Why aren't all comms end-to-end encrypted in 2015?

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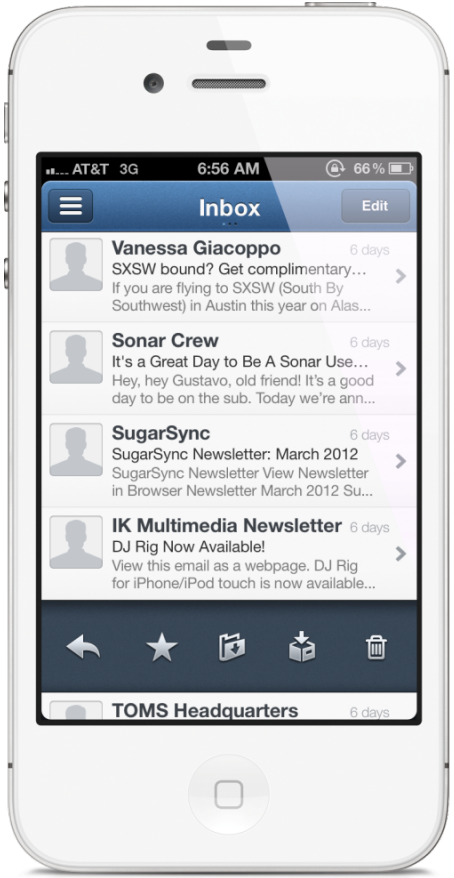
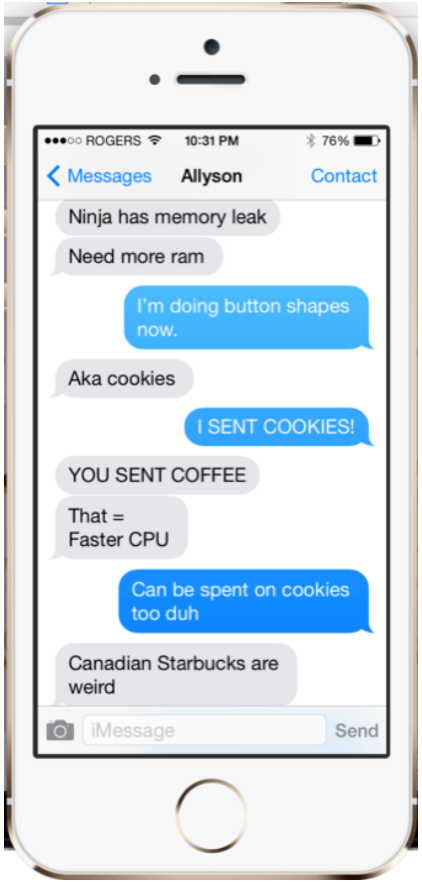
CONIKS is joint work with Marcela Melara, Aaron Blankstein, Ed Felten and Mike Freedmen, Princeton University

Email vs. “chat”

- Asynchronous
- Federated/open
- Threaded
- Searchable
- Archived
- Public addressing





- Asynchronous
- Walled gardens
- Two-party
- Not searchable
- Ephemeral
- No spam (yet)

End-to-end encrypted chat is here

1 billion+ users!

Central key servers

No security UI/fingerprints (yet)

Pain points for encrypted email

- Search
- Spam
- Federation
- Group messaging/threading

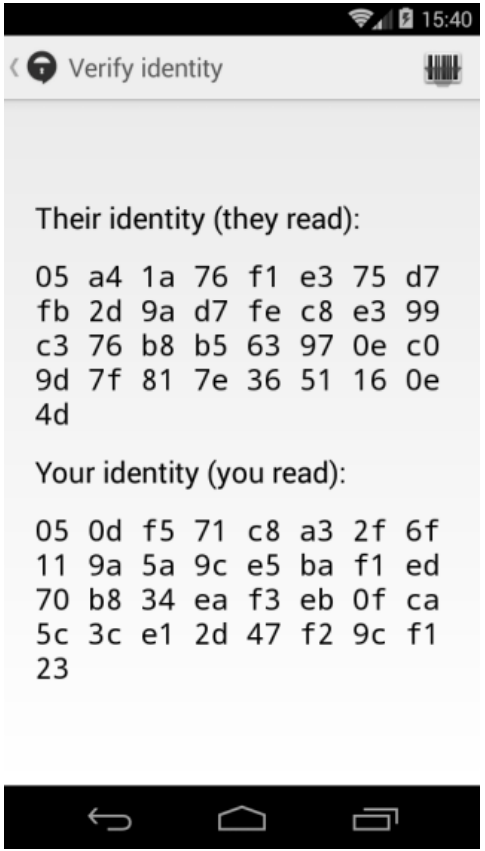
Potential future strategies

- Fix encrypted email
- Two systems, different security profiles

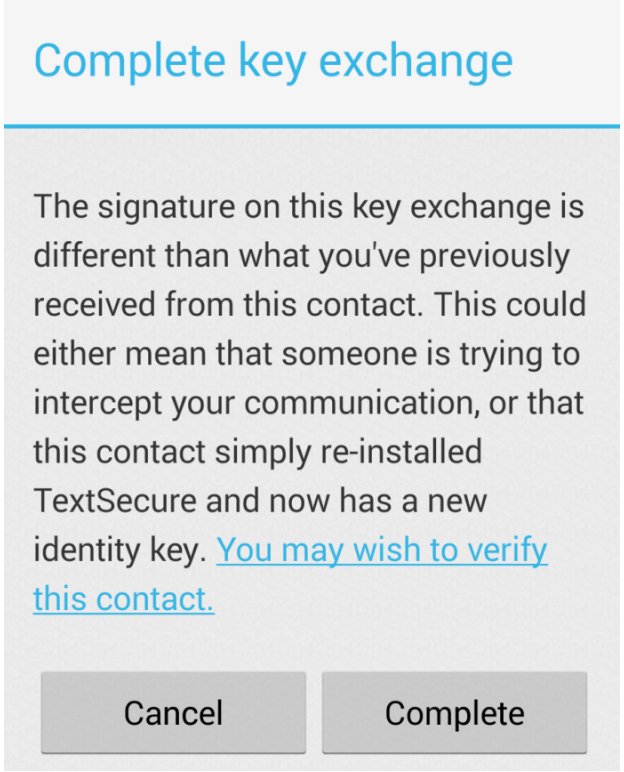
Pain points for all systems

- Trust establishment
  - ~~key management~~

Manual key verification in TextSecure



Key changes are a major pain point...



Rough estimate:

1% of users change keys each day

Median key age < 6 months

In practice: trust your provider

iMessage

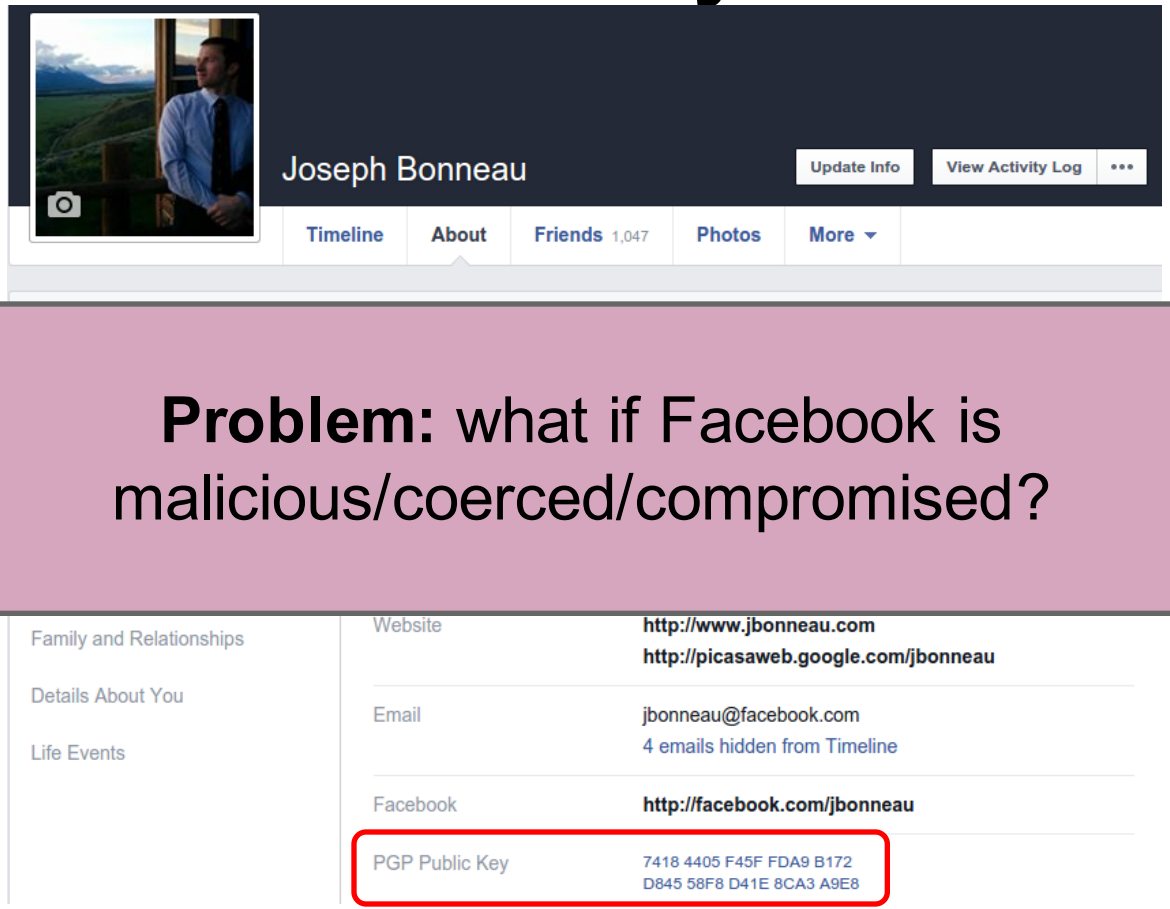
TextSecure

Threema.

Seriously secure mobile messaging.

Telegram

Facebook is now a key server!



Problem: what if Facebook is malicious/coerced/compromised?

What if Facebook is coerced/malicious?

- Use multiple social identity providers

or

- Ensure Facebook is *globally consistent*

Using multiple providers (KeyBase)

Max Krohn

Keybase.io co-founder and developer; PhD MIT CSAIL 2008; OkCupid CTO & co-founder; SparkNotes CTO & co-founder. Creator of IcedCoffeeScript, OKWS, and OneShallPass.com
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keybase.io/max

6052 B2AD 31A6 631C
maxtaco tweet
maxtaco gist
maxtaco post
coinbase/maxtaco post
maxtaco profile
oneshallpass.com https dns
keybase.io https
nutflex.com dns
maxk.org dns
1BYzrCvfbn81dfiksmD1Bdgt8pgLi1SD7Z

Max Krohn
@maxtaco

Follow

Verifying myself: I am max on Keybase.io. ZnBizHMA8RKSB598TaDtjlPILKSEu1WuaT59 / keybase.io/max/sigs/ZnBiz…

maxtaco / **keybase.md**
Created on Feb 6, 2014

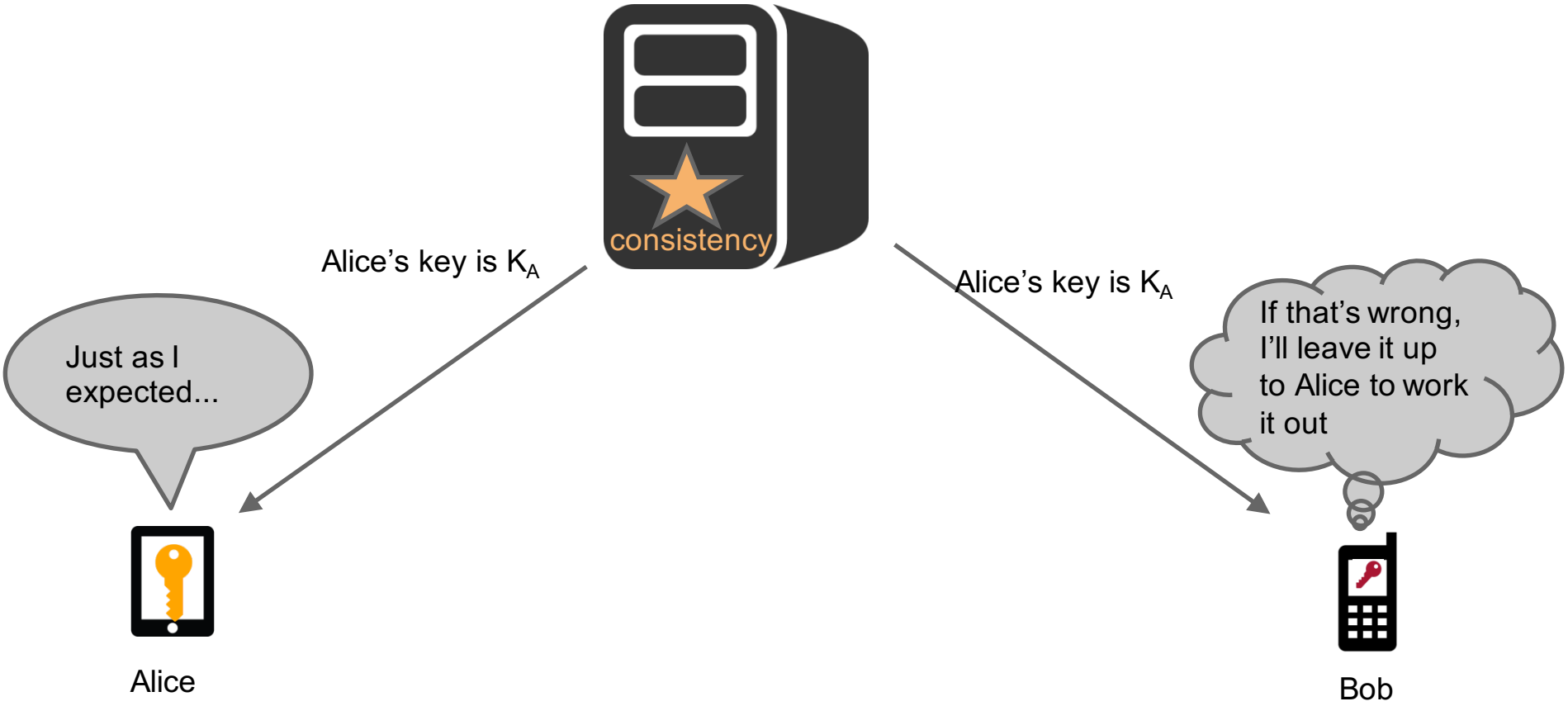
keybase.md Raw

Verifying myself: I am https://keybase.io/max

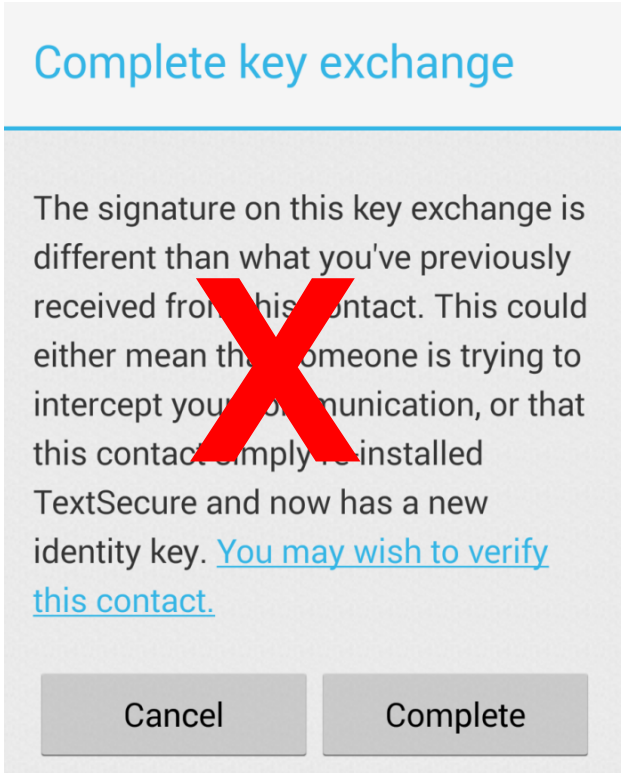
As part of this verification process, I am signing this object and posting as a gist as github user *maxtaco*

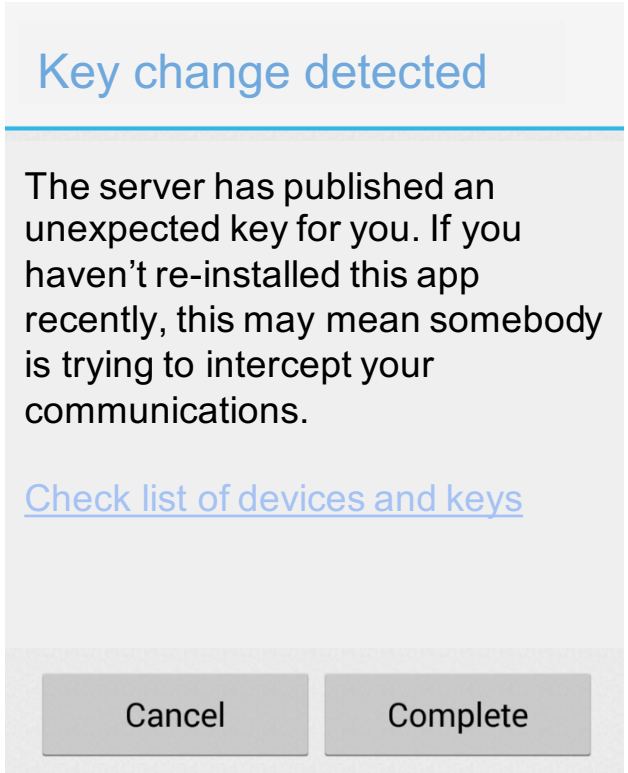
```
{
    "body": {
        "key": {
            "fingerprint": "8efbe2e4dd56b35273634e8f6052b2ad31a6631c",
            "host": "keybase.io",
```

Globally consistent key server (CONIKS)



Error UI with consistent key servers





Cryptographic append-only logs

Invariant: can only add data, not delete

More formally: $v_i = v_{i-1} \,||\, X_i$

Current version

Previous version

New data

Questions & concerns

Bystander effect: Why check when others will?

Too-big-to-fail: Equivocation is detected. Now what?

My word vs. yours: Users claim misbehavior. Now what?

Trust: I know my company is honest. Why prove it?

Thanks!

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