

Take Back Your Privacy With Hush

Duke Leto duke.leto.net hush.is

What Is Hush?



- Magic Internet Money
- Private Chat Platform
- Store-of-Privacy

- mainnet launched 2016
- Global Community
- i18n ~ 20 langs

How Is Hush Like Bitcoin?

```
// Copyright (c) 2009-2010 Satoshi Nakamoto
// Copyright (c) 2009-2014 The Bitcoin Core developers
// Copyright (c) 2016-2020 The Hush developers
// Distributed under the CPLv3 software license, see the accompanying
// file COPYING or https://www.gnu.org/licenses/gpl-3.0.en.html
```

- Based on Bitcoin 0.11.2
- No Company, Decentralized Community
- 21M Total Supply
- Halvings every four years
- Hush extends Bitcoin Protocol
- Mine with ASICs
- wallet.dat works very similar
- Compatability at many layers
- Store-of-Value \Longrightarrow Store-of-Privacy

Duke Leto hush.is/privacy

How Is Hush different?

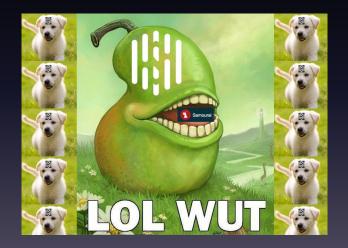


- Alice sends Bob money
- Alice's address is private!
 - Bob's address is private!
- The amount sent is private!
- Encrypted memo field is private!
- The number of recipients is private!
- Plausible Deniability
- 75 seconds vs 10 minute blocktime

F / CO

Duke Leto hush.is/privacy

Bitcoiners Pay Extra For Privacy



How Is Hush different?

You must use privacy, it's no longer optional!



- Everyone must use privacy, no choice
- Best practices are automated
 - Only can send to a zaddr (z2z)
 - Send to multiple addresses (Sietch)
 - P2P encryption mandatory (TLS 1.3 Only!)
- How much money was sent?
- How many people received funds?
- Was encrypted additional information sent?
- "Herd immunity" to metadata attacks

Duke Leto hush.is/privacy

How Is Hush different?

Herd immunity is network-wide resistance to metadata attacks.



- Sietch adds non-determinism
- Your neighbor isn't doxxing you all day
- You are responsible for your privacy, not others
- Privacy increases with time, anonset \ \
- XMR anonset is per-tx (small), decreases w/ time
- HUSH anonset is network-wide
- HUSH anonset is non-decreasing on average
- HUSH anonset \gg ZEC anonset
- HUSH: 1st privacy coin w/ real-time anonset stats

Zcash "Privacy"

Design new Elliptic Curve using Barreto-Naehrig construction

Implement new zk-math in efficient Rust code with memory-safety guarantees

Optimize shielded Sapling addresses to be fast as hell and use very little RAM



Allowing transparent addresses as the default transaction type

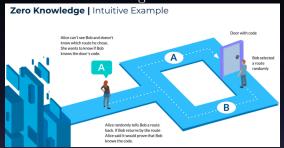
The Zcash Mind Prison Clown



Invented new Zero-Knowledge math but don't use it!!!

Hush Zero Knowledge Math

The Magic Sauce



- Zero Knowledge Proofs
- Invented in 1985, just became "usable"
- zk-SNARKs (close to 100 kinds)
- Zero Knowledge Succinct Non-Interactive Arguments of Knowledge
- Prove X is true, without saying anything about X
- Elliptic Curves, Fields, Group Theory

Duke Leto hush.is/privacy

zk-SNARKs



New atom for building privacy software

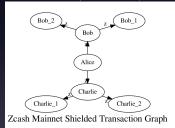
- One "flavor": Zcash Protocol built on them
- Monero uses older math that leaks metadata
- There are others, like zk-STARKs/etc
- Hush Protocol is an improved Zcash Protocol
 - Same exact cryptographic primitives
 - We enforce their use
 - First blockchain to use Sapling zaddrs exclusively
 - All our privacy is inside one "pool"

Duke Leto hush.is/privacy

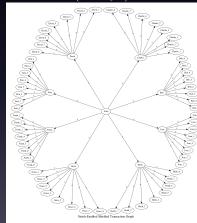
Sietch

attackingzcash.com

Zcash z2z (optional)



Hush z2z (always)



An underground fortress for every transaction!

Sietch



Attacking Zcash Protocol For Fun And Profit Whitepaper Version 0.6

Duke Leto + The Hush Developers†

February 9, 2021

Abstract.

This paper will outline, for the first time, exactly how the ITM Attack (a Inslability attack against shielded transactions) works against Zeash Protocol and how Bash in the first reptroctor with a defendance mitigation against it, called Steeks'. Seach is already nurning live in production and undergrape rounds of improvement from expert feedback. This is not an academic paper about pipedreams. It describes readulation code and reheroids.

We begin with a literature review of all known metadata attack methods that can be used against Zachs Protocol beliefschains. This includes their entirous datack costs and through model. This paper then describes the TTM Attack which is a specific instance of a new class of mendata attacks against blockchains which the author describes as Metaverse Methodata Attacks.

The paper then explains Storts in detail, which was a response to these new attacks. We hope this new knowledge and those yellow proposition throwate brite drivense against very well-instead adverse.

same including nution sistes and custs analysis comparises. A few other new princip source and metadoa sities, against Zeash Protocol coins will also be esumenous for the first time publicly. The ideas in this paper apply to all or protocons which utilize transaction graphs, which is no sign at load all flowers comes, Specifically, the beforesser debuildad calls out comparises which is no sign at load all flowers comes, Specifically, the beforesser debuildad calls out comes and the sign and the

In privacy adust we trust.

If dust can attack us, dust can protect us.

Keywordic anonymity, zoash protocol, cryptographic protocols, zic-SNARKs, metadata leakage, deanonymization, electronic commerce and payment, financial privacy, zero knowledge mathematics,

Contents

1 Introduction

hunh is, https://fersbook.io/dulerlets, THE2 HE4 C23F 98H 259C 73HA 6DEC BERG SA4D 60

Атакуем Zcash Протокол Ради Забавы И Выгоды Whitepaper Version 0.6

Duke Leto + Hush Разработчики †

7 марта 2021 г.

Краткий обзор.

Данный документ, изгреме, опшист как посино рабочет ITM Атака (опсилеваемская влака протим заявилізмах треплевацій) против Севай Проговола и Нявія нак перето ариатеваемску межецую Sitetch - силтемне Окронительного зарактера против данной анака. Sixth умо робочент в запроцена, так же проходят узивам улучаенням по отмос отвыное экспертов. Это не порчима синты о

Мы вачими с облоро уполняваний о способе втак зитадинаке, которые знеут бить испласимыны против Болосчейков Протовола Zoudi. Будет включена столноста, данной влаки и выдоль угро. Двеумент далее оплавет ЧТМ Атаку², издолносае меняретами приохром невето клюсо атом методинаке против блего-ейное, который автор сензит заке Mottwerne Methodia Attucks. Песстветт далее объязател безей на автилис ут облаго ответстве по празобне авталь. Мы вызочнос

физионеровных прило, выполным выправление последуется к попазана запиноментом анализм состоям.

— по принаментом предоста перерессии пересом предоста предоста Генера (предоста Генера (предоста

детально описывногось, ком применять методы к их боск-чейнам.
Мы верны и привитность идия
Если вълах (феф) монот ятаковять нис, яваль мовот запритить нис.
- Sixch Mottos

Keywords: анишивають, протовол есней, приптографетеские протоволы, 16-SNAR6s, утечно менаданных, доможновающих, эксперанные воможрация и оплать, финансовки принтигаеть, мисзанные справаным распланенным, диважбенным-ть, гарафия грасскаецій, деварабленняе грасска

Содержание

1 Became

⁷ bank is, https://keybase.io/dukeleto, F162 19F4 C23F 9111 289C T34A SDFC BPSE 5A4D 8059

Duke Leto hush.is/privacy

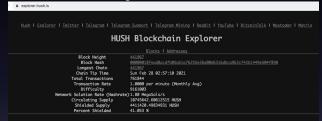
If You Are Not Paying For Privacy...

You Don't Have Any!



How Is Hush different?

explorer.hush.is



- Extreme Privacy Block Explorer
- No Javascript (client or server)
- No Images (web bugs)
- Tor Hidden Service Available
- Doesn't doxx you

Duke Leto hush.is/privacy

How Does Hush Build Upon Bitcoin?

Hush is at Layer 2



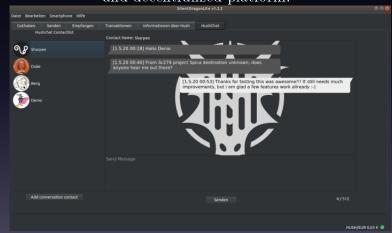
- Lightning Network
- Bisq Decentralized Exchange

We don't compete with Bitcoin, we build upon it.

Duke Leto hush.is/privacy

What Is HushChat?

HushChat is an encrypted chat messaging protocol and decentralized platform.



Like Signal Protocol on a blockchain, with ratcheting.

What Is HushChat?

	Hush	Signal	// wickr	Threema.		Telegram
Open Source Client and Server	*	×	×	×	×	×
E2EE 1-1 and Group chats	~	~	~	~	~	×
No Phone number or Email registration	~	×	~	~	×	×
Onion routing/IP Address masking	4	×	×	×	×	×
Decentralised Servers	~	×	×	×	×	×

- HushChat Protocol is an encrypted chat messaging protocol and decentralized platform.
- Signal Protocol with zaddrs not phone numbers
- We don't use Signal code.
- Proud libsodium user! Unlike Zcash...

What Is HushChat?



Signal

- Signal Protocol
- Centralized
- Phone Numbers
- Closed Source Server
- Uncle Sam backdoors

HushChat

- HushChat Protocol
- Decentralized
- Shielded Addresses
- GPLv3 Free Software
- ??? backdoors?

Duke Leto hush.is/privacy

Who Profits From

Surveillance?



- MFAANG (MSFT,FB,Amazon,Apple,Netflix,Google)
- Surveillance Valley (Silicon Valley)
- Governments
- Militaries
- Advertisers

Duke Leto hush.is/privacy

Backdoors Everywhere

Disagree? You probably get paid to cover up backdoors.

- Signal Best Protocol, backdoored by USA
- WhatsApp Backdoored by USA
- Wickr- Backdoored by USA
- Threema Backdoored by USA
- Telegram Backdoored by Russia
- WeChat Backdoored by China
- Zoom/KeyBase USA and China, most likely





Duke Leto hush.is/privacy

Who Spies On You?

Depends on your GPS coordinates...

TLDR: Too many people, alphabet soup.

Country

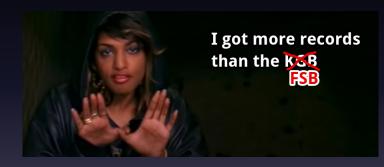
- Australia ASIO
- Canada CSE
- China MSS
- England GCHQ
- ---O-----
 - France DGSE
 - Germany BND
 - USA NSA
- Russia FSB (ΦCB)
- Singapore ISD
 - Spain CNI
- Switzerland FIS

Global Networks

- Five Eyes (FVEY)
- Nine Eyes
- 14 Eyes
- FATF (China+USA+Russia!)



A Rose By Another Name



 \bullet KGB \Longrightarrow FSB

Surveillance Devices

Most tech is designed to surveil and eject metadata in all directions.

You give it for free and it's sold back to you and others.

- "Party Lines"
- Fax machines
- Email
- Mobile Phones (SMS/MMS)
- Web browsers
- Web servers
- Social Media
- Voice Assistants
- Every for-profit tech company

Duke Leto hush.is/privacy

Hush Is Human Rights

United Nations
Universal Declaration of Human Rights
Most governments have not signed this into law.
Code is law on the HUSH blockchain!

Article 12.

No one shall be subjected to arbitrary interference with his privacy, family, home or correspondence, nor to attacks upon his honour and reputation. Everyone has the right to the protection of the law against such interference or attacks.

No government or company can see inside your multiple layers of encrypted data!



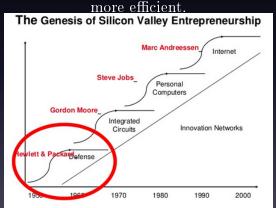
Silicon Valley?

Started by two Stanford professors: Terman (US) + Shockley (UK)

- Preferred Electronic Warfare (EW) contractor
- Best academic research was monetized
- Students invented/improved:
 - Efficient spy planes
 - Advanced Radar Jamming
 - Spy balloons, EME
 - Spy submarines
- Some PhD theses were Top-Secret
- Students went to form the first SV companies
 - Example: Hewlitt and Packard
- Example: "Traitorous 8 "
 - form Fairchild Semiconductor (1957)
 - 2 of 8 leave Fairchild to form Intel

Surveillance Valley

It's alwas been Surveillance Valley, from the start. Silicon made radar and radar jamming drastically

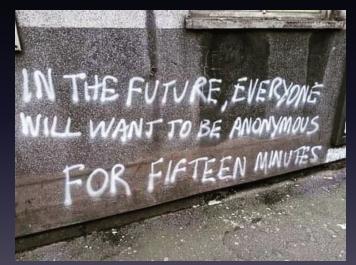


steveblank.com/secret-history/

Duke Leto hush.is/privacy

Hush Is Privacy

Humans had privacy by default 100 years ago.



Now we have surveillance by default.

Duke Leto hush.is/privacy

Hush Is Privacy

Hush delivers privacy in a world of surveillance.



What Data Do They Want?

Anything they can use to control you, market to you and/or sell to others. Which is everything.

- GPS
- IMEI/IMSI
- IP address
- Browser details
- Website URLs
- Emails
- Facebook messages
- Shopping preferences
- Financial records

- "encrypted"chats
- 24/7 camera feeds
- Sentiment (reactions)
- Facial scans
- Voice recordings
- Genetic samples
- Medical records
- Biometric sensors

Duke Leto hush.is/privacy

Hush Is Privacy

Must trust the hardware and software!



Duke Leto hush.is/privacy

Hush + Precursor



HushDroid is cool, but still so many backdoors.

Precursor is amazing new mobile hardware!

Trustable hardware + zero-knowledge math privacy

⇒ Win



Precursor is the best HW in dev for use by Hush.

Privacy By Default

Bleeding-edge Peer-to-Peer (p2p) Encryption

- Transport Layer Security (TLS) 1.3 only!
- Useless for surveillance coins, very important for privacy coins!
- Unencrypted connections disallowed
- Advanced peer banning tech
 - Feeler connections
 - test-before-evict
 - "Eclipse Attacks on Bitcoin's Peer-to-Peer Network" (2015)
 - Ethan Heilman* Alison Kendler* Aviv Zohar† Sharon Goldberg*
 - *Boston University, †Hebrew University
- BTC Core has implemented all countermeasures
- Erebus Attack mitigation via ASN map

Bleeding Edge of TLS



- NSA: TLS AES 256 GCM SHA384
- DJB: TLS_CHACHA20_POLY1305_SHA256
- No TLS certificates needed, that is a scam
- We deleted OpenSSL, now use WolfSSL!
- It's not made of CVE's
- Nodes non-deterministically prefer either cipher
- Forces network to use both ciphers randomly
- You cannot predict which will be used

Erebus Attack

https://erebus-attack.comp.nus.edu.sg Muoi Tran, Inho Choi, Gi Jun Moon Anh V. Vu, Min Suk Kang

Recent Attack against Bitcoin

- Research by National University of Singapore
- Bitcoin Core realizes it's important
- Code remains unmerged on Github for 1.5yrs
- Likely never turned on by default
- Hush protects all users by default already
- Very first cryptocoin (and privacy coin) to do this

Attacks That Molded Hush

Every attack makes Hush stronger.



- Cryptopia 51% attacker ⇒ DPoW
- Sprout Inflation Bug CVE \Longrightarrow Sapling
- Fraudulent Exchanges (Graviex, Citex, etc)
- Malicious DPoW Attack ⇒ Hush DPoW

Delayed-Proof-of-Work

Big blockchains can protect little blockchains. It only makes sense to be protected by the strongest:
Bitcoin

- HUSH injects blockhash data into HUSH+BTC
- This costs HUSH+BTC, constantly
- HUSH is protected by hashrate of BTC
- Any other coin can jump in our wagon
- Drastically easier/cheaper than doing it yourself
- Cost is \$1K USD in BTC or XMR per month
- Solves "Double Spend" attacks on exchanges!

Delayed-Proof-of-Work

DPoW enforces censorship-resistance. Without DPoW, a mining attacker can rewrite history, like politicians.

- DPoW means your data cannot be removed
- DPoW means an attacker needs to attack BTC
- Attacks are extremely costly
- Attacks are less likely to succeed
- Attackers cannot profit so they go elsewhere

Hush + Tor

停止·切勿進人

4. Do not wail against the flow 不可循反方向行走。

Both evolving greatly in 2021

- Tor Network is under constant attack
- v2 Hidden Services being DoS'ed
- Migrating from v2 to v3 Hidden Services
- Tor turning off v2 in Oct 2021
- Bitcoin recently enabled v3 support
- Currently being ported to Hush

zaddr opsec



- One zaddr per
 - Exchange
 - Mining Pool
 - Online Seller
- When in doubt: new zaddr
- Don't post publicly
- Only senders need to know a zaddr
- What about donation zaddrs?

Duke Leto hush.is/privacy

Donation zaddr opsec

This mitigates attacks from those that know your zaddr and require your wallet online to be attacked.

- Create a brand new wallet
 - SDP is best (most isolated)
 - Or SD, then SDL
- Keep donation zaddr offline!
- Make viewkey if desired
- Only put wallet online to spend
- NEVER use a public donation address for anything else
- BIP47 \Longrightarrow HIP47 will greatly improve this

Or just #yolo

Erebus Attack Prevention



- Hush filters peers by ASN
- Bitcoin uses Class B (/16)
- 65000 vs 7.4M buckets
- SilentDragon Peers Tab shows ASN
- Shodan integration

Privacy: Consensus Layer



After 4 years...

- Zcash (optional) 6%
- Hush (4 months after z2z) 41%

Zcash (ZEC) mainnet is a privacy disaster.

Duke Leto hush.is/privacy

Privacy: Consensus Layer



Zcash optimizes for profit, not privacy.

Privacy: Consensus Layer



Multiple Analysis companies now support Zcash!

Duke Leto hush.is/privacy

Hush Smart Chain (HSC)

Spin up a Hush-like network in 1 command

hush.is/hsc-creator

Options	hush.is
General	N & 18-
Customize general Hush settings	
Fully Shielded z2z (-ac_private)	1111
	git clone https://git.hush.is/hush/hush3
Name (-ac_name)	cd hush3 ./build.sh
TUSH	od src
Initial Supply (-ac_supply)	./hush-smart-chain-ac_name=TUSH -ac_supply=21000000-ac_blocktime=60
21000000	-ac_private=1-ac_reward=1250000000
21000000	-ac_halving=210000
Initial Block Reward (-ac_reward)	
1250000000	EXTREME PRIVACY
	1 1 1 1 1 1 1 1 1 1 1 1
Block time (-ac_blocktime)	
Block time (-ac_blocktime) 60	
60	
60 Block Halving Period (-ac_halving)	
Block Halving Period (-ac_halving) 210000	
Block Halving Period (-ac_halving)	
60 Block Halving Period (-ac_halving)	
Block Halving Period (-ac_halving)	
60 Block Halving Period (-ac_halving) 210000 Public Key (-ac_pubkey)	
60 Block Hallving Period (-ac_hallving) 210000 Public Key (-ac_pubkey) Addrhodes	
60 Block Hallving Period (-oc_hallving) 210000 Public Key (-oc_pubkey) Addnodes	
Block Halving Period (-ac_halving)	

Use Cases

- Lawyer-client secure chat
 - Enforced at protocol layer!
 - Dedicated HW as needed
- Censored Journalist
 - Encrypted data can be published
 - At a time determined later, or never
- Will + Testament
 - Encrypted Worldwide backup
 - Cryptographic proof
- International Diplomacy

Duke Leto hush.is/privacy

Use Cases

International Diplomacy Requires Privacy

- China
 - Create their own HSC, requires National ID, biometrics + VPN
 - For foreign diplomats outside of China
- Russia
 - Create completely isolated chain for internal usage only
 - Requires being in secured physical locations
 - Can cryptographically prove who-did-what-when
- USA
 - Studies attacks on HUSH mainnet in a Faraday Cage Under A Mountain
 - So it can be used effictively, in the field, like Tor
 - Or attack it, if they need the lulz

Use Cases

International Diplomacy Requires Privacy

- Singapore
 - US+Russia+China decide to do cyberattack against SG
 - Most of the internet goes malicious
 - Tor+Hush allows SG diplomats to communicate with UN
 - They can provide cryptographic proof of data
 - UN could be a hub of diplomatic privacy
 - DPoW protects things from being erased from history books

Duke Leto hush.is/privacy

Hush Finds Exploits and Bugs Constantly

If we make fun of your favorite things, it's probably because it's trivial to exploit or has no privacy.



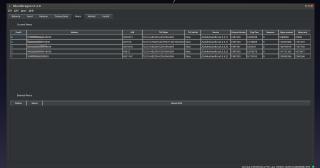
Duke Leto hush.is/privacy

Hush Finds Exploits and Bugs Constantly

- "Attacking Zcash Protocol For Fun And Profit"
- attackingzcash.com
- CVE-2019-11636 (Sapling Woodchipper)
- CVE-2019-16930 (PING/REJECT)
 - Discovered by Dan Boneh (Stanford)
 - Reported privately to Zcash
 - Zcash published weird emergency patch
 - Zcash had no explanation or binaries
 - I reverse engineered from code
 - It was trying to be hidden
 - Zcash CEO/CTO/CSO blocked me on Twitter
- CVE-2021-????? (OPIP)

SilentDragon: SD

hush.is/sd



- Full Node GUI Wallet
- Downloads gigabytes of data
- Highest privacy

SilentDragonLite: SDL

hush.is/sdl



- GUI Lite Wallet
- HushChat GUI
- Encrypted wallet on disk
- Downloads megabytes of data
- Easiest for users
- Relies on external servers!
- Communities encouraged to run servers

Duke Leto hush.is/privacy

SilentDragonPaper: SDP

hush.is/sdp

Speak and Transact Freely

Private Cryptocurrency and Messenger on Zero Knowledge Proof Encryption



HUSH Address

se1007eudgovmevjpdaxgzkvzy2g9dj45tw5m4h
40vqmylwf7prj2g9wdxf0enavxq5p675qq22k5a

Private Key

mecrat-extended-key-mainiquitatifügggggggggggggg 18533692p9jlatnrumhafvhlöddgdfm51qprxmeixdd;a 18533692p9jlatnrumhafvhlöddgdfm51qprxmeixdd;j 1801am6adgavqehi enmmelvada78jh2364qp0edd; 1801am76vndeapph640592m1jhdfm7hib26cartwkhm2 559krbou-4agfasahify43qgdaft74haecklibndflocix 650krbou-4agfasahify43qgdaft74haecklibndflocix 650krbou-4agfasahify43qgdaft74haecklibndflocix

EUSH Address

zel007eudgcvmevjpdaxgzkvzy2g9dj45tw5m4h 40vqmy3wf7prj2q9wdxf0enevxq5p675qg22k5m



- GUI Paper Wallet
- Generate addresses offline
- Print out QR code backups
- No bandwidth required
- Cold wallets

SilentDragonAndroid: SDA

hush.is/sda



- Android Wallet
- Pairs to SD or SDL
- "Lite mode"Coming Soon
- Like a mobile SDL
- On Google Play

Invest In Privacy



- HUSH is a Store-of-Privacy. You can purchase privacy now and save it for use in the future, when privacy is more costly.
- Monero and Zcash are over 1000x times more expensive than HUSH, but provide drastically inferior privacy!
- Zcash is funded by Surveillance Valley investors.
- Monero (XMR) has over 90% of total supply mined already while HUSH has about 50% mined. HUSH is a fairer emission schedule.
- Same emission as BTC: halvings every 4 years

How To Get Some HUSH?



From most privacy to least privacy.

- Join our community, do work, get paid in HUSH
- Purchase on Decentralized Exchange (DEX)
- Solo Mine HUSH via ASICs
- Solo Mine HUSH via renting hashrate
- Pool Mine HUSH via ASICs
- Pool Mine HUSH via renting hashrate
- Purchase on Centralized Exchange (dicey)

hush.is/yt - Mine directly to your own wallet

Duke Leto hush.is/privacy

HushDEX

Decentralized Privacy Coin Exchange (DEX)
"What" ain't no country I ever heard of. Do they leak metadata in "What"?



- Private Cross-Chain Swaps
- First pair: HUSH <> XMR
- Non-custodial
- Alices + Bobs
- Decentralized Application (dapp)

Coming Soon - trade.hush.is

Duke Leto hush.is/privacy

How It's Going

Duke Leto 🗖

How It Started vs How It's Going

\$HUSH

Official Website: hush.is YouTube: hush.is/yt Telegram: hush.is/tg Gitea: git.hush.is



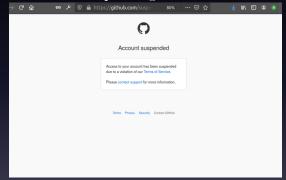


4:14 PM · Feb 5, 2021 · Twitter Web App

Duke Leto hush.is/privacy

Suspended From Github

Stop Using Github



Github=Microsoft
A Censorship and Surveillance Platform

Join The Hush Community

Most types of Hackers and Cypherpunks welcome



- We already abandoned Slack+Discord
- Official Telegrams
- English: hush.is/tg
- Russian: hush.is/tgru
- Chinese: hush.is/tgzh
- Spanish: hush.is/tges



Join The Hush Community





shoppinwithjoe.com



- Currently \$25 USD
- Limited Promotion:
- Show receipt $\rightarrow 5 \text{ HUSH}$
- 50000 HushChat encrypted messages

Duke Leto hush.is/privacy

Join The Hush Community

If you know about this stuff \Longrightarrow earn HUSH



- Linux/BSD servers
- C/C++
 - Rust
- Docker
- QT5
- ullet Android/Kotlin
- Tor/i2p/Mix networks

