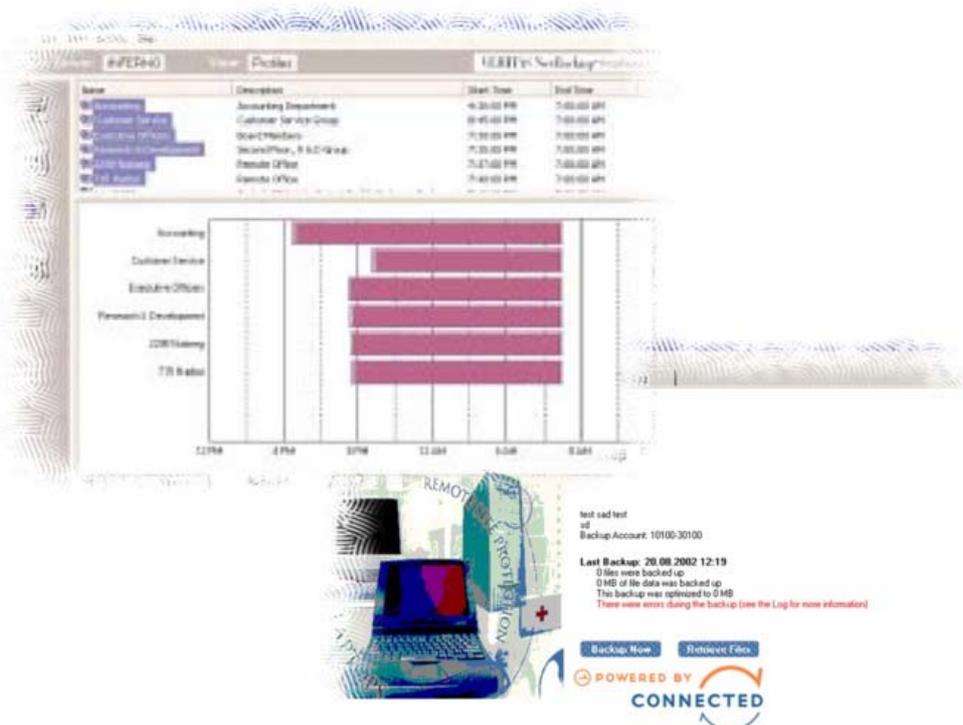


Evaluation of a Enterprise Backup Product to secure Laptop-Data



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1 SUMMARY

1.1 Laptop & Desktop Data Protection

With the proliferation of desktop computers, home offices, remote offices and mobile systems, critical corporate data now resides outside the traditional bounds of corporate IT responsibility. Studies show that as much of 30% of a corporation's data resides outside of its managed servers, on desktops and mobile systems. IT departments face the not uncommon dilemma of having to take responsibility for desktop and remote client data over which they have little actual control. Both statistics and common experience show that end users rarely maintain consistent backups of their own data. Data on desktops and mobile workstations can be enormously valuable to an organization. It can be the result of hours or weeks of work, and replacing it may be impossible. Worse yet, a slow recovery can cost days of lost productivity. Mobile users need easy, fast backups and simplified, rapid recoveries of their critical data, even if recovering to a completely new system.

Nowadays business affording flexibility to all kind of resources and people are working more and more from home-based office or direct on the Customer Site. Technicians and many other users need Laptops for their daily work and it is almost unimaginable for them to renounce to work without a Laptop.

1.2 The Importance of Protecting User Data

Normal server data is normally protected by a central Backup Solution and a daily backup of all user files (incremental and full backups) assure a relatively good protection for data lost. Desktop and laptop data, however, goes largely unprotected. This fact is somewhat surprising given the enormous aggregate value of data and intellectually property that reside on these machines. Not to forget all the specials settings in user profiles and registry entries. As laptop users are rarely in the office administrators have few control over backup from user , or mostly users are not willing to save all changed data to the server. How painful it will be for a Administrator to reset up Laptop's ? It's still astonishing that Company's not using widely backup-tools for their Laptop/Desktop users.

- ">~10 % of corporate intellectual property resides on C: drives"
- While your corporate servers hold the past & present of your business, much of its future is stored on laptop and desktop workstations.
- Proposals, plans, forecasts and presentations - this is the critical user-generated information that will drive the future growth of your organisation.

... and most of it is completely unprotected!

- Only 12% of PC desktops and laptops are ever backed up
- Of these, virtually all are backed up just once a week - or even less often

However, most business managers mistakenly believe that their Laptop/Desktop data is being backed up regularly!

IT professionals sometimes comment that none of this is their problem as company policy dictates that all important documents are to be saved to a file server. The reality is that most users do not follow this directive and the IT department is ultimately held responsible for any resulting data loss.

1.2.1 The Unique Needs Of Mobile Users

As more of your skilled staff "go mobile" and spend more of their time working away from the office, the need to protect the data on their laptop computer becomes much greater - and more difficult to solve.

All the difficulties of desktop workstation backups apply to mobile users, with two further complications:

- Intermittent connectivity: a user who's working away from the office will probably be connected to the corporate network only for short, irregular periods. They often won't be connected for the entire duration of a traditional, scheduled network backup, making this approach ineffective.
- Low network bandwidth: mobile users may be away from the corporate LAN for days or even weeks at a time. The only contact we can be certain that they'll have with your LAN is dialing in to collect their email. To protect their data, you must be able to back it up over a modem connection.
- Apart from technical issues, there is a logistical one: laptop computers are far more likely to be lost or stolen than desktops. The fact that mobile users are often the most highly skilled (and highly paid) staff in your organization further raises the importance of protecting their data effectively.

2 THE REQUIREMENTS

2.1 Some required Functional functions for Backup

- Completely automatic backups

You can't rely on users to consistently backup their data - they often forget. They will also resist any attempt to change their routine, such as to accommodate a daily backup. The best solution is the one that's completely automatic and doesn't require any change to the user's behavior.

- Simple, "self-service" file recovery

Major productivity gains result when users are able to quickly recover a lost or deleted file as soon as they find out that it's gone. Often they're working at home or outside business hours when this happens, so help desk support may be unavailable.

Ease of use is paramount! Many of your users have limited IT expertise and won't be able to manage with a complex system.

- Minimum overhead on IT

Your IT department is already overloaded with work, so any new system must require only a minimum of management effort. It's also essential that users be able to recover their own files without assistance - otherwise the help desk will be swamped with calls.

- Minimum impact on networks

Most corporate LANs & WANs are already overloaded with traffic - the last thing you need is a new bandwidth-hungry application adding to the problem.

- Modem support for mobile users

With advanced compression techniques, a typical daily backup is reduced to around 200KB of data - just 60 seconds of modem time. Mobile laptops can be backed up automatically while the user is checking their email.

- Fast disaster recovery

When a PC needs to be replaced because of loss, theft or hardware failure, it's essential to minimize both:

- Lost user productivity - by quickly delivering a replacement PC with all software and data in place, ready for use.
- IT overhead - by automating the software/data rebuild as far as possible.
- Integrated with existing server backups

Workstation backups have many of the same requirements as server backups: offsite copies of data for disaster recovery, centralized monitoring of success or failure and management from a single point.

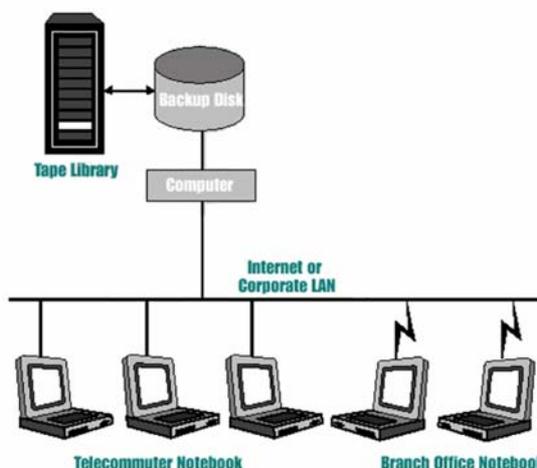
Integrating with and leveraging your existing server backup infrastructure is the best way to minimize the ongoing costs of the new system.

3 EVALUATION OF LEGATO LAPTOP AND VERITAS BACKUP PROFESSIONAL

3.1 Common products future

Products functioning's both behave mainly the same manner and using the same Principe to secure data from laptop/desktop to a central location. As both product pretend to use delta block architecture and therefore save files without any redundancies, usage of Disk as storage medium is almost mandatory as many processes und restores are working in parallel. Before Laptop can write files to laptop backup software files on disk are compared to the central database and only changed or not available files are sent to the backup server. For that reason backups takes normally a while to start.

Both products using disk as primary storage. Basically Laptop A is saving lets say



c:\windows* with all bin's. When laptop B saves the same files then pointers shows to the second laptop data instead of saving again the same files. This Principe is by Legato Laptop as well by Veritas Professional used. How well this is functioning and if only one version of one file is applied, should in big environments be verified. To have even more efficiencies, Veritas splits Files in block segments. Legato Laptop use direct file system block level backup to save only the changed disk block instead of the complete file.

If one file of 2 KByte uses 4 disk blocks (512 Byte cluster) and somebody updates this file, then for example only one block is changed. Instead of resaving the entire file

again, only the changed block is saved. This significant lower band witch using for data transfers.

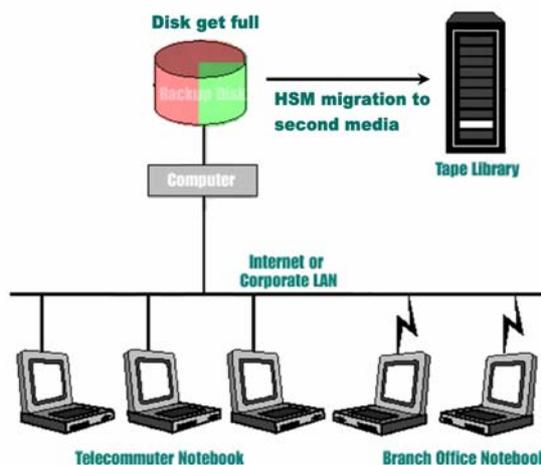
Even with this space saving methods quite a lot disk space is required (specially in huge environments). Therefore both products make usage of their own HSM Software (Legato Diskextender and Veritas Storage Migrator, to offload data from primary storage (disk).

3.2 HSM Migration

As the laptop data is saved as “file” on disk, simple HSM criteria’s can be defined to migrate older data to tape or optical medias. These criteria’s can be 80 % disk space full migrate all files down to 50 % disk usage or all files older as 2 months. Normally the HSM Software can specify these values as preferred. As explained HSM is basically not included in the Laptop Backup Server (Legato and Veritas). Technically they are separated products of the Laptop Backup server.

When ordering Legato Laptop the Legato Disk extender (HSM) will delivered automatically with the laptop server and the customer not even realized that is add on product. But anyway Legato HSM is delivered free with Legato Laptop.

In occurrence Veritas Storage Migrator is not included in the Veritas Profesional and must be purchased separately at cost.



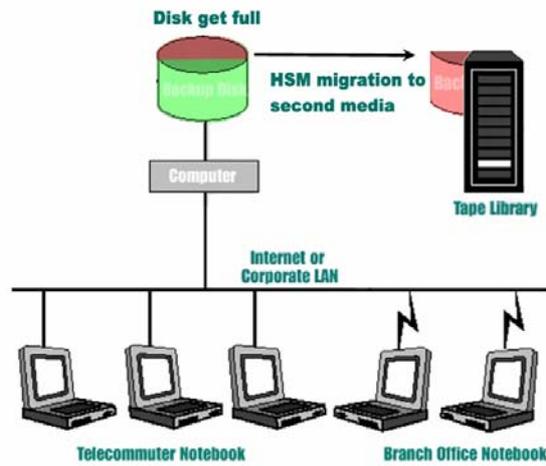
This migration is completely independent of the laptop saving processes, but can have some interaction to the laptop application. As users (depend software integration to HSM) may not see in the restore application, if their files are migrated and thus need longer to retrieve, or if these files are still on disk.

Legato is not showing up to the users if backup files are migrated or not.

Veritas Profesional shows in the restore Gui on the User-Desktop a different icon the user. So Veritas Users knows if restore comes from disk or if date must re fetched from tape.

How Important this will be depend the disk size an planning. But independently of this, always retrieve data from HSM (Tape) can have it’s danger as restores queues gets to big, as tape is quite slow.

3.2.1 HSM Migration

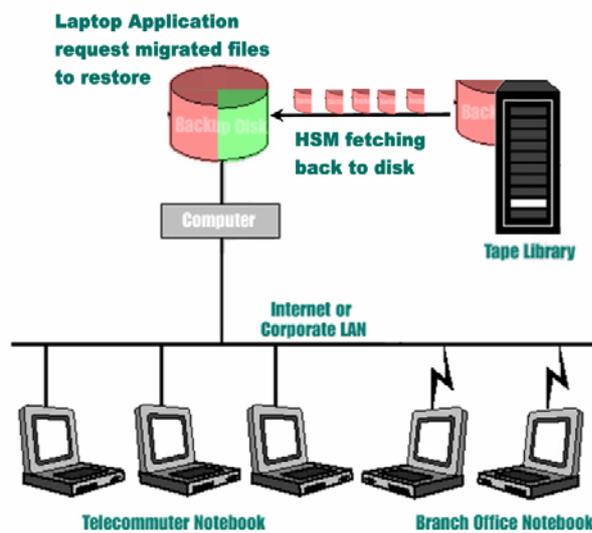


The migration process of files is independent of the laptop backup itself. It's always advice to chose a fast secondary medium to store offline-files as retrieving is faster.

3.2.2 Fetching Process

When users request files for restoring, HSM is requesting automatically Data from tape (slower). I

This point has to be planned. If disk space is generally too small, user restore requests are always queued and users have to wait very long for their files.



More difficult is even the re- fetching form Tape to Disk. For this, we need enough free disk space. When various users make restores, these files are for the HSM application again new files as they are again on the Laptop and thus saved again from the backup (ev. pointers). So the HSM criteria's running from beginning.

4 PRODUCTS

4.1 Veritas Netbackup Professional

The Veritas product portfolio is quite large and needs some explication. Veritas Netbackup Professional has nothing to do with the product range Netbackup or Backupexec. Veritas sells 2 mature Backup Products:

Product	Utilization
Veritas Backupexec	Backup for Windows OS's in Workgroup and department level. Formulary Seagate Backup Exec! Technically, "complete" other source code than Veritas Netbackup.
Veritas Business Server	Backup for Enterprise Datacenters in heterogeneous environments. Source-Code identical to Datacenter (limited licensing).
Veritas Datacenter	Backup for very large Enterprise Datacenters in heterogeneous environments.

Veritas Professional is a completely other product than these backup tools, and offers neither an integration to them. Veritas Professional is designed to Backup data to disk with a pointer architecture and to eliminate redundancies of files while these classic backup tools just write data from disk to tape.

HIGHLIGHTS VERITAS PROFESSIONAL

- Windows- or Web-based console for managing multiple servers
- Multiple options for client install, including e-mail, FTP or third-party tools
- Scheduled backup options, including event-driven backups
- Choice of account-based or Windows NT authentication
- Automated client upgrades
- Ability to move clients between servers
- Console-initiated backup and restore
- Reporting and email (SMTP) notification
- Centralized management for all NetBackup Professional servers
- Fast, easy client installation
- Clients are upgraded automatically as new software comes available
- Manage storage easily
- Administrator control over client data
- File exclude/include filters
- Migration of older files to tape
- Localized language versions: English, French, German and Japanese
- Filter files and identify specific files and directories for protection
- Client-initiated backup and restore
- 128-bit data encryption
- Open file protection
- Point-in-time recovery
- Checkpoint restart — restarts a backup from a point of interruption
- Alternate dial-up profiles
- Recover complete hard drive including OS, apps and unique data
- Complete and efficient backup coverage of Outlook .PST files open files
- Windows Explorer integration for client for HSM (ICON)

4.1.1 Required products to secure Laptops

As mentioned we need following products to build a solution for enterprise laptop backup with Veritas Professional.

- Veritas Professional
- Veritas Storage Migrator (HSM) (not included in base Product)
- ev. Veritas/Microsoft Clustering (& replication) (not included)

As Veritas do not offer included Data replication between multiple Professional servers risk of data lost or interruption is real, specially with 2-4000 users.

4.1.2 Veritas Professional Architecture

The main Software includes:

Veritas Professional Server	Database and Backup Server	
Microsoft IIS Server	web admin/tools	included by Microsoft
Veritas Professional client	Backup client	
Veritas Storage Migrator*	HSM	must purchased separately

* optional

4.1.3 Installation

The Installation is quite simple and includes the Installation of the Server console, virtual Web site and client package generator.

4.1.4 Reporting

Te reporting capabilities can be accessed trough the web and console interfaces.

4.1.5 Management

It is a native mfc Application for managing, reporting and disk usage available.

4.2 Legato Laptop

Like Veritas, Legato has a large product portfolio including clustering, backup and other Products.

As with Veritas, Legato Laptop is a complete separated product of Legato Networker.

HIGHLIGHTS LEGATO LAPTOP

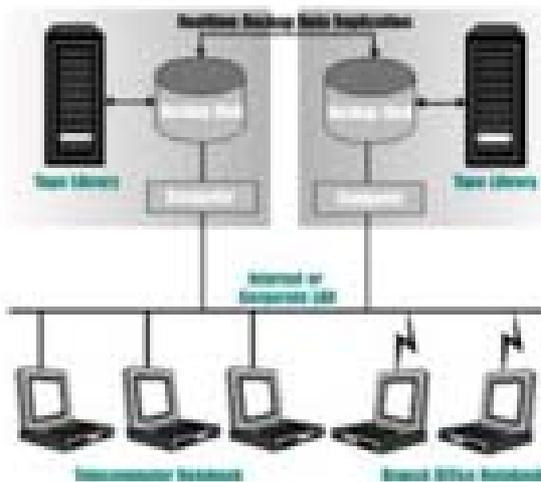
- Hands-Free Backup requires no user intervention
- Occurs automatically on a schedule or when a network connection is detected
- Open File Management
- Efficient and Secure Data Transmission and on server
- Delta block significantly reduces the time and amount of data transmitted
- Compression occurs prior to transmission and continues to reduce the time and storage needs
- Triple DES 112-bit encryption occurs prior to transmission - data is stored encrypted
- Incomplete backups will resume at the point they were interrupted
- roll back their entire system or an individual file to a specific point in time
- Web-based management tools allow administrators and help desk operators
- Help desk access
- Billing to the user
- Data protection and high availability through HSM and Mirroring
- State of the art 112 bit Triple DES encryption technology
- Software optimized for remote access with dial up speeds as low as 14.4 Kbps.
- Centralized web-based management tools for IT and Help Desk operations.
- Users can restore previous file versions, on their own, with a few mouse clicks.
- Users can “roll-back” their machines to the last time it worked properly with no IT intervention.
- Auditing and Remote Assistance features
- Software can be automatically deployed company wide
- Hard und Software inventory for help desk
- File exclude/include filters
- Web restore
- restore of other users data

4.2.1 Product Architecture

In occurrence to VBP Legato Laptop needs a slightly more complex environment. It includes the following:

MS-SQL Server	Database	must purchased separately (MS)
Microsoft IIS Server	web admin/tools	included by Microsoft
Legato Laptop Server Software		
Legato Laptop Client		
Legato DiskXtender	HSM	included as optional install

In occurrence to Veritas, Legato offers a build in data replication solution to prevent data loss and load balancing. This eliminates to have multiple logical Laptop Servers and makes to entire installation fault tolerant and easy to manage. How transparent a failover process would be for users was not tested.



4.2.2 Installation

The Installation is more complex then with Veritas and includes to Install the SQL Server, IIS virtual web sites, Laptop Server, Laptop Client and client package generator, AOK and Web restore.

4.2.3 Reporting

The reporting capabilities can be accessed trough the web interface

4.2.4 Management

Web-Interface and native GUI.

5 COMPARING VERITAS PROFESSIONAL WITH LAGATO LAPTOP

As requirements were only approximately specified we will only point out some important differences between Legato and Veritas. For each criteria 100 % fulfilled, we provide 10 points.

We are not going to provide functions with definitive points, as it is only an example. We specified for each theme the differences. As criteria's are not specified and the evaluation was much to short, we provide just an idea how it should be done.

The empty files must be filed in by the customer.

5.1 Comparing user functionally

5.1.1 User functions on Desktop/Laptop

0.0 Backup-Software					
1.0 User Backup functions comparison					
Nr.		must	can	Legato	Veritas
1.1	Easily to use (Gui)	x		x	x
1.2	Backup can be done automatically	x		x	x
1.3	Backup can be done manually	x		x	x
1.4	backup of open files like *.pst	x		x	x
1.5	heal functioning (roll back)	x		x	-
1.6	free backup-schedule can be specified	x		x	x
1.7	backup trough modem	x		x	x
1.8	backup trough Internet (Web-Explorer)		x	0	0
1.9	restore trough Web-Explorer		x	10	0
1.10	using data compression	x		x	x
1.11	backup on connection automatically (when to backup)	x		x	x
1.12	order data CD automatically by administrator		x	10	0
1.13	disaster Recovery CD		x	10	10
1.14	automatically skipping of application binaries (saving data)		x	10	0
1.15	manually include exclude directories/files	x		x	x
1.16	automatically exclude directories/files	x		x	x
1.17	automatically backup-client installation (package make)	x		x	x
1.18	users can restore previous file versions on their own	x		x	x
1.19	backups/restores encryption of Network Data transfers	x		x	x
1.20	files on server must stocked crypt (confidential data, no Admin.)		x	10	0
1.22	restores can be done trough administrator/helpdesk (central)		x	5	10
1.23	backup can be done trough administrator/helpdesk (central)		x	10	10
1.24	client-software must support DHCP, WINS, Dyn. DNS	x		x	x
1.25	remote Assistance		x	10	0
1.26	billing to the customer		x	10	0
1.27	backup / restore trough firewall	x		x	x
1.28	HSM migrated backup must show as migrated icon in GUI		x	?	10
1.29	Multilanguage support User-GUI		x	0	5
1.30	Automatically update Backup Client (Software distribution)		x	0	5
	Total			85	50

5.1.2 Result of Backup/Restore User functions

Both tools behave very well, and offer very similar functionality. Veritas provide no Healing functionality to rollback a User Laptop, no Web restore, no access to other users date over the web but Veritas Professional has strength nesses as well. Probably to must missing functionality by Veritas is the healing function what makes the life much easier for IT organization. Users can after a wrong home installation simply rollback their Laptop. But both tools are doing what a normal user wants and this very comfortably and easily.

5.1.2.1 Weaknesses Veritas against Legato

Nr	weakness	consequences
1	no web restore	when own Laptop not available no access to data
2	no healing function to roll back	many Support calls and intervention to resolve bugy software Install/de installs
3	no user backup/restore sharing	if working in group no access to data
4	no hard/software monitoring	no information for helpdesk
5	no Help desk access for backup/restore prbl.	backup/restore problems must be resolved by customer
6	no automatic CD ordering of all Data by Admin	many phone calls and overhead in IT- organization no disaster recovery possible
7	no electronically support order to Admin	many phone calls and overhead in IT- organization
8	no automatic detection of Applications on System to skip these binaries	much disk/tape storage waste as appl. bins are saved

No possibility to make initial Install of Veritas client. Only update/distribution of existing clients are possible, so usefulness is limited.

5.1.2.2 Weaknesses Legato against Veritas

Nr	weakness	consequences
1	no automatically distribution of client appl. updates (see comment)	Software updates must distributed trough distribution tool.
2	uncertain if HSM migrated backups are displayed with remarks/Icon in Restore GUI (not tested)	users wonder why restore takes so long. not tested !
3	no limitation of number of versions to save. Only by retention "time" limit	needs more storage space
3	uncertain how users account can created trough Active Directory (LDAP connection is there)	not tested
4	Laptop Client offers not many possibility when to backup data automatically, on logon/logout/schedule ?	only automatically backups by schedule and logout are possible. May some laptops are not back- up.

5.1.2.3 Strengthens Veritas

Nr	strengthens	consequences
1	limitation numbers of file-version to save	lower storage space needed
2	automatic client update	easy software distribution
3	Users can created and authorized trough Active Directory	No need to recreate second Account
4	HSM stored backups are marked in user GUI	user knows that restore will take longer
5	Client package creator can create all desired options.	No manually setup of unattended file.

5.1.2.4 Strengthens Legato

Nr	strengthens	consequences
1	All weakness of Veritas are not existing	more functionality
2	Healing and roll back	Laptop roll back from user
3	automatically order Date CD	Disaster recovery and offsite data availability
4	Help desk access	remote admin
5	Sharing of other users backup data	always data access
6	support request trough Web	fast support processes
7	Web restore	Data availability every ware
8	billing system	fast return of investment (ROI)
9	User identification with clear address, department	automatic billing to customer/users

5.1.3 User functions who needs be tested in more detail

Some functions were not tested.

Nr	Not tested function	Product
1	automatically distribution of client appl. updates	Veritas
2	uncertain if HSM migrated backups are displayed with remarks/Icon in Restore GUI	Legato
3	uncertain how users account can created trough Active Directory (LDAP connection is there) and if password modifications will put trough	Legato

5.1.4 Summary User Functions

Legato Laptop offers slightly more functionality as Veritas. Specially the missing healing of Veritas is regrettable. Legato offers automatic support request, CD order billing functions etc. Very interesting functions in big organizations. Veritas has the nose in front concerning HSM and showing this in the user GUI (must be verified in Legato). Both tools are doing what users are expecting and this is very good.

5.1.5 Result of System functions

The Server based components are quite important as specially in huge environments some challenge arise. With ex. 2000 Laptop Users always somebody calls for assistance and needs/wants a disaster recovery CD. This has to be considered in huge organizations. More if we are using only one system disk speed is insufficient and suffers maybe of disk congestions. What's happen when a second system will installed, must all desired users manually, configuration manually added to the new system? How secure is the online Database and if one server is overloaded is there a automatically load balancing process?

5.1.5.1 Weaknesses Legato against Veritas

Nr	weakness	consequences
1	more complex architecture (SQL) server	more know how
2	Sharing the same Tapelibray with Laptop HSM and Veritas Netbackup/Legato Networker is not possible	needs second library
3	Integration to veritas storage migrator cloud be problematic	Integration difficulties

5.1.5.2 Weaknesses Veritas against Legato

Nr	weakness	consequences
1	no advanced reporting possible	limited analysis/reporting
2	no reporting of departmental usage possible	usage and billing of storage space not possible (department)
3	no billing functionality	billing manually or not possible
3	no SQL Database , therefore low reporting possibilities	limited billing analysis possibilities
4	no data replication of database	low security and availability
5	no automatic load balancing	performance congestions
6	many logical/ph. servers are required in huge organizations	Management coasts and failure susceptible.
7	limited web management	native GUI required
8	no included HSM	Buying storage migrator
9	limited support Laptop numbers	for huge organization multiple servers are required

5.1.5.3 Strengthens Veritas

Nr	strengthens	consequences
1	easy to install / maintain	low education needs
2	laptop data can manually deleted on server*	old or not needed data is erased
3	Admin can start laptop backup/restore from console	resolve users backup/restores problems
4	Some good standard reporting available	easy reporting
5	User Accounts from Active Directory	elimination of second user administration
6	easy client package generation generator and silent installation for user	simple roll out and distribution of appl. clients
7	User policy can replicated automatically	modification of backup-rules is done automatically

* With huge number of users difficult to manage

5.1.5.4 Strengthens Legato

Nr	strengthens	consequences
1	designed to support huge numbers of desktop/laptop	scalability
2	database replication	Fault tolerant / availability
3	load balancing between Laptop Servers	no bottlenecks better performance
4	HSM (disk extender) is included for free	Cost savings
5	billing system included	automatically invoice
6	security ticketing system	encryptions key's distribution
7	access Help Desk to user System (only within net worker appl.) Advanced + Remote Assist	Help desk can access user backup/restore and solve problems
8	easy client package generation generator and silent installation for user	simple roll out and distribution of appl. clients
9	web administration	Web management possible
10	detailed Web reporting	management and controlling
11	web restore	users can always data from everywhere
12	support requests can be done trough web	fast and cheap support processes
13	advanced SQL reporting tools available	billing, management
14	ordering disaster/data CD automatically	fast and cheap support processes
15	data CD ordering is in billing integrated	automatically invoice
16	Admin can take over backup / restore control	user help
17	Support ticketing system	analysis of support requested

5.1.6 Functions who needs be tested in more detail

Some functions were not tested in this short period.

Nr	Not tested function	Product
1	clustering support	Legato, Veritas
2	failover and load balancing	Legato
3	entire billing system	Legato
4	data replication (failover)	Legato
5	advanced SQL Reporting tools	Legato
6	how efficient delta block architecture is functioning	Legato, Veritas
7	HSM integration Legato to storage migrator	Legato, Veritas
8	HSM integration Proff. to storage migrator	Veritas

5.1.7 Summary System Functions

Legato Laptop offers a lot more System functionality then Veritas Professional. Legato can support larger environments, has data replication and load balancing functions. Future more the HSM module is included in the product. With the included billing System and detailed reporting a complete automated Laptop/Desktop saving system including billing invoicing can be built up. To support user requests, even a support ticketing system is build in. Many user requests are forwarded directly from their Laptop Application.

But to explore all functionality a significant amount of consulting services or education must be taken in consideration. Specially if billing and advanced reporting etc. will be used.

In occurrence, Veritas Professional offers a still a broad range of functionality, has a very good Windows 2000 (active dir.) integration, easy incorporation to storage migrator, including specials icons, to show users if the requested restore was offloaded from disk (migrated).

Veritas Professionals offers a clear and easy solution for Laptop/Desktop saving and administrators find fast the required functions.

6 RECOMANDATION

Both tools backup desktops and Laptops, and both are doing this very well. The differences are in the details. It's very difficult and time-consuming to check for example efficiencies of the delta block technologies or if files are not stored redundant. We recommend therefore to visit reference sites. Software producers have the tendencies not to tell the negative sides of their products. If backup, 2000 – 5000 users the efficiencies of details could be very important and probably some negative surprises can be avoided.