



HIDING IN THE DARK

ANONYMOUS DISTRIBUTED DATA STORAGE

HOWDY.



HOWDY.



HOWDY.

HOWDY.



Let

OUTLINE

- Monetas
- An Overview of Open Transactions
- An overview of Bitmessage and what it can do for the decentralized ecosystem.
- The “Holy Grail post”
- The “Bazaar” marketplace and key concepts.
- What we want to accomplish and what our limitations are.
- Distributed Storage and key concepts.
- Requirements for the design and approaches.
- State of progress and plans for the immediate future.
- Q&A
- References

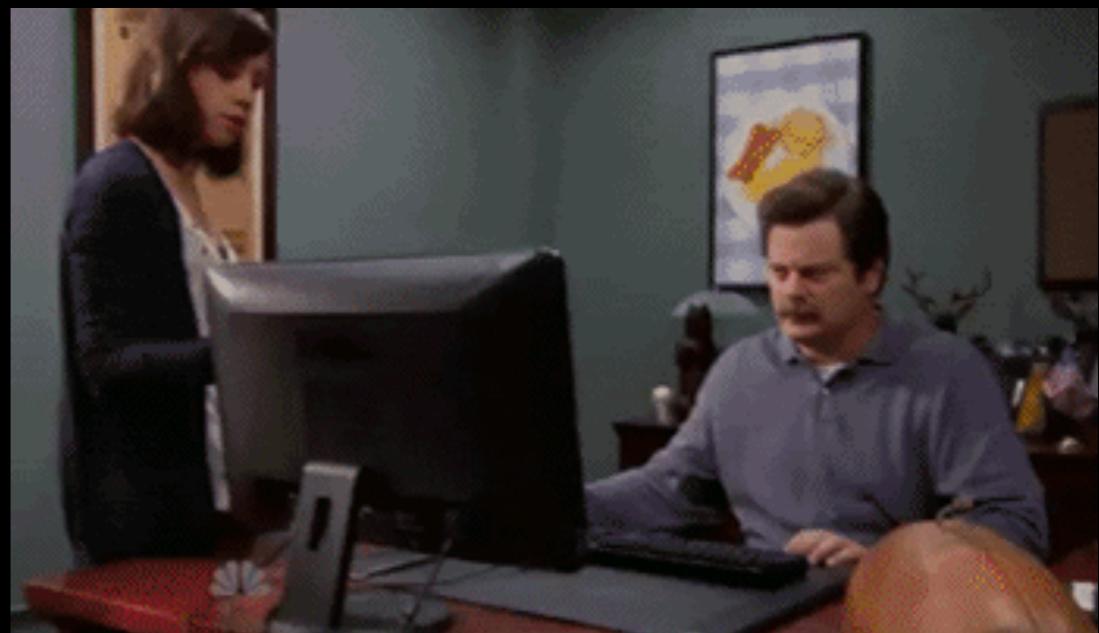


Monetas

Instant. Global. Secure. Private.

LEGACY FINANCIAL SYSTEMS

- World's existing financial systems are centralized, creating single points of control and failure.
- Centralized systems are inherently vulnerable to abuses of power and catastrophic failure.
- “Legacy” systems are expensive, slow, complicated, insecure and prone to privacy violations, fraud and corruption.



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HISTORICAL RECAP

- Decentralized (People-based) trust systems start to fail as market systems exceed Dunbar's Number (~150 relationships).
- This led to the evolution of market systems controlled through a top-down model.
- Printing press was the beginning of a return to Decentralized Systems.
- Most recent developments in this direction have been the Internet and Bitcoin (Blockchain based systems).

PILLARS OF A DECENTRALIZED SOCIETY

1. Decentralized Communications
2. Decentralized Law
3. Decentralized Production
4. Decentralized Finance

SMART CONTRACTS



- Computer protocols that facilitate, verify, or enforce the negotiation or performance of a contract, or that obviate the need for a contractual clause.
- Claimed to have begun with the “Agoric Computing” movement in the 1970s to bring market mechanisms (such as Auctions) to computational resource management.
- Coined by Nick Szabo around 1993.
- Anything humans can agree to do together, can be described in a smart contract.
- Can enable Wallets, Decentralized Exchanges, Merchant Services.

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OPEN TRANSACTIONS



OPEN TRANSACTIONS

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A financial crypto and digital cash software library that operates as a centralized transaction system.

Complementary to Bitcoin in that it provides features that Bitcoin cannot, such as untraceable anonymous transactions, no latency and more.

Featuring:

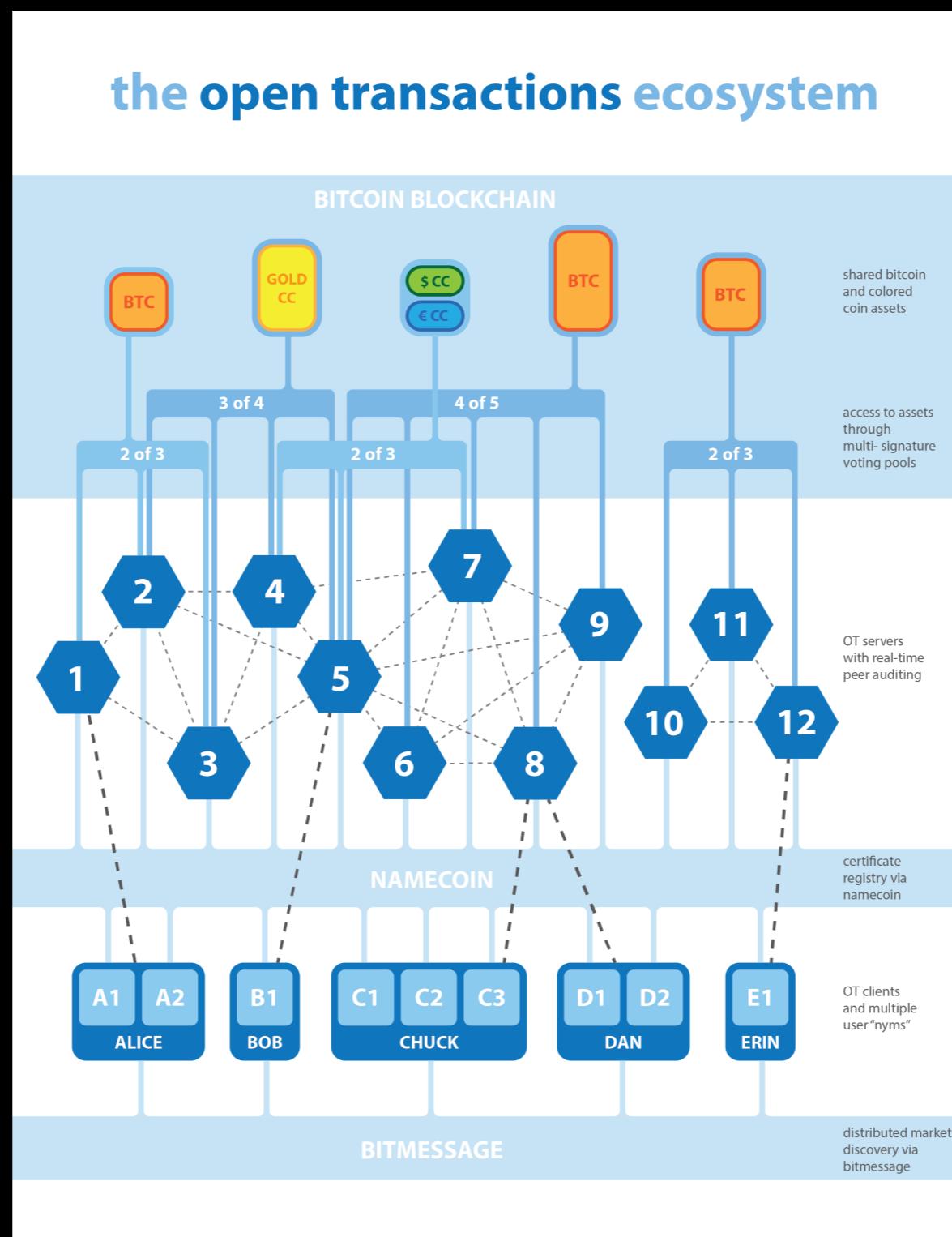
- Untraceable Digital Cash (real blinded tokens)
- Anyone An Issuer (Ricardian-style Contracts)
- Bearer-only, Fully-Anonymous (when used cash-only)
- Pseudonymous User Accounts (user account == PGP key)
- No Account History (asset account == the last receipt)
- Many Financial Instruments (cheques, cash, vouchers, invoices...)
- Basket Currencies (10 "baskets" == 5 gold, 3 silver)
- Markets with Trades (stop, fill-or-kill, limit orders...)
- Payment Plans
- Includes an API, server and client.

Moneychanger

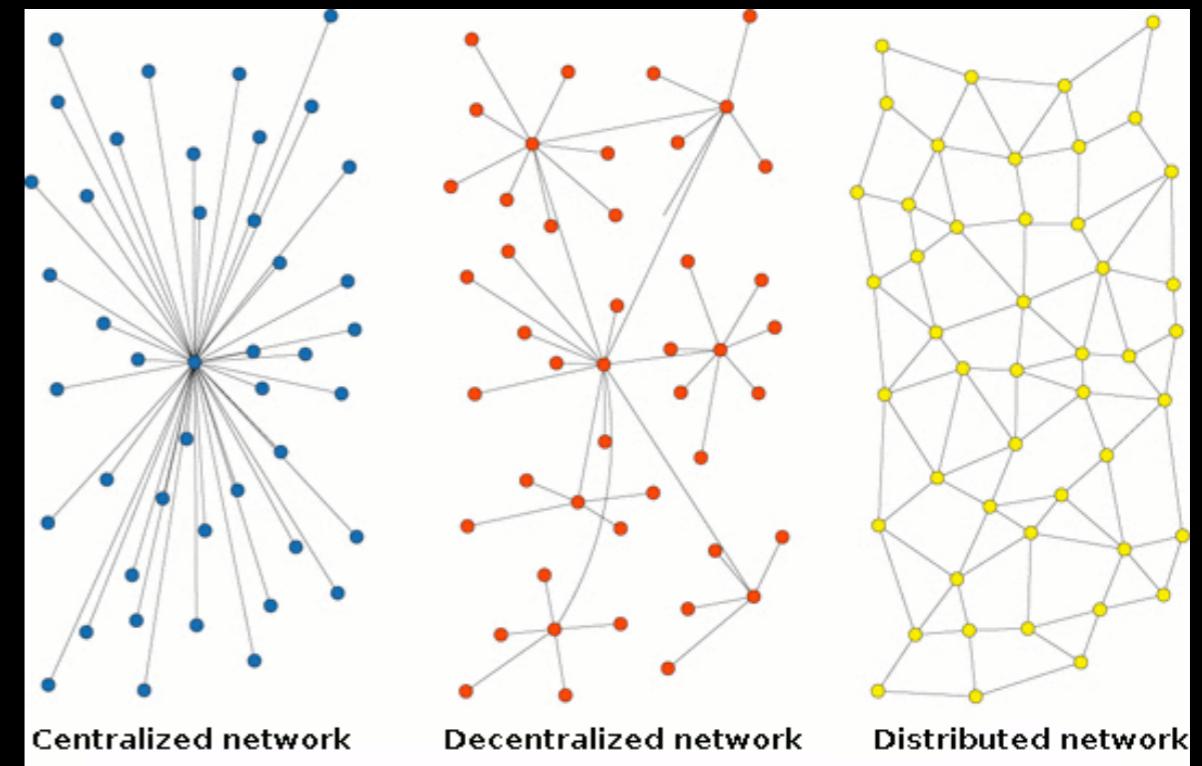
- A reference implementation of a currency accounting application that accesses the Open Transactions API.
- Integrates with Bitcoin, Namecoin and Bitmessage.

OPEN TRANSACTIONS

OPEN TRANSACTIONS

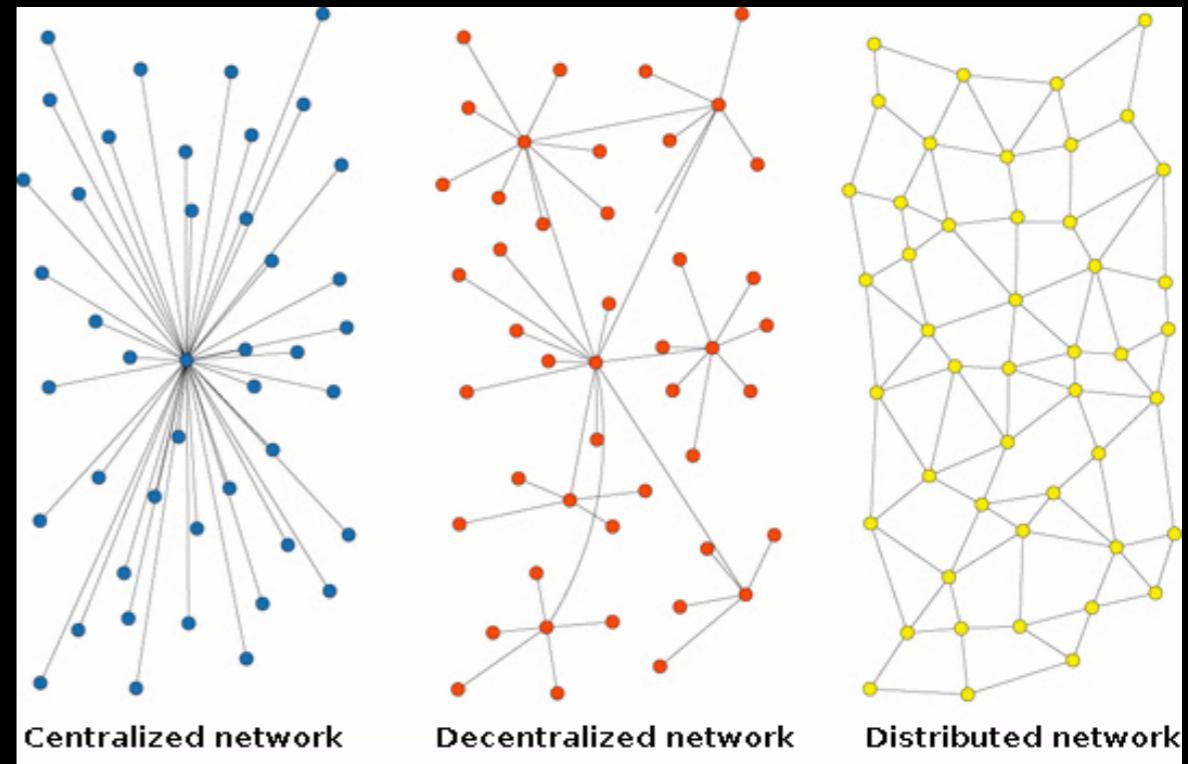


WHAT IS BITMESSAGE?



WHAT IS BITMESSAGE?

- Bitmessage is a peer to peer communications protocol used to send encrypted messages to one person or many subscribers.
- It is Distributed and Trustless, meaning that you need-not inherently trust any entities like root certificate authorities.
- It uses strong authentication, which means that the sender of a message cannot be spoofed.
- “non-content” data such as sender and receiver information is hidden from eavesdroppers, such as those running warrantless wiretapping programs.

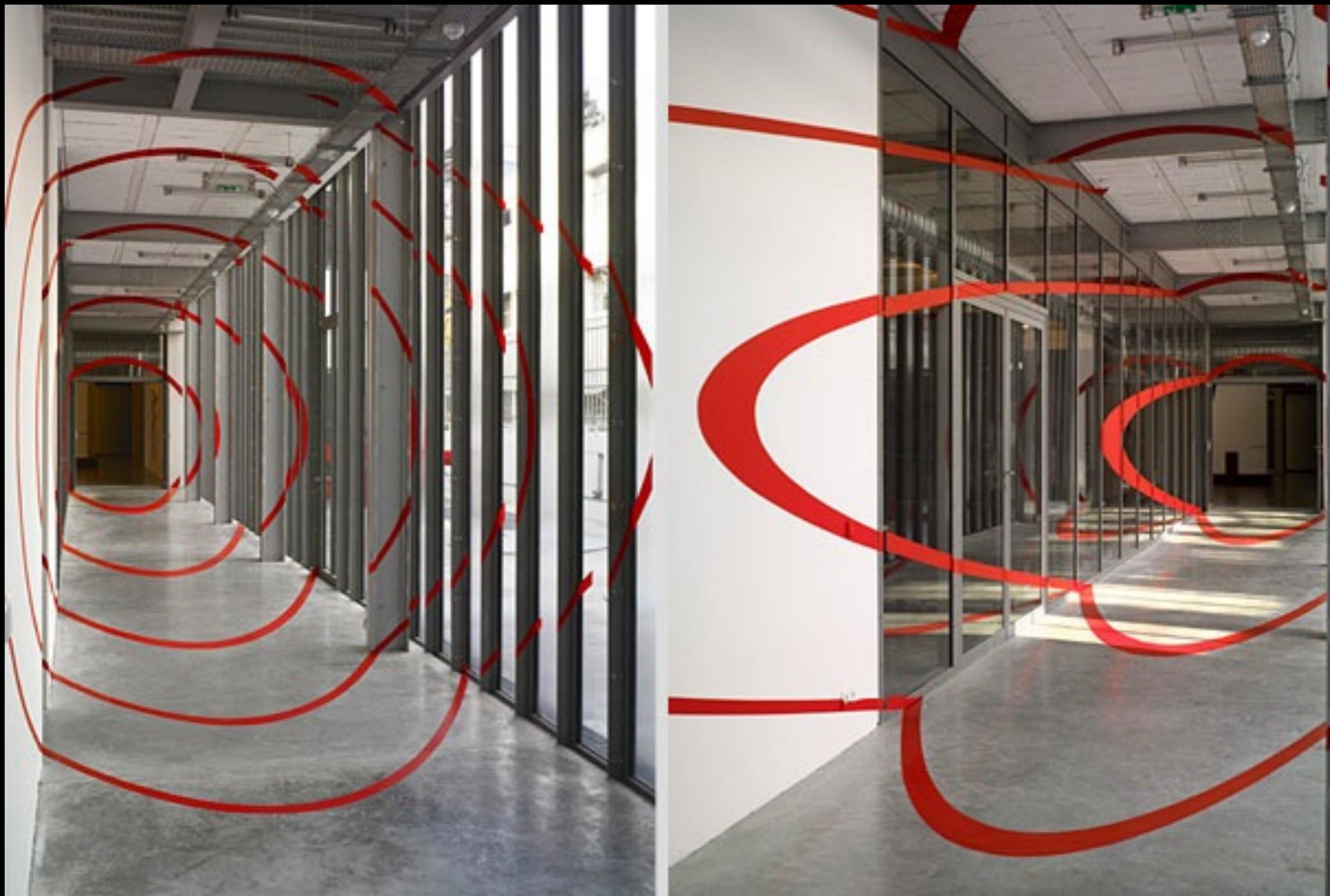


BITMESSAGE OVERVIEW

- * Messages are encrypted and sent across network, where all nodes are guaranteed to receive it and hold it for a set period of days.¹
- * A broadcast message can be opened by all subscribers. Requires owner to be online.
- * A channel can be created using the password as the deterministic address key.
- * Messages are limited to 256kb¹
- * There are ways of using custom drivers to speed up the proof of work calculations in Bitmessage by 40%.

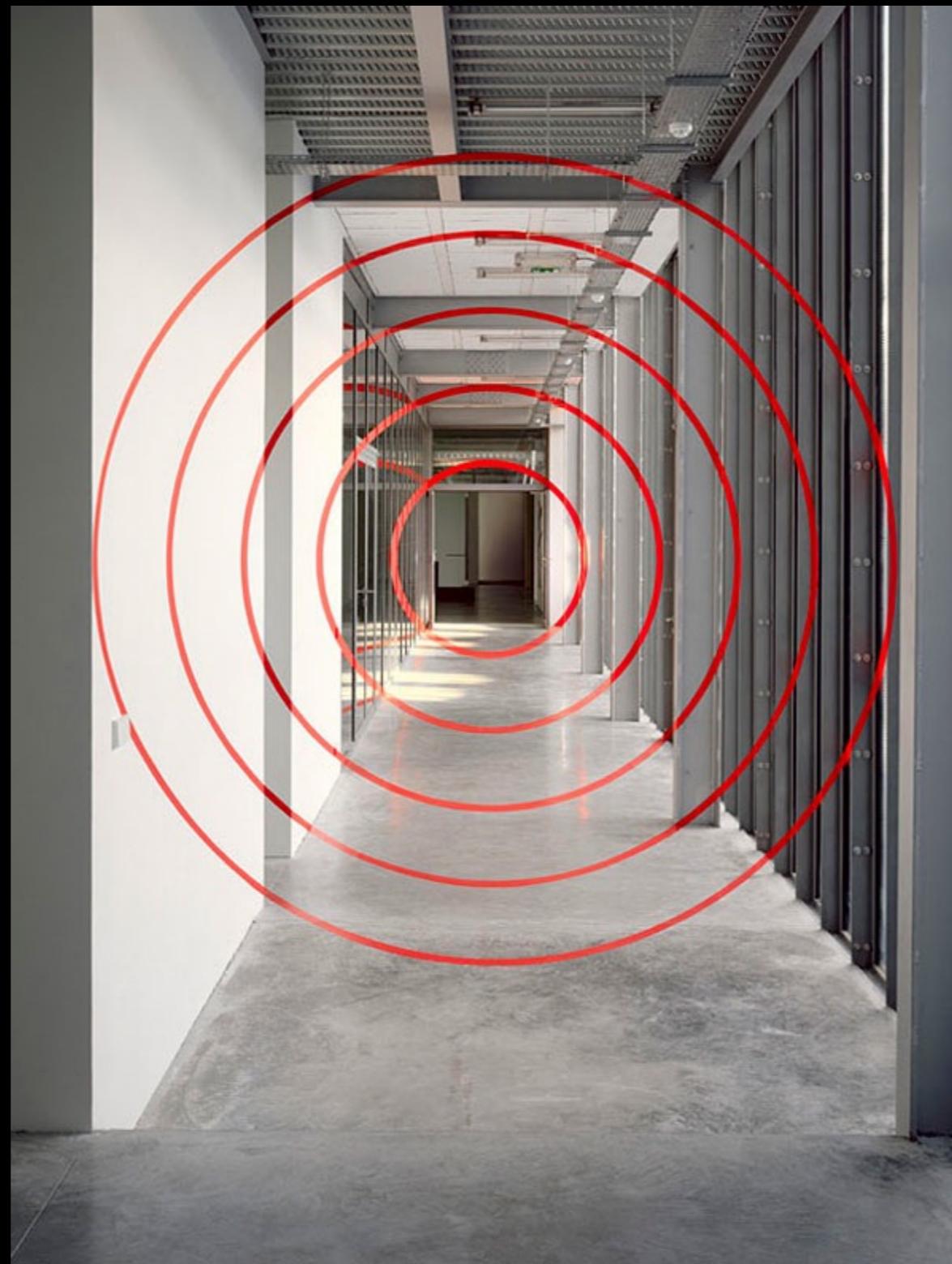
¹ THIS IS A NEW FEATURE IN BITMESSAGE V3

HIDING IN PLAIN SIGHT



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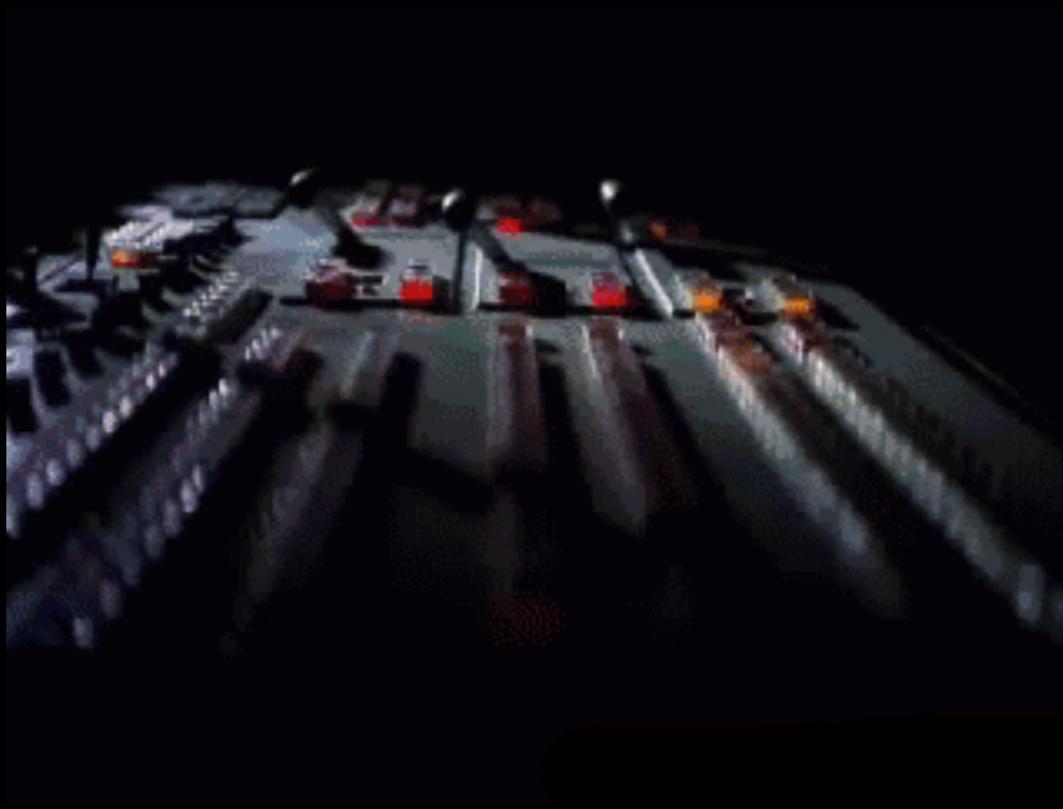


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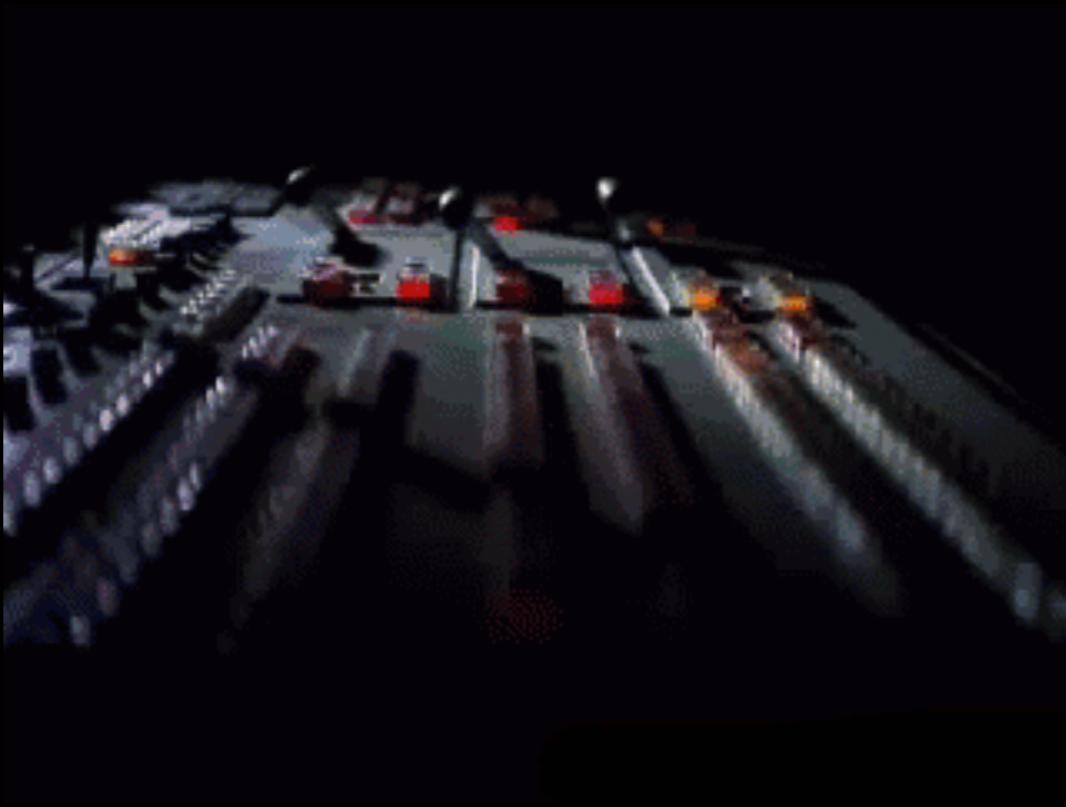
- The ability to discretely broadcast information is part of what makes this attractive for OpenBazaar and our own Bazaar project.
- Binary data doesn't have to sit on the network permanently. It only needs to stay alive for transfer.
- Nodes can't arbitrarily open messages.
- Messages can still be encrypted on top of what is already performed by the network.
- Binary data can be transferred by base64 encoding it first.

WHAT CAN IT DO?



- Decentralizing markets from the bottom up.
- “BitCloud” distributed fault-tolerant file storage (plus it’s free!)
- Proof of work security with speed boost.
- Secure order announcements.

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THE HOLY GRAIL

Bitmessage solves discovery across federated OT servers.

Bitmessage makes possible fully-decentralized p2p markets, as well as p2p escrow across OT federated servers, easy p2p and server-to-server wiring of funds and conversion of currencies, both within OT and also between OT and the conventional banking system.

THE HOLY GRAIL

THE HOLY GRAIL

Holy Grail Post - <https://bitcointalk.org/index.php?topic=212490.0>

Using Bitmessage with OT to effect server-to-server wiring of funds: <http://pastebin.com/NjQgDarx>

- The wiring protocol is all about Alice trying to discover Bob so she can move her money from one server to another (and Bob trying to discover Alice so he can make a profit by moving money from one server to another.)

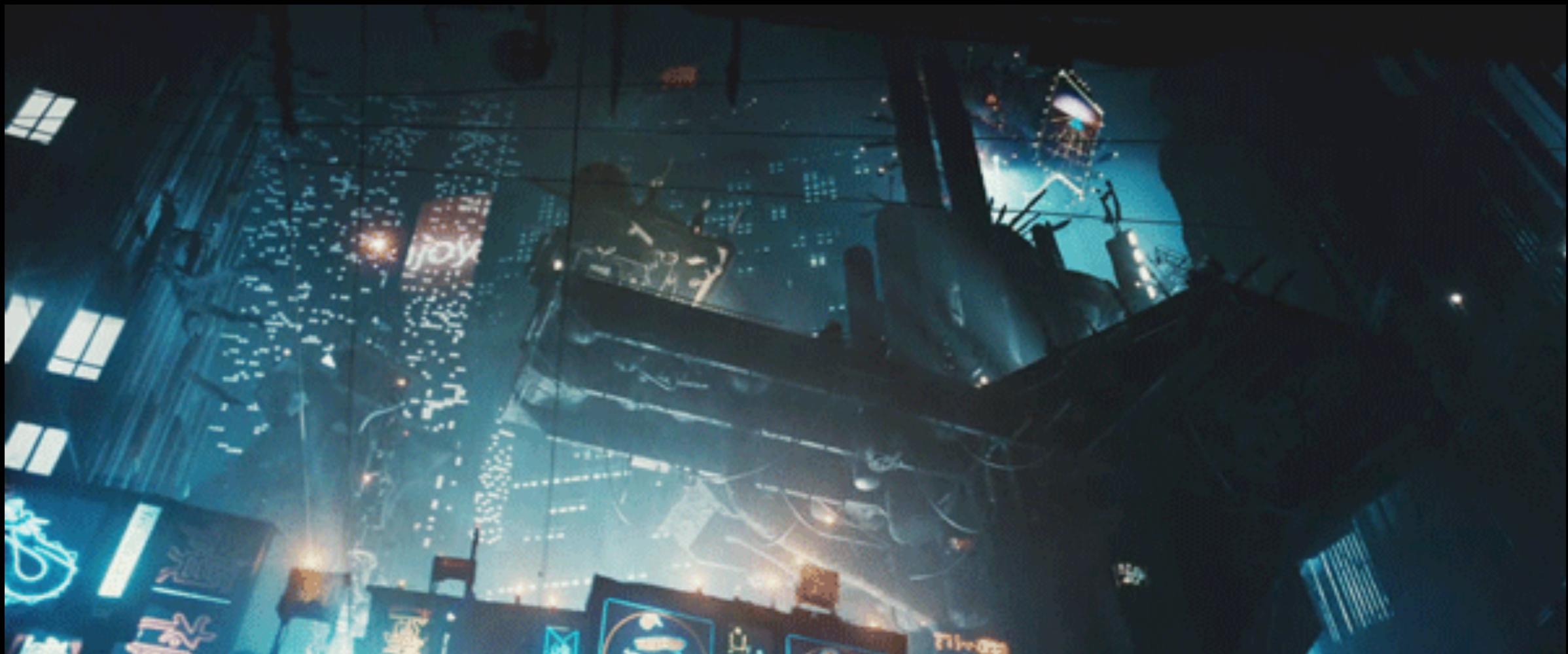
Using Bitmessage with OT to effect escrow-based conversion of currencies across OT federated servers:
<http://pastebin.com/S1W5guAQ>

- The currency conversion protocol is about Alice and Bob being able to choose a server they can agree to meet on so they can trade one currency for another inside OT. (For cases where they aren't already trading on the same OT server.)

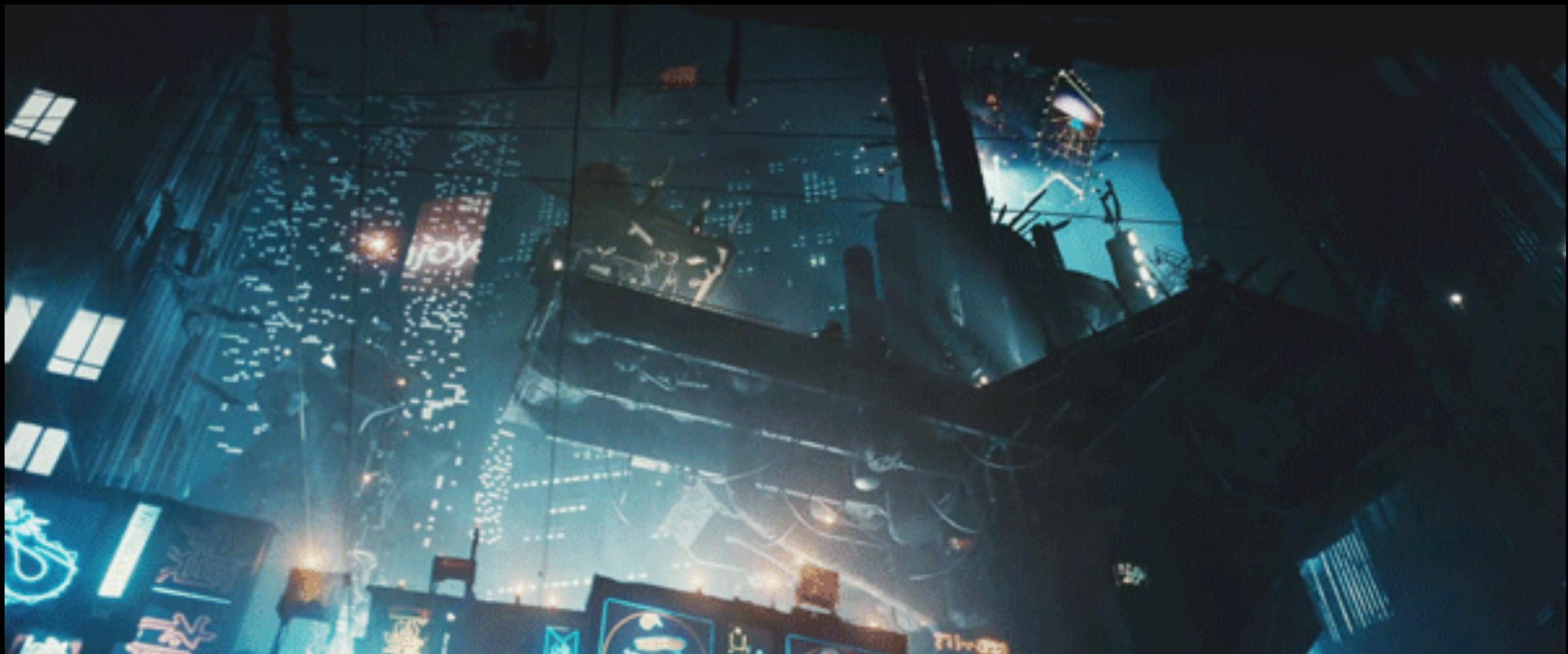
Using Bitmessage with OT and SEPA so that Alice can p2p send any currency which Bob receives as Euros in his Euro account: <http://pastebin.com/SsLrxVP6>

- The SEPA transfer protocol is about Alice being able to send Silver Grams, which Bob receives as Euros in his Euro bank account. It's also about Jorg earning a profit in silver grams, by sending a SEPA transfer to Bob on Alice's behalf.

THE BAZAAR



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Vendor

- Creates advertisements and submits them to marketplace for approval.

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Marketplace

- Marketplace is who broadcasts the advertisements for the clients to browse.
- Approves / revokes vendors.
- Approves advertisements.
- Tracks and provides ratings info for all parties.
- Does NOT adjudicate disputes.

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User

- Adds marketplace contracts to his client.
- Listens to Bitmessage channel for each marketplace.
- Answers advertisements by contacting Vendor directly.

BAZAAR CONTRACTS



BAZAAR CONTRACTS

Marketplace Contract ¹

- Contains Bitmessage address for private communications.
- Contains info on requirements for payment and dispute mediation.
- Hashed ID is deterministic seed for Bitmessage channel.
- Optionally can contain a URL, or Freenet or I2P URL where ads are posted.
- Client software should ignore any broadcasts in the marketplace's channel unless they are signed by the marketplace.
- Any user can ask the Marketplace (via his private BM address) to provide ratings data on any vendor. Similarly, any vendor can ask for ratings data on any user.
- Any entity can supply ratings to the marketplace, as long as the rating is from a vendor regarding a user, or a user regarding a vendor, and as long as the rating contains a copy of the vendor's original signed acceptance of an order, and optionally a copy of the payment receipt or dispute mediation receipt.



¹ Signed OT contract.

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Vendor Contract

- Contains Bitmessage address for private communications.
- Includes payment info.
- Marketplace and Vendor contracts are similar to OT asset/server contracts, since they contain the public key of the signer, and since the contract ID is the hash of the contract.



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Advertisement Contract.

- Must be signed by both marketplace and vendor.
- (Alternately, Vendor signature is sufficient as long as Marketplace has approved Vendor.)
- Contains timeout field.
- Contains text content.
- Alternately contains a URL or Freenet or I2P URL where ad content is posted.



¹ Signed OT contract.

BAZAAR ORDERS



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User order

- Includes copy of advertisement.



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Vendor acceptance of order

- Includes copy of user order, which includes copy of advertisement.
- Includes payment request. (OT escrow, OT invoice, BTC address, BTC multisig, etc.)



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Order Process

1. The Vendor sends his vendor contract to the marketplace for approval.
2. The vendor sends his advertisements to the marketplace for broadcast.
3. The marketplace signs and broadcasts the advertisements.
4. Users receive and organize the advertisements. They either read them directly from the channel broadcasts, or from a URL located in the marketplace contract.
5. Users answer advertisements to vendor directly. (Placing an order.)
6. Vendors can ignore, or reject, or accept.
7. Marketplace tracks ratings, and “Judge Judy” adjudicates disputes. (She is a third party to an escrow contract.)



UNIFIED INTERFACES

File View Help Uptime: 00:33:33

gnutellaNet

- Stats
- Uploads
- Downloads
- Search
- Monitor
- Stats
- Config

General

Type	Count
Routing errors	129
Searches to local DB	2442
Hits on local DB	1384
Compacted queries	-
Bytes saved by compacting	-
UTF8 queries	-
SHA1 queries	372
Broadcasted push messages	-

Drop reasons

Show reasons for Total

Show percentages

Type	Count
Bad size	-
Too small	-
Too large	-
Way too large	-
Unknown message type	-
Unexpected message	-
Message sent with TTL = 0	-
Max TTL exceeded	-
Ping throttle	-
Unusable Pong	303
Hard TTL limit reached	-
Max hop count reached	-
Unrequested reply	-
Route lost	-
No route	-
Duplicate message	129
Message to banned GUID	-
Node shutting down	-
Flow control	-
Query text had no trailing NUL	-
Query text too short	112
Query had unnecessary overhead	-
Malformed SHA1 Query	-
Malformed UTF-8 Query	-
Malformed Query Hit	-
Query hit had bad SHA1	-

Search Hits New

sample wav	111	0
fractal	0	0

Messages Flow control Received

Type	Received	Expired	Dropped	Relayed	Generated
Unknown	-	-	-	-	-
Ping	108	-	-	-	547
Pong	5115	-	309	-	74
Bye	-	-	-	-	14
QRP	-	-	-	-	488
Vendor Spec.	1	-	-	-	1
Vendor Std.	-	-	-	-	-
Push	-	-	-	-	-
Query	2700	64	241	-	8
Query Hit	27	-	-	-	257
Total	7951	64	550	-	1389

Show percentages Show bytes
 Columns show hops Add headers

http://gtk-gnutella.sourceforge.net/

UNIFIED INTERFACES

UNIFIED INTERFACES

gtk-gnutella 0.96u unstable

Fichier Settings Voir A propos

Navigateur

- GnutellaNet
 - Stats
 - cache des hôtes
- Envos
 - Historique
- Téléchargements
- Recherche
 - Moniteur
 - Stats

Résultats de la recherche

Current search: heavy metal

Fichier Extens Taille # Metadata Info

Fichier	Extens	Taille	#	Metadata	Info
+ ace frehley - heavy metal.mp3	mp3	2,30 MiB	2	128 Kbps 44 kHz 2:30; Bear Shar	
- Transformers Theme song - Heavy Metal Version.mp3	mp3	3,24 MiB		128 Kbps 44 kHz 3:32; Bear Shar	
- legend, john - ordinary people (vinyl single) - 02 - ordinary people (heavy metal remix inc	mp3	6,61 MiB		193 Kbps 44 kHz 4:46; Bear Shar	
- 06 (She's) Heavy Metal.mp3	mp3	3,18 MiB		LimeWire	
+ Shattersphere - Final Extinction (Heavy Metal) AWESOME BAND FROM CT www.shat	mp3	3,43 MiB	4	128 Kbps 44 kHz 3:44; Bear Shar	
+ Blue Oyster Cult - Veteran of the Psychic Wars (Heavy Metal Soundtrack).mp3	mp3	5,57 MiB	3	LimeWire, push, proxy	
- Judas Priest - Heavy Metal.mp3	mp3	9,54 MiB		LimeWire, push, proxy	
- Judas Priest - Heavy Metal.mp3	mp3	9,54 MiB		LimeWire, alt	
+ Wilco - Heavy Metal Drummer.mp3	mp3	4,28 MiB	2	LimeWire, push, proxy	
- Blue Oyster Cult - Heavy Metal.mp3	mp3	3,80 MiB		LimeWire, push, proxy	
- Les Cowboys Fringants - Heavy Metal.mp3	mp3	3,37 MiB		LimeWire, push, proxy	
- HEAVY METAL - Metallica - Master of puppets.mp3	mp3	7,84 MiB		128 Kbps 44 kHz 8:33; Bear Shar	
- Sexy Brunette With Heavy Hanging Naturals.wmv	wmv	1,04 MiB		Gnucleus, stable	
- Manowar - The Gods Made Heavy Metal.mp3	mp3	5,55 MiB		LimeWire, push, proxy	
- Shattersphere - Final Extinction (Heavy Metal) AWESOME BAND FROM CT www.shat	mp3	3,43 MiB		iMesh, push, proxy	
- Heavy Metal Hits 80s - 13 - We're Not Gonna Take It - Twisted Sister.mp3	mp3	3,32 MiB		iMesh, stable, push	
- legend, john - ordinary people (vinyl single) - 02 - ordinary people (heavy metal remix inc	mp3	6,61 MiB		193 Kbps(VBR) 44 kHz 4:47; Bea	
- Metallica - Heavy instrumental very rare never released.mp3	mp3	1,73 MiB		LimeWire	
- Tony Hawk Pro Skater 2 - Consumed - Heavy Metal Winner.mp3	mp3	2,29 MiB		LimeWire, push, proxy	
+ House of Pain - Shamrocks and Shenanigans (Heavy Metal Mix).mp3	mp3	3,62 MiB	2	LimeWire, push, proxy, alt	
- [08] Sonny Black & Frank White - Heavy Metal Payback.mp3	mp3	6,19 MiB		192 Kbps 44 kHz 4:30; Bear Shar	
- 07 Heavy Metal Rules.mp3	mp3	5,93 MiB		LimeWire	
- Minibosses Castlevania - Vampire Killer (Heavy Metal Mix).mp3	mp3	3,51 MiB		LimeWire, push, proxy	

Information à propos du fichier sélectionné

Nom de fichier: Wilco - Heavy Metal Drummer.mp3

SHA1: urn:sha1:SIAL6VSASMNYY452AUS2HLCBLVGBD4BV	Source:
Servent ID: ea7b29903c43e2ee4cca81e2e3ab8a00	Country: ?? (?)
Index: 31	Taille: 4,28 MiB (4487129 bytes)
Speed: 350	Vendeur: LimeWire
Tag:	Received: Fri Jul 29 19:57:24 2005

63 élément (0 skipped, 0 ignored, 0 hidden, 0 auto-dl, 1 dupe) Hits: 46 (46 TCP, 0 UDP)

Réessayer la recherche tous les 1800 secondes

Télécharger ceux sélectionnés Edit filters Affiche les paramètres Étendre tout Tout regrouper Efface les résultats

1 files auto selected with 2 sources by urn:sha1.

39 noeud 5958 fichier 115,97 GiB 00:10:08

UNIFIED INTERFACES

UNIFIED INTERFACES

Kazaa - [Search]

File View Player Favorites Tools Actions Help

Search Traffic My Kazaa Theater Shop PeerPoints meetic

New P2P Search Download Search Field Close Tabs

Channel Directory Skilled Gaming Crazy Play Games Hip Hop Channel G-Spot One Love Ringtone Channel Love & Dating Emerging Artists

P2P Search

Quick Advanced Search Agent

Search for: Ninja

Found 72 Res. Click Search More to get more results.

Everything
Audio
Documents
Images
Playlists
Software
Video

Search More (4) Stop

meetic.com
I am: looking for: With photo: SEARCH

Skype Contacts Web Search Love and Dating Ringtone Channel

Ninjaman Returns - Ninja Man/Richie Stephens

Description: Reggae music, forever good...

NINJA MAN ALTHNEY

Album download details:
View all files in this album
Buy album for \$5.88
More by this Artist
More in this Genre

Title	Artist	Size	Prev...	Price	Download	Integrity	User
Romeo	Ninja Man	5,204KB			Download	Excellent	On
Weed & Moan	Ninja Man	5,536KB			Download	Excellent	On
Japanese Slang	Ninja Man	5,501KB			Download	Excellent	On
Matter Of Time	Ninja Man	5,484KB			Download	Excellent	On
Beam Up	Ninja Man	5,099KB			Download	Excellent	On
Smile	2pac	4,704KB			Download		kle
Ninja bike	A+	3,488KB			Download		3 L
I Know	Vanilla Ninja	4,663KB			Download		Ka:
ÿтт шзб	сабжойрн	4,982KB			Download		2 L
Gezada	Ninja Man	5,221KB			Download	Excellent	On
Hentai-Karakuri Ninja Girl - Episode 2 [HZ] (Su...)	Unknwon	2,715KB			Download		Ka:
дфйрамй	сабжойрн едши	3,889KB			Download		3 L
Naruto-Ninja Scroll Immortal Battle	Unknwon	7,022KB			Download		chc
ninja	Big L	2,650KB			Download		chz
Bad Man	Ninja Man	5,300KB			Download	Excellent	On
Ninja Scroll - Mortal Combat	ULTIMATE	44,500KB			Download		Gin
Cool Vibes	Vanilla Ninja	1,220KB			Download		Kai
ъшлое ѿйлжн	дэв рэш	3,917KB			Download		Kai
Teenage Mutant Ninja Turtles	Theme	958KB			Download		2 L
Born Serial Killer	Ninja Man	5,300KB			Download	Excellent	On
manque d'argent	LA FOUINE	4,473KB			Download		hoj

Готово

They're FREE!

CURSORMANIA

GERZ.RU

2.4M users online, 601.3M files shared (46,777,344 GB)

Found 72 files

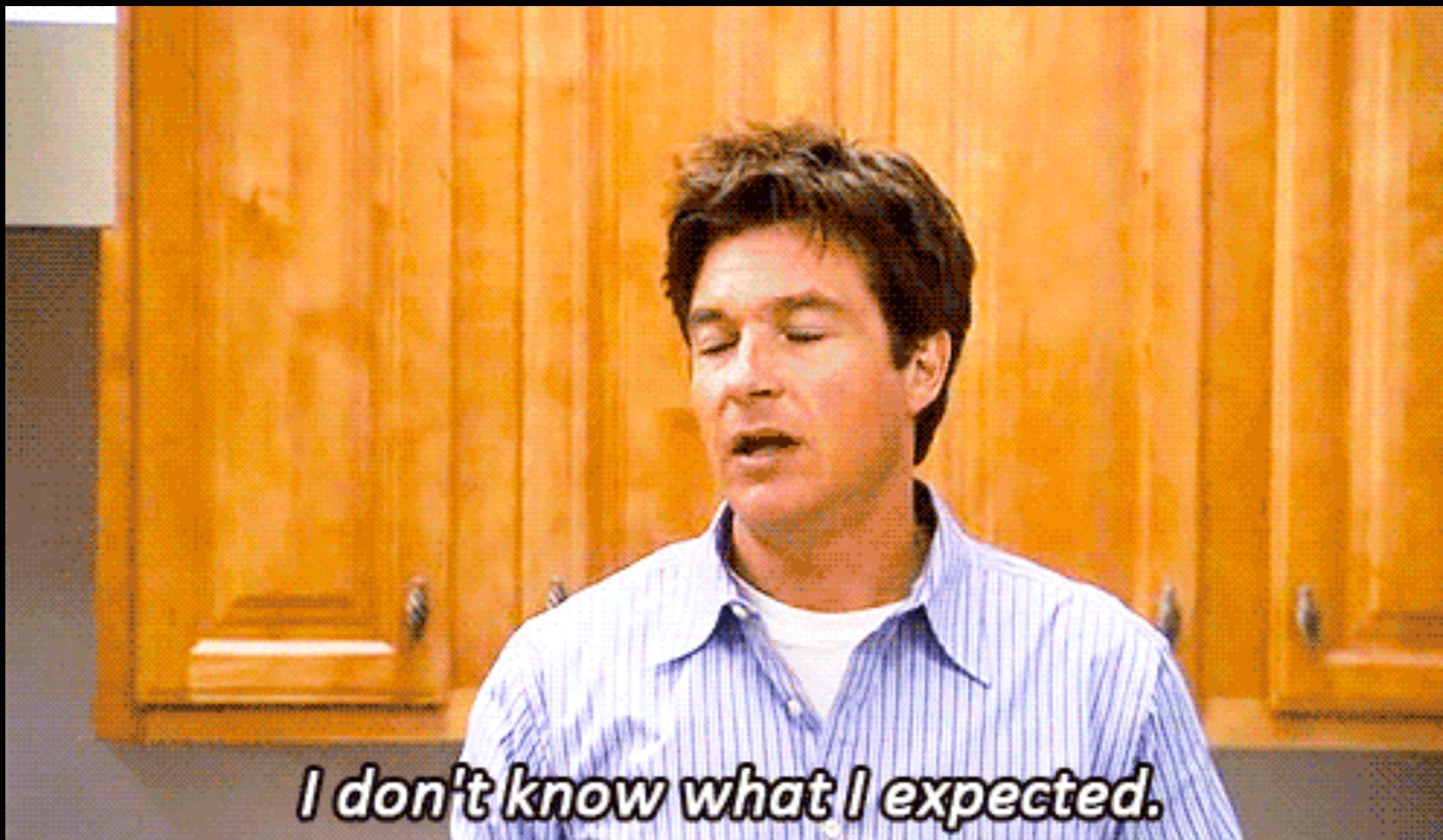
Traffic: 0 0 0

BITMESSAGE UNFRIENDLY TO BINARIES

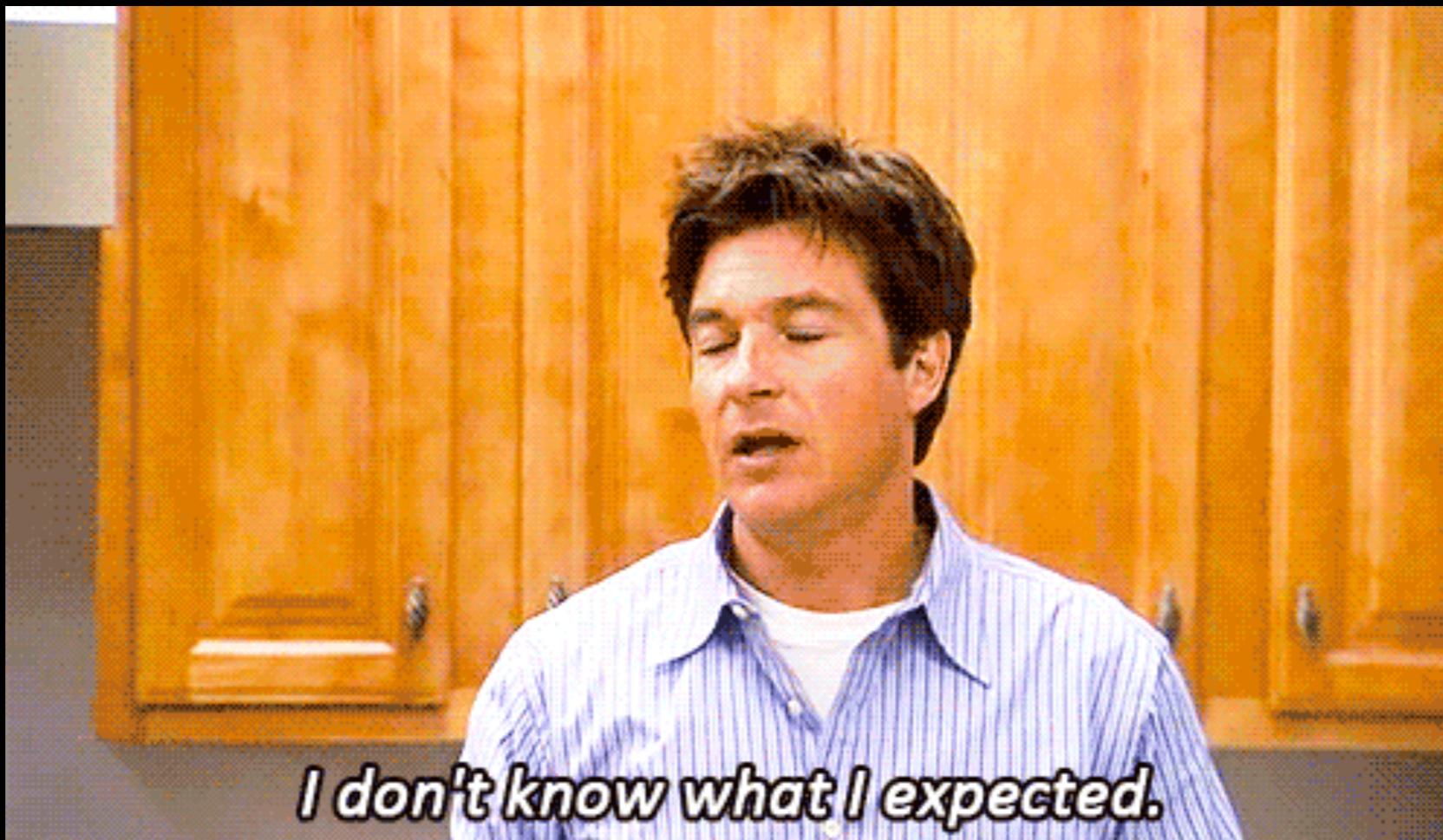


- The larger the message, the longer it takes to process.
- Large messages can congest the network as a byproduct of its features.
- 256kb limit on messages prevents most binary data transfers.
- Makes data retrieval costly in time.

TESTING THE NETWORK



TESTING THE NETWORK



I don't know what I expected.

TESTING THE NETWORK

TESTING THE NETWORK

- Composing a message larger than 1mb took about 15 minutes to complete.
- Complaints from users on the network about large messages.
- Bitmessage v3 will limit messages to 256kb, I was likely partially responsible for that change.
- Large messages would freeze the client.

TESTING THE NETWORK

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**THAT'S NOT
GOOD ENOUGH**

Gifsforum.com

DILEMMA



- We know that we don't want Advertisements to be extraordinarily large. This will complicate the situation more.
- We don't want users to have to leave the application they're in to use another tool to view the details from the contracts. That can destroy anonymity.
- We could use tags in advertisement information for things like images and audio or video and store data with peers, however...
- If we store data in single places that may give information away about the users and create bottlenecks and failure points for data.

DILEMMA



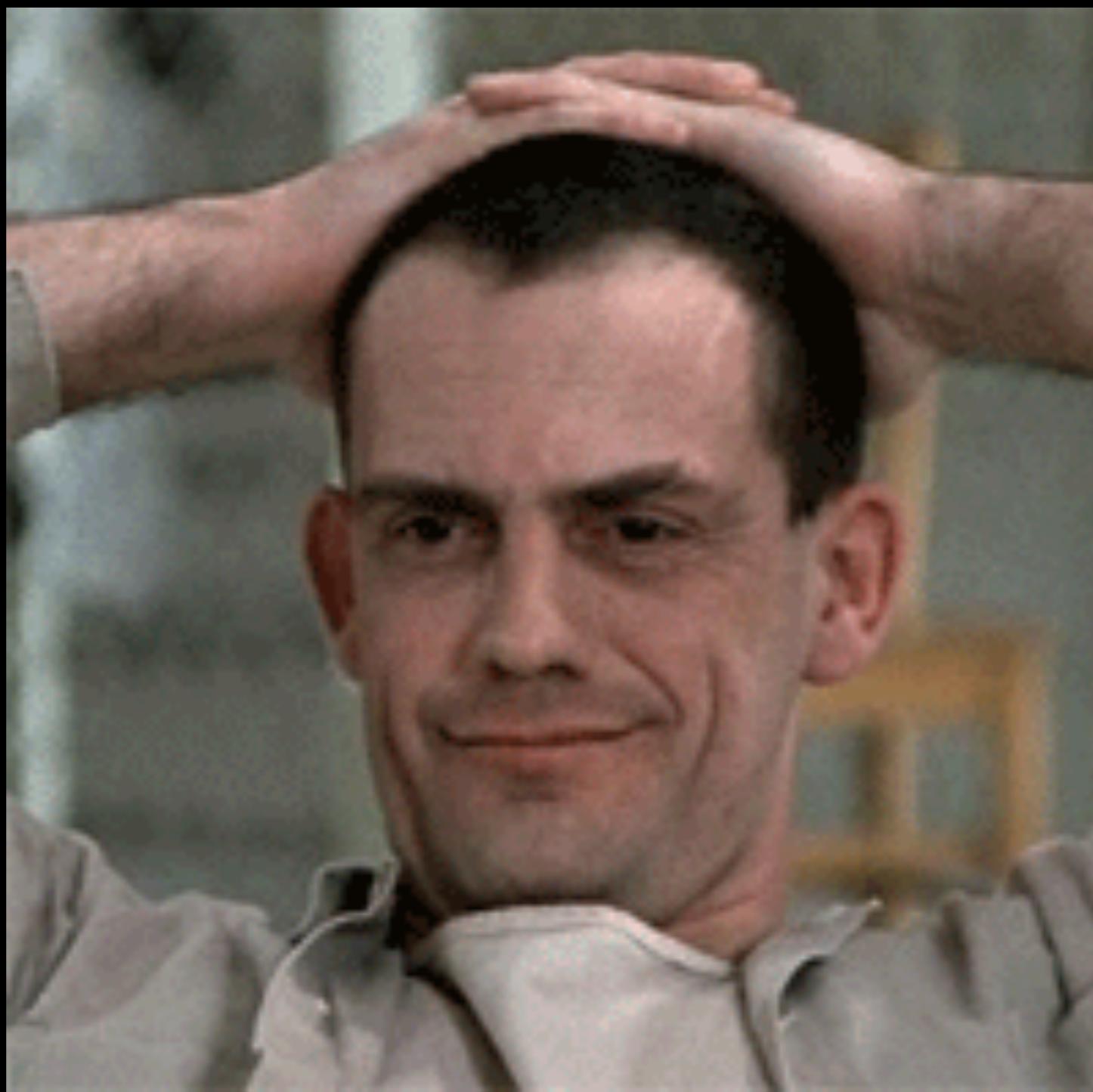
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DISTRIBUTED ANONYMOUS STORAGE



Keep it Secret

DISTRIBUTED ANONYMOUS STORAGE



Keep it Secret

ERASURE CODE



- * An erasure code transforms messages of k symbols into longer messages with m symbols such that that original message can be recovered from a subset of m symbols.
- * Optimal codes have the property that any k of m is sufficient to recover the original message.
- * Optimal codes are costly in terms of CPU and memory usage when m is large.

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VNDERMONDE MATRIX

1	1	1
1	2	4
1	3	9
1	4	16
1	5	25
...

L O V E
F R O M
D A W N

=

L+f+d	o+r+a	v+o+w	e+m+n
L+2f+4d	o+2r+4a	v+2o+4w	e+2m+4n
L+3f+9d	o+3r+9a	v+3o+9w	e+3m+9n
L+4f+16d	o+4r+16a	v+4o+16w	e+4m+16n
L+5f+25d	o+5r+25a	v+5o+25w	e+5m+25n
...

**As long as the second column has no repeated elements,
the matrix is invertible.**

REASSEMBLY

? X = ?

REASSEMBLY

? $x =$?

As long as we know which rows were chosen

REASSEMBLY

? X =

As long as we know which rows were chosen

REASSEMBLY

? $x =$

$L+f+d$	$o+r+a$	$v+o+w$	$e+m+n$
$L+2f+4d$	$o+2r+4a$	$v+2o+4w$	$e+2m+4n$
$L+4f+16d$	$o+r+16a$	$v+4o+16w$	$e+4m+16n$

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REASSEMBLY

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As long as we know which rows were chosen, we can multiply both sides by the inverse of the Vendermonde matrix.

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REASSEMBLY

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1	2	4
1	4	16

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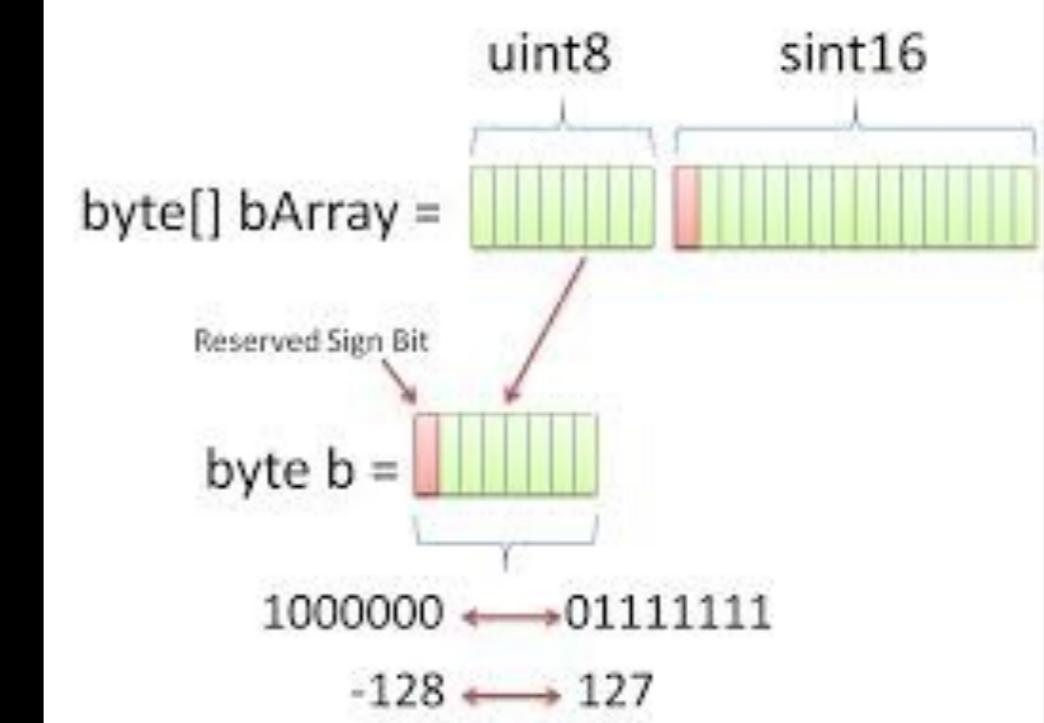
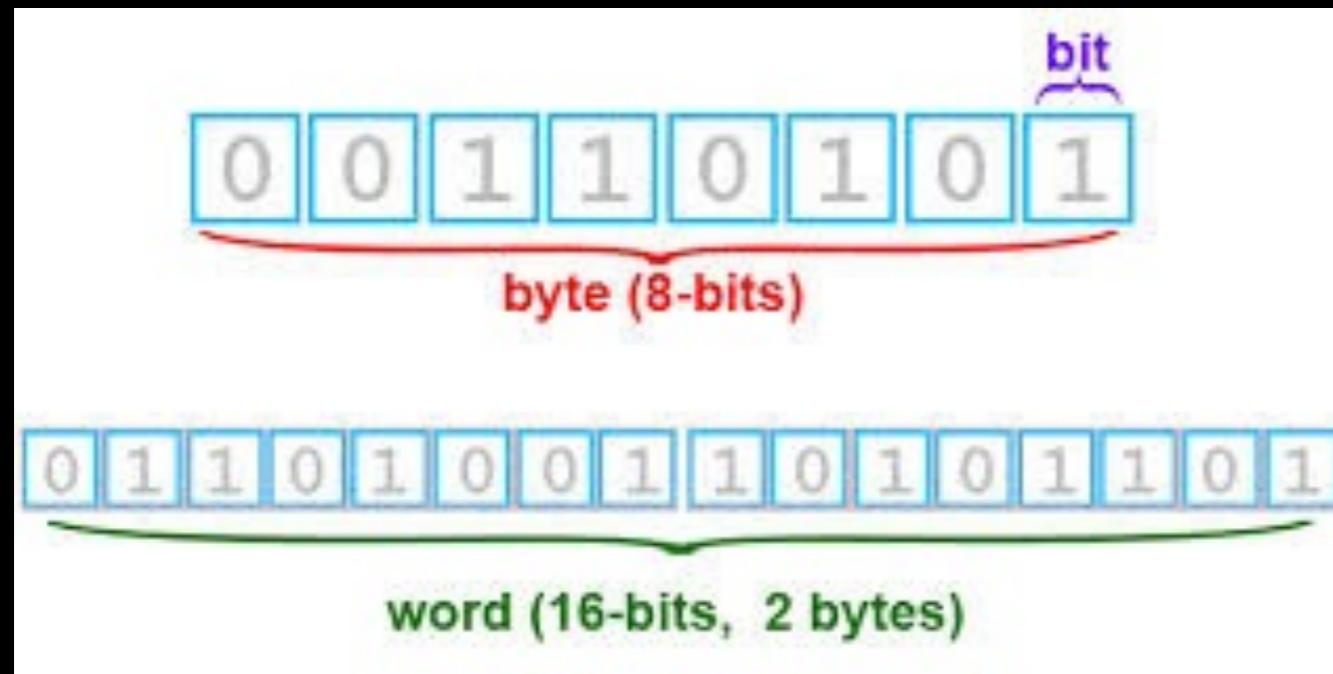
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Lovefromdawn

BYTE ARRAY LIMITATIONS



- * A byte is the smallest addressable space in most computer architectures.
- * A byte is 8 bits, thus the binary value [1111 1111] == 255 in decimal.
- * Using standard integer arithmetic, the resulting matrices could end up with values larger than 255, which can't be stored in a byte array.

FINITE FIELD THEORY



ÉVARISTE GALOIS (25 OCTOBER 1811 - 31 MAY 1832)

- * A “Field” is a mathematical structure that has addition, a 0, multiplication, a 1, and a reciprocal for every non-0 element.
- * A “Finite Field” is different from standard integer arithmetic, in that there are a limited number of elements in the field, and all operations performed in the field must result in an element in that field.
- * A finite field with p^n elements is denoted as $GF(p^n)$, and is also called the “Galois Field”. There exists a special field that resolves our limitations $GF(2^{**}8)^1$
- * In this field, 0 is the 0, 1 is the 1, addition is bitwise exclusive-or (so every number is its own additive),
- * Once we operate over this field, all matrix values are guaranteed to be in the range [0, 255], and our method for bytewise encoding and decoding becomes easy.

¹ALSO KNOWN AS G(2⁸)

GF(2⁸) FINITE FIELD IN C

Add, subtract, and multiply numbers in Rijndael's finite field:

```
/* Add two numbers in a GF(2^8) finite field */
uint8_t gadd(uint8_t a, uint8_t b) {
    return a ^ b;
}

/* Subtract two numbers in a GF(2^8) finite field */
uint8_t gsub(uint8_t a, uint8_t b) {
    return a ^ b;
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/* Multiply two numbers in the GF(2^8) finite field defined
 * by the polynomial x^8 + x^4 + x^3 + x + 1 = 0 */
uint8_t gmul(uint8_t a, uint8_t b) {
    uint8_t p = 0;
    uint8_t counter;
    uint8_t carry;
    for (counter = 0; counter < 8; counter++) {
        if (b & 1)
            p ^= a;
        carry = a & 0x80; /* detect if x^8 term is about to be generated */
        a <<= 1;
        if (carry)
            a ^= 0x1B; /* replace x^8 with x^4 + x^3 + x + 1 */
        b >>= 1;
    }
    return p;
}
```



TECH NOIR

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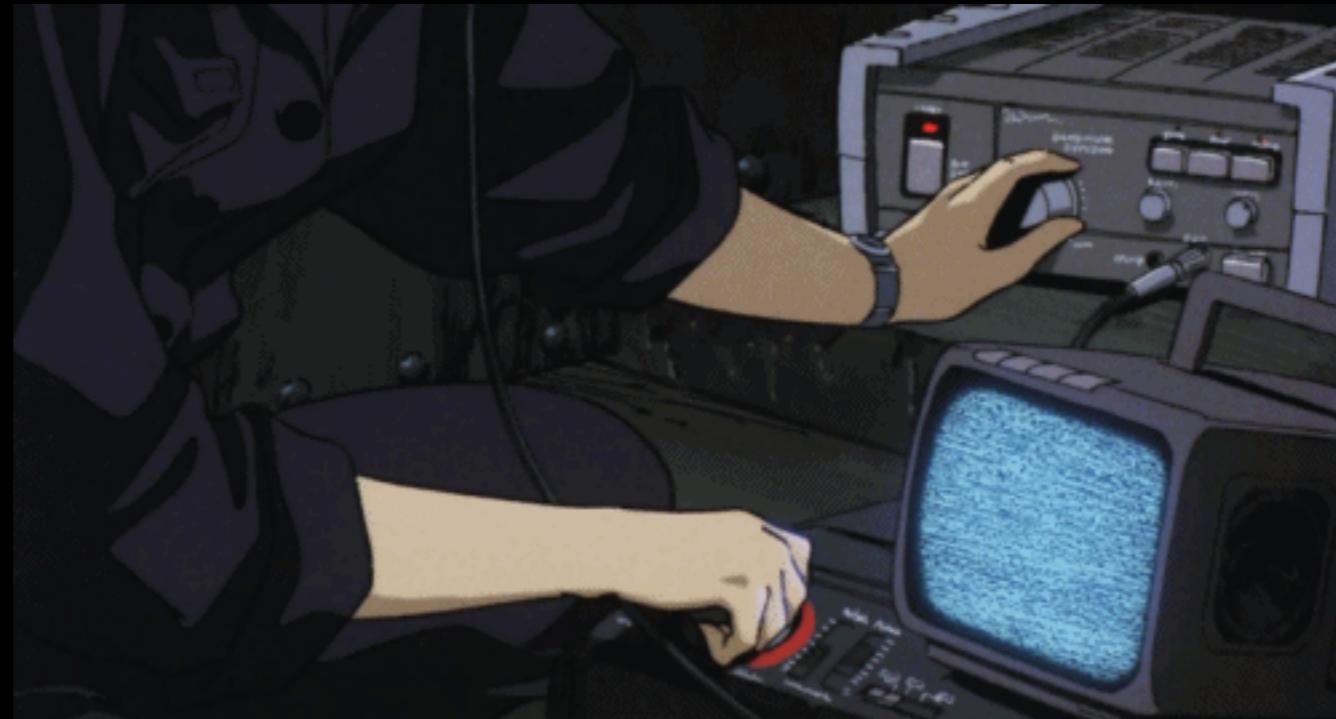
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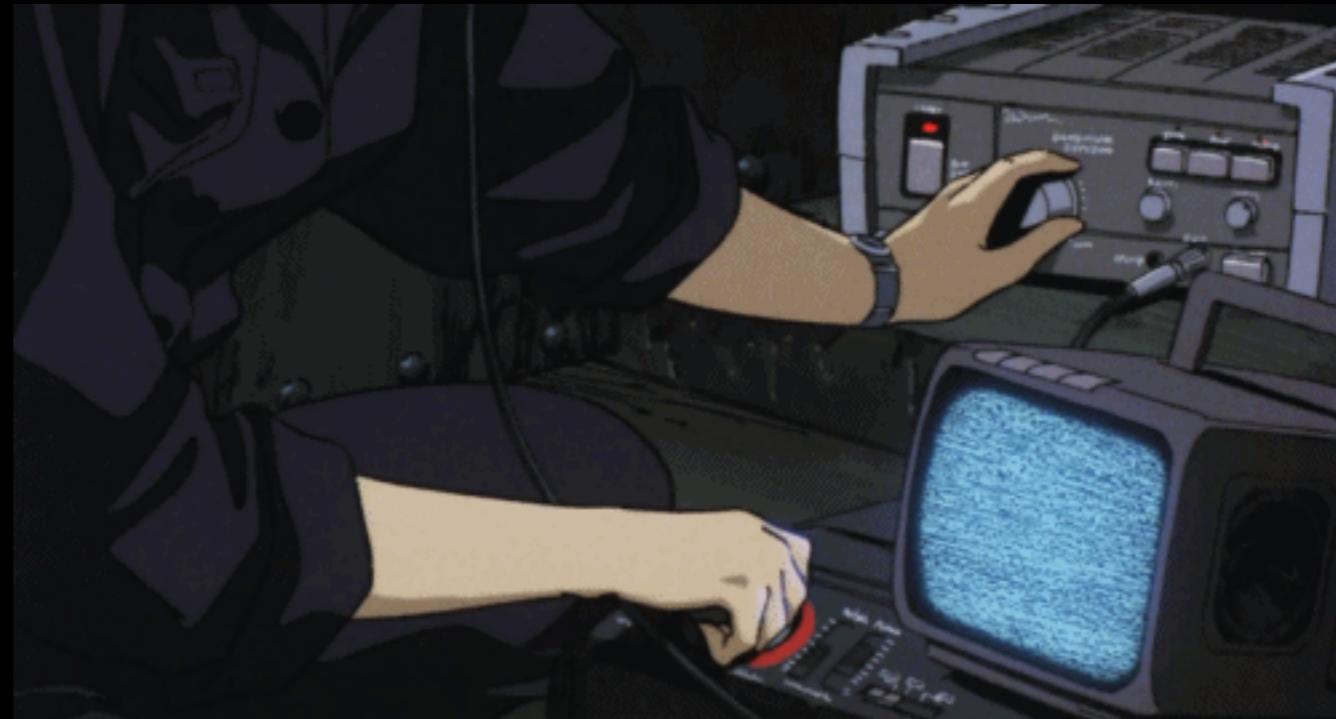
TECH NOIR

LETS RECAP



- We have a transport protocol that maintains anonymity.
- We want to be able to broadcast binary data with a size constraint of 256kb per message.
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PIECING IT ALL TOGETHER



- Open Transactions Contracts
- Moneychanger as a reference client
- libbmwrapper for Bitmessage integration.
- libnmcrpc for Namecoin integration.
- C++11 threading facilities.
- fecpp for Forward Error Correction with SSE2 support.

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CONCEPTS



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UPLOADING DATA



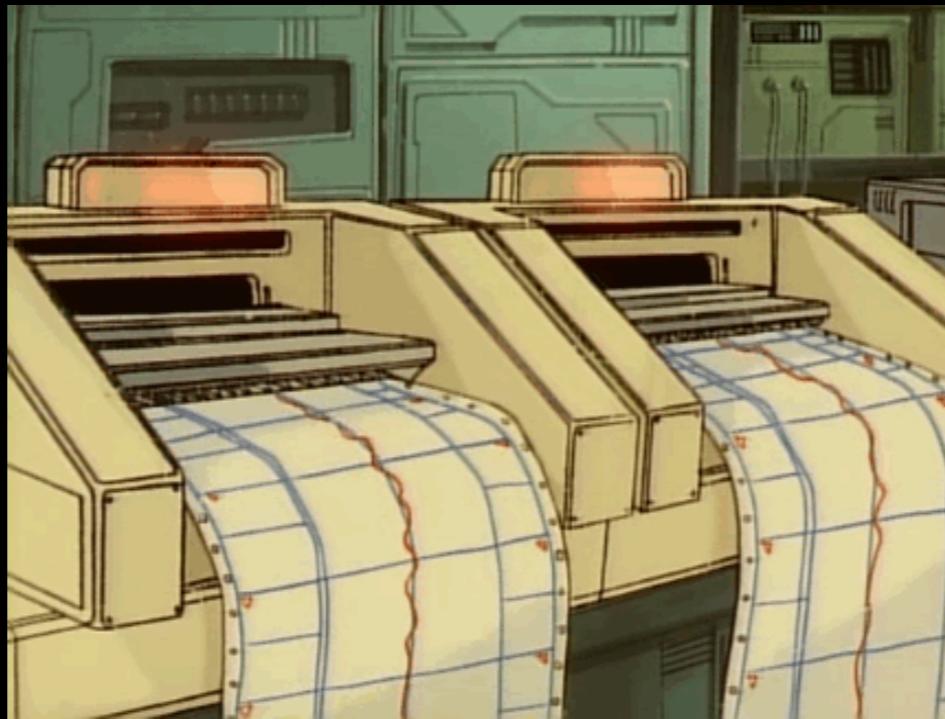
- We don't want every host to have every piece of every file, This defeats the purpose of splitting it up.
- We know that we only need a subset of the total set of data to reassemble our file.
- We can split up our uploads across channels, which are created in a deterministic way.
- Files that already exist on the network should not be uploaded twice.
- Files can be appended with a header describing what file they belong to using a Merkle Tree as a solution to determining which pieces belong to which files quickly.
- Uploading a file will still take the longest to complete, but the 40% “mod” will make this negligible.

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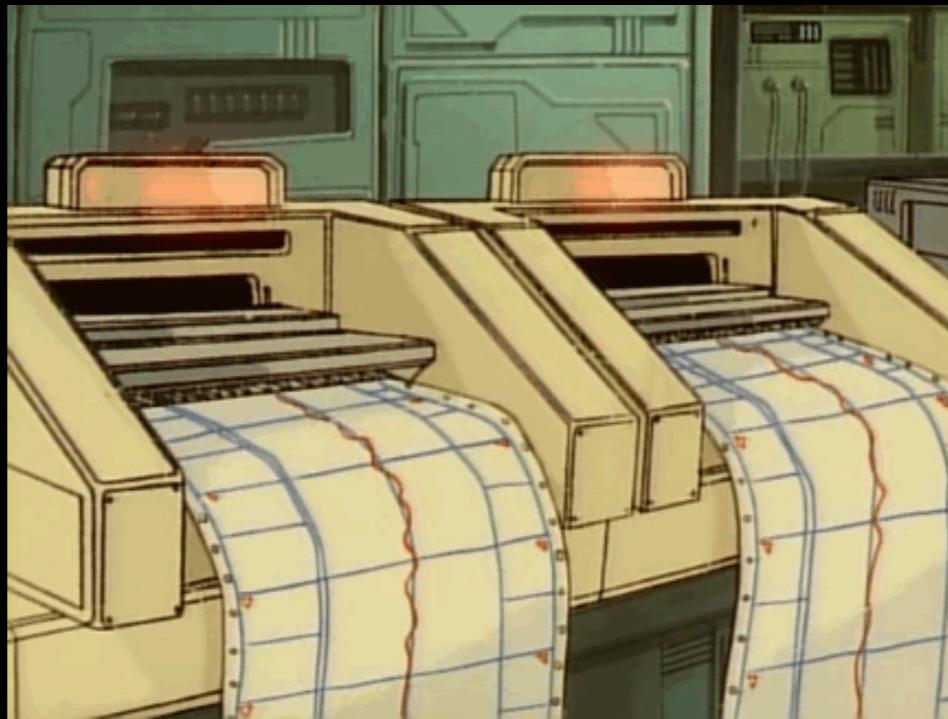
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RETRIEVING DATA



- A requester should only have to send two messages - once when a file is requested, and again when they have all the pieces they need.
- A broadcast request will contain the requesters address for the file, so that the application knows how to file it accordingly and should only be used once.
- The more pieces a client has, the faster it can reassemble it.
- If a client has sufficient information to request a file, they will have the information necessary to know how many pieces they need.
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CLEANING UP

- Requesters should broadcast when they are done with reassembly.
- This benefits both uploaders and the requester who may otherwise be flooded with data they don't need.
- Users should set a short TTL on file requests, and rebroadcast as needed.
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MAKE GIFS AT GFSOUP.COM

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MAKE GIFS AT GFSOUP.COM

CURRENT STATE

- Moneychanger building against Monetas opentxs
- libbmwrapper fully compliant with BitMessage v2 and is thread-safe.
- BitMessage works in Moneychanger
- Forward Error Correction implemented and tested over network with binary files (mp3 and images).
- fecpp converted to CMake build system.
- Command Line GUI using ncurses
(cross compiles to SDL) - “bmfec” on Github.
- Binary pieces are binary compatible with the Tahoe-LAFS filesystem.

IN PROGRESS

- How many channels to keep open for data broadcasts.
- Formatting the header structure of a broadcast.
- Automate filesystem handling of stored file pieces.
- Determine best options for files behind the scenes (k of m).
- Testing on Linux
- Converting libnmcrpc to CMake build system.



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PLANS

- A headless user agent similar to ssh-agent or gpg-agent
- Transitioning OT Client features to use this user agent, ie. Moneychanger would talk to the agent.
- Keeping Moneychanger up to date with the latest opentxs and updating the stable-client branch of opentxs as tests are completed.
- Updating libbmwrapper to be fully compliant with Bitmessage v3
- Setting up nodes on cloud instances to act behind the scenes on the Bitmessage network.
- Integrate “Bitcloud” features into Moneychanger (one as a file manager, another for the Bazaar).

CONCLUSION



JEROLOGY.TUMBLR

CONCLUSION



JEROLOGY.TUMBLR

QUESTIONS?



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QUESTIONS?



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- * <http://www.reddit.com/r/reactiongifs> and <http://www.reddit.com/r/cinemagraphs> - For all those gifs