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The secure storage system of personal information and DNA forever

Annotation

Here we describe a system designed for permanent and safe storage of personal information and DNA. We show that this system is democratic and attractive for private persons. We also show that this system may include a global library open to general use, available for catalogization and information search. We are considering the concept and the providing systems permitting the realization of the mentioned functions.

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In Switzerland the system Swiss DNA Bank has been realized for permanent and safe storage of personal information and DNA [4] The authors of this system have formulated their mission as follows: "Our mission is to store your digital and biological footprint on this planet securely, and forever". Such functions are possible only while secure and permanent physical and informational safety is provided as well as permanent financial and informational safety. Historically in Switzerland there exist exactly the conditions for the appearance of a system for such security and support. We shall call such systems basic systems, for the Swiss DNA Bank may have been invented (its author is Luigi Boschin) and developed only on the base of such systems. Therefore, before describing the functions of Swiss DNA Bank, we shall briefly describe these systems

1. Securing Physical Safety

Swiss DNA Bank do not compromise on security. We also pay special attention to the physical storage of your data. This helps our location on the world map. Switzerland is both politically and financially the world's most stable country. It has been an independent nation for over 700 years, making it the safest place in the world to store your most important assets: your DNA and lifetime memories. In Switzerland, the headquarters of 25 international organizations.

Swiss DNA Bank located in the center Swiss Fort Knox [1]. This center is located in a former Swiss military nuclear-proof underground shelter in the heart of the Bernese Alps, in Switzerland – see fig. 1.

Swiss Fort Knox consists of two independent underground data centers, belonging to the top IT-infrastructure of Europe. The facilities are equipped with the latest technologies, physically separated by 10km and connected internally as well as with the Internet by a high performance network. Swiss Fort Knox is resistant against any known civil, terroristic and military threat, incl. ABC and EMP. Embedded inside the Swiss Alps and hermetically sealed, Swiss Fort Knox also offers protection against environmental disasters such as earth quakes, floods, landslides and large-scale fires.

The Swiss Fort Knox is shown on Figure 1 [1]. On it the offices for technical personnel are located above, below there are five sequentially located safety zones, in the center - the rooms with the servers, a little below – recreation zone for the personnel, below and to the right – climatic plant (using the cold glacial water), accumulators, transformers and Diesel-generators, and a big reservoir for drinking water. The Fort is closely guarded – we may see the guarding helicopters and airplanes.

2. Securing Informational Safety

This function is also performed by sub-systems of the "Swiss Fort-Nox" [2, 3]. For it are provided:

- Server with high safety requirements,
- Server out of reach for own employees,
- Server with high availability,
- Backup server,
- Comprehensive Information Data Protection.

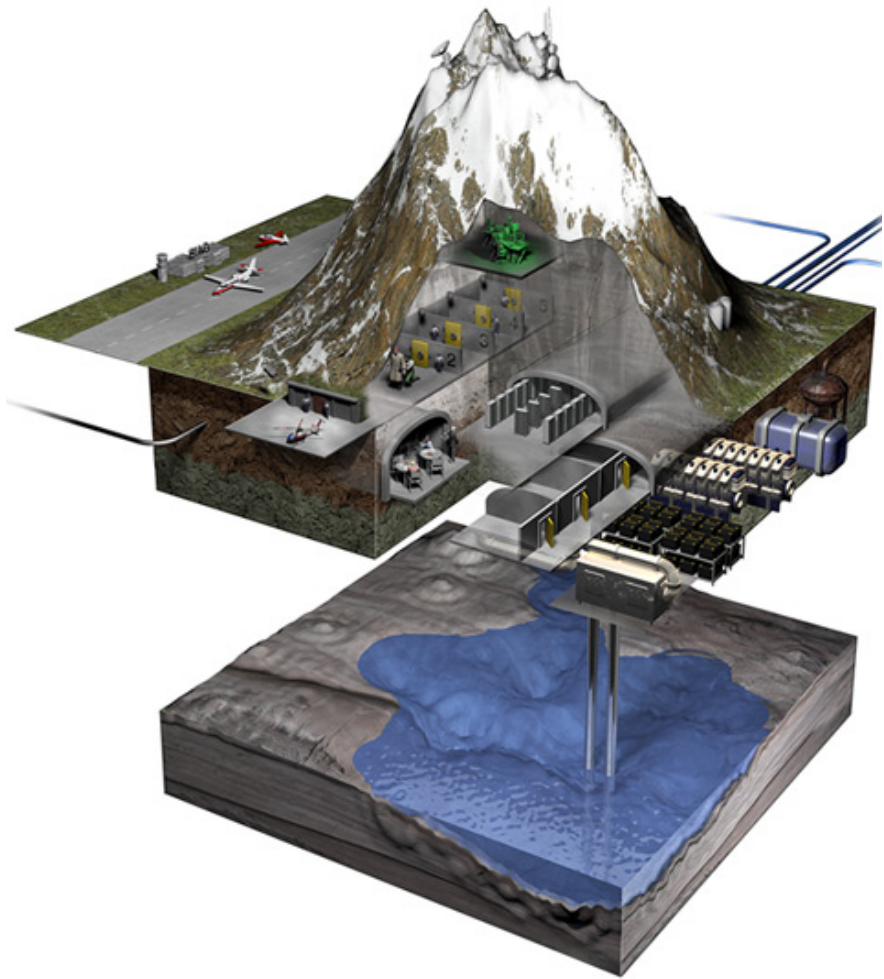


Fig. 1

To prevent unauthorized access from Internet at each information access session not only username and permanent password is required but also a single-time password generated by a special card Swiss Card DNA with microprocessor (issued to registered user) – see Figure 2.



Fig. 2.

3. Permanent Financial Support

A storage system requires constant expenses. In State libraries these expenses are covered by the state (by the taxpayers). The storage of personal libraries should be financed by their owner (and this is why all the personal sites and personal pages "are doomed to extinction"). In the Swiss DNA Bank owner of the information and the DNA makes only one initial payment is required, which will generate annual interest to cover for your storage expenses, forever. We call this feature the "Perpetual Financial Engine". We do it by investing your subscription fee through secure conservative Swiss investment formulas that are able to generate a small yet sufficient annual interest to pay for your information storage and hardware-software upgrades, forever. This means that you will "live on" even after your life, leaving precious information about yourself to future generations and, maybe, taking advantage of future science and DNA technologies.

4. Legal Support

In addition to financial resources there must exist also the will to continue collecting and storing. It would be even better if besides the will, there would be a duty to do so (Returning to the example with personal sites and pages we must note that there is little hope of such will in the descendents of the to-day site owners: the wishes and interests of descendents may be utterly different. Looking, for instance, on the splendid Mashkov's library, one may ask oneself: "What will become of it?" This resembles beautiful statues made of ice or sand on a sea shore.)

Your payment is invested through a notarial fiduciary account regulated by the Swiss Federal Banking Commission. No entity or person will be able to use your payment other than for its intended purpose: the storage of your personal information forever. This is also a function of the "Perpetual Financial Engine" – it guarantees that your payment will be properly invested and used for the forever storage of your information. Company Management is arranged so that no one person alone can never gain complete control over it.

5. DNA Storage in Swiss DNA Bank

Swiss DNA Bank can store your DNA. DNA is a very stable molecule: just imagine that DNA molecules have been extracted from the Neanderthal man, the remains of a human body 70,000 years old! Today, collecting DNA requires just a simple mouth swab. You will receive a mouth swab kit with your Swiss DNA Card upon subscription to Swiss

DNA Bank. In the same kit you will find a pre-stamped envelope to return your collected DNA. – see fig. 3. Swiss DNA Bank stores your DNA forever, using the most advanced technologies. You do not know that science can do with your DNA in the future. You do not know how future medicine can use your DNA to cure your heirs.

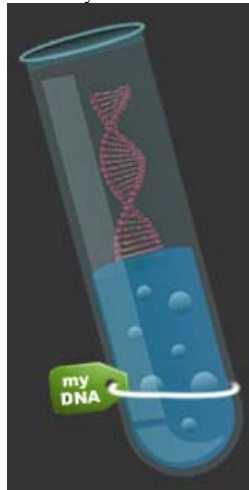


Fig. 3.

Thus, Swiss DNA Bank retains key elements of your personality - your DNA, which is a biological description of your body (and, perhaps, is an instruction to reproduce in your body), and your memories that will describe the most striking events of your life and give an idea of your personality .

6. Informational Functions of Swiss DNA Bank

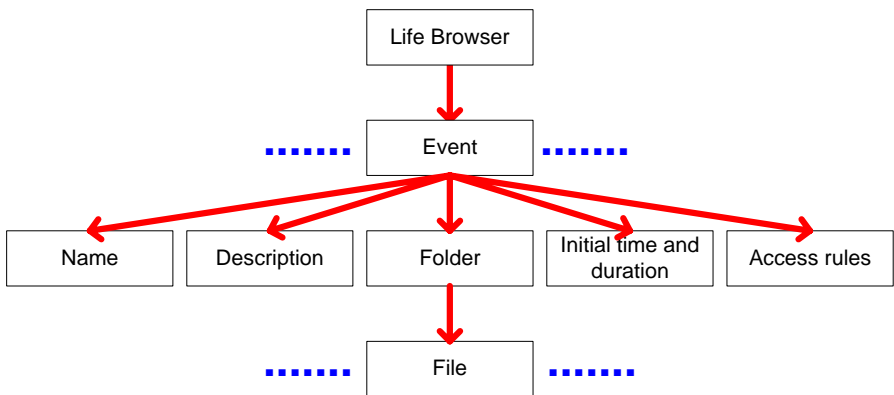


Fig. 4

Swiss DNA Bank allocates the client a certain amount of memory. Currently, the minimum amount is 1 gigabyte and is called 1 ForeverGigabyte. Its cost is 299 USD. Our complete USD 399 package allows you to store both your DNA and up to 1 ForeverGigabyte of personal memories forever. Naturally, the amount of memory (quantity 1 ForeverGigabyte) can be further increased.

The user is given a chance to describe and browse through his life's events. The concept of "event" is a key one, and all the user's information is in fact the description of events. Each event is characterized by the following information (see also Figure. 4):

- name of the event,
- description of the event,
- temporal characteristic - the moment of occurrence or duration of events,
- the level of access - keep private, public domain, reserve restrict to someone, restrict to genetic descendants,
- information folder, it may be placed of any digital file: text, audio, video, images, etc.; it could be family chronicle, family trees, memoirs and, finally, the creative works (which will be discussed later).

Naturally, all this information can be viewed and edited, which offers web-interface "Life Browser". When an event is complete, you can decide to keep it private forever, or open it in the future to your family, your friends, your genetic descendants or even to the public. You will have unlimited access to your events using any computer connected to the Web.

Figure 5 shows the functioning scheme of Swiss DNA Bank in the time.

1. Each registered user (Grandfather) has a safe place for storing his personal information. A safe and accessible storage of the key information ensures handing it over to the future generations.

2. The Forever Account permits to put in chronological order any kind of digital data, and the life browser ensures access to them for you and your descendants in future.

3. Your data is loaded and saved in the Secure Server. You are allowed to delete or edit this data.

4. If you decided to save your memoirs on the Forever Server, they will be enciphered and saved forever with security system of a bank level. Our eternal financial "perpetuum mobile" will always ensure the storage expenses.

5. Your family (Daughter & Granddaughter) will always have access to your life's history and memoirs. You will be given a great gift of experience exchange and eternal remembrance.

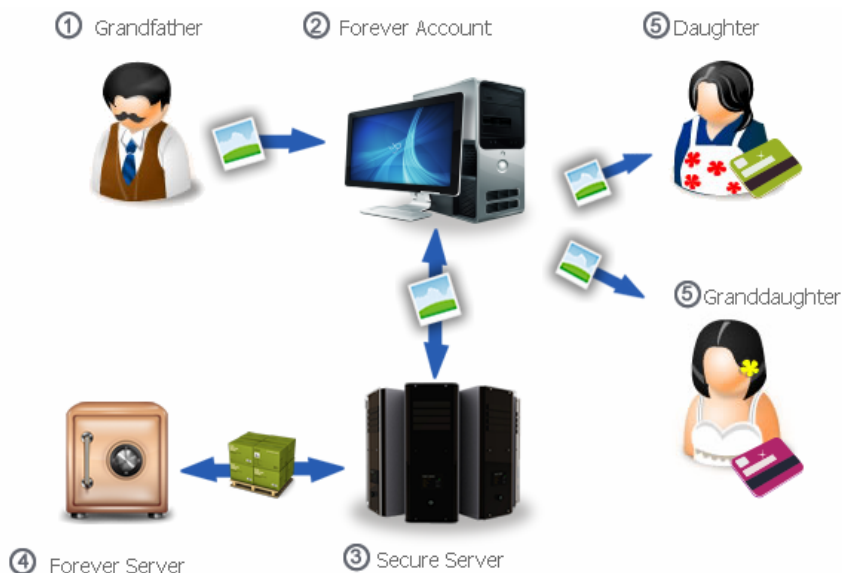


Рис. 5.

7. Library in Swiss DNA Bank

Swiss DNA Bank is oriented by the mentality of a person who is anxious to preserve a memory of himself, and even more important – of the results of his life work. The latter is to a large extent typical for people of creative professions – writers, scientists. They want to preserve their heritage in a secure and public library, ensuring the validity of priority.

This is one of the reasons for the appearance of electronic libraries – people want to publish their works. But electronic libraries vanish as quickly as they appear. It is really unpleasant for the authors. It is much more prestigious and secure to publish one's work in print, but it is also much harder from organizational point of view.

Based on the Swiss DNA Bank we may organize a multi-discipline library with the following features:

- 1) Very high security and eternal storage of electronic information,
- 2) A simple and democratic procedure for entering the literature into the library,
- 3) Conclusive priority proof of original electronic publications,
- 4) Easy access to the library fund for all readers,

- 5) Easy way of reviewing and searching for information,
- 6) Easy way of reviewing and copying any sort of information,
- 7) Unlimited volume of the library fund.

Such library may be of interest for the authors, because of its features 1-6, and for the readers – by the fact that it gives access to original works – unpublished or published in small numbers. The state or university libraries cannot guarantee such features due to limited financing (These library are not able to receive all materials). There are also considerable problems with catalogization (as well as with publication) related to the work's appraisal - the reviewer (belonging to a certain scientific school) can not be unbiased. While, as Francis Bacon said – "the truth is a daughter of time, not of authority". A library in Swiss DNA Bank renders the works to the justice of time.

To include the works into the library the author may not be a registered user, i.e., he must not buy an obligatory for such user 1 gigabyte of memory – the author's contribution is an order smaller. On the other hand, the registered users of Swiss DNA Bank may register their collections or parts of them without physical transfer of these data into the library. Let us note that physically easy access of personal data does not make it easily accessible in the wide sense of the word, as their existence is not known.

On the first stage the library will contain the following electronic collections :

- The library's catalogue,
- Collection of classifiers used in the library,
- Collection of brief biographies of the authors of library works,
- Book collection,
- Articles and journals collection,
- Separate papers collection,
- Patents collection,
- Projects and ideas collection,
- Collection of private collections of Swiss DNA Bank (private collection may contain books, articles, works of art, musical compositions, family chronicles etc.).

Now there is an electronic library [5]. Publications, cataloged in the library, are placed in the Swiss DNA Bank. In this library are all volumes of magazine "DNA". Open access to these publications are scheduled to begin in January 2010. Thus, an electronic library [5] can be regarded as a growing point of the library in Swiss DNA Bank.

References

1. Swiss Fort Knox - Information Technology in a safe Place - <http://www.swissfortknox.ch/swissfortknox-english/sicherheit.html>
2. Swiss Fort Knox - <http://www.swissfortknox.ch/swissfortknox-english/Informatik-Loesungen.html>
3. Swiss Fort Knox - <http://www.swissfortknox.ch/swissfortknox-english/Service-Partner.html>
4. Swiss DNA Bank - <http://www.swissdnabank.com/>