Why there are no secure messaging apps

Or other obviously distributed problems

Dean F. Valentine Jr., Tox Developer

October 12, 2018

What the fuck happened?

The internet has yet to develop a coherent system of sending messages between people.

So far, we have a few mature options:

- Proprietary, centralized services that host and coordinate (Skype, Discord, Etc.)
- End to End Encrypted, but still centralized messengers (Signal) (Matrix)
- Open source messengers that simply permit hosting your *own* centralized servers with logs of all chat (IRC)

It makes you feel bad for the Chinese.

Basic, human messaging is the perfect application for distributed systems. It is a process that, in principle, should require only the parties that intend to do it. Beyond NAT traversal, the idea that any other servers need to be involved in transporting your text messages to another human being is incomprehensible.

All of these messaging systems have one or more of the following flaws:

- They allow the hoster of the service to collect chatlogs.
- They allow the hoster to collect metadata.
- They enhance the censhorship capabilities of powerful actors by committing everyone to a single server/service.
- They require trusting the hoster of the server not to be a dick.

So, why has the internet — a technology for instant communication — not created a good platform for actual communication?

The answer is: There is no incentive to do it.

Any disributed platform that truly solved this problem would have no avenue for the creator to benefit from their position as developer.

Consider what there would be left if someone actually did a good job in protecting groupchat communication:

- There would be no way for the NSA or CCAC to spy on their citizens :(
- There would be no way for a company to sell chatlogs to third parties :(
- Metadata collection and parsing the userbase for relationships would be difficult :(
- There would be no way for infrastructure owners to silence people they didn't like :(

Clearly it would be very unfortunate if anyone ever *did* come up with a good messanger app.

After all, consider all the GOOD that has come out of services like Discord :D

- Your government now has a collection of all of its citizens correspondences so they can Stopping Terrorism™
- It is infinitely easier for private actors to learn what, and when, and with whom you communicate
- Sending a secure E2E Encrypted message to even a single individual requires trusting a third party with the metadata and using proprietary software
- And for most good groupchatting, these services now provide a nice compulsion for backdoored proprietary software to be included even on your linux machines :D

Section 2

I think we can all agree this development has been great. But what should we look out for to make sure this powerbalance is never upset?

Well, let's consider what a BAD messaging app would look like.

- An EVIL messaging app might avoid servers as much as possible, relying on trustless meshnets and self organizing swarms to connect users.
- It might use end to end encrypted messaging to make sure communications were authenticated and confidential.
- It might also prevent unassociated third parties from learning identifying information about users.

Sadly, there seems to be a development on this front.

There is a messaging app called Tox that has been in development for the last few years with the sole purpose of depriving Paul Nakasone of his hard-earned civil liberties violations.

It is an open source, peer to peer messaging library that enables the exact kind of communications protocol that we've been worrying about.

Tox is an underbelly for several GUI/CLI clients like qTox, toxic, and Ricin that let people message each other over the WORST way possible. One that is end-to-end encrypted, completely peer to peer, and devoid of any centralized administrators.

Tox has solved the problem of fully, non-federated peer to peer messaging by using a Distributed Hash Table to manage userid's and public keys.

1. First, clients generate a long-term public key used as a "Tox Address".
2. These IDs are announced to the network via onion routing.
3. In order to talk to a Tox user, one sends a friend request to that Tox Address over the onion network.
4. Once they accepts the friend request over that onion network, both hosts negotiate a second Public/Private keypair for direct IP—IP communication.
5. They announce those private temporary public keys to the self-organizing swarm of tox nodes, and use them to find each other and communicate.
6. If the users cannot directly connect to one another's PC's, they use NAT Traversal over those messenger nodes in the network to bypass this.

Fortunately, the current network has several problems.

- There is no offline messaging; meaning, you can't send messages to a friend while they're offline, turn your computer off, and still have them arrive.
- The groupchats are not persistent — Just like IRC, you can't send messages if you don't have a bouncer that retrieves them automatically.

Unfortunately, these things will not be a problem forever.

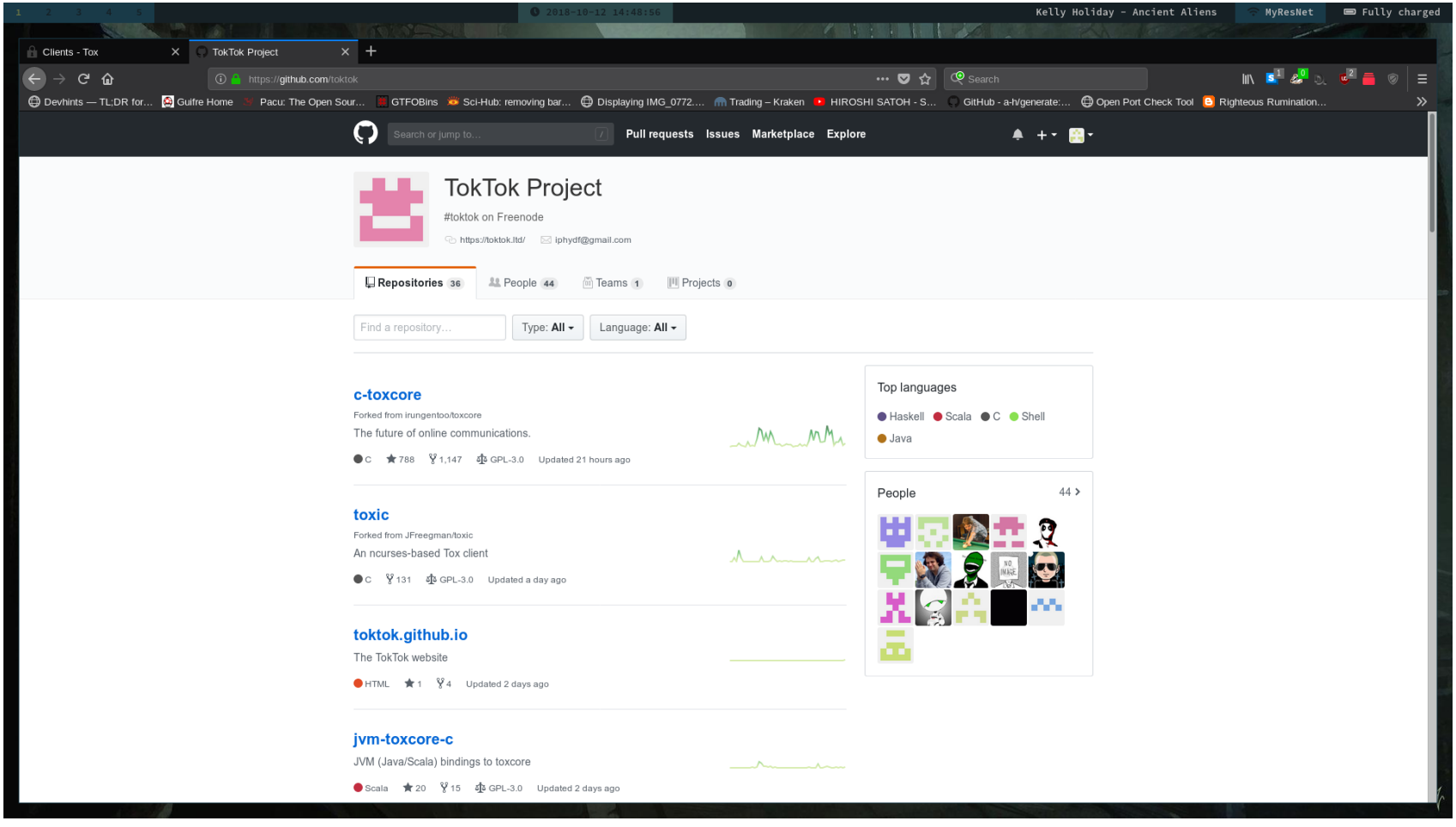
Freenet has already solved the problem of offline, anonymous, decentralized data storage and a Rust or C implemmentation would make the above features trivial.

Section 3

What should I NOT do to help prevent this from happening?

I think it'd be a good idea to explain exactly what we shouldn't be doing to prevent this freedom situation from getting worse.

There are public repositories on github for both the rust and C toxcore implemmentations.



DO NOT CONTRIBUTE TO THESE.

Here is list of some of the things you SHOULDN'T contribute to that above github organization, TokTok, at `https://github.com/toktok/`:

- The marked work on new features, like New Groupchats, and Offline messaging
- Clear, concise, specific bug reports or suggestions in the issue box
- Easy fixes for any of the issues in the c-toxcore or rs-toxcore issue list.
- Useful, efficient, self-documenting code improvements
- Improved or new unit and integration tests

And *DEFINITELY* don't help improve any of the several interfaces and clients like Toxic, qTox, Toxygen, Antox, and Antidote, by improving their ease of use or encouraging design improvements.

If you're not comfortable programming or using git, you can still mess up by:

- Contributing to the wiki at `https://wiki.tox.chat/`
- Using github's edit feature to submit pull requests for the website at `https://tox.chat`
- Improving or clarifying documentation of Tox's core protocol specification
- Shilling it to other programmers or users to the project, as I am doing now

Remember — Only hard libertarians, tech people and stallmanites would go through the agony and social discomfort of installing or recommending a second chat service. Think of all the cool funny messages Discord shows you when you're loading its spyware. Think of all the targeted advertising. What would you do without targeted advertising?