



**ON-LINE BACKUP
SERVICE WHITEPAPER**

Memopal: an efficient solution
to backup and organize your data

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December 2008



Memopal is a European startup which began in December of 2007 with the mission to **preserve** and **organize** digital culture, developing **effective** and **innovative tools** created by combining talent and IT expertise.

Analysts forecast that the **market** will reach **715 Million** dollars by 2011, identifying the primary growth **drivers** as:

- ✓ The explosion of **online data**
- ✓ Less expensive **Broadband** access
- ✓ A higher level of user comfort thanks to **web-based services**

Memopal is the software that **backs up** users files on remote servers through a **secure** internet connection.

By installing Memopal you will discover the **features** that make it one of a kind in its field:

- ✓ Automatic continuous backup, in a single word **Real-Time**
- ✓ Access it anywhere and back up what you want, with **DAV** and **Web Folder**
- ✓ The storage space **grows** according to your needs
- ✓ Your data is safe even if you **Delete** it from the computer
- ✓ Your computer and your internet line will not slow down, Memopal is **adaptive**
- ✓ The files you work on are saved first and more **frequently**
- ✓ You can save and share files **larger than 1 GByte**
- ✓ Through **Versioning**, Memopal keeps track of the changes made on any type of file that you have chosen to backup
- ✓ Your files are **encrypted** for transfer and later they are maintained encrypted with the **highest levels of security**
- ✓ We do not share your data with anyone and we respect your **privacy**



Chapter 1

Introduction

Market analysts confirm that the 2008 trends reveal growing phase in the online backup market. Both the retail and business market are putting data security high on their list of priorities.

The diffusion of broadband is the keystone for on-line devices being able to transfer an adequate quantity of data in less time than it takes to create and modify the information.

Following positive acceptance of the fact that “*someone else*” maintains and is responsible for our data, several companies have generated a service offer aimed at data backup and low maintenance costs per GB.

Remote Data Storage and Remote Data Backup are today the two most active threads in the service market for on-line data storage. Every day the most seasoned market players seek for new acquisitions with the aim of reaching a potential market of several billion users.

To that same end, a recent study calculated that the portable computers of a SMEs’ - *Small & Medium Business* - sales team hold an average of two years of work - with the corresponding value in euro in case of data loss. That same study clearly highlights how personal computers for consumer use have an average of four years of personal information. This data is constantly subjected to viruses, corruption and HW malfunctions.

A short history of online-backup

The history of backup began at the same time as the first Mini Computers started being used. However technology was not online at that time due to low band availability (modems with 1200 baud, 1MB transferred in 72 hours) and the lack of diffusion of the *internet*.

The first true commercial online-backup service dates back to 1986 and it was offered in the USA to a community of physicians who needed to store their patient's data.

Today, natural disasters, terrorism, cyber-attacks and problems with electrical systems happening more frequently than ever have brought terms like *disaster recovery* and *business continuity* into our vocabulary.

In the same way, from a business point of view, “recurring costs” and “optimization of operational resources” have made concepts such as *data center consolidation*, *virtualization* and *green computing* familiar. During their evolution, they have increasingly become managed services.

Cloud computing takes the concept of IT infrastructure distribution, from which it derives, to the limit. With regard to data memorization infrastructures, the term *cloud storage* means the possibility of accessing hosted memorization services that internet offers. The Memopal service was designed to be the cloud version of the backup-online service offered in the USA back in 1986.



Resale, on-line Services and Service Providers

“Who has my data and where?”

When a company decides to integrate a backup system with its contingency plan or with a data life cycle management system, an answer must also be found to the question *“which backup service do I need?”*

The answers of those who have found themselves facing these questions fit into one of the following three cases, with very few exceptions:

- ***Purchasing a solution from a backup service retailer***

Pros: I do not need another service supplier; I will make the current one responsible for it. The seller can customize it in less time, if the solution allows, because he already knows the context;

Cons: The seller is not able to control the data and does not directly drive the possible recovery phase, which is the prerogative only of those who offer the hosting service.

- ***Purchasing space from a retailer for “data storage” or “data repository”***

Pros: the linear cost of space is theoretically lower than the purchase price of equal capacity storage hardware and it is possible to increase space availability at lower than linear costs;

Cons: the rented space does not include context-aware services. Personalization for sharing or the use of space quotas for different users is not an offered feature.

- ***Purchasing a backup solution from a supplier of on-line backup services***

Pros: Services relating to saved data are a differentiator compared to available market solutions. Those services are totally developed by who offers the service and they are made available in a bundle with backup solution. An active role is maintained in the control of saved data and the development of services is delegated to third parties without ever giving them control of the data.

Cons: In any case, installation of a client on the platforms is almost always necessary to make the backup. The most critical limiting factor is the control of the available band per individual client.

To summarize it to the extreme, the growing attention to and regulation of preventing data loss is rapidly creating a very appealing market of solutions in terms of cost. However, it is less attractive from a service point of view. Several low-cost solution companies are earning their revenues, not from services offered by their backup platform, but from the obligatory advertising spaces on their sites or client programs.

Memopal focuses its offer on security, automation, versioning, research, accessibility, availability and professional support – *a differentiation that is based more on services than on costs.*

Chapter 2

Memopal: What is it?

Memopal is an online-backup platform that is service oriented, real-time, resistant to breakdown and distributed geographically. It is highly accessible, open, expandable and developed on a standard technological platform with completely open-source software components.

The key concept of Memopal is to safeguard and organize, while its technological diversifier is based on a TurboUpload algorithm that allows for reducing impact on the band and optimizing the time necessary to carry out the backup. Here below, we will briefly illustrate the key points that make Memopal the solution to your backup needs.

Memopal is:

- **Real-time**
Backup operations never have to be carried out by the user, an efficient and continuous monitoring process only transfers the real changes made to the file.
- **Security**
All of the transfer transactions take place on an encrypted channel with mutual authentication between client and server.
- **Highly accessible**
Once saved, files are available for access with any web browser and through a FileManager with standard DAV protocol.

Memopal: services offering

Memopal is an *SOBP - Service Oriented Backup Platform* and as such it may be extended with services developed by third parties through a set of API standards that will be made public at the end of the third quarter of 2008.

Today the following basic services are available as they were developed in-house:

- **Files Search**
When there has been a significant quantity of files saved, knowing whether a file does or doesn't exist, is not a task to relegate to memory or a complete internal search of all the backup set paths. **Memopal** makes a full-text search available to users by the name, the file extension and the location of the files saved, which may be used through a web interface making it universally accessible from any platform at all;
- **Versioning**

If there is more than one saved version of the same file (the same name, the same original location, the same computer), Memopal makes them available in the list of the file versions, with all of the information necessary to distinguish the different copies. Through this service, it is always possible to recover the latest uncorrupted version of a file by choosing between the many available options.

- **Dedicated professional support**

Memopal is not only a product, it is also a company made up of the professionals who developed the product, and who use it for their own businesses making their knowledge of solutions and their experience with technicians and users available through Memopal Customer Service.

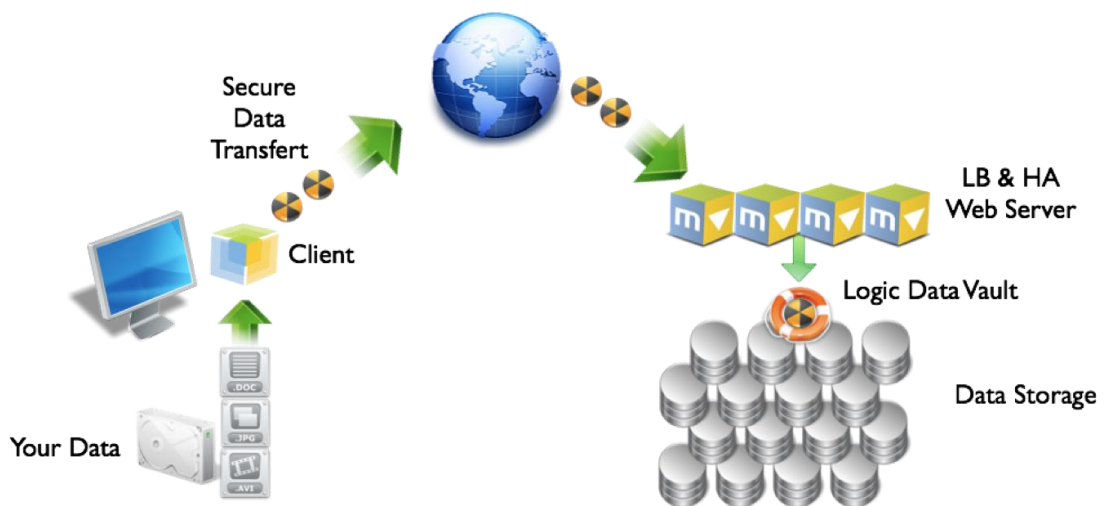


Figure 1 – Memopal Architecture : Client – Server Interaction

Memopal: the reference architecture

Memopal architecture was created to support that which we previously defined as a service oriented backup platform.

To assure the proper balance between services and the information protection level, the architecture is characterized by the following components:

- **Multiplatform Client** supports the most common operating systems including Windows, Linux and Mac OSX (both the PPC and Intel platforms) with the following functions:
 - **User authentication** with scratch-code, credentials. Strong authentication with a digital certificate is coming soon.
 - **Mutual authentication** with the Memopal server, to avoid *man-in-the-middle* type attacks.
 - **Full-text search interface** on the location and local name of the saved files.

- **Access through WebDAV interface** on an HTTPS channel, for maximum accessibility and total security.
 - The possibility to configure the **portion of the File System** to be backed up.
 - **Backup and sharing functions** are directly accessible with the Explorer interface (i.e. identify as important, share, . . .).
 - Visualization of the **progress**.
- **WEB-Services**, *redundant and in load balancing configuration to supply the following services:*
 - Management of files **upload** and **download**.
 - Verification of the presence of **other versions** of the same file.
 - **De-duplication** of the information.
 - **Compression** of the transmission to increase the efficiency of the client side channel availability.
 - **Transmission channel encryption** and mutual authentication with the client.
 - **DAV-Server**, *used for transparent access to the latest versions of the file in on-line storage with the following functions:*
 - **Copy** from backup to local by simple drag & drop.
 - **Cancel** files and directories.
 - **Open** remote files with local applications.
 - **MGFS - Memopal Global FileSystem** *represents the core of Memopal technology. It is a parallel file system that is distributed, fault-tolerant, highly accessible and ready to be interfaced with research technologies and semantic organization.*

Its primary characteristics are:

- **Performance** similar to local File Systems in terms of accessing individual files.
- **Hot expandability** of the logic volumes with a maximum single node capacity of 16 EsaBytes.
- Constant access and search performance for up to **100,000** files for each individual user.
- **Segregation** of user data and native **encryption** of data.

- **Anonymization** of names and file owners on the Data Source.
- **Data Source**
 - The Memopal storage structure used to store backup data, offers several kinds of optimization such as *high dependability* with geographic RAID-5 high availability with data redundancy in many sites, *content-aware* compression for formats that have already been compressed and hot drive recovery.

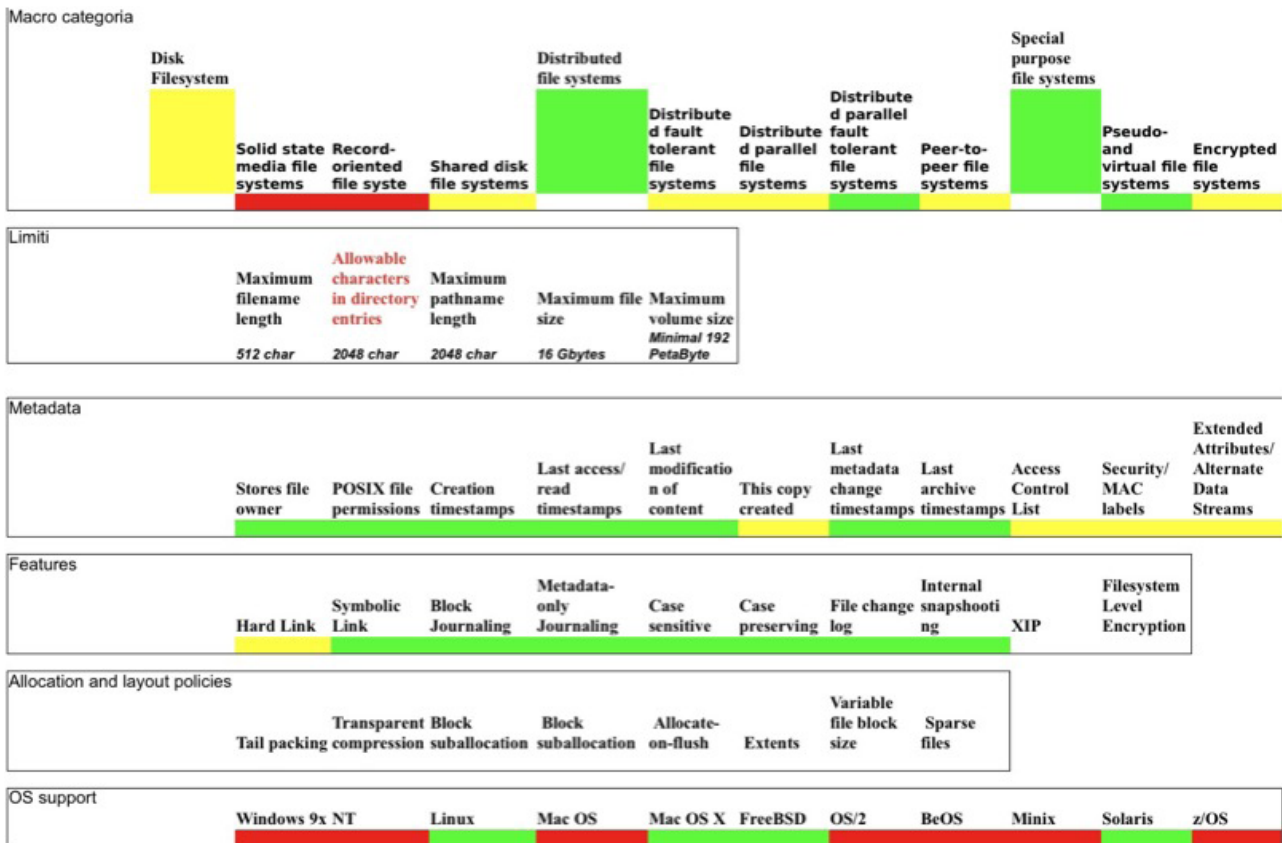


Figure 2 – Summary of the properties of the MGFS file system

Memopal: the data security model

The Memopal security model is in constant evolution to guarantee a high level data security standard.

All of the connections between the client and server in the Memopal infrastructure are SSL encrypted through a server side certificate and every connection to a server that has an unverifiable certificate is refused by the client to avoid MITM (Man-in-the-middle-Attacks). The authentication phase begins only after having established a valid SSL connection so that when a false client certificate is proposed there is no user name or password sent from the client to the server.

And more, to install the Memopal client it is necessary to have a user account with privileges, which means no one may install Memopal on a personal computer to steal the users data.

The data is encrypted and transferred from the client to the server, therefore it is memorized in encrypted FS and distributed in sections with RAID-5 strategy. By looking at the MGFS (Memopal

Global File System) it is impossible to know who is the owner of the file being backed up or the original file name.

If someone took a memorization unit from the Memopal infrastructure it will not be enough to access the memorized information.

The data structure contains associations between the file and the owner. It is also encrypted and is not accessible to assistance personnel, not even during assistance.

In the current beta version the validation of the client side certificate is being tested to avoid a possible server side attack.

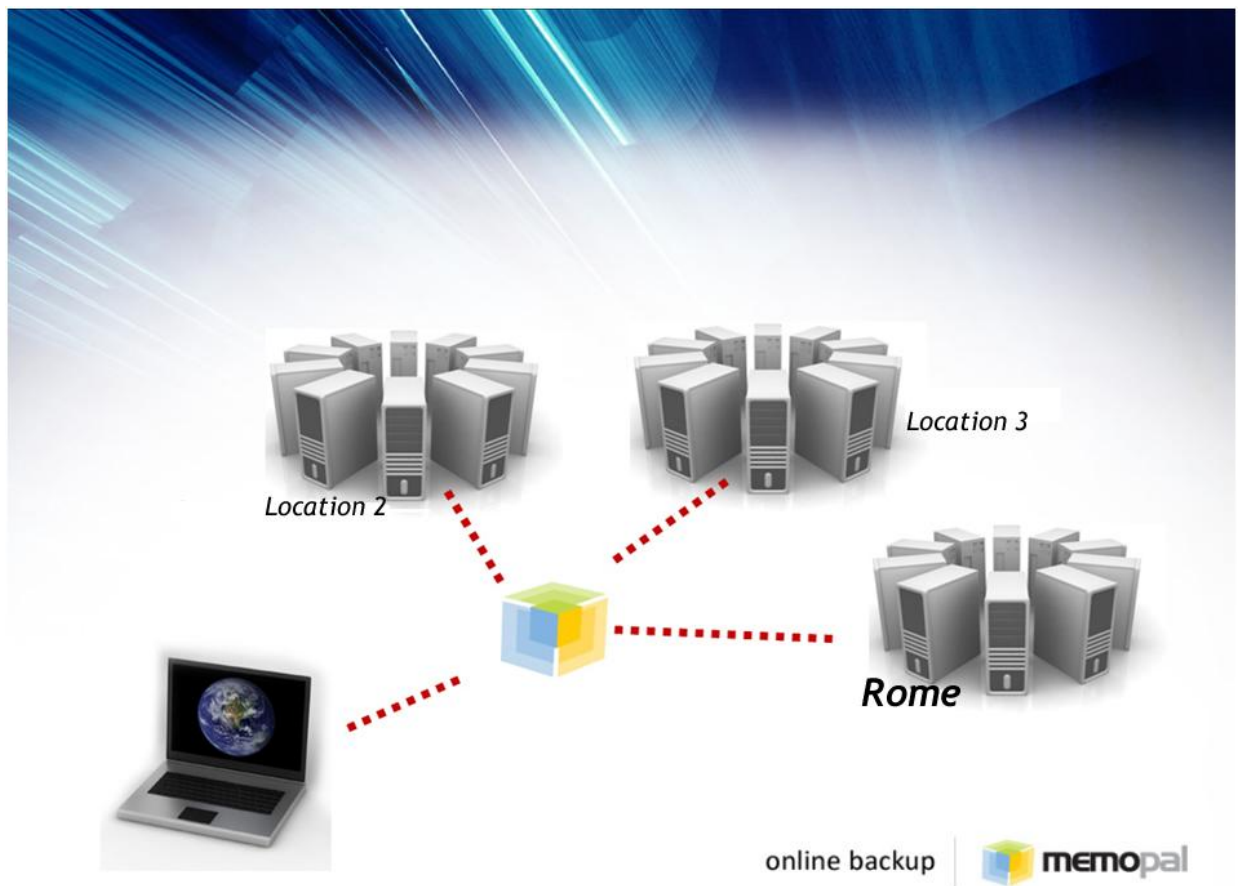


Figure 3 - RAID-MGFS Redundancy System

Conclusions

Memopal is an **online backup and storage** software that backs up files in real time on a remote server.

It is not important how many times you change computer - you will always know where your data is.

It is possible to look through all of the files from any Internet location or with internet-ready mobile phones.

You can share files that would be too big to send by e-mail with friends and co-workers.