

The background of the slide is a dark, pixelated version of the Bitcoin logo, which is a stylized face with a wide smile. The entire image has a grainy, digital texture.

Bitcoin Forks History

UPGRADE, BUG AND CONTENTIOUS FORKS

Stéphane Roche

ABOUT STEPHANE



2015

Start working on Bitcoin in 2015 at Ledger (hardware wallet)



2017–2018

Focus on blockchain technical trainings
Founder of D10eConsulting
Consultant at Chainsmiths

Work on Ethereum in 2016-2017

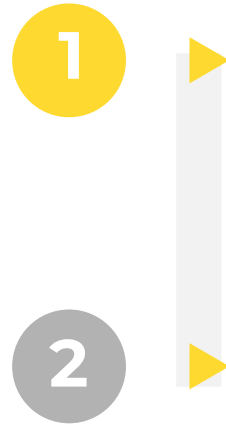
- Co-found non-profit organization Asseth
- R&D on Dao1901
- Contribute to the ERC20 Consensys smart contracts
- Dether.io (15,000 ETH raised)



2016–2017

@janakaSteph on Twitter
rstephane@protonmail.com

OUTLINE

- 
- 1 Main Consensus Forks**
 - 2 The Block Size Debate**

1

MAIN CONSENSUS FORKS

- Bitcoin is a decentralized P2P consensus network
- A change to the consensus rules = fork
- 18 consensus rule changes to date
- Protocol upgrade is an active field of research
 - Since now, it has been trial and errors
 - Exploring new protocol upgrade methods
 - Lot of forks post-BCH can teach us a lot
 - Still not trivial at all

BIP-123 OFFICIAL FORKS TAXONOMY

Soft Forks

- Some [cryptographic commitment] structures that were valid under the old rules are no longer valid under the new rules
- Structures that were invalid under the old rules continue to be invalid under the new rules

Hard Forks

- Structures that were invalid under the old rules become valid under the new rules

SF ACTIVATION METHODOLOGY PHASES

- The 2010 forks: No activation methodology
- The 2012 forks: Towards a methodology
- March 2013 – December 2015: BIP34 versioning aka IsSuperMajority
- December 2015 – July 2017: Version bits (BIP9)
- July 2017 – August 2017: SegWit activation drama
- Next one in BIP-8 ?

THE 2010 FORKS: NO ACTIVATION METHODOLOGY

28 July 2010	0.3.5	OP_RETURN disabled. Fixing a critical bug which enabled anyone to spend any Bitcoin	No evidence of any issues
31 July 2010	0.3.6	OP_VER and OP_VERIF disabled	Some users had trouble upgrading S.N. recommends to shutdown nodes
		The addition of the OP_NOP functions	
01 Aug 2010	0.3.7	Separation of the evaluation of the scriptSig and scriptPubKey. Fixing a critical bug which enabled anyone to spend any Bitcoin	No evidence of any issues
15 Aug 2010	0.3.10	Output value overflow bug fix following a 184.5 billion Bitcoin spend incident	Chainsplit during 51 blocks. Fix released after 5h
		Disabling OP_CAT, which removed a DoS vector, along with the disabling of 14 other functions	
07 Sept 2010	0.3.12	Adding the 20,000 signature operation limit, in an incorrect way. This incorrect limit still exists today	No evidence of any issues
12 Sept 2010	n/a	Adding the 1MB blocksize limit	No evidence of any issues

2012: TOWARDS A METHODOLOGY

- **BIP-30 (require tx to have a unique identifier)**
 - Applied to all blocks whose timestamp is after March 15, 2012, 00:00 UTC
 - Simple flag day activation because the only way for a miner to violate it was to forever destroy 50 BTC by reusing a scriptpubkey in a coinbase output
- **BIP-16 (P2SH)**
 - 55% activation threshold, over blocks in the 7 days prior to 1 February 2012
 - Miners did not upgrade fast enough, so the evaluation point was delayed until 15 March

BIP-34 VERSIONING AKA ISSUPERMAJORITY

- **First mechanism that employed hashpower activation**
 - **Requires trusting the hashpower will validate after activation**
- **75% threshold signaling within a 1000 block interval to enforce the new rule**
- **Once 95% of blocks had the higher version, blocks with the lower version number would be rejected**
- **Version 2 (BIP34) – March 2013**
- **Version 3 (Strict DER encoding – BIP66) – July 2015**
- **Version 4 (CheckLockTimeVerify – BIP65) – December 2015**

BIP-66 DEPLOYMENT INCIDENT

- Some non-upgraded miners (from the remaining 5%) generate invalid blocks
- Roughly half the network hashrate was mining without fully validating blocks (SPV mining), and built new blocks on top of that invalid block
- The soft fork caused two chain splits (during 6 and 3 blocks)
- Consequences:
 - Miners lost funds
 - Some softwares don't detect invalid blocks
 - Network unreliability (ask for 30 extra confirmations)

ISM LIMITATIONS

- Soft forks could only be deployed one at a time
- Miners can signal without really validating and enforcing
- If any activation failed for whatever reason, it would prevent any further soft forks from being deployed and activated

BIP-9 AKA BETTER VERSIONING

- Allow parallel soft fork deployment
 - Use different bits in the version field for each soft fork rather than increasing the version number
 - Up to 29 soft forks parallel deployment, activated independently
- Still rely on hashpower signaling
- Used for the relative timelocks functionality
 - CheckSequenceVerify (BIPs 68, 112, 113)

SEGREGATED WITNESS ACTIVATION DRAMA

- SegWit soft fork (BIPs 141, 143, 147) became highly politicized
- Threats of running other versions of Bitcoin software (UASF, Cash, 2X)
- Divergence of interest between miners and economic majority
- Majority of hashpower refused to signal until last minute

BITCOIN CORE PROPONENTS FIGHT BACK

- **BIP-91 (Reduced threshold Segwit MASF) – 23 July 2017**
 - Network rejects the non-signaling blocks
 - Pressure to force SegWit with current deployment method
- **BIP-148 (Mandatory activation of segwit deployment) – 01 August 2017**
 - Mix of BIP-9 MASF and UASF
 - Goal is to align miners and users interests
 - Incentivizing miners to work for the economic majority
 - Means of pressure to activating SegWit early
- **BIP-8 (Version bits with lock-in by height) - proposed on February 2017**
 - Alteration to BIP-9 that replaces time based activation with block height, as well as guaranteed activation of soft fork



Download Bitcoin Core with BIP148 support

Latest version: 0.14.2-uasfsegwit1.0

Choose your operating system



Windows

64 bit - 32 bit



Linux (tgz)

64 bit - 32 bit



Windows (zip)

64 bit - 32 bit



ARM Linux

64 bit - 32 bit



Mac OS X

dmg - tar.gz



Ubuntu (PPA)

Verify release signatures

Source code

Signing Keys

Luke

Wladimir

LESSONS LEARNED

- Instrumentalization of the MASF deployment mechanism
 - 95% was chosen just to be on the safe side. Never intended to be a *vote*
- Too much responsibilities granted to miners => risk of veto
- Signalling mechanism \neq enforcement of rules (cf. BIP-66)

2

BLOCK SIZE DEBATE

BITCOIN UNLIMITED PRESENTS

SATOSHI'S VISION

23-25 MARCH 2018
TOKYO JAPAN

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BITMAIN

DEVELOPING THE PROTOCOL



AMAURY SÉCHET
LEAD DEVELOPER,
BITCOIN ABC



ANDREW STONE
LEAD DEVELOPER,
BITCOIN UNLIMITED



TOM HARDING
LEAD DEVELOPER,
BITCOIN XT

BUILDING THE PERMISSIONSLESS ECONOMY



RYAN K. CHARLES
CO-FOUNDER AND CEO,
YOURS.ORG



ROB DANIELSON
CO-FOUNDER,
ROCKETH.NET



CHRIS PACIA
DEVELOPER,
OPEN BAZAAR

RESEARCHING FOR THE FUTURE



PETER RIZUN
CHIEF SCIENTIST,
BITCOIN UNLIMITED



EMIN GÜN SIRER
ASSOCIATE PROFESSOR,
CORNELL UNIVERSITY

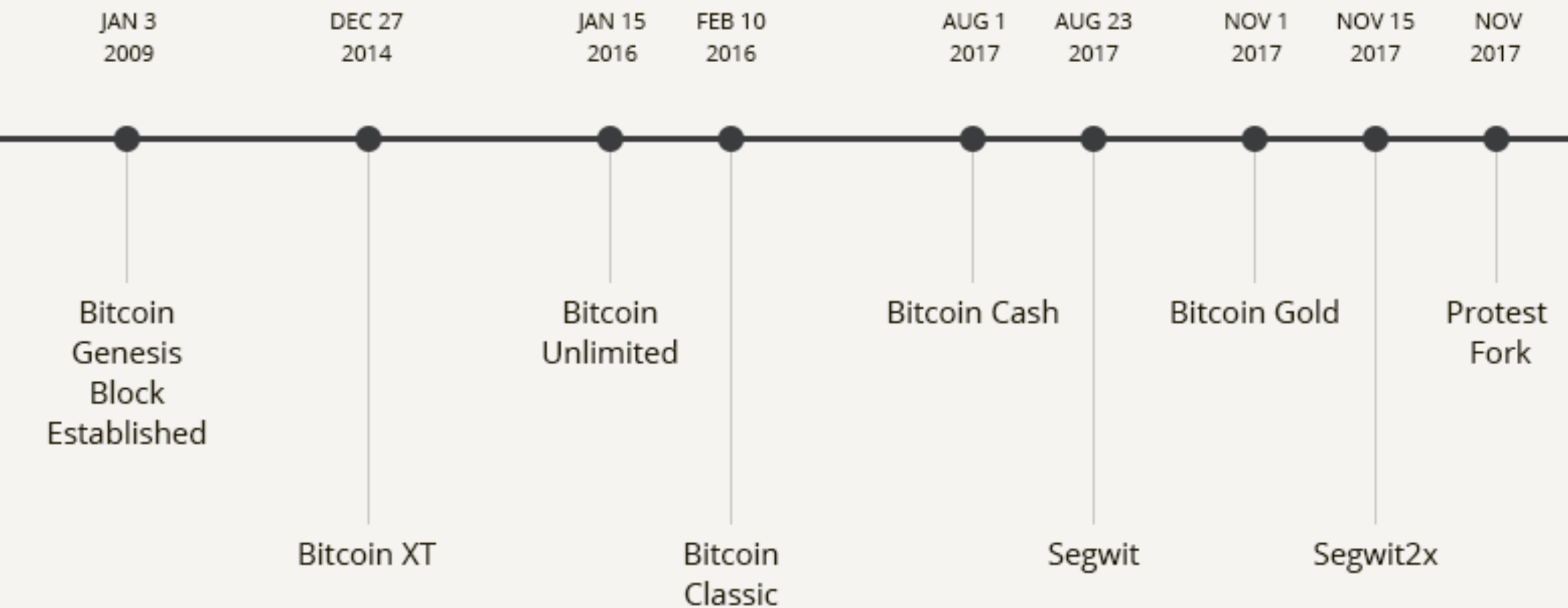


JOANNES VERMOREL
FOUNDER, LOKAD

THE BLOCK SIZE DEBATE

- A size issue: Small blockers vs Big blockers
- Lot of alternative implementations for bigger blocks
- While Bitcoin Core is focusing on optimization and layer 2

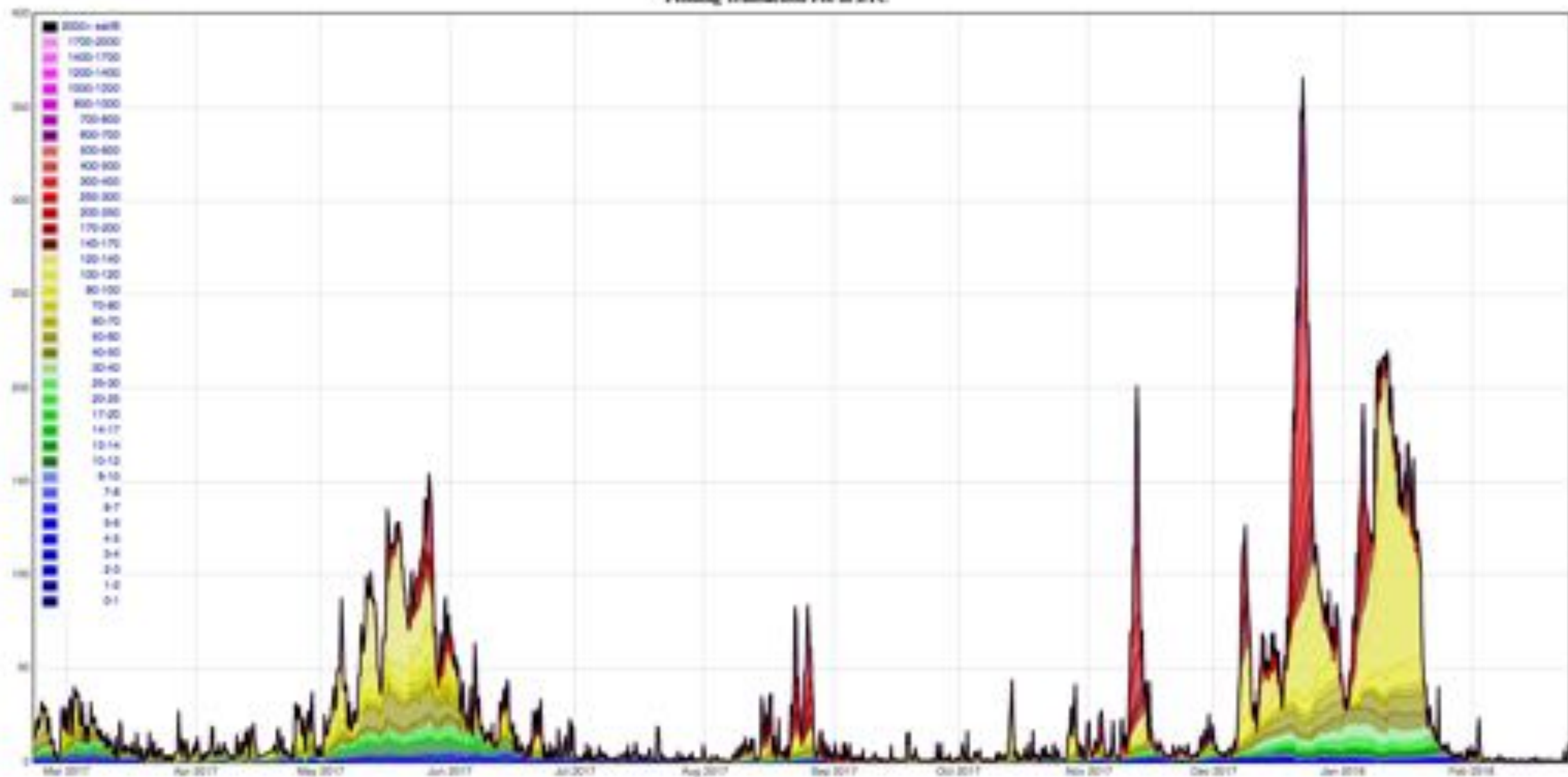
Bitcoin Forks Timeline



BITCOIN CORE ROADMAP

- 1MB block size limit
- Optimization rather than bigger block
 - libsecp256k1 verification (500% to 700% speed boost on x86_64)
 - Block compression (IBLT, Weak Block, Compact Block, ...)
 - Segregated Witness (up to x4)
 - Schnorr signatures
 - ...
- Off-chain overlay network (layer 2)
 - Lightning Network

Pending Transaction Fee in BTC



BITCOIN XT IMPLEMENTATION

- Dec 2014: First client launched by Mike Hearn
- Jun 2015: Plan to increase the max block size (BIP0101)
 - Max block size increase to 8MB, doubling every two years
 - Aug 2015: BIP 101 merged into the XT codebase
 - 75% hashrate threshold never met
 - Jan 2016: BIP 101 reverted and 2MB block size of Bitcoin Classic applied instead
- Now defaults to being a Bitcoin Cash client

Bitcoin XT

Bitcoin XT is an implementation of a Bitcoin full node that embraces Bitcoin's original vision of simple, reliable, low-cost transactions for everyone in the world. Bitcoin XT originated as a series of patches on top of Bitcoin Core and is now an independently maintained software fork. See our notable [features](#).

bitcoinxt / bitcoinxt

Watch

66

Star

353

Fork

118

Code

Issues 27

Pull requests 4

Projects 1

Wiki

Insights

Bitcoin XT. Most recent release is G - Bitcoin Cash

9,313 commits

13 branches

12 releases

330 contributors

MIT

Branch: master

New pull request

Create new file

Upload files

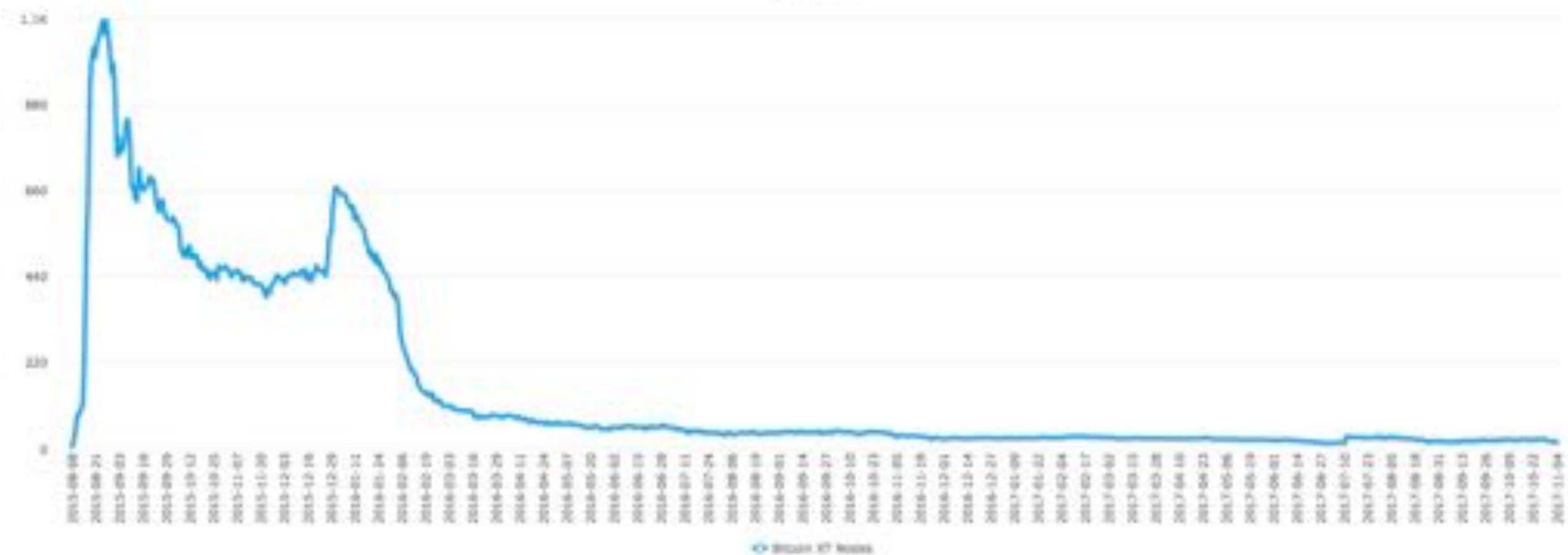
Find file

Clone or download

dgenrB Merge pull request #272 from dgenrB/bch

Latest commit 1114226 8 days ago

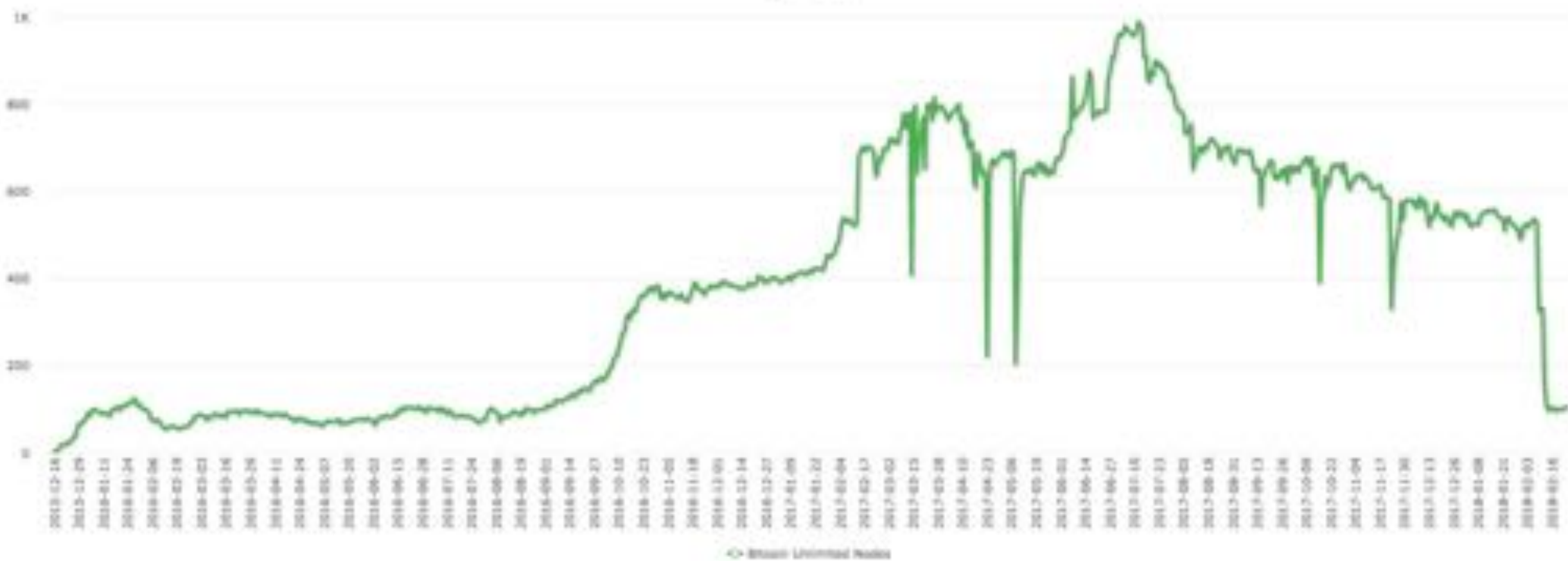
Bitcoin XT Nodes (historical)
coin.dance



BITCOIN UNLIMITED IMPLEMENTATION

- Created in January 2016 by Peter Rizun and Andrew Stone
- Intention of « providing a voice to all stakeholders in the Bitcoin ecosystem »
- BUIP001 - Fixed block limit made obsolete
- Test 1GB blocks with nChain
- BU node follows the blockchain with most PoW
- Separation of the mining block size (default 1MB) from the non-mining block acceptance size (default 16MB)
- 2% of the Bitcoin nodes , 13% of the Bitcoin Cash nodes

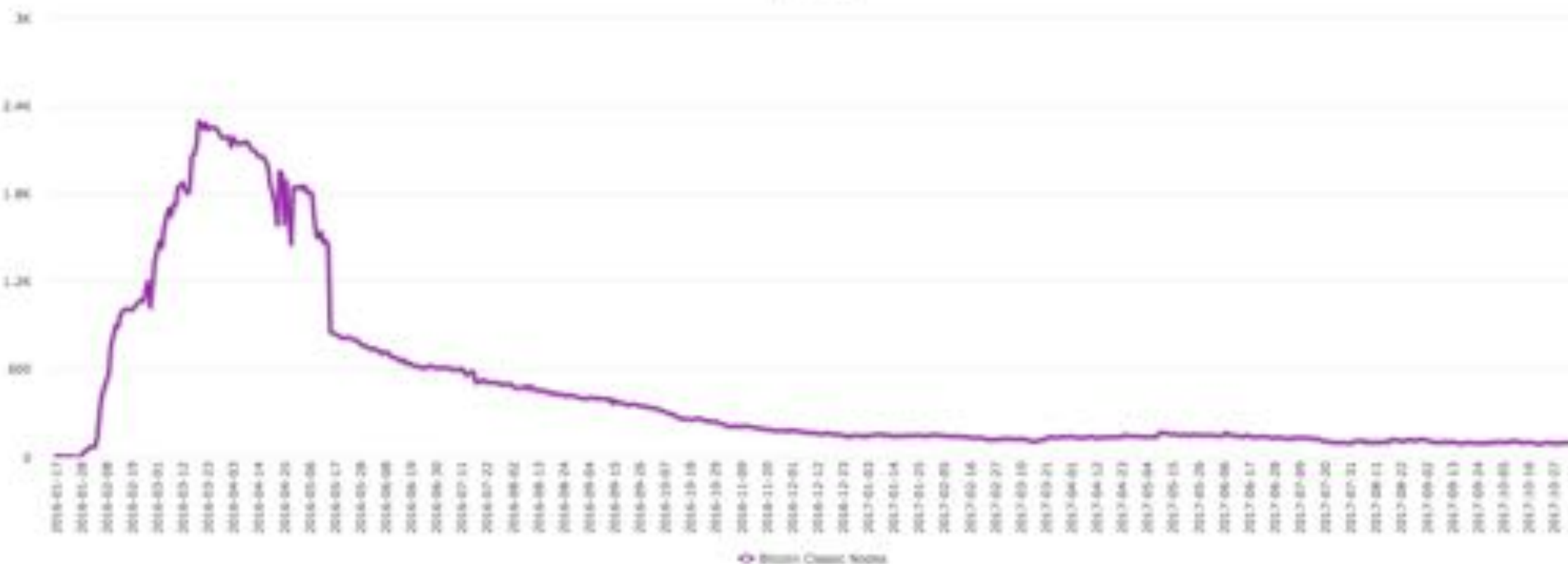
Bitcoin Unlimited Nodes (historical)
coinbase



BITCOIN CLASSIC IMPLEMENTATION

- Created in February 2016
- Received support from some Bitcoin companies, developers, investors and miners, such as Coinbase, Bitstamp, Circle, Jeff Garzik, Roger Ver and Gavin Andresen
- Want to increase of the maximum block size from 1Mb to 2 Mb
- November 2016: moved the limit out of the software rules into the hands of the miners and nodes
- November 2017: ceased operation

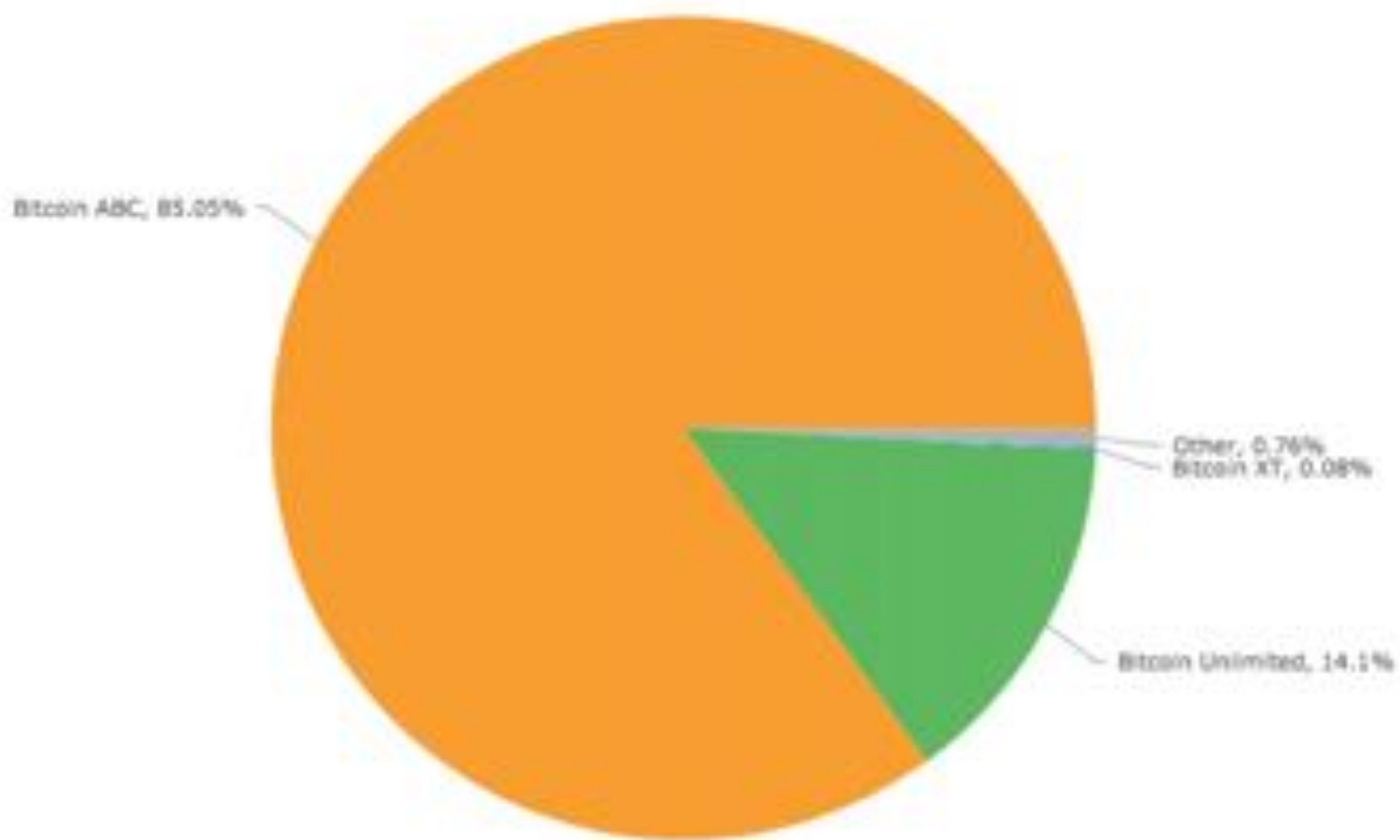
Bitcoin Classic Nodes (historical)
coin.dance



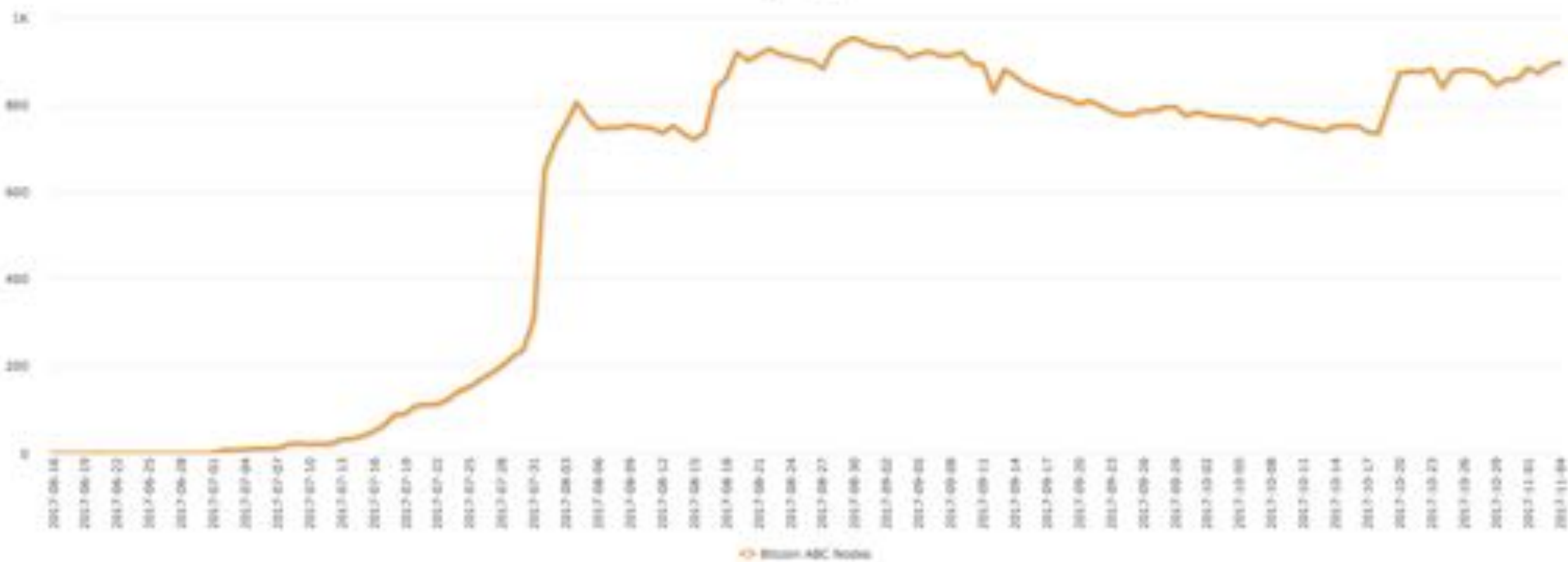
BITCOIN CASH PROTOCOL

- Hard fork on August 1, 2017
- *Bitcoin ABC*: main implementation of the Bitcoin Cash protocol
- First announced by Bitmain in response to BIP-148 UASF
- Subsequently, some developers took interest in the project (A. Séchet)
- Adjustable Blocksize Cap (in theory)
 - Defaults to 8MB
 - Can be raised up to 32MB

Bitcoin Cash Nodes (2018-02-02)
coin.dance



Bitcoin ABC Nodes (historical)
coin.dance



POST-BCASH SCAM FORKS

Name	Current Price	Block Number / Date	Market?	Official Website	Walleting Services Extractable?	Market Cap	Circulating Supply	Volume (24h)	% 7d
 Bitcoin Cash (BCH)	\$1118.34	478558 / Aug 01 2017	High Volume	www.bitcoincash.org	Yes	\$22,584,984,740	16,979,675	\$689,591,000	-0.16%
 Bitcoin Gold (BTG)	\$126.68	491407 / Oct 24 2017	High Volume	www.bitcoingold.org	Yes	\$2,132,049,906	16,838,361	\$41,944,620	0.40%
 Bitcoin (BTC)	\$22.37	492820 / Nov 2 2017	Low Volume	https://bitcore.io		\$258,513,366	11,558,294	\$1,710,580	-15.60%
 Bitcoin Diamond (BCD)	\$17.6932	495866 / Nov 24 2017	Low Volume	http://www.bcd.io	Yes	\$?	?	\$7,571,736	-32.58%
Bitcoin Lightning (BLN)		498553 / Dec 18 2017		bitcointalk.org ADR					
Bitcoin Hot (BTH)		498848 / Dec 12 2017		www.bthot.org					
United Bitcoin (UBTC)	\$73.7191	498777 / Dec 12 2017	Low Volume	www.ubtc.com	Yes	\$?	?	\$918,201	-18.48%
Super Bitcoin (SBTC)	\$21.0864	498888 / Dec 14 2017	Low Volume	www.supermariobitcoin.com	Yes	\$?	?	\$939,227	-15.45%
BitcoinX (BCX)	\$5.0687248	498888 / Dec 14 2017	Low Volume	www.bcx.org	Yes	\$?	?	\$1,031,790	-12.8%
Q4 Bitcoin (QBTC)		498888 / Dec 14 2017		www.q4bitcoin.io					
Bitcoin Nexus (NRQ)		498967		bitcointalk thread					
Bitcoin World (BTW)		499777		www.btw.one	Soon				
Bitcoin Faith		500000		www.bitcoinfaith.org	Soon				
Bitcoin God (GOD)	\$43.8278	501225 / Dec 25 2017		www.bitcoingod.org		\$?	?	\$15,243	-8.04%
Bitcoin Atom (BCA)	\$24.0734	505888 / Jan 25 / 26		www.bitcoinatom.io		\$?	?	\$6,571	-24.31%
Bitcoin Uranium (BUM)		Dec 31 2017		www.bitcointalk.org/showthread.php?p=101407					
Bitcoin Cash Plus		501407		www.bitcoincashplus.org					
Segwit2x (SDX)	\$6.23197	501451 / Dec 28 2017	Low Volume	Article	Yes	\$?	?	\$135,943	-0.40%
Bitcoin Pizza (BPA)		501888		www.p.tgpt					
Bitcoin Smart (BCS)		500050		www.bcs.info					
Bitcoin Interest (BIT)		505583		www.bitcoininterest.io					
Bitcoin Private		Jan / Feb		Reddit					
Bitcoin Life (BTCL)		Jan / Feb		www.bitcoinlife.us					
Bitcoin Rhodium (BTR)		Airdrop (see website)		www.bitcoinrh.org					
Byether		678558 / Aug 01 2017		www.byether.com					
Bitcoin Silver		Scam							
Bitcoin Platinum		Scam							

CONCLUSION

- Blockchain protocol upgrade is not trivial
 - Requires coordination to not lose nodes, or the least possible
 - Not reversible (without damage)
 - Script versioning allows much more flexibility
- The Core team gained experience over the years to deploy hard forks
 - Carefully exploring different upgrade methodologies
 - HFs post-BCH can teach us a lot
- Decentralized governance manifests itself in consensus forks and software implementation choice

- Does size really matter?
 - The whole scaling debate can be seen as a huge waste of time
 - But necessary
 - More urgent issues (privacy)
- Next contentious topics?
 - Energy consumption
 - Privacy
- Bitcoin dramas come and go...

- /r/bitcoin is a BTC subreddit
- /r/btc is a BCH subreddit
- [@bitcoin](#) is a BCH twitter
- [@btc](#) is a BTC twitter
- <http://bitcoin.com> is a BCH site
- <http://bitcoin.org> is a BTC site
- Bitcoin Core is a BTC implementation
- Bitcoin ABC is a BCH implementation

Thank you!