Flick.rs

Creating Hogwarts' Flickr without magic

Ruben De Smet, Thibaut Vandervelden, Tom Godden

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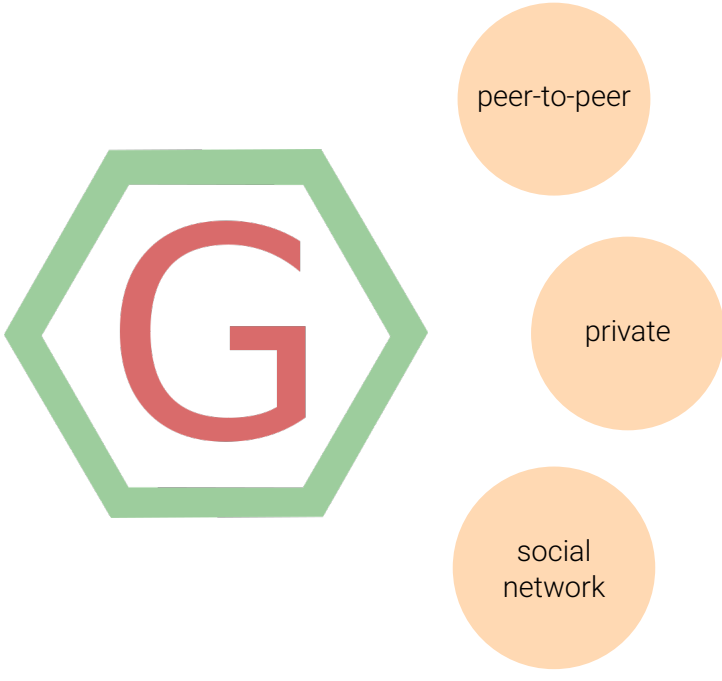

De Smet *et al.*, 2018

peer-to-peer

private

social network

access control: large ACLs

De Smet *et al.*, 2018

attribute based encryption

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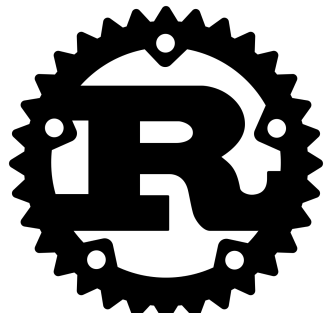
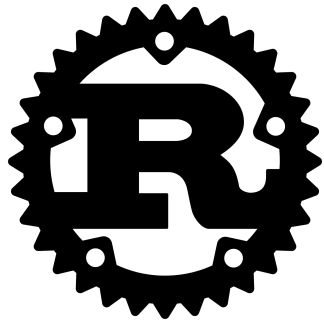


Decentralised ABE scheme, Yan Michalevsky and Marc Joye 2018

DIPPE



Decentralised ABE scheme, Yan Michalevsky and Marc Joye 2018

demo application

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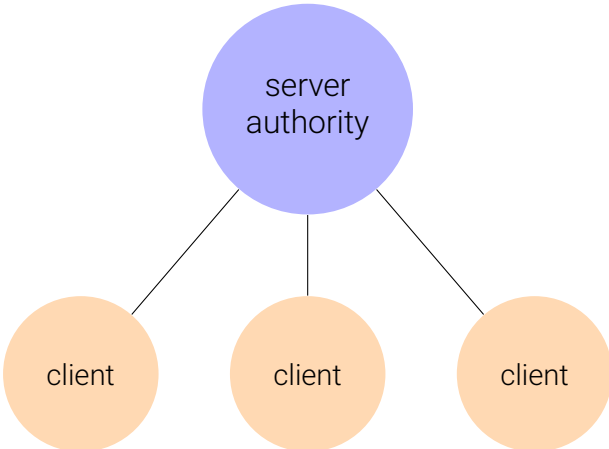

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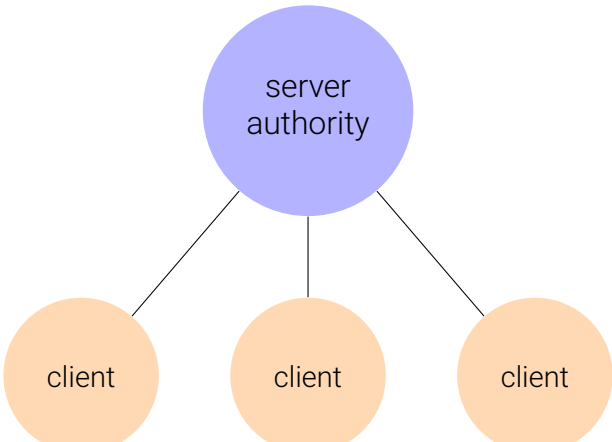
https://flickrs.
opencloudedge.be

SCAN ME

Architecture

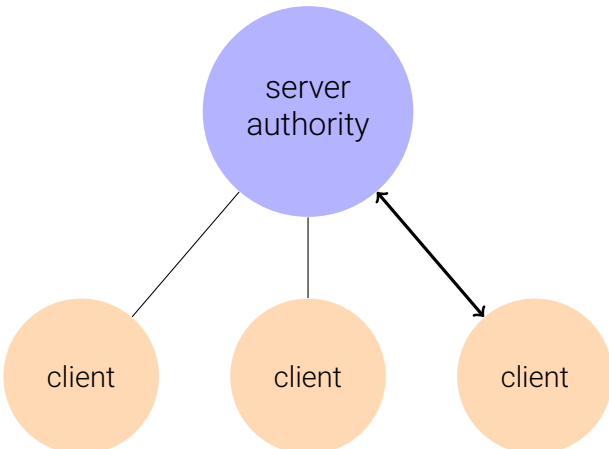


authority server on Kubernetes

client web browser and WASM

`https://flickrs.opencloudedge.be`

Architecture



Setup:

1. Download webpage and WASM
2. Fetch authority key
3. Request `UserPrivateKey`

Upload (hybrid encryption):

1. Select attributes
2. Hybrid encryption ChaCha20Poly1305-DIPPE
3. Upload to server

Fetch images:

1. Fetch all images
2. Hybrid decryption.

`https://flickrs.opencloudedge.be`

preliminary benchmarks

- In production Kubernetes: ±1 k user registrations per second on single machineEPYC Rome 16-core, 64 GB.
- Encryption with 16 attributes $k = 2$: ±350 ms[1]

. . . future work: compare with CiFEr/GoFE.

[1] Threadripper 1920X, 32 GB

Results & Caveats

We have

- a complete Rust implementation with 90 %+ test coverage of DIPPE
- …compilable to WebAssembly
- extensive documentation and tested example code: `https://etrovub.gitlab.io/smartnets/cife-rs/doc/cife_rs/abe/dippe/index.html`
- a live demo[2]

…but …

- hash-to-curve is stubbed as `return` G, although tested as `return` $\mathcal{H}(msg) \cdot G$.
- serialization does not use point compression
- interop between CiFEr, GoFE and CiFE-rs untested

[2] …which hopefully didn't fail!