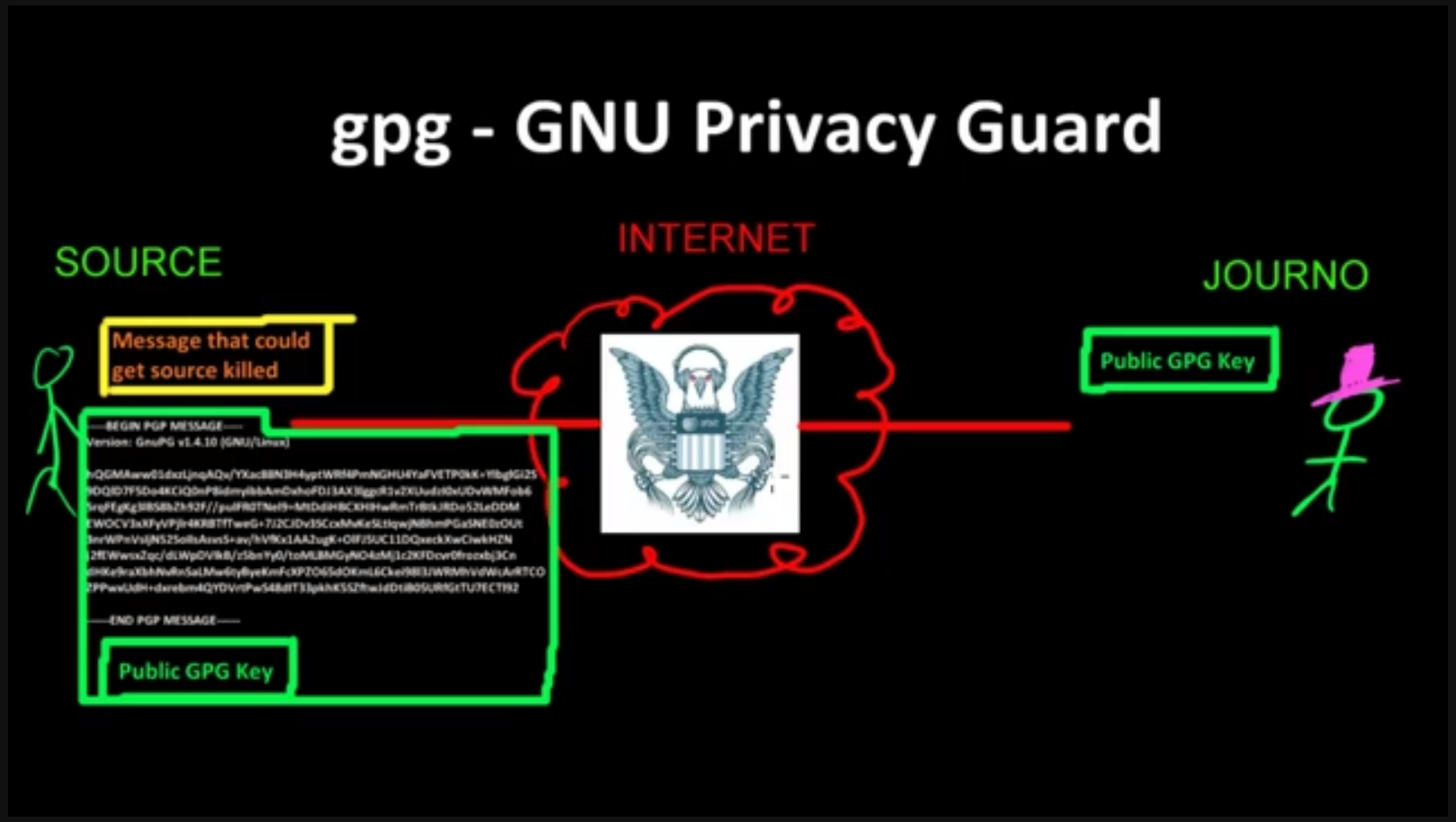
BitmasK: encryption for mere mortals

FOSDEM 2018

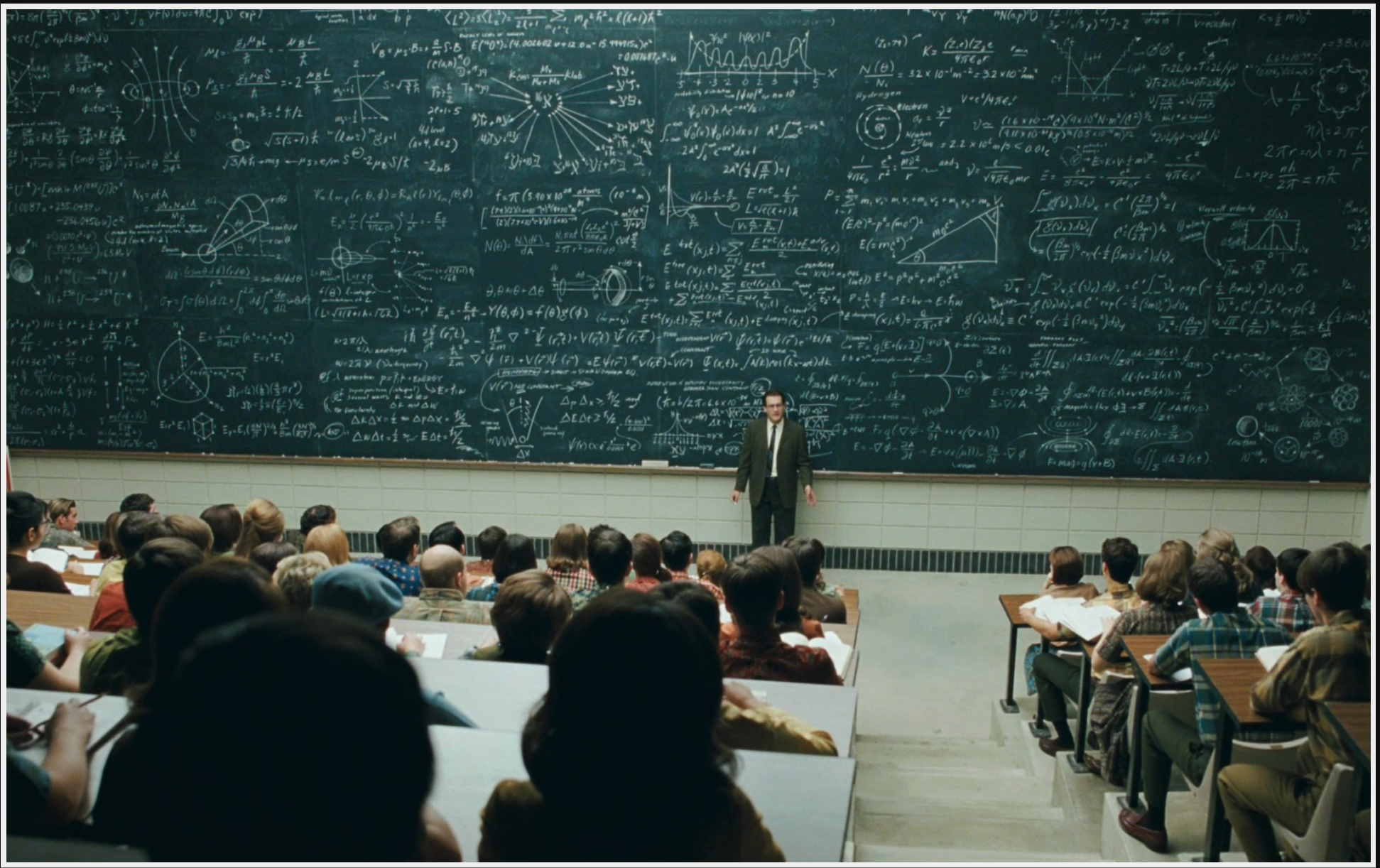
kali - meskio - kwadronaut

https://leap.se

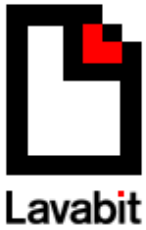
Problem: encrypted email is ...complicated


gpg - GNU Privacy Guard
SOURCE
INTERNET
JOURNO
Message that could get source killed
-----BEGIN PGP MESSAGE-----
Version: GnuPG v1.4.10 (GNU/Linux)
-----END PGP MESSAGE-----
Public GPG Key
Public GPG Key


HOW TO USE PGP TO VERIFY THAT AN EMAIL IS AUTHENTIC:
LOOK FOR THIS TEXT AT THE TOP:
REPLY
-----BEGIN PGP SIGNED MESSAGE-----
HASH: SHA256
HEY,
IF IT'S THERE, THE EMAIL IS PROBABLY FINE.




Problem:
providers



Lavabit

My Fellow Users,

I have been forced to make a difficult decision: to become complicit in crimes against the American people or walk away from nearly ten years of hard work by shutting down Lavabit. After significant soul searching, I have decided to suspend operations. I wish that I could legally share with you the events that led to my decision. I cannot. I feel you deserve to know what's going on--the first amendment is supposed to guarantee me the freedom to speak out in situations like this. Unfortunately, Congress has passed laws that say otherwise. As things currently stand, I cannot share my experiences over the last six weeks, even though I have twice made the appropriate requests.

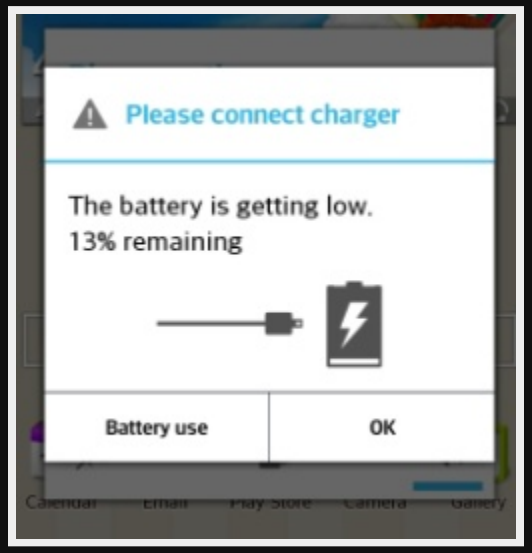
What's going to happen now? We've already started preparing the paperwork needed to continue to fight for the Constitution in the Fourth Circuit Court of Appeals. A favorable decision would allow me resurrect Lavabit as an American company.

This experience has taught me one very important lesson: without congressional action or a strong judicial precedent, I would _strongly_ recommend against anyone trusting their private data to a company with physical ties to the United States.

Sincerely,
Ladar Levison
Owner and Operator, Lavabit LLC

Defending the constitution is expensive! Help us by donating to the Lavabit Legal Defense Fund here.

Peer to peer?


Please connect charger
The battery is getting low.
13% remaining
Battery use
OK

Better federation!

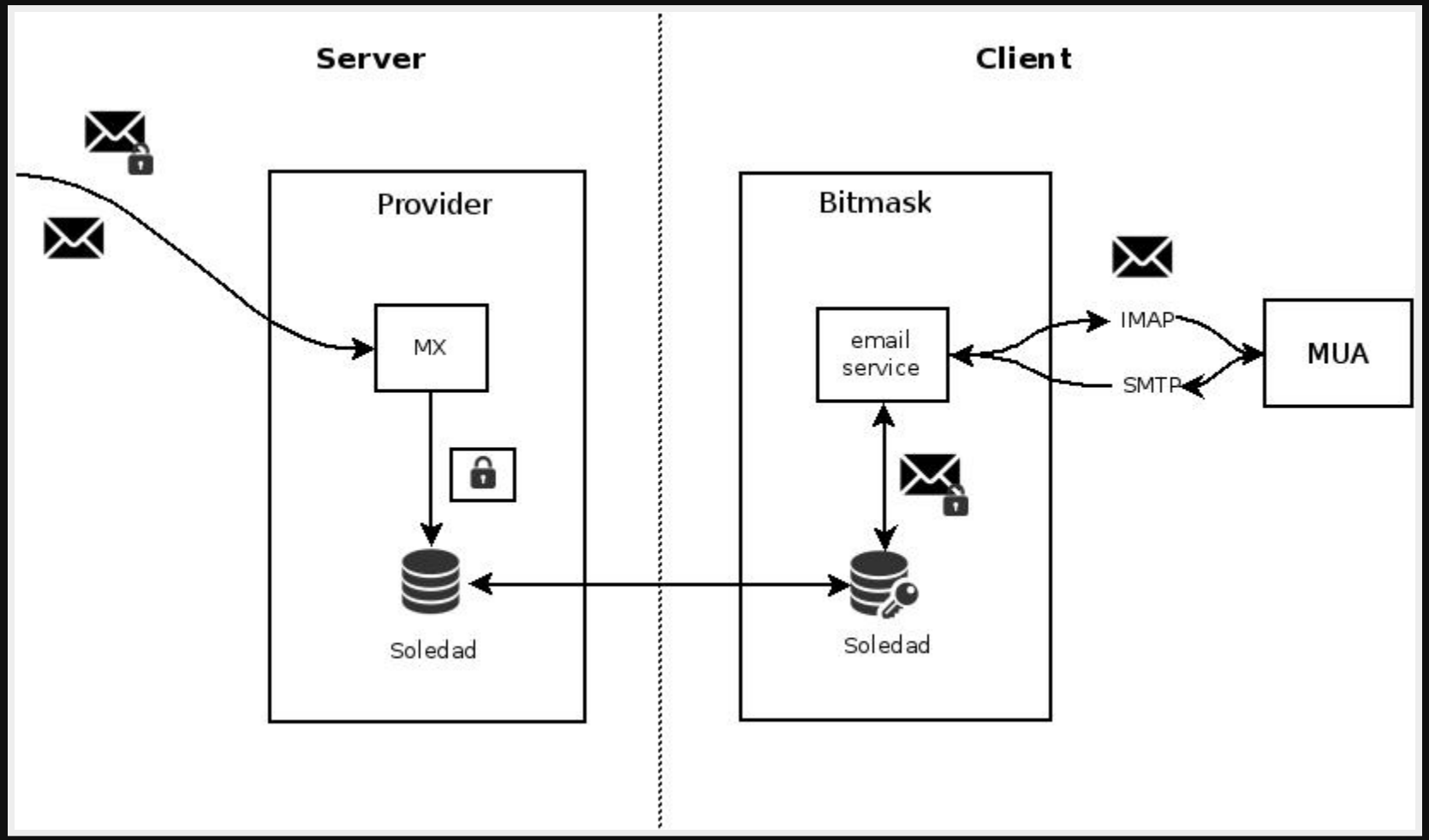
- Protect providers from their users
- Protect users from the provider

What does LEAP do?

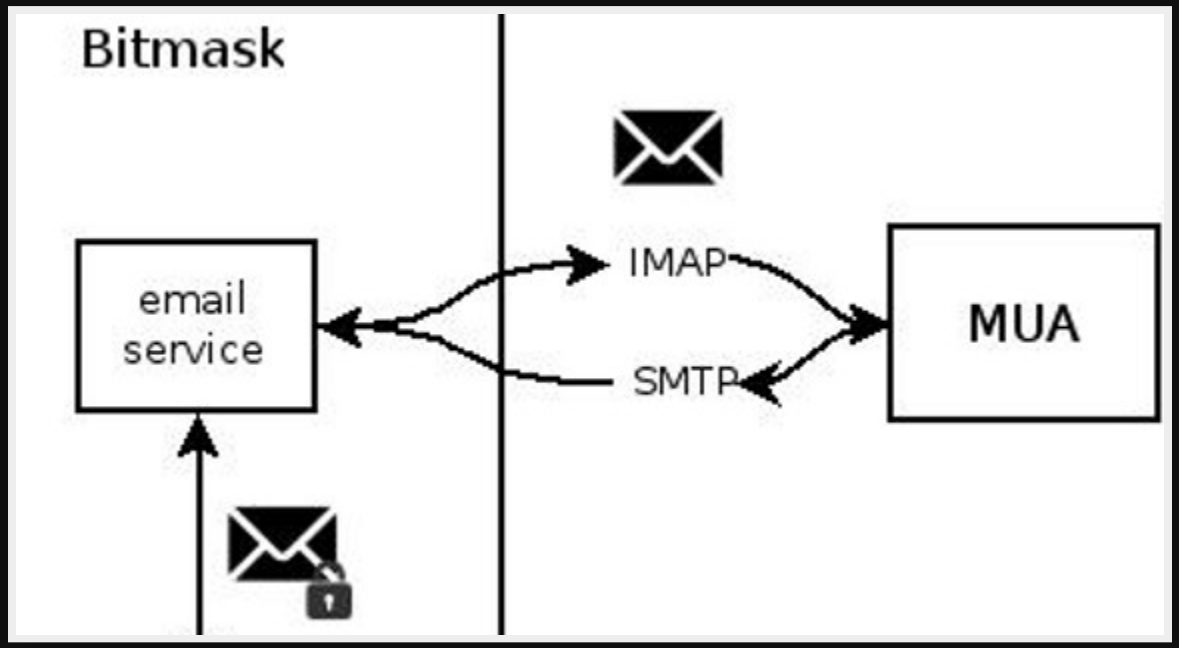
- **LEAP Platform:**
  toolkit to make it easier to run a service provider
- **New protocols:**
  so no need to trust your connection provider
- **Bitmask client:**
  smooth working client with compatible providers

leap mail service

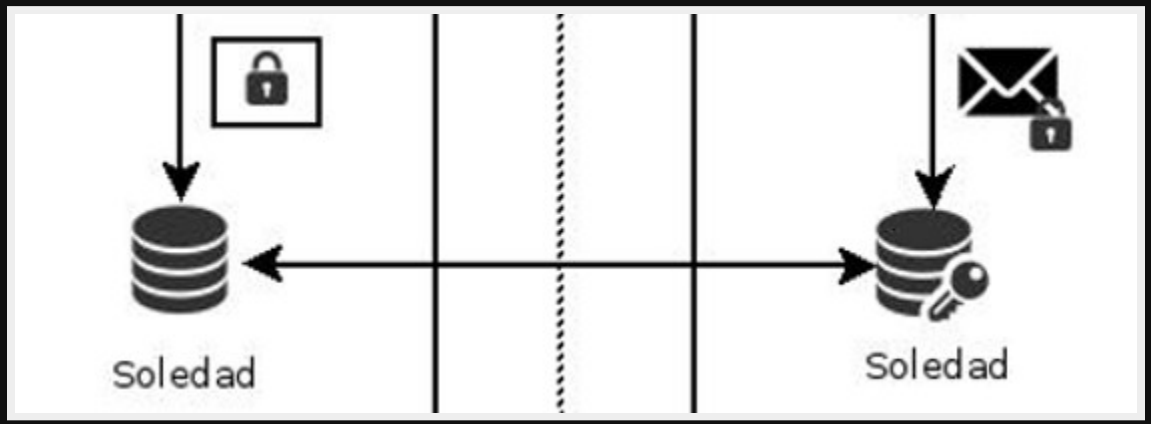
- End-to-end encryption
- Backwards compatible with email and current OpenPGP usage
- Service provider has no access to user data
- Automatic key discovery and validation
- Cloud synchronized for high availability on multiple devices


Server
Client
Provider
MX
Soledad
Bitmask
email service
IMAP
SMTP
MUA
Soledad

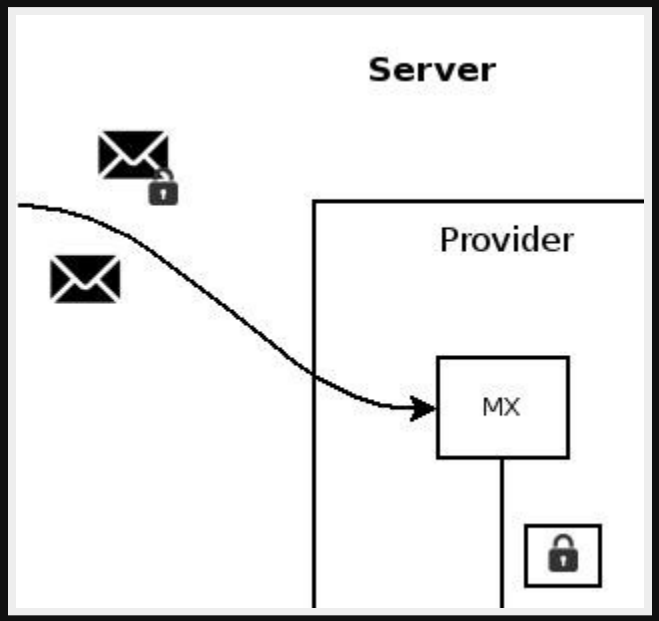
email service

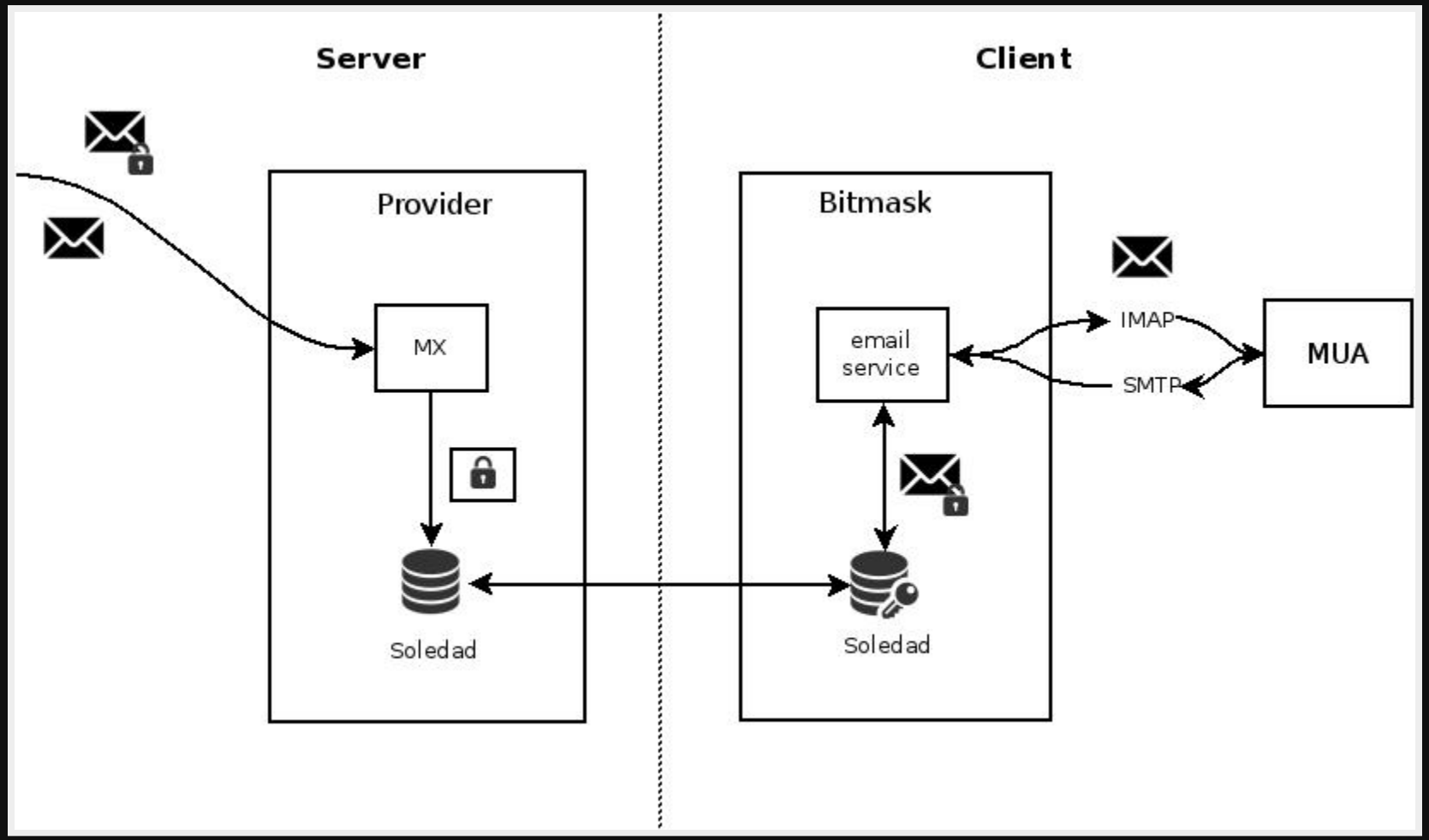


soledad



mx




Server
Client
Provider
MX
Soledad
Bitmask
email service
IMAP
SMTP
MUA
Soledad

transitional key validation

generic rules for automatic key management,
transition from TOFU to more advanced ruleset.

- bind key <-> email address
- key directory
- endorser (provider)
- binding info: evidence for "educated guess"
- verified key transition (automatic)

[leap.se/en/docs/design/transitional-key-validation]

TOFU

With a bunch of exceptions

1. First Contact

When one or more keys are first discovered for a particular email address, the key with the highest validation level is registered.

2. Regular Refresh

All keys are regularly refreshed to check for modified expirations, or new subkeys, or new keys signed by old keys.

This refresh SHOULD happen via some anonymizing mechanism.

3. Key Replacement

A registered key MUST be replaced by a new key in one of the following situations, and ONLY these situations:

- Verified key transitions.
- If the user manually verifies the fingerprint of the new key.
- If the registered key is expired or revoked and the new key is of equal or higher validation level.
- If the registered key has never been successfully used and the new key has a higher validation level.
- If the registered key has no expiration date.

VPN

- Prevent eavesdropping.
- Circunvent internet censorship.
- Prevent leaks (DNS, IPv6, ...).

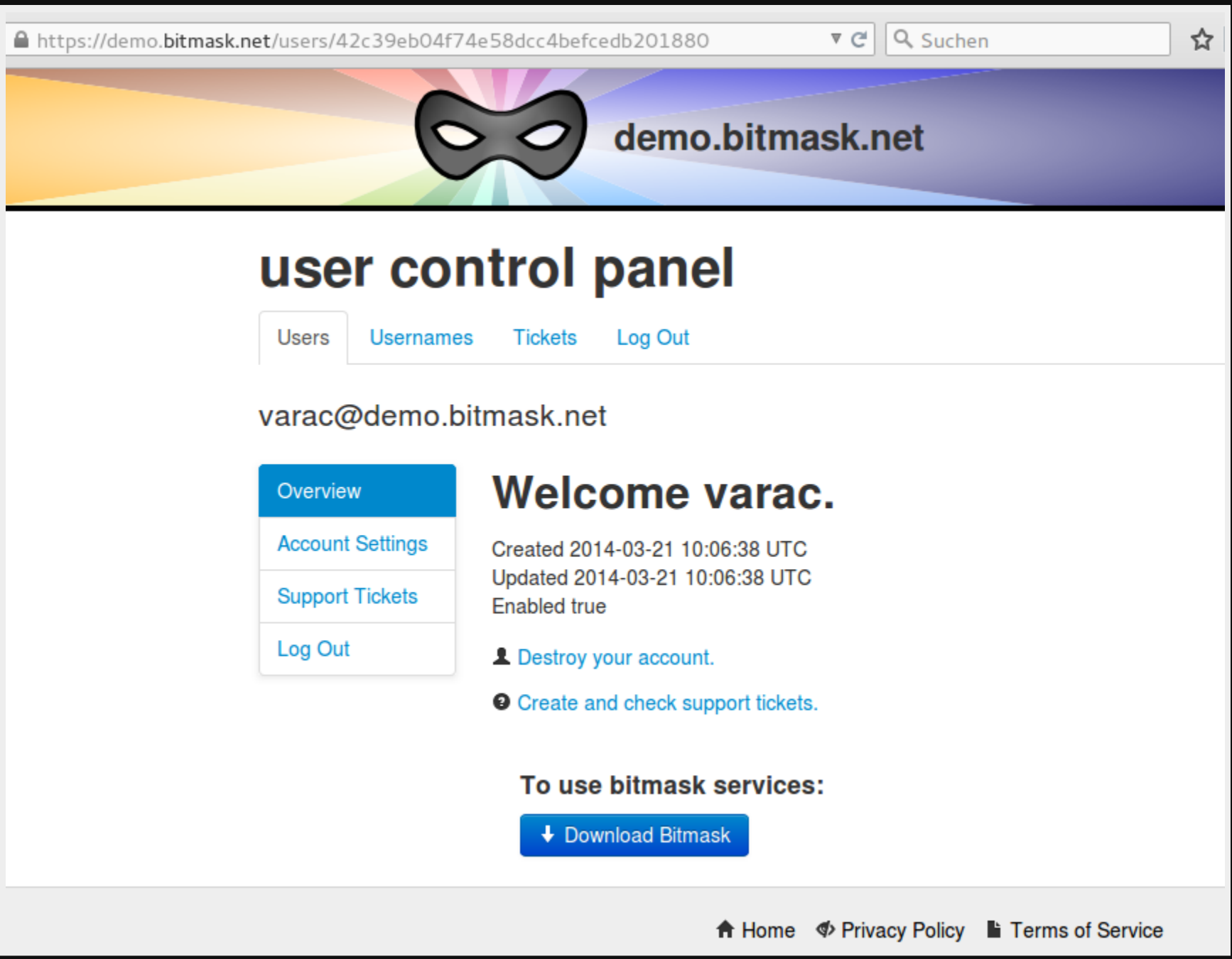
LEAP platform

```
sudo gem install leap_cli
leap new example --domain example.org
cd example
leap add-user --self
leap cert ca
leap cert dh
leap cert csr
leap node add blueberry services:openvpn \
     ip_address:1.1.1.1 openvpn.gateway_address:1.1.1.2
leap node add raspberry services:couchdb,webapp \
     ip_address:1.1.1.3
leap init node
leap deploy
```

sysadmins are human

and deserve usability too

"leap deploy"


https://demo.bitmask.net/users/42c39eb04f74e58dcc4befcedb201880
Suchen
demo.bitmask.net
user control panel
Users
Usernames
Tickets
Log Out
varac@demo.bitmask.net
Overview
Account Settings
Support Tickets
Log Out
Welcome varac.
Created 2014-03-21 10:06:38 UTC
Updated 2014-03-21 10:06:38 UTC
Enabled true
Destroy your account.
Create and check support tickets.
To use bitmask services:
Download Bitmask
Home
Privacy Policy
Terms of Service


your right
to whisper
leap.se

show me the code!

https://0xacab.org/leap/

- ~10 important repos
- GPL code

current state

Email Beta (0.10...)

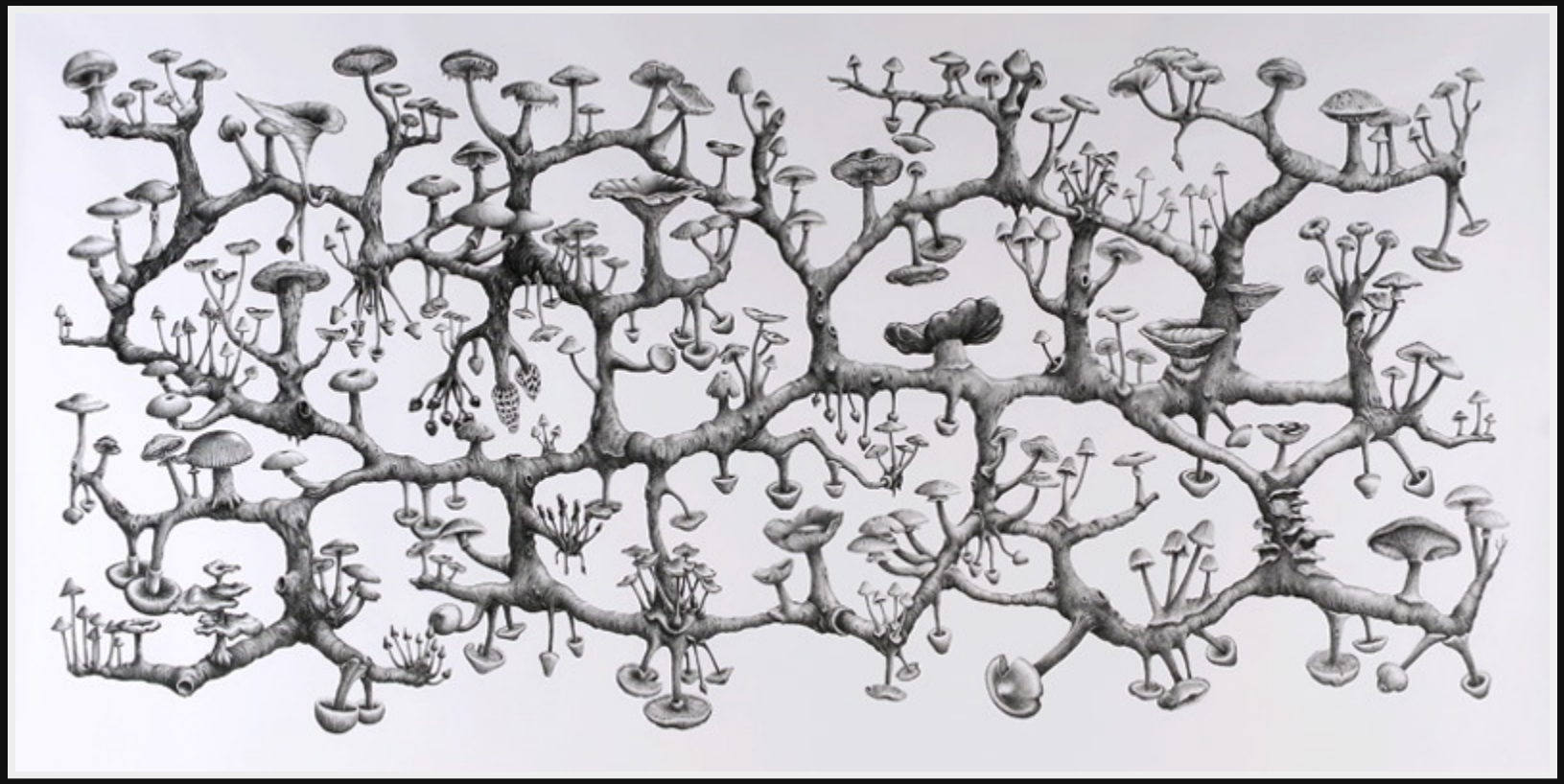
works on Linux

Bitmask VPN

works on Linux && Android

next steps

- OSX and windows



let a thousand providers bloom

thanks! questions?

https://bitmask.net

https://leap.se

katzenpost.mixnetworks.org


Bitmask
Encrypted communication for mere mortals
(superheroes welcome, too)
Home
Features
Install
Help
English
Español
Português
Русский
Bitmask is an open source application to provide easy and secure encrypted communication. You can choose among several different service providers or start your own. Currently, Bitmask supports encrypted internet (VPN) and encrypted email.
Download Bitmask

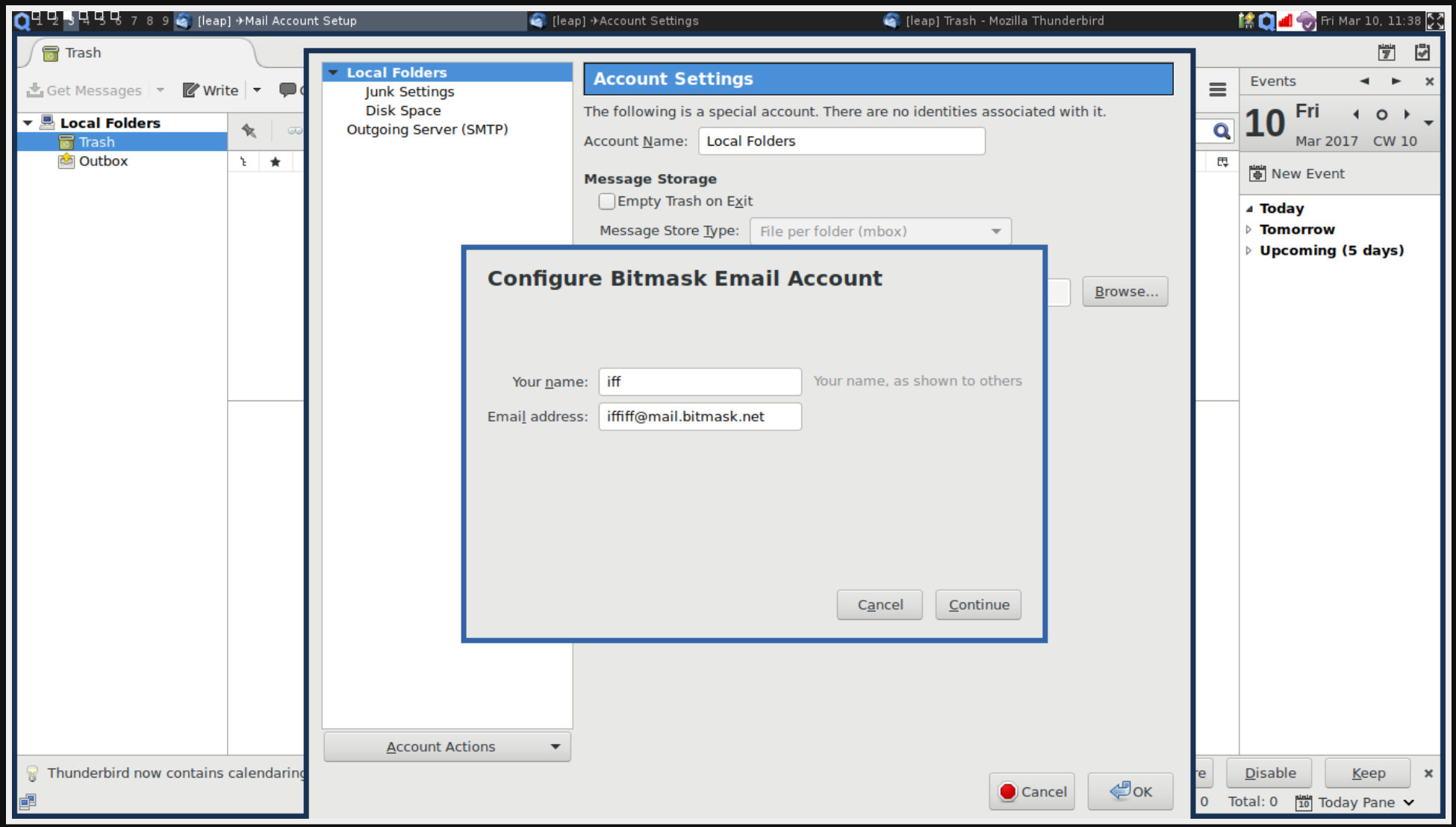
Bitmask Thunderbird Extension

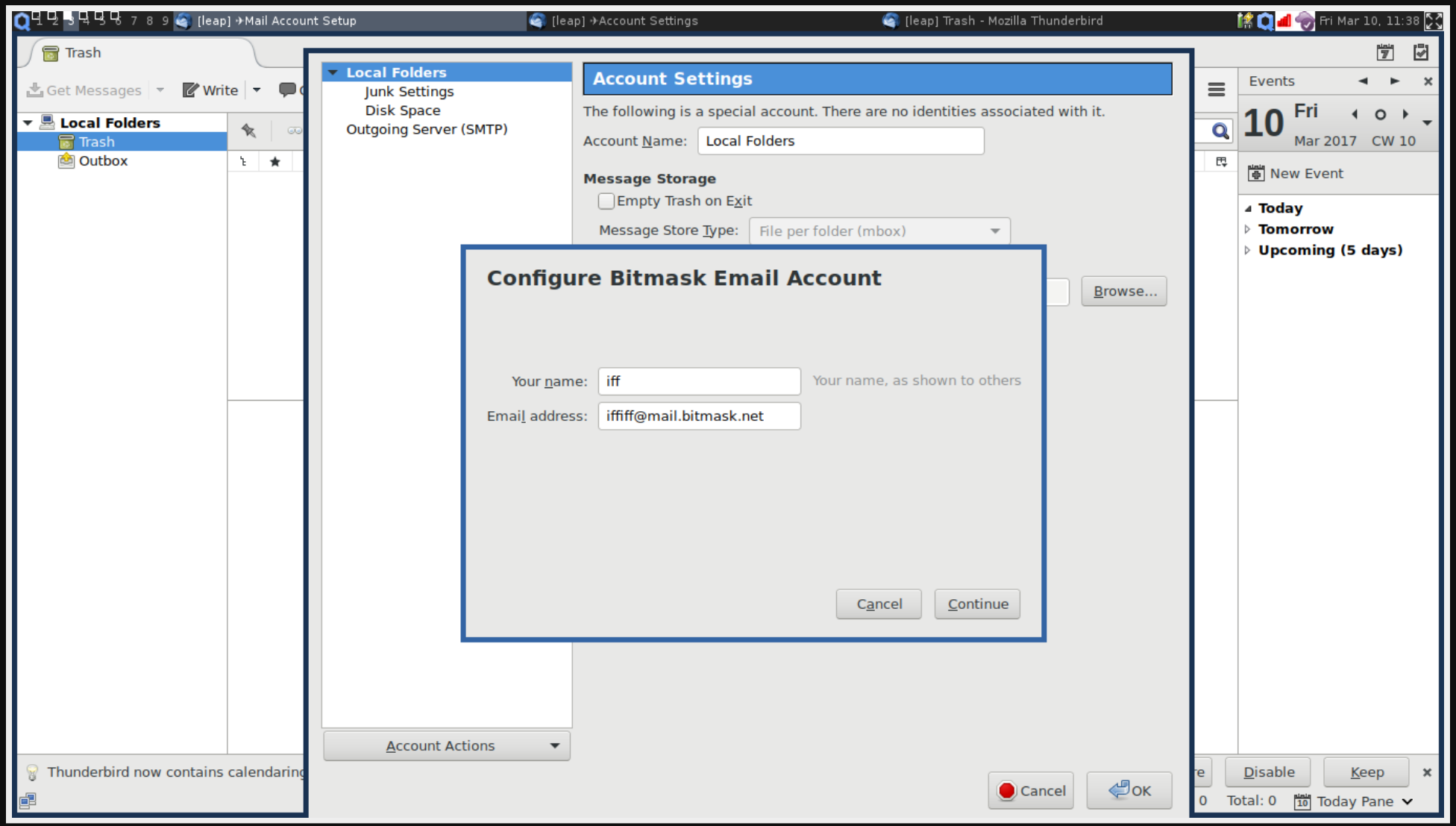
REQUIRES RESTART

After installing the extension, do the following:

1. Make sure that Bitmask is running and you are logged in.
2. In Thunderbird, click the main menu, then "Preferences" - "Account Settings".
3. Click "Account Actions" - "New Bitmask Account...".

★★★☆☆ (1) · 286 users


[leap] Mail Account Setup
[leap] Account Settings
[leap] Trash - Mozilla Thunderbird
Fri Mar 10, 11:38
Trash
Get Messages
Write
Local Folders
Trash
Outbox
Thunderbird now contains calendaring
Local Folders
Junk Settings
Disk Space
Outgoing Server (SMTP)
Account Actions
Account Settings
The following is a special account. There are no identities associated with it.
Account Name:
Local Folders
Message Storage
Empty Trash on Exit
Message Store Type:
File per folder (mbox)
Browse...
Configure Bitmask Email Account
Your name:
iff
Your name, as shown to others
Email address:
iffiff@mail.bitmask.net
Cancel
Continue
Cancel
OK
Events
10
Fri
Mar 2017
CW 10
New Event
Today
Tomorrow
Upcoming (5 days)
Disable
Keep
Total: 0
Today Pane


[leap] Mail Account Setup
[leap] Account Settings
[leap] Trash - Mozilla Thunderbird
Fri Mar 10, 11:38
Trash
Get Messages
Write
Local Folders
Trash
Outbox
Thunderbird now contains calendaring
Local Folders
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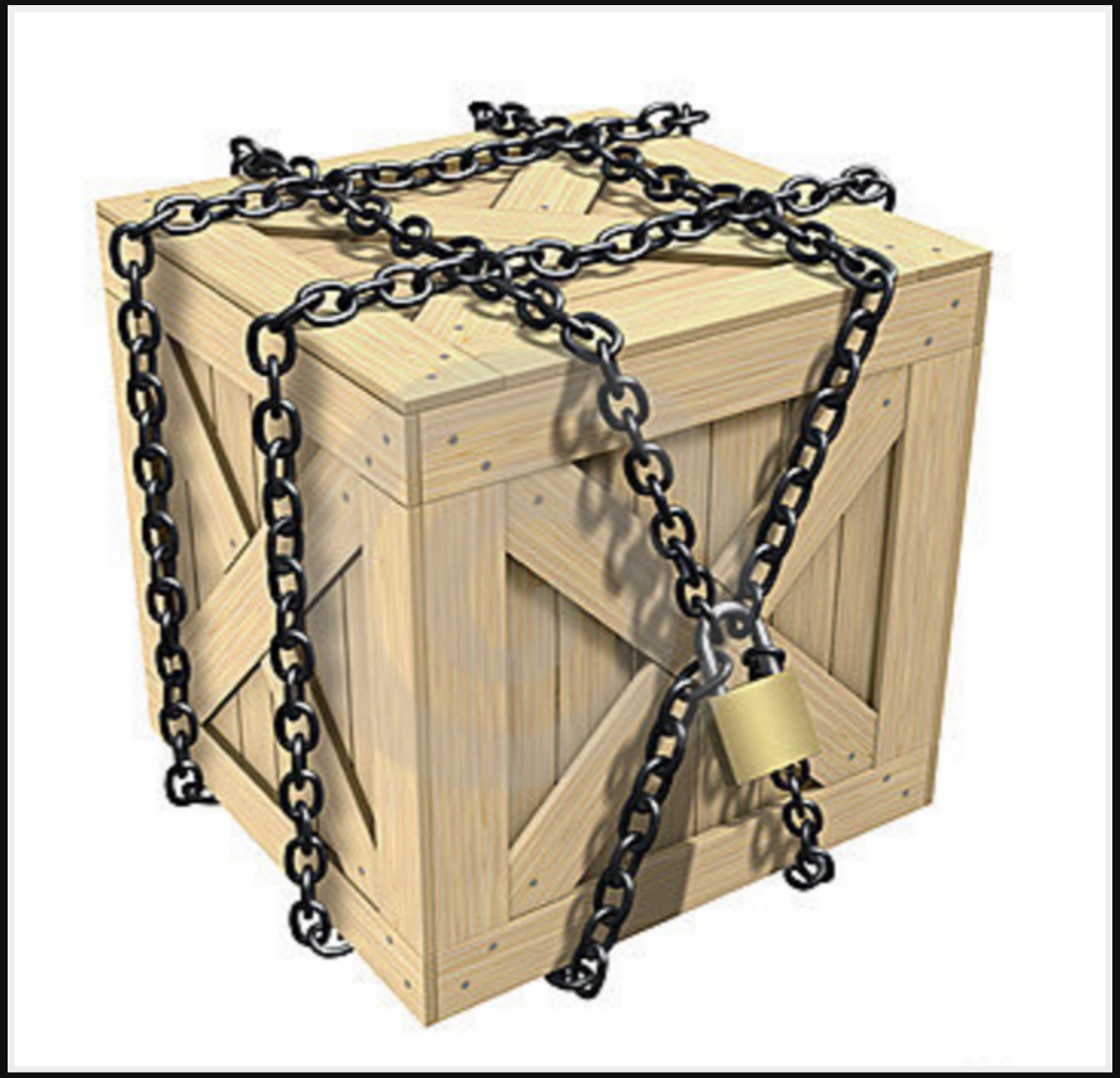
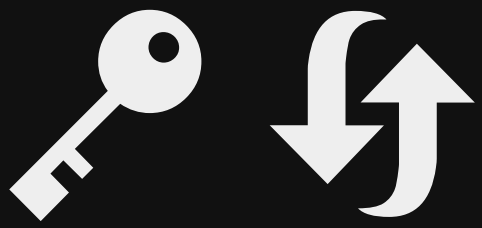
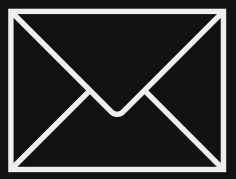
Account Actions
Account Settings
The following is a special account. There are no identities associated with it.
Account Name:
Local Folders
Message Storage
Empty Trash on Exit
Message Store Type:
File per folder (mbox)
Browse...
Configure Bitmask Email Account
Your name:
iff
Your name, as shown to others
Email address:
iffiff@mail.bitmask.net
Cancel
Continue
Cancel
OK
Events
10
Fri
Mar 2017
CW 10
New Event
Today
Tomorrow
Upcoming (5 days)
Disable
Keep
Total: 0
Today Pane



2. ability to use multiple devices



Synchronization Of Locally Encrypted Data Among Devices

data =  + 

bitmask keymanager
requires no user interaction

interoperability is a must

many projects converging

(Watch AUTOCRYPT: Enigmail, K9, Mailpile, Bitmask)

SOLEDAD

- Synchronization of Locally Encrypted Data Among Devices
- auth: srp
- kdf: scrypt
- AES-256-GCM
- built on top of canonical's u1db
- vector clocks
- clientside: sqlcipher backend
- serverside: couchdb cluster

Problem: Attachments

- Syncing blobs in a convoluted store
- Pluggable BlobsIO backend for server (in dev)
- FS as MVP, others welcome!

Validation levels

low == less trust on the source

1. Weak Chain

sks key servers, email attached key, OpenPGP header, ...

2. Provider Trust

webfinger, provider mailvelope

3. Provider Endorsement

NickNym

4. Historical Auditing

CONIKS, google's transparent keyserver

5. Known Key

client pinned keys

6. Fingerprint

manual verification