AnonReddit

A Strongly Anonymous Public Forum

—

5/21/17

Theodor Lukin Yelin, Albert Kwon

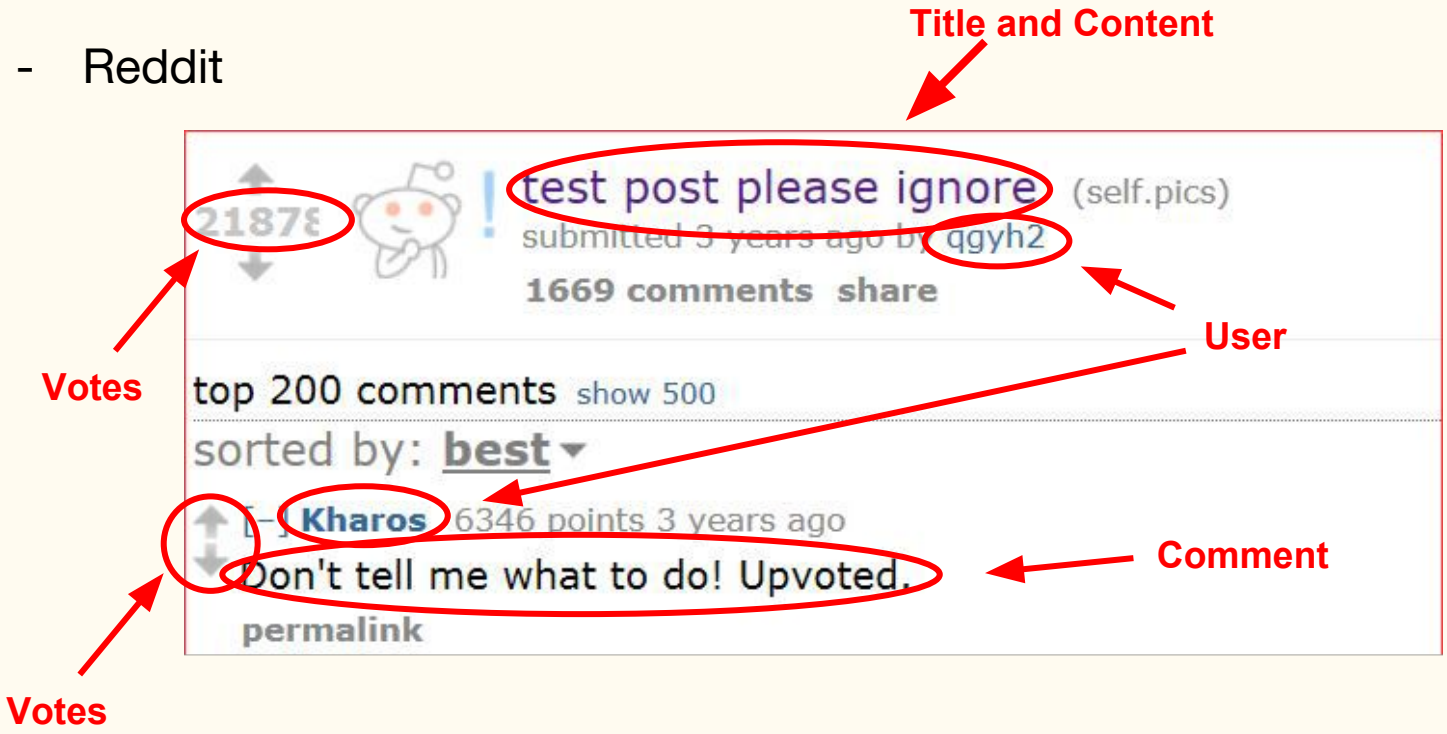
Acknowledgements

- Albert Kwon
- Prof. Srini Devadas
- PRIMES Program
- Friends and Family

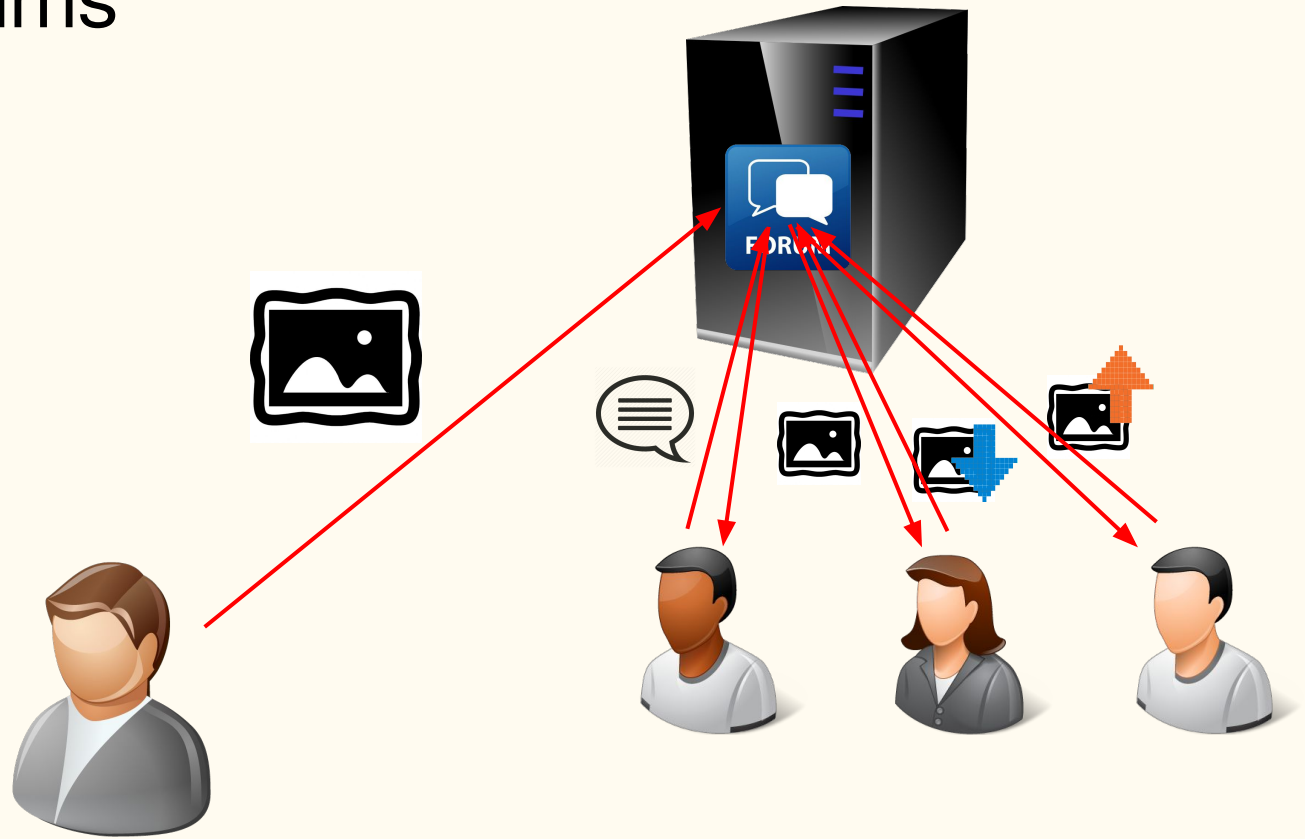
Motivation and Background

Forums

- Reddit



Forums



Problems of Current Forums

- Users can be personally attacked
- Opinions can be tied back to user, i.e. not shared freely
- In general, not Anonymous
- If Anonymous:
  - Double voting cannot be prevented as no way to track individual user
  - As votes are main reflection of support, this is a large issue

Why Anonymity?

- Prevent personal feuds, attacks from interfering with forum actions
  - Cannot be targeted based on identity if anonymous
- Whistleblowing (i.e. Edward Snowden)
  - Share information/opinion anonymously
  - Receive feedback/support anonymously
- Voting
  - In an election, voting must remain anonymous

Desirable properties of anonymous forums

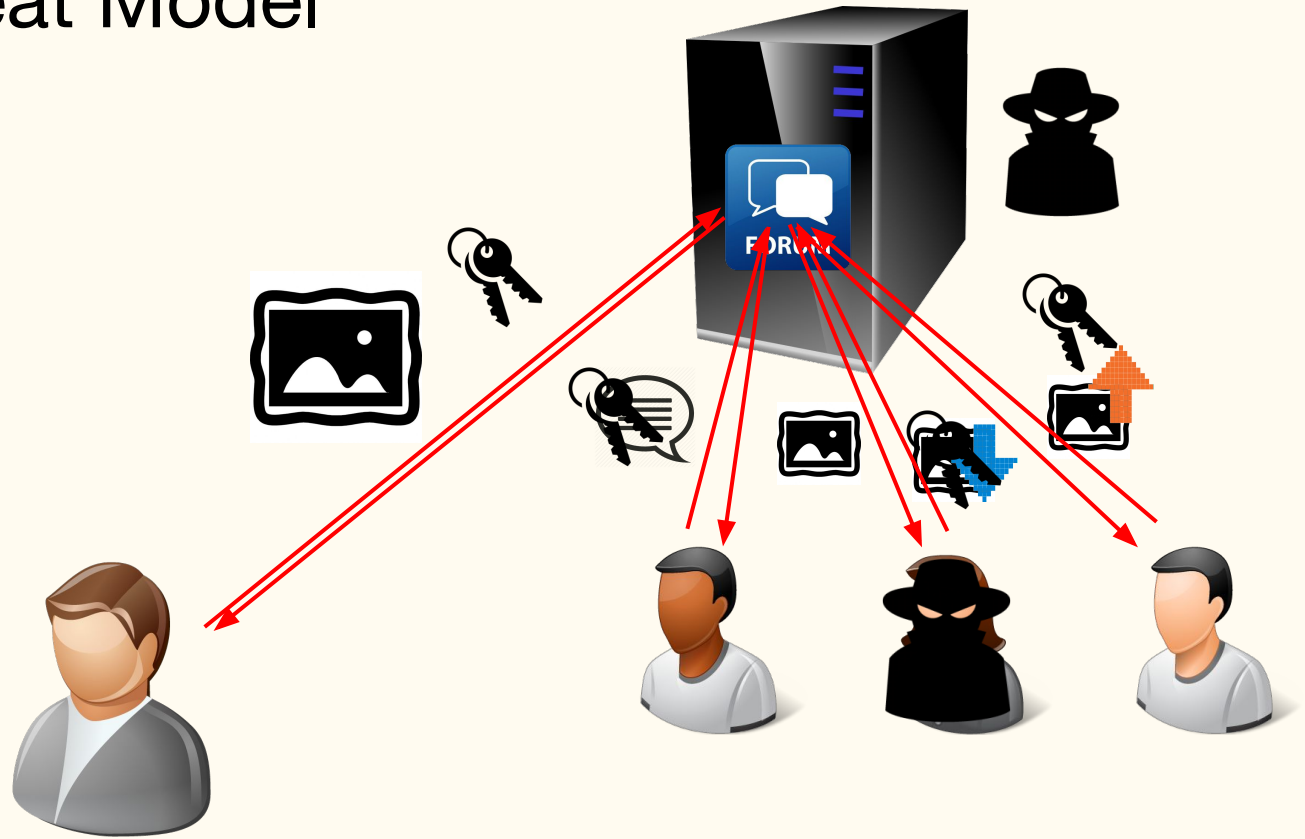
- All registered user can Post, Comment and Vote
  - Unregistered users cannot perform any of these actions
- All posting, voting and commenting is completely anonymous
- No double voting
  - Same user cannot vote on same post more than once

Threat model and Goals

Goal

- Provide Anonymity for all necessary forum actions

Threat Model



Goals

- Posting, Voting, Commenting is Anonymous
- User must be registered
- Double voting is not possible

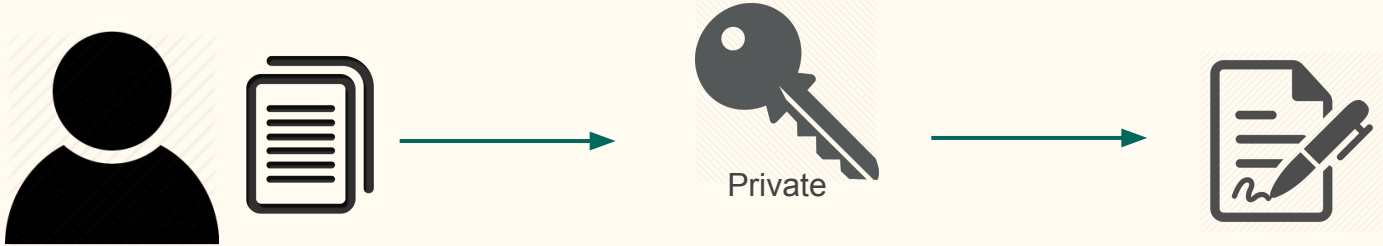
Non-Goals

- A user registering should not be hidden
- Secure communications between client and server
- A single user registering multiple accounts

AnonReddit Design

Signature

Signer

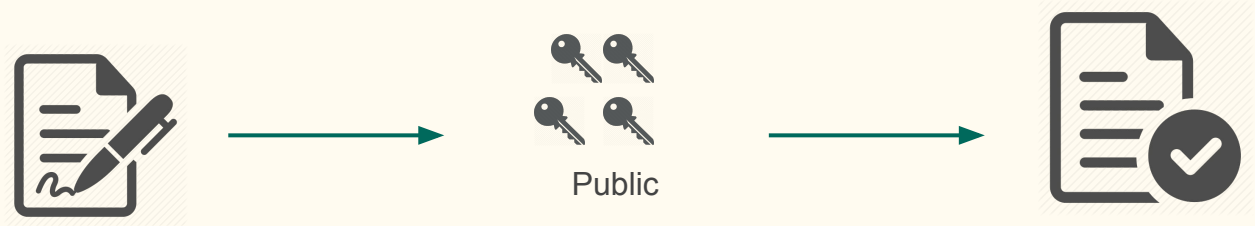


Verifier

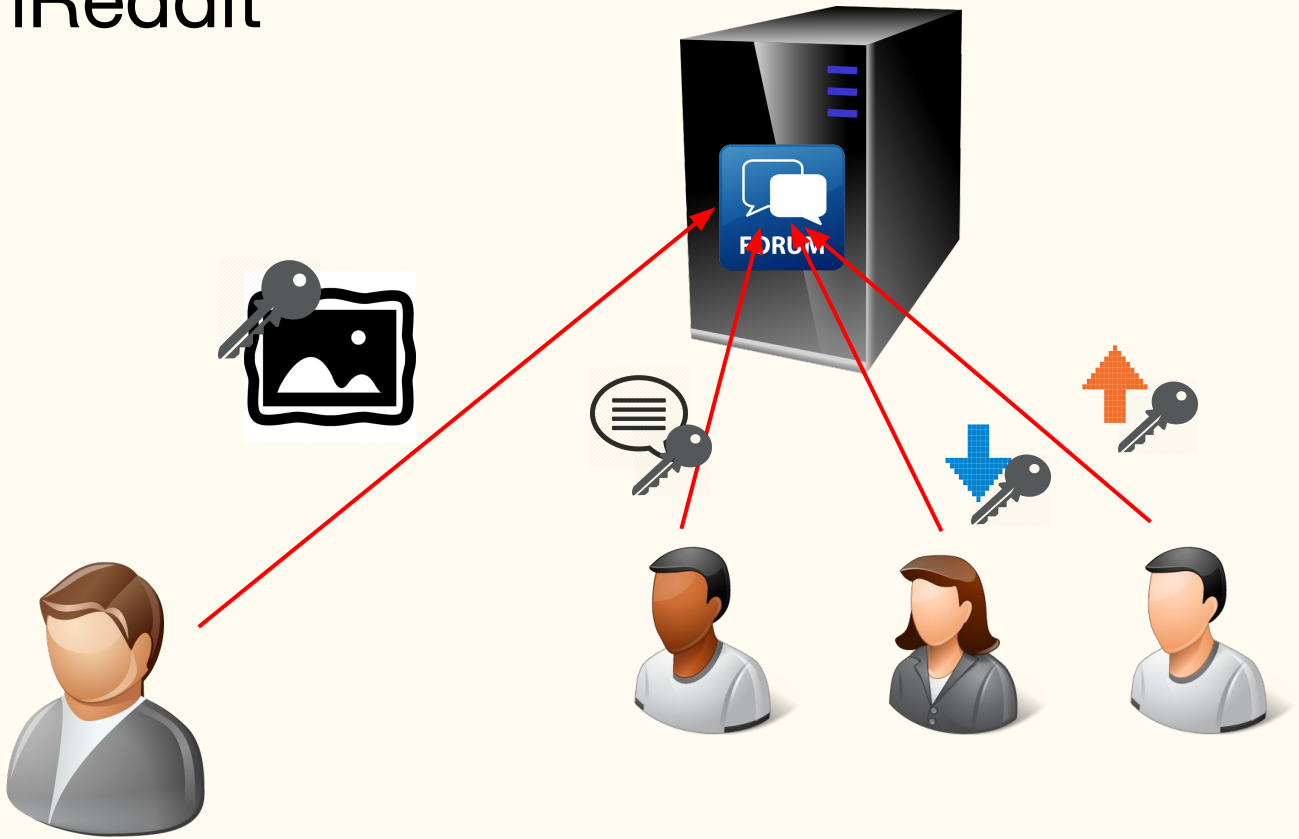
Linkable Ring Signature

Signing

Verifying



AnonReddit

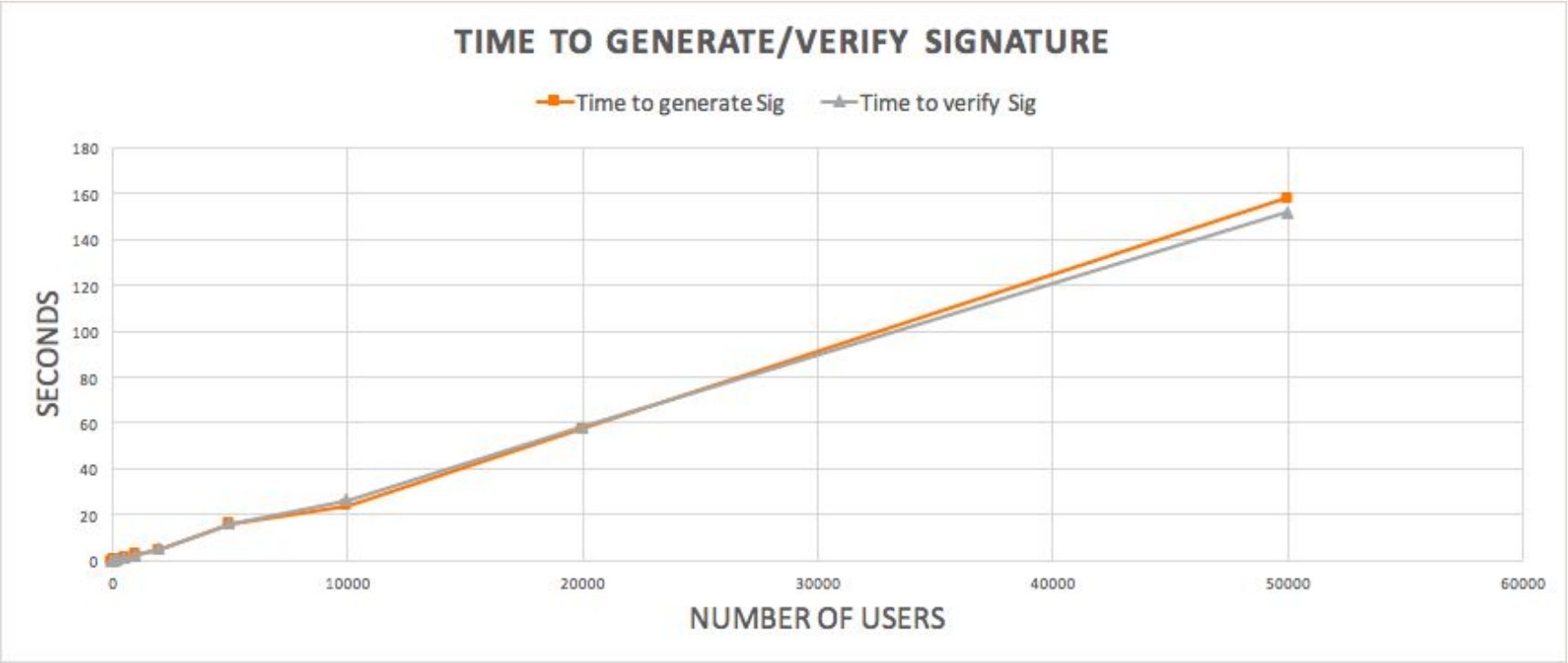


Experiments and Results

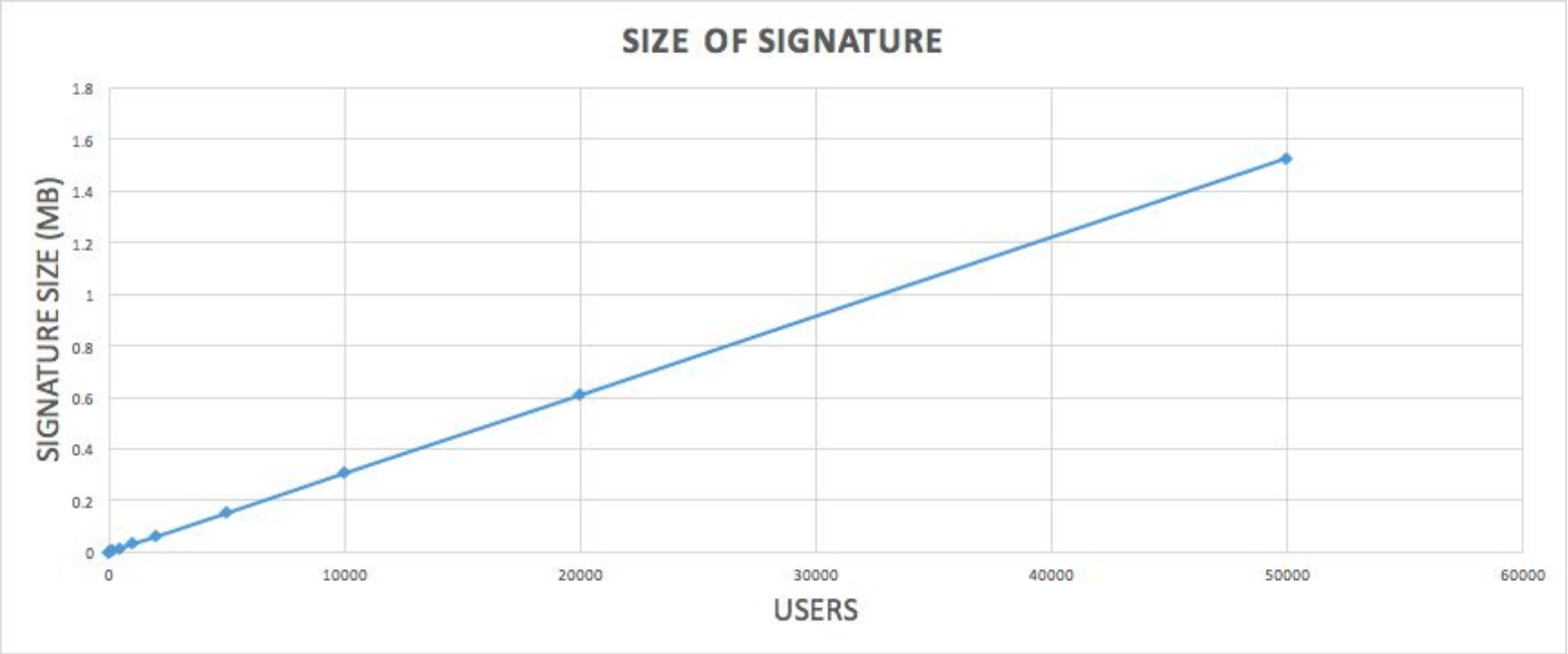
Methodology

- Scaling for number of Users (up to 50,000)
- Time measured for Posting
  - Client for creating signature
  - Server for verifying signature
- Network latency ignored
- Size of signature measured

Posting and voting latency



Network Overhead



Conclusion and future work

- Improve signature generation efficiency to support ~1,000,000 users
  - Currently viable to scale up to ~100,000
- Use differential privacy
  - Hide exact number of votes on a post/comment
- Add options to be recognizable on certain posts
  - I.e. keep only specific posts anonymous
- Link posts in certain communities