a large number of small files, there is not much improvement in the backup speeds even if more bandwidth has been provided. The bottleneck is thus on the client workstation where the files are being processed, compressed and encrypted.

For backup sets with an average number of medium-sized files, increasing the uplink bandwidth does improve the backup speed by a significant amount. This reflects that, with a lesser number of files, the bottleneck then turns to the network instead. In other words, the larger the number of files, the more processing is required on the Remote Backup Agent (RBA) machine. For a backup set with a smaller number of large files, similar patterns are observed. Namely, the backup speed is significantly improved when the uplink bandwidth is increased.

The time required for a backup (or backup speed) depends very much on the backup set's collection of files and the types of files. Other than uploading a large number of files (over 2 million files) in a single backup, network latency is the major constraint on backup speeds.

In general, for a large number of small files (e.g. File system backup), the uplink bandwidth is relatively less important as the stress would be on the CPU of the source machine (for compression and encryption processing). In this case, a more powerful RBA machine could improve the backup speed.

On the other hand, with a smaller number of big files (e.g. MS Exchange, MS SQL backups), the available uplink bandwidth would have a bigger impact on the overall backup speed and throughput.

Therefore, some of the recommendations at the planning stage for system administrators should be to choose the most cost-effective bandwidth options pertinent to their backup requirements. The following are some of the factors that systems administrators should consider:

- Type of backups
- Anticipated data volume (as well as the amount of data volume changes – data deltas)
- Backup frequency
- Performance criteria
- Budget constraints
- Trade off between performance and costs
- Expected growth in data volume

If you require more information regarding the Nirix Hosted Backup service, you can always visit our web site @ <http://www.nirix.com> 24 hours a day, 7 days a week or call our customer service line at 1-780-414-1556 to speak to one of our knowledgeable account executives today.