

10 Questions - which might decide your Company's Future

1. Why is backup required?

- Each year 1 of 500 companies is faced with a total server failure*
- 93% of companies which were out-of-data for ten days had to cancel their business within a year**
- In the case of fires, 44% of businesses failed to reopen and 33% of these failed to survive more than 3 years***
- An effective BCP (Business Contingency Plan) and disaster recovery plan can reduce losses by 90% in the event of an emergency****
- 75% of storage management are backup and recovery, but 30% of all recovery operations fail due to faulty backups*****

Sources:

*McGladrey and Pullen Administration **National Archives & Records ***Infocon Magazine Issue One, October 2003

****Info Security News Magazine (2000) *****Anders Lofgren, Forrester Research

2. How can data loss be avoided?

- Choose a reliable backup software - the main part of data safety and recovery
- During backup the partition should be idle. Ideally: Unmount the filesystem
- Tape cleaning should be applied frequently
- Store backup tapes in a safe place (bank safe, own fire resistant safe, other company branch, at home)
- Don't run server hardware in overheated or dusty environment, keep server rooms locked
- Inspect system logfiles frequently
- Be prepared for emergency situations

3. May one work on a partition while a backup is running?

- For safety reasons this should be avoided
- Backup doesn't save a defined state of the data structure
- Restore might find invalid file references (files were changed, moved, renamed, etc.)
- It is not assured that all data can be restored

4. What is the difference between backup and archiving?

Backup	Archiving
A second copy of information	The only place of information
To restore information	To access information
Optimized for fast availability	Freeing harddisk space and preventing data manipulation
Keep information for short time (weeks or months)	Keep information for long time (months, years, decades)
Information will be overwritten	Information will be kept (e.g. for analyses, legal requirements)
No legal requirement (not in all countries)	Legal requirement for specific information

5. How can backup and restore be adjusted to each other optimally?

Optimally for backup	Optimally for restore
One full backup followed by incremental/differential backups minimizes amount of data to backup, takes less time	Just full backups speed-up restore, less tapes are required for loading
Multiplexing several backups to one tape could accelerate data throughput	One contiguous backup per tape accelerates restore operation
Backups not so often require less time	Backups as often as possible increase safety

- By archiving seldom used data, the amount of data to backup frequently is minimized
- Several smaller partitions allow backing up to several devices simultaneously, e.g. to adhere to available time frame
- In case a small partition crashes the amount of lost data is less
- Already restored partitions are ready to be accessed, while remaining data is still restored to other partitions
- Choose a suitable backup mechanism:

	Advantage	Disadvantage
Full backups only	Shorter restore times	Suitable only for smaller amount of data/ sufficient backup time frame
Full backups followed by incrementals (changes since last full backup)	Restore takes less time compared to differential	Backup takes more time compared to differential
Full backups followed by differentials (changes since last differential backup)	Backup takes less time compared to incremental	Restore takes more time compared to incremental
One fullbackup only, followed by (infinite) incrementals/differentials	Total backup time is shorter	Restore takes more time (a lot of tapes)
Synchronisation	Suitable for failover setups	No replacement for backup (no copies of previous versions)

6. How to choose suitable backup hardware?

	Advantage	Disadvantage
Single tape drives	Tapes can be exported (e.g. bank safe) Tapes less expensive than harddisks	Slower than backup to harddisks Tapes require manual loading
Tape changers	Tapes can be exported (e.g. bank safe) Tapes less expensive than harddisks Tapes are loaded automatically	Slower than backup to harddisks More expensive than single tape drive
Virtual tape changers (harddisks simulating tape changer)	Faster than tapes	Harddisks cannot be exported/exchanged Backup/archiving of harddisks to tape is required additionally
Harddisks	Faster than tapes	Manual mount/unmount, server shutdown required Not suitable for long-time archiving
Virtual harddisk changer	Faster than tapes Harddisks are exchanged "automatically"	Manual mount/unmount, server shutdown required for export Not suitable for long time archiving

7. How to prepare for an emergency?

Develop an emergency plan

- Choose one or more persons responsible for different tasks
- Keep supplier and support addresses available, conclude service contracts if required
- Where is exported backup media located and how fast can it be accessed?
- Is hardware replacement required (server, RAID, tape changer) and how fast is it available?
- Is an existing computer suitable to restore data? Test SCSI card, harddisk capacity!
- Ho to use the backup/restore software and who is familiar with it?
- Are there alternatives for GUI based software?
- Does a failover system exist and how fast can it be activated (automatically)?
- Is reconfiguration of clients required to acces the failover system (IP addresses)?
- How to get data from the failover system to the new main server (synchronization, backup/restore)?

Test the emergency plan frequently

- Simulate an emergency case at least two times a year
- Also simulate the worst case with hardware replacement, etc.
- Don't try to save simulation costs, they are far less compared to a tied-up company
- Let an independent inspector record the simulation
- What can be optimized/accelerated? Adjust the emergency plan if required

8. What criteria is used to choose a "reliable" backup software?

A backup software is said to be reliable if required data can be restored in every situation.

This is even more important than speed. Following criteria must be met:

- Changes and manipulation of backup data are not allowed to occur
- A standard and open available data format must be used
- Source code to restore data must be available
- Restoring data must be possible without a GUI application
- Restoring data from partly damaged tapes must be possible
- Restoring data must be possible on different operating systems as a by-pass
- Software must be easy-to-use and must minimize handling errors
- Technical support must be available

9. Do more features lead to a more reliable and robust backup software?

- The more features and changes to saved data, the more risk of errors

10. Has reliable backup software to be expensive?

Backup and restore commands included in the operating systems are free-of-charge and are adjusted to the system

- e.g. (ufs)dump, (ufs)restore, tar
- usually no GUI is available to handle large amounts of data

How ES-Backup fits to a reliable backup strategy

1. ES-Backup uses the standard Unix backup format

The Unix backup format dump is written by using the (ufs/esb)dump commands.

Advantage ES-Backup	Disadvantage of other formats
Safe and reliable format due to long time experiences	Partly new formats without practical experiences, thus not reliable
Well known, thus reliable	Unknown by others, vendor dependency, thus not reliable

2. ES-Backup uses a Java based GUI application

Advantage ES-Backup	Disadvantage of other solutions
Available for all modern operating systems	Partly available for specific operating systems only
Optimally adjusted for the specific tasks and user-friendly	E.g. Internet browsers are not designed for these tasks
Independent from other applications	E.g. Internet browsers do not offer drag&drop, no complete control over windows, etc.
Administration through the network possible	Some allow administration directly on the server only

3. ES-Backup offers alternatives to the GUI application

With Unix commands esbrestore, ufsrestore and restore it is possible to access the standardized data format in special situations and in emergencies.

Advantage ES-Backup	Disadvantage of other solutions
Data restore possible even without ES-Backup	Data restore possible only after software installation, license data required
Handling of defect tapes possible	
Source code available as OpenSource (can be adjusted by anyone for special requirements, will be available as long as Unix exists, independent from ES-Backup)	No source code available (vendor dependency, no guaranteed access to saved data in the future)
Existing dump archives of other software can be furtheron used with ES-Backup	

4. ES-Backup uses features of the Unix operating system

Scheduled backups are started via the Unix built-in cron mechanism.

Advantage ES-Backup	Disadvantage of other solutions
Cron is always available, no additional application required	Additional application required, not available in every situation
Scheduled backups are started without an ES-Backup Server process and without an active user login	Scheduled Backups are not started in every situation

5. ES-Backup supports all important backup devices

Single tape drives

Tape changers

Virtual tape changers

Harddisks

Virtual harddisk changers (with new ES-Backup 4.0)

6. ES-Backup is fast

A single backup operation reads from harddisk and writes to tape with several processes simultaneously.

Advantage ES-Backup	Disadvantage of other solutions
Full speed of the tape drive is supported, best restore speed is available	A single backup process is too slow
Manual restore is possible (contiguous backup data stream), thus safe in every situation	Manual restore is difficult (what parts on the tape fit together?), thus not safe in every situation, risk of errors
Several backup operations can write to different tapes simultaneously, thus backup speed is multiplied	Multiplexing several backups to one tape slows down restore (repositioning, more reloading of tapes)
During restore the tape can be positioned directly to required files (Quick File Access mechanism developed by UGSoft as OpenSource)	
Several restore processes can read from different tapes simultaneously, thus restore speed is multiplied	

7. ES-Backup is reliable

ES-Backup allows to backup unmounted filesystems:

On Solaris unmounted ufs partitions, on Linux ext2/ext3 and on Mac OS X (with upcoming ES-Backup 4.0) ufs and HFS+ partitions can be backed up. Of course ES-Backup can backup any other type of filesystem mounted.

Advantage ES-Backup	Disadvantage of other solutions
Data structures cannot be changed during backup, thus it is guaranteed they can be restored	Data structures can be changed during backup, thus it is not guaranteed they can be restored

ES-Backup does not allow to interrupt backups:

Advantage ES-Backup	Disadvantage of other solutions
Always well defined backup status, thus restore is possible	So called "Smart Backups" do not assure backups are finished, thus restore might be impossible

ES-Backup does not change saved data structures:

Advantage ES-Backup	Disadvantage of other solutions
Every full and incremental/differential backup contains an unchangeable table of contents (these can be saved to disk as well - for offline browsing with Unix commands) Additional ES-Backup meta data is saved to tape and harddisk	So called "Synthetic full backups" change data structures (extremely critical with backups made from active filesystems, impending data loss)
Restore possible also without ES-Backup meta data	Restore only possible with meta data
Restore to any previous state always possible	Restore of files and folder structures from synthetic backups to any previous state impossible (synthetic backup represents the filesystem's state at the time of the last incremental backup, without any steps in between)
	Creating a synthetic backup requires a lot of time (each full backup's and incremental's tapes must be read and new tapes be written)
	Synthetic backups require a huge hardware investment (in order to not interfere with daily backups, additional tape drives/changers/harddisks need to be purchased)

8. ES-Backup supports HELIOS Server

HELIOS Servers are known to be stable and fast and offer a lot of powerful features, thus are often used in professional environments. ES-Backup supports the special HELIOS features automatically without any user intervention:

Advantage ES-Backup	Disadvantage of other solutions
During backup and restore data and resource forks as well as Windows filestreams are saved/restored automatically	Data and resource forks need to be selected individually by the user, resource files might be invisible, risk for errors
Restored files are integrated into the HELIOS volume's desktop database and file IDs are preserved automatically	Restored files need to be integrated into the HELIOS volume desktop database manually, risk of errors
UTF-8 filenames and special characters are handled correctly	In case HELIOS filenames are not recognized, files cannot be saved/restored
The saved file format can be converted for use on different systems	Restoring files on the source system with installed HELIOS Server only

9. ES-Backup is available for several operating systems

Solaris, Linux, Mac OS X - with or without HELIOS Server:

Advantage ES-Backup	Disadvantage of other solutions
In case of growing requirements change to a more powerful system possible	Limited change to other system without HELIOS support
Easy system change while existing backups can be used furtheron	Limited change to other systems
In emergency restore can be made on other systems	

10. ES-Backup is inexpensive - even in a network

ES-Backup for a single computer, e.g.:

Backup and synchronisation with tape drive and/or harddisk

	Price
ES-Backup Workstation	348,-*

ES-Backup for workgroups, e.g.:

Backup and synchronisation of a server with a tape changer, two tape drives and forty slots,

Backup and synchronisation of an additional server in the network,

Backup and synchronisation of twenty network clients to harddisks on the backup server

	Price
ES-Backup Workgroup+Simultan-License	1102,-*

ES-Backup keeps further costs low:

	Price
Additional Simultan-License	232,-
Additional clients in network	0,-
Additional servers in network	0,-
Additional slots in tape changer	0,-

Prices in Euro incl. 16% taxes, recommended enduser prices in Germany, *without HELIOS support, as of 02/2006

11. More information on ES-Backup

Please visit our website www.es-backup.de

or find an international distribution partner

at www.ugsoft.de/intl/distrib.html



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