Integrating PostGuard into FileSender

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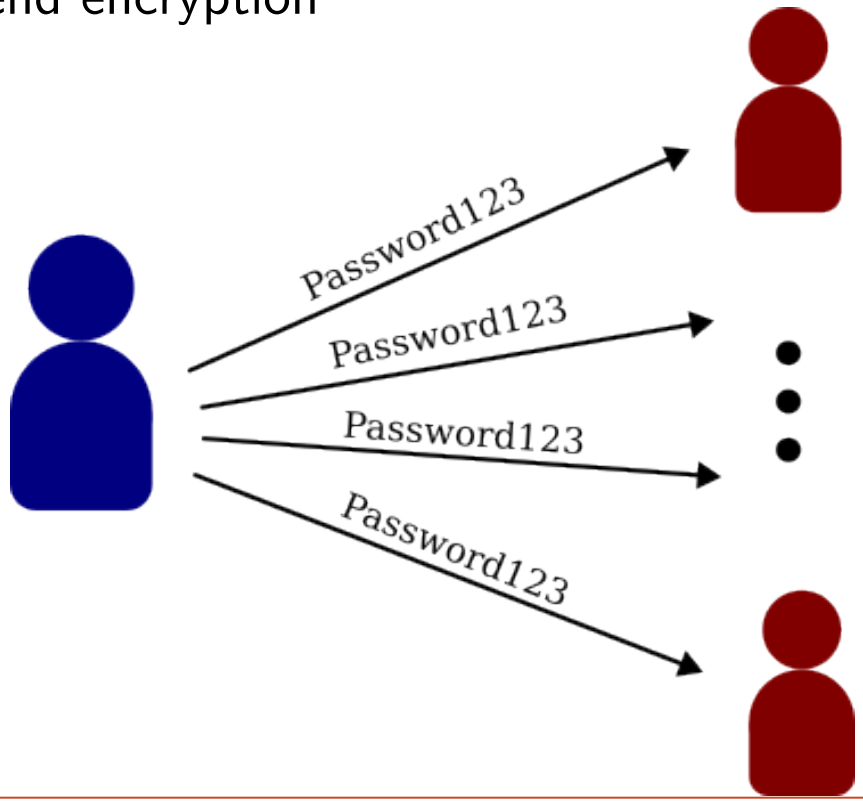
FileSender

- Web application for sharing large (encrypted) files
- Comparable to WeTransfer[1]
- Open source
- Focused on privacy and security
  - End-to-end encryption (E2EE) of files

[1] `https://wetransfer.com`

The Problem

- Distribution of the encryption password to the recipients
- How to do this securely?
  - Authenticate recipients
  - End-to-end encryption



PostGuard

PostGuard is an encryption service that is privacy- and user-friendly.

PostGuard combines:

- Identity-based encryption
- Identity wallet yivi

Identity-based encryption (1)

- Based on public key crypto
  - Private Key Generator (PKG) to manage the cryptographic keys
  - Use identities as public keys (usually something memorable e.g. email address)

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Identity-based encryption (2)

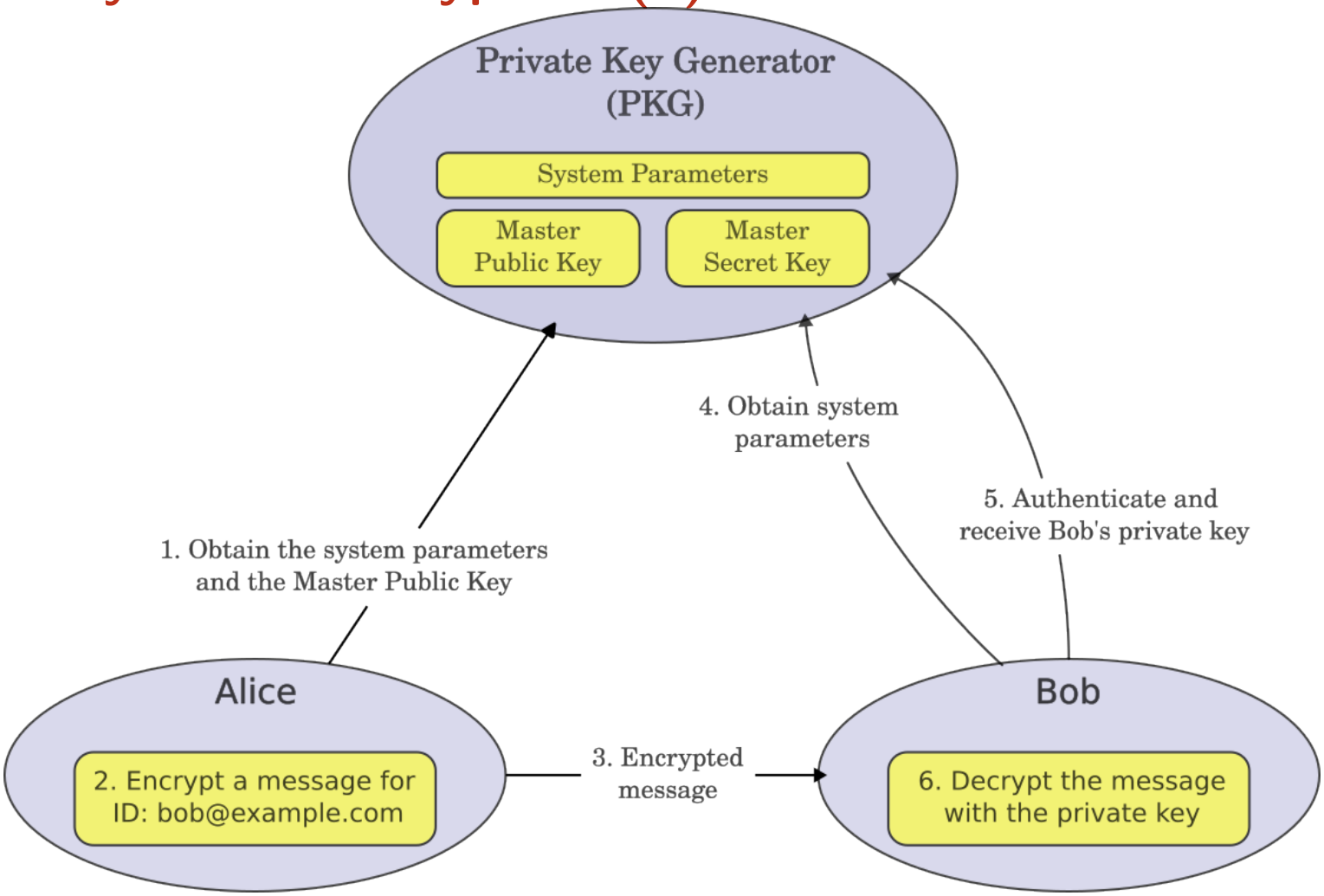

Figure 1: Identity-based encryption session flow, based on [1].

Yivi (identity wallet) (1)

With Yivi you can safely can securely share personal data.

- Passwordless authentication

Attributes

- email address
- name
- date of birth
- nationality
- ...

Yivi (identity wallet) (2)

Decentralized architecture

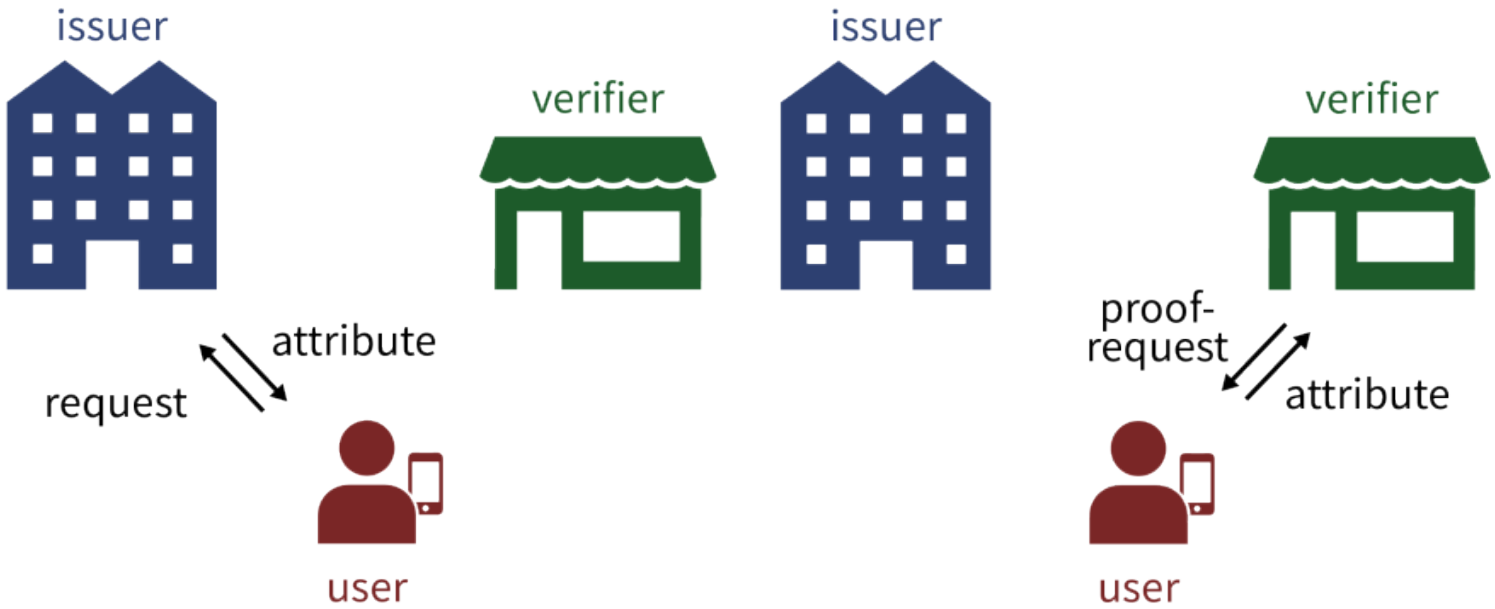

Figure 2: Issuance and sharing of attributes [2].

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Yivi (identity wallet) (3)

Comparison with a centralized architecture (e.g. Google)

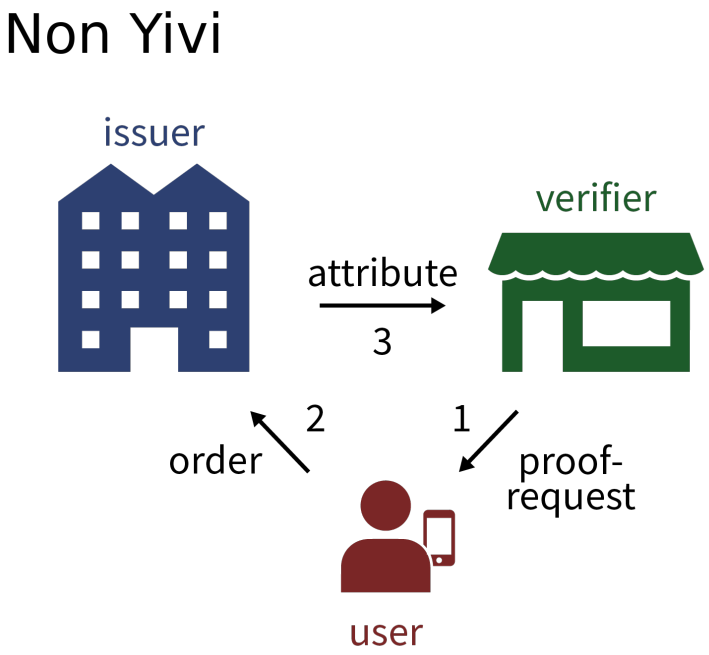


Figure 3: Centralized identity management architecture [3].

PostGuard

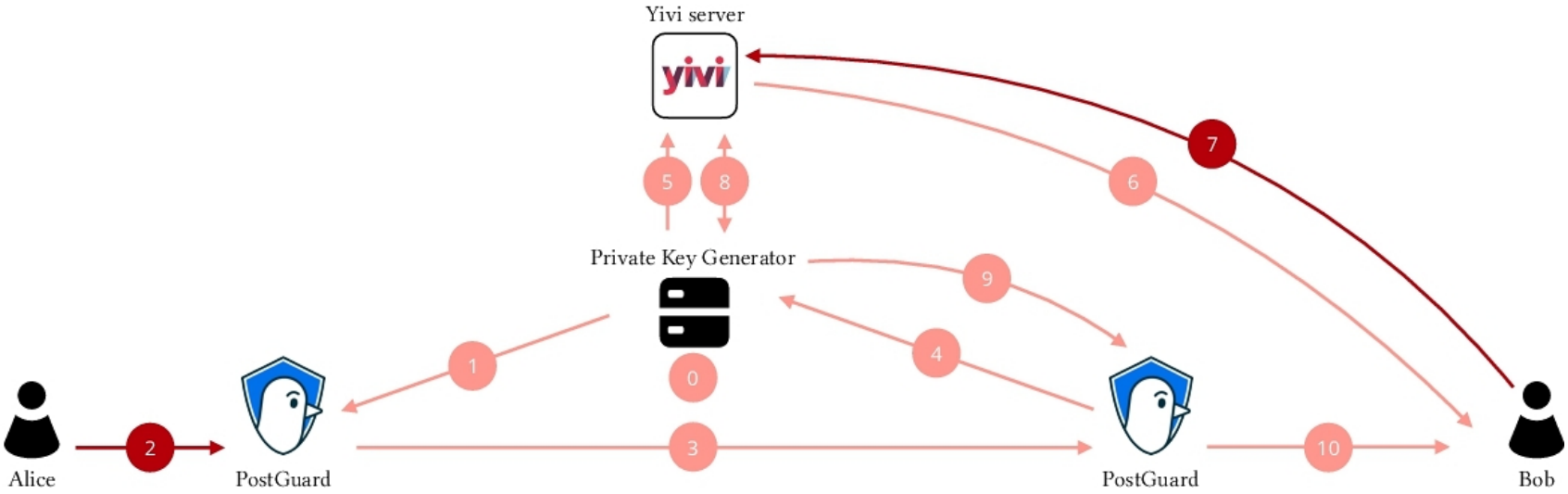
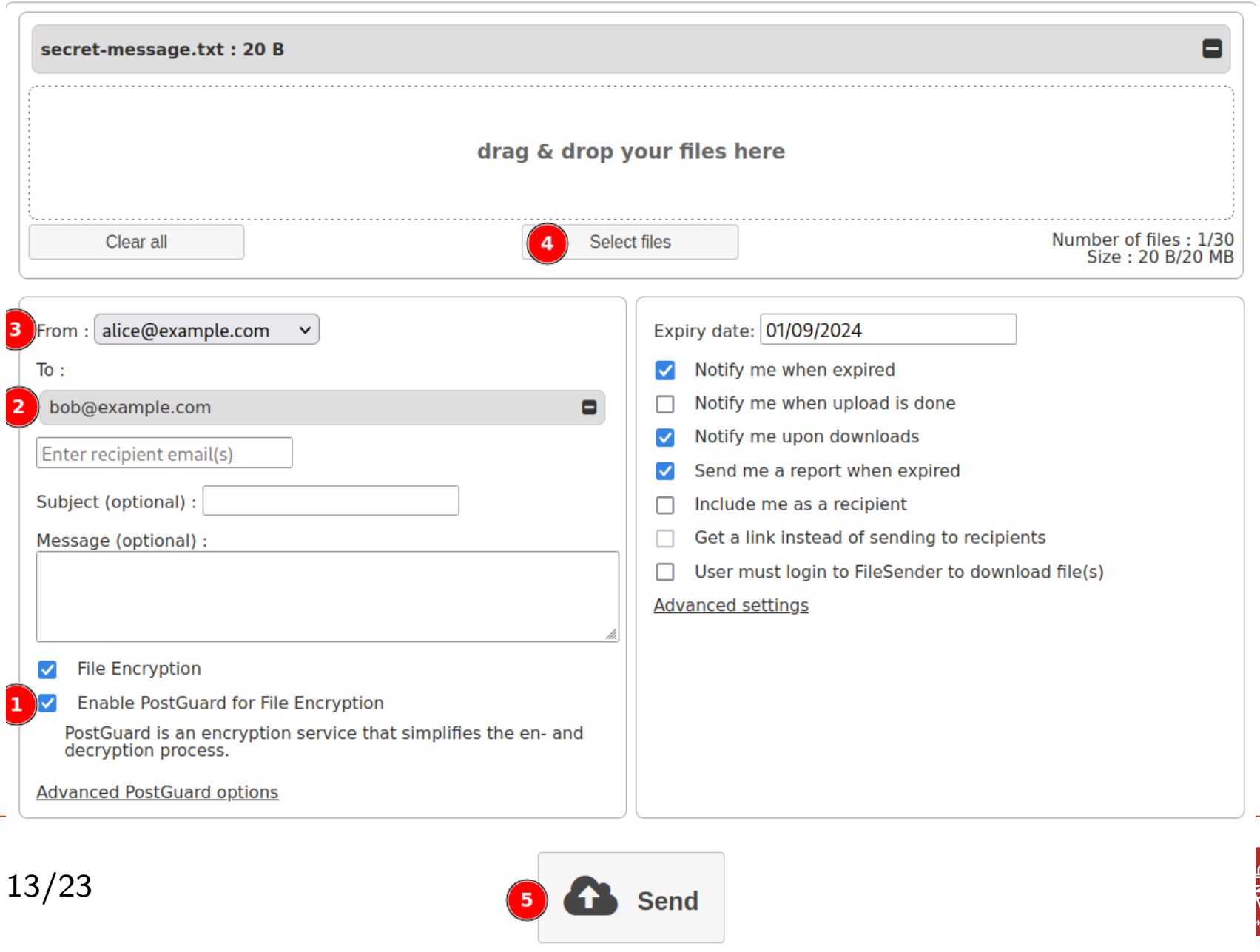


Figure 4: PostGuard session flow [4].

- Note: no digital signing
- Simplifies the decryption process to a simple authentication

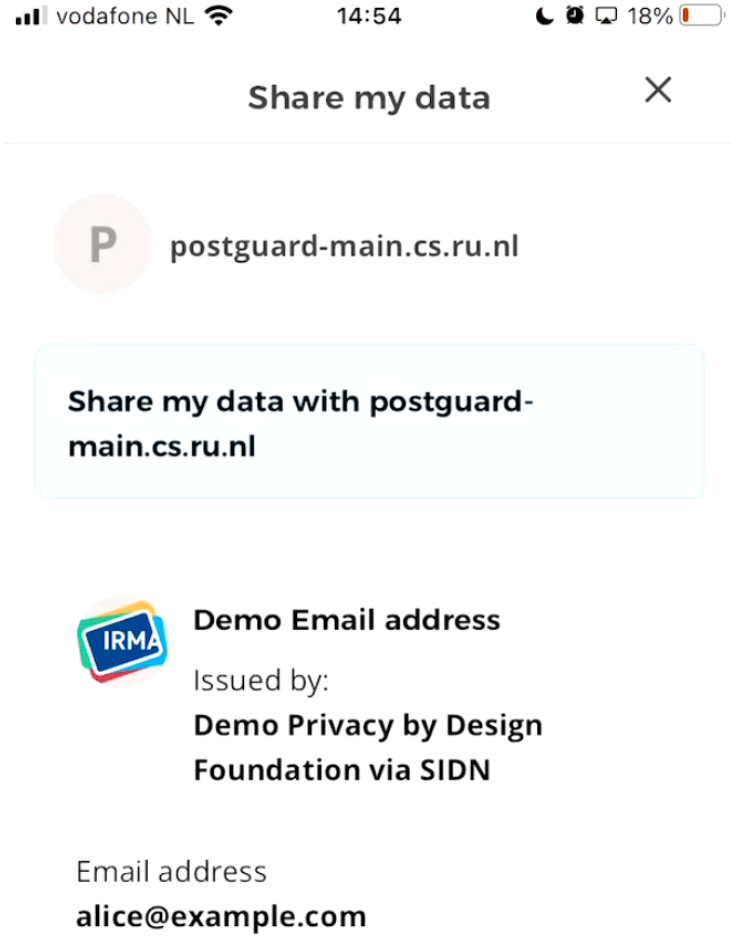
Demo

Demo uploading (1)

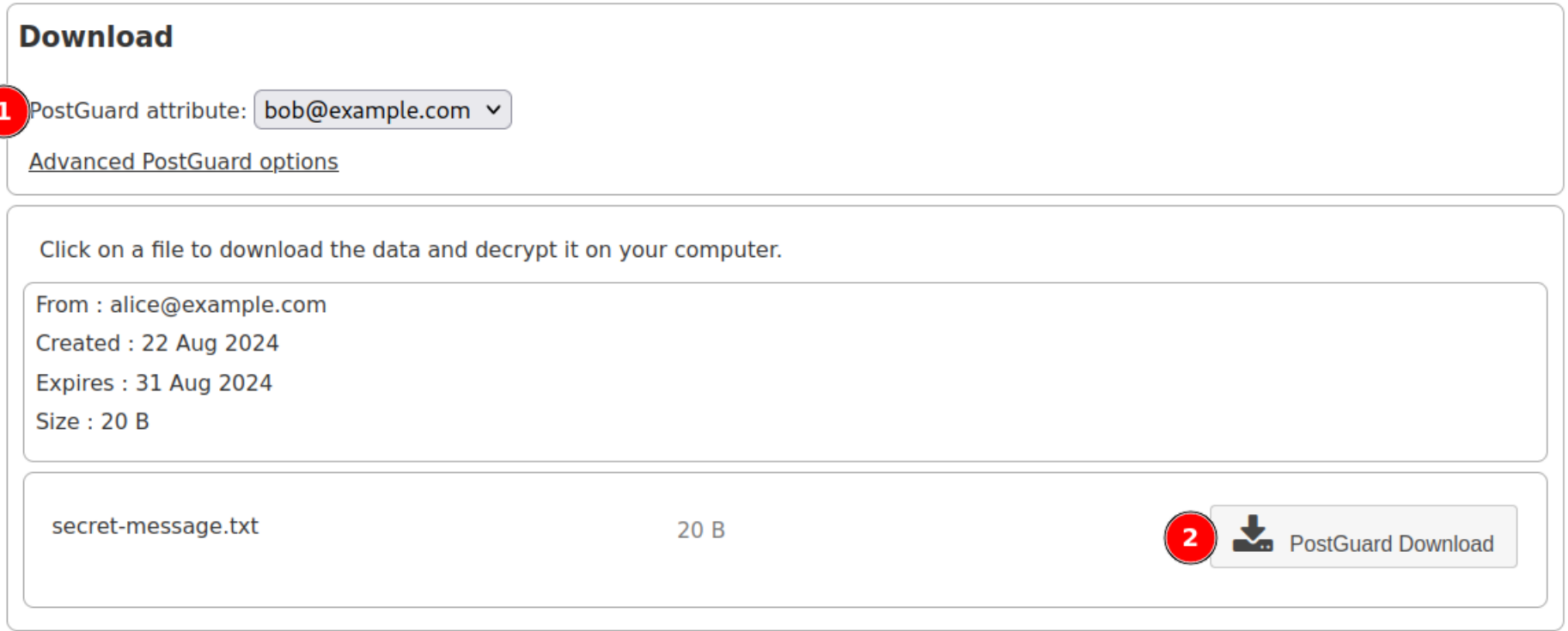


Demo uploading (2)

Demo uploading (3)



Demo downloading (1)



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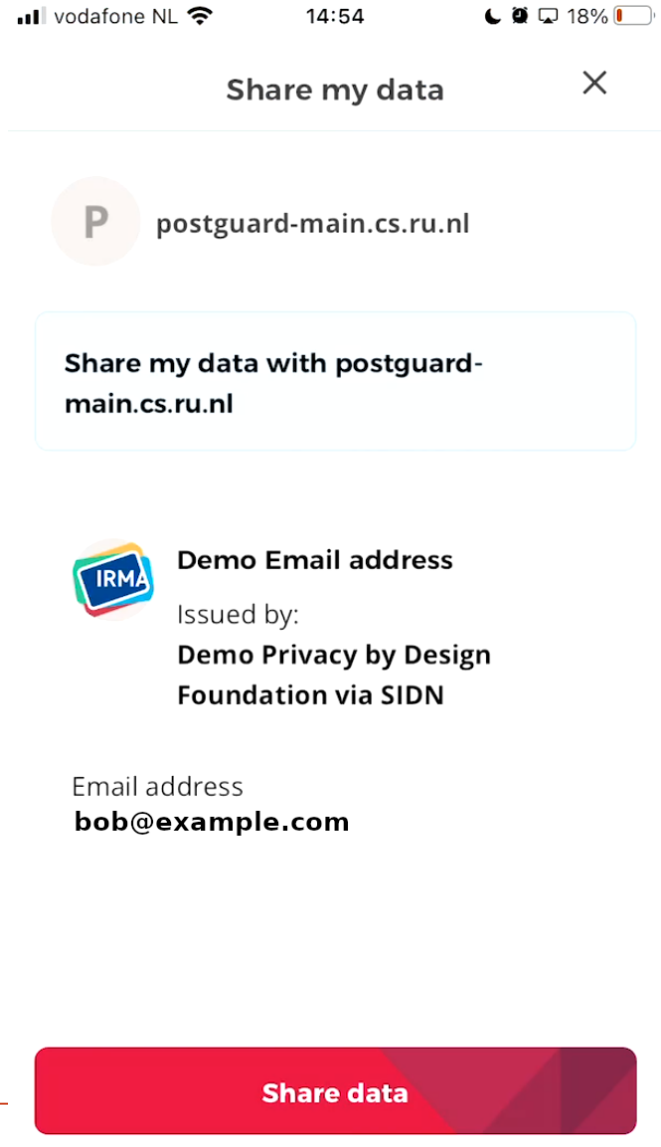
Demo downloading (2)

Demo downloading (3)



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Issues during development

- Encryption
  - Signing?
- Content Security Policy (CSP)
- Webpack (a JavaScript bundler)

Conclusion

Links

Prototype

- `https://filesender.bryanrinders.xyz`

Source code

- `https://gitlab.com/postguard-filesender/filesender`

Questions?

Bibliography

[1] Y. Sheffer, *File:Identity Based Encryption Steps.png*, May 26, 2009. [Online]. Available: `https://en.wikipedia.org/wiki/File:Identity_Based_Encryption_Steps.png` (visited on 08/04/2024).

[2] Privacy by Design Foundation, *What is IRMA?* Version 0.15.0. [Online]. Available: `https://irma.app/docs/what-is-irma/`.

[3] Privacy by Design Foundation, *Yivi in detail*, [Online]. Available: `https://privacybydesign.foundation/irma-explanation/` (visited on 08/04/2024).

[4] L. Botros, M. Brandon, B. Jacobs, D. Ostkamp, H. Schraffenberger, and M. Venema, "Postguard: Towards easy and secure email communication," in *CHI Extended Abstracts*, ACM, 2023, 232:1–232:6.

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