cyphar / paperback

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contrib	DESIGN: add serialisation information and mockups	13 months ago
pkg	paperback-core: add small test for KeyShard encryption round-trip	12 months ago
src	*: template rust project	14 months ago
.gitignore	*: template rust project	14 months ago
COPYING	*: license under GPLv3+	14 months ago
Cargo.toml	pkg: merge paperback-shamir and paperback-core	12 months ago
DESIGN.md	DESIGN: add serialisation information and mockups	13 months ago
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paperback

NOTE: This project is still a work-in-progress.

`paperback` is a paper-based backup scheme that is secure and easy-to-use. Backups are encrypted, and the secret key is split into numerous "key shards" which can be stored separately (by different individuals), removing the need for any individual to memorise a secret passphrase.

This system can also be used as a digital will, because the original creator of the backup is not required to be present (or consent to) the decryption of the backup if enough of the "key shards" are collected. No individual knows the secret key (not even you), and thus no party can be compelled to provide the key without the consent of `k-1` other parties.

To make this system as simple-to-use as possible, `paperback` creates several PDFs which you can then print out and laminate, ready for recovery. The mockup layout of these document is given below.

Main Document	Key Shard

About

Paper backup generator suitable for long-term storage.

#backup #encryption #paper #secret-sharing #user-friendly #shamir-secret-sharing

Readme

GPL-3.0 License

Releases

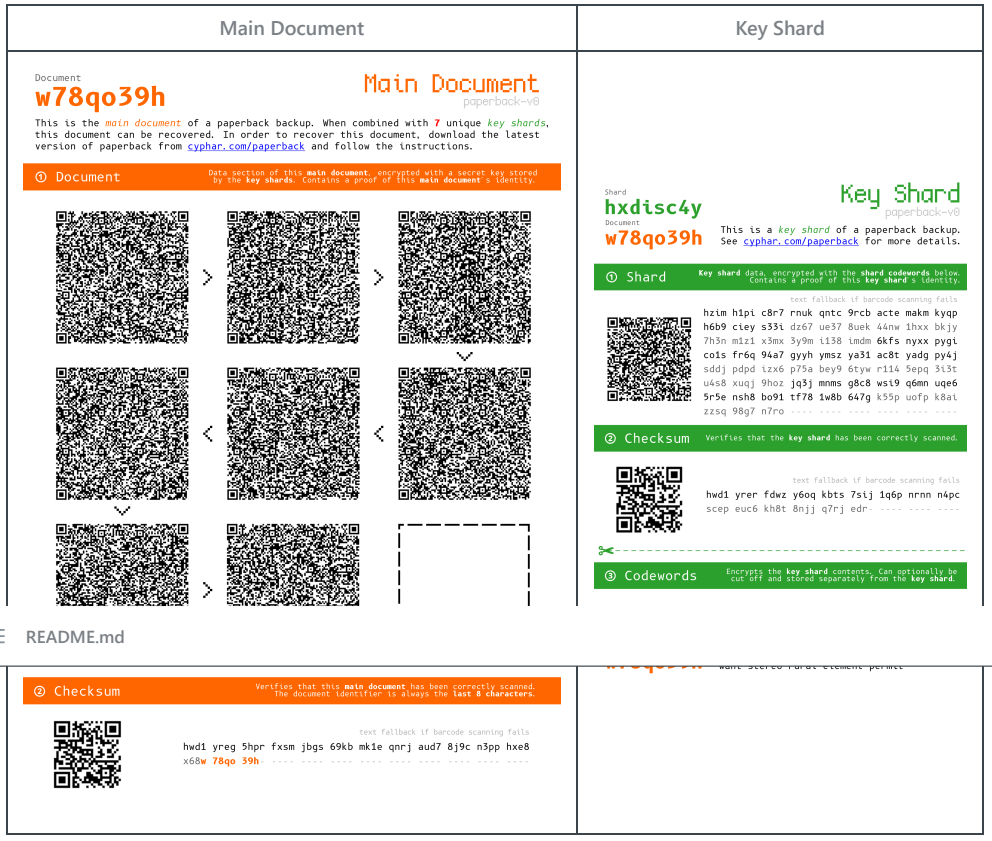
No releases published

Packages

No packages published

Languages

Rust 100.0%



README.md

These "key shards" can then be given to a set of semi-trusted people. `paperback` also supports `(k, n)` redundancy, allowing for `n` key shards to be created but only `k` being required in order for the backup to be recovered.

"Semi-trusted" in this context means that you must be sure of the following two statements about the parties you've given pieces to:

1. At any time, at least `k` of the parties you've given pieces to will provide you with the data you gave them. This is important to consider, as human relationships can change over time, and your friend today may not be your friend tomorrow.
2. At any time, no party will maliciously collude with more than `k-1` other parties in order to decrypt your backup information (however if you are incapacitated, you could organise with the parties to cooperate only in that instance). Shamir called this having a group of "mutually suspicious individuals with conflicting interests". Ideally each of the parties will be unaware of each other (or how many parties there are), and would only come forward based on pre-arranged agreements with you. In practice a person's social graph is quite interconnected, so a higher level of trust is required.

Each party will get a copy of their unique "key shard", and optionally a copy of the "master document" (though this is not necessary, and in some situations you might want to store it separately so that even if the parties collude they cannot use the "master key" as they do not have the "master document"). We recommend laminating all of the relevant documents, and printing them duplex (with each page containing the same page on both sides).

A full description of the cryptographic design and threat model is provided in the included design document.

Paper Choices and Storage

One of the most important things when considering using `paperback` is to keep in mind that the integrity of the backup is only as good as the paper you print it on. Most "cheap" copy paper contains some levels of acid (either from processing or from the lignin in wood pulp), and thus after a few years will begin to yellow and become brittle. Archival paper is a grade of paper that is designed to last longer than ordinary copy paper, and has standardised requirements for acidity levels and so on. The National Archives of Australia have an even more stringent standard for Archival paper and will certify consumer-level archival paper if it meets their strict requirements. Though archival paper is quite a bit more expensive than copy paper, you can consider it a fairly minor cost (as most users won't need more than 50 sheets). If archival paper is too expensive, try to find alkaline or acid-free paper (you can ask your state or local library if they have any recommendations).

In addition, while using **hot** lamination on a piece of paper may make the document more resistant to spills and everyday damage, the lamination process can cause documents to deteriorate faster due to the material most lamination pouches are made from (not to mention that the process is fairly hard to reverse). Encapsulation is a process similar to lamination, except that the laminate is usually made of more inert materials like BoPET (Mylar) and only the edges are sealed with tape or thread (allowing the document to be removed). Archival-grade polyester sleeves are more expensive than lamination pouches, though they are not generally prohibitively expensive (you can find ~AU$1 sleeves online).

The required lifetime of a `paperback` backup is entire up to the user, and so making the right price-versus-longevity tradeoff is fairly personal. However, if you would like your backups to last indefinitely, I would recommend looking at the National Archives of Australia's website which documents in quite some detail what common mistakes are made when trying to preserve paper documents.

It is recommended that you explain some of the best practices of storing backups to the people you've given shard backups to -- as they are the people who are in charge of keeping your backups safe and intact.

License

`paperback` is licensed under the terms of the GNU GPLv3+.

```
paperback: resilient paper backups for the very paranoid
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