

ETC Cooperative

2020 Retrospective

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Background

What is Ethereum Classic (ETC)?

Ethereum Classic (ETC) is a peer-to-peer payment platform and a platform for decentralized applications. ETC is Ethereum technology with a Bitcoin philosophy.



Like Bitcoin, ETC:

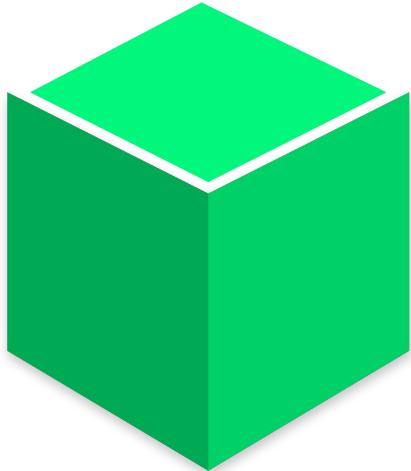
- Is digitally scarce, with a fixed supply monetary policy.
- Uses the Proof of Work consensus algorithm
- Values censorship resistance and trust minimization.
- Values security and safety over throughput.
- Protocol aims for multi-decade stability.
- Is [socially scalable](#) within the ecosystem.
- Grassroots movement with no ICO or premine.

Unlike Bitcoin, ETC:

- Has [rich statefulness](#).
- Has a deterministic [turing machine](#) bounded by gas (the EVM).

What is the ETC Cooperative?

The Ethereum Classic Cooperative Inc (“ETC Coop”) is a non-profit legal entity that has held 501(c)(3) public charity status since 2018. Donations to ETC Coop are tax-deductible under IRC Section 170 for US taxpayers, both individual and corporate. Enterprises investing in infrastructure or other “public goods” within the ETC ecosystem can do so in a more tax-efficient manner by donating to the ETC Coop rather than investing directly.



The mission of the ETC Coop is to steward the development of the Ethereum Classic protocol and to support the growth of a mature ecosystem around that protocol. There are three pillars to this mission:

- **Accelerate adoption** of ETC technology by individuals and enterprises through effective branding, marketing and education.
- **Foster collaboration** between ecosystem participants including developers, miners, investors, enterprises and end-users.
- **Mature Governance and Transparency** – efficient and transparent governance framework, including use of funds.

This 2020 retrospective for the ETC Coop is organized around these three pillars - **Adoption, Collaboration** and **Governance**.

Overview

The Successes of 2019

2020 was a challenging year for the ETC ecosystem after a very successful and upbeat year in 2019.

ETC was broadly seen as “a protest coin with no developers” during 2016, 2017 and 2018 which was not *entirely* unjustified. The only major protocol update during that period was the Monetary Policy change adopted during 2017, and ETC was getting very behind on opcode changes made in ETH. This made it unnecessarily difficult for developers to migrate smart contracts from Ethereum to ETC.

The Classic Geth client maintained by ETCDEV was also deliberately diverging from upstream Geth, and not in a good way. IOHK was developing the ETC-exclusive Mantis client through 2017 and 2018 but it never quite reached full production quality and there were only ever a handful of active Mantis mainnet nodes. The healthiest client was Parity-Ethereum, which had supported ETC from the beginning.

2019 was a breakthrough year where that perception started to change, with ETC Labs founding ETC Labs Core (later renamed as ETC Core), and staffing up quite aggressively. While Classic Geth was being maintained, their efforts were largely on Multi-Geth (a Geth variant which actively tracked upstream Geth), and later Core-Geth (with much the same pattern). ETC Cooperative funded and supported the addition of ETC support to Hyperledger Besu, giving the ecosystem three clients that benefited from all the work of the Ethereum core developers.

Various well-known individuals from the Ethereum ecosystem joined ETC teams in early 2019. The Atlantis hard fork in September 2019 brought the protocol much closer to Ethereum and was the first well-coordinated update for two years. The ETC Summit 2019 in October 2019 brought everyone together and was an opportunity to show all the progress being made.

Agharta and Phoenix hardforks

2019 was a hard act to follow, but there was a positive start to the year with the [Agharta hard fork](#) successfully activating in January, bringing the Constantinople opcodes to ETC.

That was a strong follow-on from the [Atlantis hard fork](#) which added Byzantium opcodes in September 2019.

The second hard fork of the year was Phoenix. It was very challenging, with three separate points of consensus reached (Aztlan, Aztlan+Phoenix, and then finally Phoenix). In addition, the originally targeted March activation did not occur until June due to a miscalculation in the estimated block for activation.

- [ECIP-1061 - Aztlan](#)
- [ECIP-1061 - Aztlan](#) + [ECIP-1078 - Aztlan "fix"](#)
- [ECIP-1088 - Phoenix](#)

We lost momentum through that period, with little work done on gathering consensus for the follow-up hard-fork while Phoenix was still pending. Contention and conflict between various core developers about the Phoenix scope also resulted in the removal of ETC support from Multi-Geth and OpenEthereum in the aftermath of the hard-fork.

The shared expectation within the ecosystem was one of broad adoption of ETC by Ethereum ecosystem projects after Phoenix achieved protocol parity, but that hope did not materialize. Phoenix had dragged on for months and was an anticlimax in the end.

51% Attacks

Shortly after Phoenix, the network staggered until the heavy blows of three consecutive 51% attacks from late July through August. The details of the attacks are covered in detail later in this retrospective. They had a huge negative impact which even at the time of writing in January 2021 is still lingering.

The immediate consequence of the attacks was the complete suspension of ETC deposits/withdrawals at many exchanges, or to hugely extended confirmation times (as long as two weeks in some cases). Some mining pools suspended ETC mining as well. Even for the mining pools which were active, the miners suffered from the extended confirmation times and were unable to quickly convert their block rewards to fiat to pay their bills. This resulted in a large drop in hash-rate.

In the aftermath of the attacks, numerous proposals were made about potential protocol changes and mitigations. There was a very high volume of discussion and activity but there was no obviously clear path forward. 51% attacks are an intrinsic feature of POW systems and ultimately it is only a preponderance of honest hash-power which can truly

mitigate that risk. All the proposals compromised the purity of the Nakamoto consensus in some way.

The Return of IOHK and Charles Hoskinson

One unexpected but hugely welcome side-effect of the 51% attacks was the return of IOHK and Charles Hoskinson to the ETC ecosystem. IOHK's ETC-specific Mantis client had been defunded and undeveloped since December 2018, but Charles decided to revive Mantis to production status and to start work on proposed protocol updates for Checkpointing and for the introduction of a Treasury.

Charles released a series of videos and was very active on Discord on his return and it was a delight to see him back.



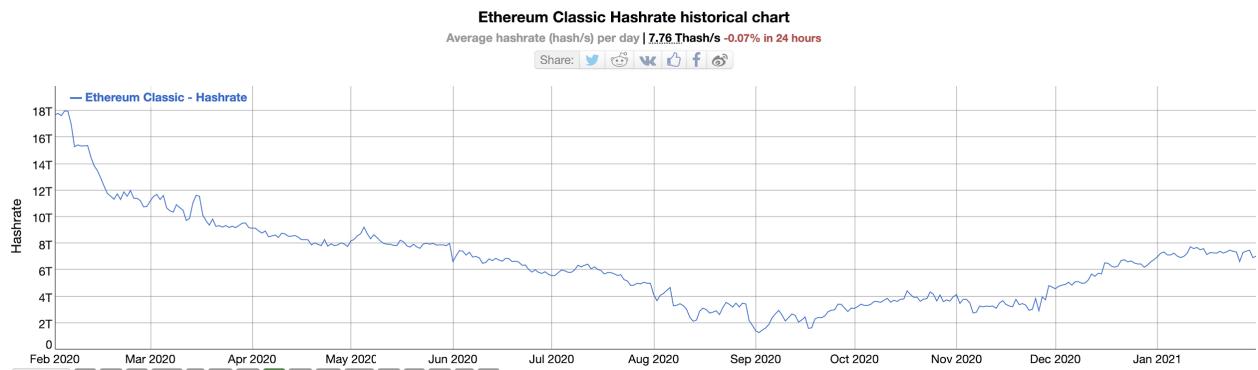
IOHK also hosted a series of showcase presentations for various of the proposed 51% attack mitigations.

Thanos and MESS

The Thanos hard-fork was the eventual short-term band-aid, with a single protocol change - [ECIP-1099 - Calibrate Epoch Duration](#) - which made it possible to mine ETC with 4GB and

3GB graphics cards again. The goal was to attract more hash rate, to secure the network. The Core-Geth team also implemented a non-consensus feature called [MESS - ECIP-1100 - MESS \(Modified Exponential Subjective Scoring\)](#), aimed as a “band-aid” protection against future 51% attacks.

The network hash rate dropped as low as 1.3 TH/s and even at the time of writing, in January 2021, has only returned to May/June 2020 levels. Exchanges have restored deposits/withdrawals and generally lowered the number of confirmations again, but the improved confidence has not been reflected in the ETC price, which has stagnated. The market is still not confident or excited about the project and much of that is down to the attacks.



Data from [bitinfocharts.com](#)

The **ETC Cooperative 2021 Roadmap** document will detail the path we see towards a vibrant ecosystem built around a protocol which respects the Code is Law roots of ETC but leaves behind the stagnation and Ethereum-slipstreaming which has been hindering the ecosystem. ETC needs to be compelling in its own right.

Adoption - Comms and Marketing

Communication and Marketing are a key function for the ETC Cooperative.

We keep ecosystem participants informed and connected with a mixture of in-person events and online channels. Given the travel restrictions due to COVID-19, we participated only in a small number of in-person events during Q1. The majority of our efforts during 2020 were through online channels - blogs, social media, interviews, mailing list, etc.

We had extensive outreach to help node operators around the hard-forks. Unfortunately, we also had several periods of crisis management during 2020 where our communication and community management was critical.

No ETC Summit



Due to the pandemic, there was no ETC Summit during 2020. In previous years, these Summits have been important events to bring the community together and update everybody on the latest ETC happenings and projects.

There have been three ETC Summits to date:

- [ETC Summit 2017](#) in November, Hong Kong, China (organized by [DCG](#))
- [ETC Summit 2018](#) in September, Seoul, Korea (organized by [Anthony Lusardi](#))
- [ETC Summit 2019](#) in October, Vancouver, Canada (organized by [Bob Summerwill](#))

These events have been **very expensive**, using up a significant proportion of the ETC Cooperative's budget in each of these three years:

- ETC Summit 2017 - \$130,000 (90% of budget, estimated)
- ETC Summit 2018 - \$180,000 (29% of budget)

- ETC Summit 2019 - \$160,000 (47% of budget, estimated)

For our 2020 roadmap, the ETC Summit in its current form did not represent a good return on investment on top of the pandemic. There were two options - moving to be a “premium event” or cancellation.

The first option was dependent on significant improvement in public perception about the ETC project that attendees would be willing to pay several hundred dollars for their tickets so that the conference was profit-making or at the very least only slightly loss-making. We never got the opportunity for this option to be considered because of the global pandemic, so ETC Summit 2020 was canceled by default.

As things stand, we still have not seen the breakthrough in popularity for ETC which would make ETC Summit 2021 as a premium event a viable option.

Perhaps some other legal entity would subsidize a future ETC Summit, with ETC Labs and IOHK as the only likely candidates.

Another alternative would be to hold a virtual event, but that would be a far cry from the in-person conferences held to do. Their primary “win” is the opportunities which they bring for face-to-face interactions between individuals who might be mutually distrustful or very misaligned in their values with relation to the ETC project.

Other Conferences and Hackathons

Representatives of the ETC Coop (Bob Summerwill, Yaz Khoury) attended many of the primary Ethereum hackathons and community conferences which were held in the early months of 2020 prior to COVID lockdown.

The events were chosen to maximize grassroots contacts with individuals already familiar with the Ethereum technology stack, but unaware of the ETC story. Our attendance was intended to signal that ETC is part of the Ethereum family, that ETC Coop is friendly, technically competent, and are “team players”. All of the other conferences which we planned to attend later in the year, such as EDCON, Toronto Blockchain Week, and DEVCON were canceled.

- Feb 1 to Feb 2 – FOSDEM, Brussels, Belgium

- Feb 14 to Feb 16 - ETH Denver, Denver, CO (Bob speaking)
 - [What's Happening with ETC? - Bob Summerwill](#)
- Feb 26 – EEA Meetup, London, UK
- Feb 27 to Feb 28 - EEA Technical Specification WG, London, UK
 - [Ethereum Public and Enterprise Specifications - Bob Summerwill](#)
- Feb 28 to Mar 1 - ETH London, London, UK
- Mar 3 to Mar 5 – ETHCC, Paris, France (Bob speaking)
 - [A call for an end to tribalism in Ethereum - 2 years later](#)
- May 11 to May 13 – Consensus: Distributed (Bob and Yaz speaking)
 - [Foundations: Ethereum Classic - Bob Summerwil and Yaz Khoury](#)

FOSDEM 2020 – BLOCKCHAIN BIRDS OF A FEATHER

UPDATE – We have a room assigned! H.3244 on Sunday 2nd February between 14.30 and 15.30. That is upstairs in the H building which has the info centre, T-shirts and some of the rooms for the talks. Look for the BoF signs pointing in the right way.

Posted on January 30, 2020

Sunday H.3244		Project	BoF Coordinator
14	00 – 15	PINETIME	Koen Zandberg
	15 – 30		
	30 – 45		
	45 – 00	BLOCKCHAIN	Bob Summerwill
15	00 – 15	BLOCKCHAIN	Bob Summerwill
	15 – 30		
	30 – 45		
	45 – 00		

Greetings!



Bob Summerwill on stage with Kent Barton, speaking at ETH Denver 2020.



With Sebastian Couture of Epicenter after doing a podcast on Crypto-Tribalism

- <https://youtu.be/l1FpoyYcuac>

Messari Disclosures Registry Completion

Messari Disclosures Registry

This open source disclosures database aims to become a central repository for project information that can be freely accessed industry-wide. The information will provide a level of transparency to project stakeholders that is nonexistent today, facilitating the diligence process for exchanges, wallets, investors, regulators, and developers.

The effort is intended to be a collective action to push standards of basic disclosures that should be expected of projects with numerous global stakeholders. We want to allow for honest projects to have a platform to differentiate themselves and build trust with their communities and anyone looking to better understand their project.

The Messari Disclosures Registry population was completed during 2020 with Kevin Lord taking the lead, both while he was at IOHK and during his time at the ETC Coop. Messari aims to be a central repository for project information to be accessed by anyone and is incredibly detailed. ETC Cooperative paid for the subscription during 2020. ETC Labs are taking that expenditure on for 2021.

- [ETC profile on Messari](#)
- [ETC Datasheet populated by Kevin Lord](#)

ETC Cooperative on Medium

ETC Cooperative is now using Medium as a channel for publishing blog posts **in addition** to the primary website, to broaden our reach:

- [ETC Cooperative Medium channel](#)

ETC Weekly

In October of 2020, ETC Cooperative [announced](#) the formal relaunch of its newsletter now called *ETC Weekly*. Since then, the ETC Cooperative has sent just near 50,000 emails at the end of 2020 with an average open rate of 22%.



Developer Calls

There were a number of core developer calls during the year. The earlier calls were for coordinating on the Phoenix hard-fork and the later calls were around potential 51% attack prevention solutions.

- [ETC Core Devs Call: ECIP-1078 - Phoenix Finalization](#), February 5, 2020
- [ETC Core Devs Call: Phoenix Upgrade From Scratch](#) — February 26, 2020
- [Ethereum Classic Treasury Initial Discussions with Charles Hoskinson of IOHK](#) — August 13, 2020
- [ETC Core Dev Meeting | Proposal Evaluation and Consensus Finding: Q3 2020 Hard Fork](#) — August 28, 2020
- [ETC Core Devs Call | IOHK Checkpointing Presentation and Q&A](#) — September 4, 2020
- [ETC Core Dev Meeting | Mining Algos and Last Call Proposals](#) — September 11, 2020
- [ETC Core Dev Meeting | 51% Attack Solutions and Epoch Calibration Proposal](#) — September 25, 2020
- [ECIP-1049 Keccak Breakout Session](#) — October 5, 2020

Content

ETC Cooperative put out blog posts and other articles throughout the year in various media. They were primarily blog posts on our own website and on Media, but also some videos.

- [Vyper and Brownie Contract Development on EVM Chains](#) — January 10, 2020
- [Hard Cap on the Gas Limit for the ETC Mainnet as In-Protocol Consensus Rule](#) — January 17, 2020
- [ETC Cooperative Support for Switch of Mining PoW to Keccak256 Proposal](#) — February 10, 2020

- [Update on ETC Phoenix Hardfork](#) — February 28, 2020
- [Bob Summerwill Joins EEA Tech Spec WG as a Vice-Chair](#) — March 9, 2020
- [Yaz Khory Joins EEA Testnet WG as Vice-Chair](#) — March 24, 2020
- [ETC Cooperative Website Relaunched](#) — March 27, 2020
- [ETC Cooperative 2019 Retrospective Released](#) — April 13, 2020
- [ETC: Foundations at Consensus Distributed](#) — April 23, 2020
- [ETC Cooperative Q1 Transparency Report](#) — April 30, 2020
- [Consensus 2020 - Bob and Yaz Speaking](#) — May 6, 2020
- [ETC Cooperative April 2020 Report](#) — May 22, 2020
- [Enterprise Ethereum Alliance Permissioned Blockchain Specification V1](#) — May 27, 2020
- [Kevin Joins ETC Cooperative](#) — July 2, 2020
- [Connext State Channels on ETC](#) — July 17, 2020
- [ETC Chain Split Diagnosis](#) — August 1, 2020
- [The 51% Attack on ETC](#) — August 2, 2020
- [ETC Network Security Plan](#) — August 19, 2020
- [Staffing Changes](#) — September 16, 2020
- [Migrate to Hyperledger Besu](#) — September 29, 2020
- [Ensuring Network Security](#) — October 20, 2020
- [Announcing ETC Weekly Newsletter](#) — October 27, 2020
- [Ensuring Network Security \[Chinese Translation\]](#) — November 1, 2020
- [ETC Cooperative Q3 2020 Transparency Report](#) — November 16, 2020
- [Thanos Hard Fork This Week](#) — November 23, 2020
- [Why Change The ETC Proof of Work Algorithm to Keccak 256](#) — December 3, 2020
- [Installing Enterprise Ethereum Client Video by Stevan Lohja](#) — December 29, 2020
- [Installing Enterprise Ethereum Client](#) — December 30, 2020

Social Media Presence

The ETC Cooperative actively engages in community management, content creation, moderation throughout many social media channels. It also actively participates in media engagements including webinars, AMAs, and traditional interviews.

- Messari Telegram AMA, Bob - January 23, 2020
 - [Why Ethereum Classic wants To Become More Interoperable with Ethereum](#)
- Tuoyuan Research Interview, Bob - January 26, 2020
 - [A Few Questions For Bob Summerwill](#)
- Let's Talk ETC! Podcast #101, Bob, Yaz - January 27, 2020

- [ETC News Show, First Episode of 2020](#)
- The Bitcoin & Crypto Podcast, Bob - February 14, 2020
 - [Ep: 69 Ethereum Classic - How Anti-Tribalism will Power Mass Adoption](#)
- Let's Talk ETC! Podcast #102, Bob, Yaz - February 24, 2020
 - [Bob Summerwill and Yaz Khouri of the ETC Cooperative, Latest ETC News](#)
- Hyperledger Netherlands Webinar, Yaz - March 16, 2020
 - [Webinar by Yaz Khouri - Ethereum & Hyperledger](#)
- Blockchain Mentoring Lab Podcast, Yaz - April 2020
 - [Leveraging the Ethereum Stack with Yaz Khouri](#)
- Hyperledger Vienna Webinar, Yaz - April 16, 2020
 - [Hyperledger Besu: Hyperledger Ethereum & Ethereum Stack](#)
- Epicenter Podcast, Bob - May 13, 2020
 - [Bob Summerwil Interview: Tribalism in the Crypto Space \(EthCC 3\)](#)
- [ChangeNOW Telegram AMA](#), Bob, Kevin - July 10, 2020
 - [ChangeNOW ETC AMA Announcement](#)
 - [Ethereum Classic's AMA with ChangeNOW Recap](#)
- The Decrypt Daily: Bitcoin/Cryptocurrency Podcast, Bob - November 25, 2020
 - [Nov. 25: Interview with Bob Summerwill of the ETC Cooperative.](#)

Other Media

The ETC Cooperative has been featured by well-known crypto media outlets such as Coindesk, Cointelegraph News, CryptoBriefing, Decrypt, and many others. It maintains open communication with various journalists and regularly shares comments on events and developments in ETC.

- [Ethereum Classic Traders Undeterred by Potential 51% attack](#) (via @decryptmedia)
- [Ethereum Classic Cooperative Director Rebuts Mismanagement Claims](#) (via @decryptmedia)
- [Ethereum Classic Hit by Yet Another 51% Attack, But Has Defensive Plans](#) (via @crypto_briefing)
- [ChangeNOW AMA Recap With 5 Ethereum Classic Devs](#) (via @publish0x)
- [Hard Fork Sets Stage for Ethereum Classic's Second Major Departure From Ethereum](#) (via @coindesk)
- [Ethereum Classic Successfully Completes 'Agharta' Hard Fork](#) (via @coindesk)
- [ETC Cooperative on Accelerating the Growth of Ethereum Classic](#) (via @coindesk)
- [Ethereum Classic Hit by Third 51% Attack in a Month](#) (via @coindesk)

- [Ethereum Classic's MESS Solution Won't Provide 'Robust' Security Against 51% Attacks: Report](#) (via @coindesk)
- ["Ethereum Classic Cooperative Warns Public Against Hardfork Scam,"](#) (via Cointelegraph News)
- [Why Did Ethereum Classic Cooperative Warn the Public About the Possible Hard Fork Scam?](#) (via Financial Report24)
- [ETC Cooperative's 46 Page Detailed Transparency Report Considers Volunteerism Insufficient for Work Code](#) (via @thecurrencyA)
- [Bob Summerwill of ETC Cooperative Makes Positioning Statement - ASIC Resistance is a Myth](#) (via @thecurrencyA)
- [Ethereum Classic \(ETC\) on ECIP-1099 Merged into Hyperledger Besu](#) (via @thecurrencyA)
- [Ethereum Classic \(ETC\) Working with a Clear Roadmap to Keep Things Evolving for Good Beyond 51% Vulnerability](#) (via @thecurrencyA)
- [Ethereum Classic \(ETC\) Will Introduce Treasury System if Community Consensus is Obtained](#) (via @thecurrencyA)
- [Ethereum Classic \(ETC\) Exploring the Checkpointing Solution from IOG](#) (via @thecurrencyA)
- [Ethereum Classic a 'Better Platform than ETH for DeFi Projects](#) (via @CryptoAmb)
- [ETC Cooperative, IOHK Publish Analysis on Preventing 51% Attacks](#) (via @cryptoAMB)
- [ETC Cooperative Exec Proposes Hard Cap on Gaslimit for ETC Mainnet](#) (via @CryptoAMB)
- [Ethereum Classic's Terrible, Horrible, No Good, Very Bad Week](#) (via @Yahoo)

Crisis Management

As stewards of this public blockchain, the ETC Cooperative will always be determined to protect the ecosystem's integrity by leveraging resources to address any critical network issues or events, enhance security, strengthen the network, and ensure a bright future for ETC.

- Conduct extensive outreach to Exchanges, mining pools, and other service providers during hard-forks or network attacks using its list of contacts
- Use social media channels to communicate with broader ecosystem
- Worked with other organizations to create a "[ETC Chain Split Diagnosis](#)" detailing network attacks

- Collaborated with ETC Labs and Byzantine Fault to create the "[ETC Network Security Plan](#)" after attacks
- Collaborated with IOHK to create a "[Comparison Report](#)" evaluating the many proposed 51% attack mitigations and detail more secure solutions for the network

Challenges

With COVID-19 travel restrictions it has not been possible even to organize small scale public ETC events and meetups, let alone for conferences to happen.

It has been hard to motivate ETC community members who have become apathetic and disengaged. Much of this apathy is likely the result of the ongoing hostility between various of the parties within the ETC ecosystem. This abrasive environment is not for everybody, and wears down even the most enthusiastic of individuals.

Many have also been demotivated by the lack of price action of ETC in the past year or so. The cryptocurrency markets as a whole have been on a bull run, but ETC has not been participating in that upside.

As a consequence, Ethereum Classic has slid from a position in the Top 10 of Coin Market Cap in January 2020 to just outside the Top 50. That is also the case for Coingecko, Messari and other trackers.

Adoption – Development and Infrastructure

The ETC Cooperative both develops projects using internal resources and funds external teams to deliver value for the benefit of the ETC ecosystem as a whole.

Likely the single most important such project is our support for Hyperledger Besu. The BlockScout block explorer and Ethercluster API endpoints we run are very broadly used. During 2020 we also funded a handful of other projects through our grants program, though not as many as we would have liked.

Hyperledger Besu Support



ETC Cooperative actively supports the Besu project and ETC Besu users. We've ensured ETC Besu compatibility throughout the scheduled protocol upgrades and addressed any bugs along the way as well as identified new feature priorities going into 2021.

Hyperledger Besu is an open-source Ethereum client developed under the Apache 2.0 license and written in Java. Besu is a strategic client for the ETC ecosystem because Besu allows users to develop enterprise applications with high performance and security.

All supporting infrastructure managed by ETC Cooperative has been migrated to exclusively using Besu in 2020.

- <https://etcnetstats.com/>

Vyper support for ETC



ETC Cooperative funded the Vyper team to bring Vyper to ETC. [Vyper](#) is a pythonic programming language that targets the Ethereum Virtual Machine. This allows smart contract programmers to write smart contracts using the Vyper language which is designed massively simply writing smart contracts and more secure. Vyper provides the following features to smart contract developers:

- Bounds and overflow checking: On array accesses and arithmetic.
- Support for signed integers and decimal fixed point numbers
- Decidability: It is possible to compute a precise upper bound for the gas consumption of any Vyper function call.
- Strong typing
- Small and understandable compiler code

- Limited support for pure functions: Anything marked constant is not allowed to change the state

<https://etccooperative.org/posts/2020-01-07-vyper-support-comes-to-etc>

Connext State Channels for ETC



State Channels are essentially the Lightning Network of EVM-based chains and networks. A state channel allows for multiple transactions off-chain that have final settlement on-chain after. This allows for a much faster transaction than is normally allowed on-chain. For example, let's say you're buying coffee. You only own gold bars that you want to use for transacting. It'll take the cafe a long time to weigh the gold and convert its weight to equivalent USD price in order to properly value how much it's worth for the transaction. A cafe would certainly prefer a credit card transaction or cash. The gold in this example is basically you using on-chain payments like say Bitcoin or ETC. You want faster payments for quick transactions like a cup of coffee than using an on-chain solution.

You need a payment network like the Lightning Network.

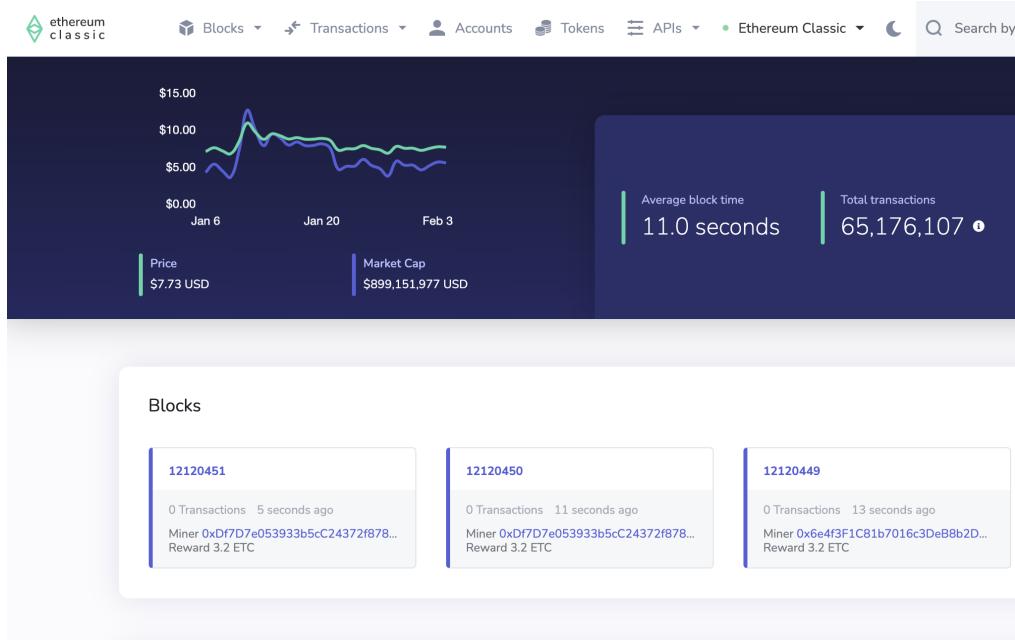
Connext State Channel is a fast payment network that now works with Ethereum Classic.

- <https://etccooperative.org/posts/2020-07-17-etc-connext-state-channels>

Blockscout Block Explorer

[BlockScout](#) by POA Network is the most popular ETC block explorer available with a pleasant user experience. POA ran an ETC mainnet instance as a public service during 2018 and early 2019, before the ETC Cooperative took on that responsibility, also adding instances for the Kotti and Mordor testnets.

This explorer is very widely used and is even more important since [ETC Labs dropped support](#) of their own [Expedition.dev](#), which was the primary alternative.



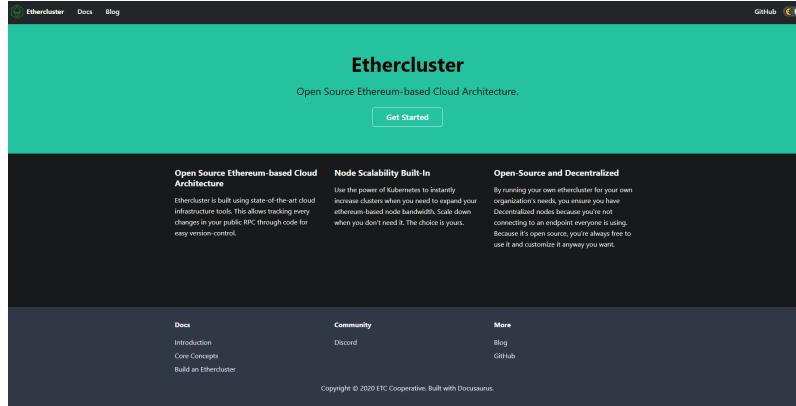
Ethercluster

Ethercluster is ETC Cooperative's open source alternative to Infura. It provides a cloud architecture for providing ETC or ETH endpoints. We host public instances of Ethercluster for the ETC mainnet and for the Kotti and Mordor testnets.

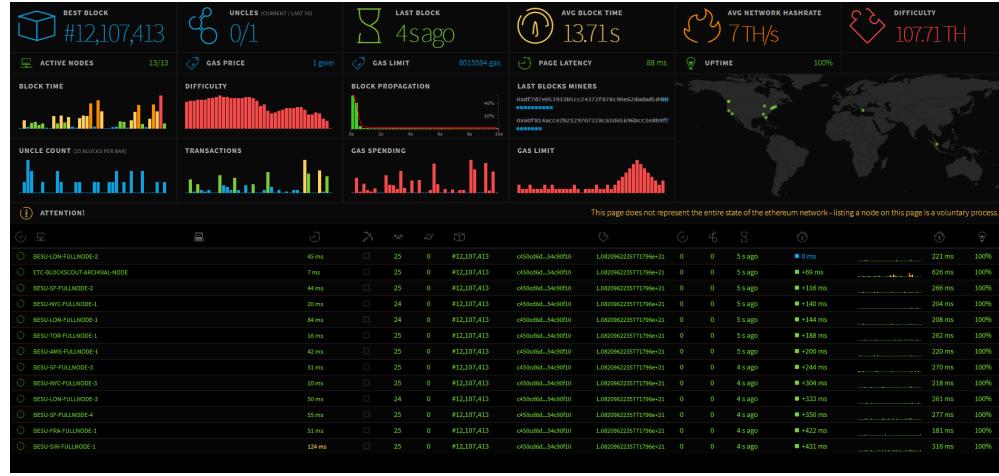
The Ethercluster code was [contributed into Hyperledger Labs](#) in December 2019.



Ethercluster documentation has been improved during 2020 and updated [with a new site](#). The old documentation featured Ethercluster with the Parity client, but Ethercluster is exclusively Besu as of 2020.



Netstats



To provide basic network statistics and oversight of Besu nodes on the Ethereum Classic network. ETC Cooperative is maintaining <https://etcnetstats.com/>. This also helps us track the health of ETC Coop's managed bootnodes which are used in Besu and any other ETC client that is inclusive of ETC Coop's bootnodes (Core-geth).

Development and Infrastructure challenges

The primary challenge is our limited internal capacity. For the majority of 2020 we only had two members of staff - Bob and Yaz. Yaz did double duty maintaining our infrastructure and also working on the development projects above.

The development work on the Besu client, which is our most important project, was outsourced to ChainSafe and Whiteblock.

We really need to build our internal capacity. That is a primary reason why ETC Cooperative is supportive of the treasury proposal. A full-time development team could make a huge difference in helping the ETC ecosystem to succeed.

Our hosted infrastructure projects (such as BlockScout and Ethercluster) are in maintenance mode. They are functional and widely used. In the absence of increased funding, it is unlikely that those offerings will extend significantly.

Collaboration – Protocol

The ETC Cooperative actively supports ETC core protocol upgrades and network events through our collaborative partnerships and engagement with the community.

Protocol updates are coordinated using the ECIPs (Ethereum Classic Improvement Process) process. We actively participate in that process. The protocol is the most important collective asset for the ETC ecosystem. Nothing is more important for ETC Cooperative.

Hard-forks

In September of 2019, the ETC protocol undertook the *Atlantis* hard-fork. In 2020, the ETC protocol undertook 3 more hard-forks; *Agharta*, *Phoenix*, and *Thanos*. This series of hard-forks was completed within 15 months thanks to the collaborative effort of all ecosystem participants.

- <https://etcnodes.org/>

Atlantis



The ETC network successfully activated the Atlantis hard-fork on block [8,772,000](#), September 12, 2019. The Atlantis hard-fork was inclusive of the ETH *Spurious Dragon* and *Byzantium* network upgrades.

Agharta



The ETC network successfully activated the Agharta hard-fork on block [9,573,000](#), January 11, 2020. The Agharta hard-fork was inclusive of the ETH *Constantinople* and *Petersburg* network upgrades.

Phoenix



The ETC network successfully activated the Phoenix hard-fork on block [10,500,839](#), May 31, 2020. The Atlantis hard-fork was inclusive of the ETH *Istanbul* network upgrades bring ETC to protocol parity with ETH.

OpenEthereum was the majority client heading into Phoenix and hit real issues with syncing following the hard fork, resulting in an [emergency patch release](#) a day later. The issue was detailed in the [Ethereum Classic Postfork Turbulence](#) blog post by Isaac Ardis.

Thanos



The ETC network successfully activated the Thanos hard-fork on block [11,700,000](#), Nov 28, 2020. In response to diminishing hash-rate and network attacks, the Thanos hard-fork halved the dag size and dag growth rate to allow 3-4 GB mining hardware an extended lifespan on ETC.

Protocol Providers

ETC Cooperative funds ETC support in the Hyperledger Besu Enterprise Ethereum client and is proud to continue supporting Besu. The ETC ecosystem's protocol providing clients have consolidated by the end of 2020 like so:

- [Hyperledger Besu](#) (Supported by ETC Cooperative)
- Parity/ Open Ethereum
- Geth-Classic
- Multi-geth/ [Core-geth](#) (Supported by ETC Labs)
- [Mantis](#) (Supported by IOHK)

Parity/ OpenEthereum, Geth-Classic, and Multi-geth have retired ETC support, but ETC Labs continued Multi-geth under their new fork, Core-geth. IOHK has excitingly revived the Mantis client which is the first original client built natively for ETC.

Version	Client
Atlantis	Hyperledger Besu Parity/ Open Ethereum Geth-Classic Multi-geth
Agharta	Hyperledger Besu Parity/ Open Ethereum Geth-Classic Multi-geth
Phoenix	Hyperledger Besu Parity/ Open Ethereum Multi-geth/ Core-geth
Thanos (current)	Hyperledger Besu Core-geth Mantis

Challenges - 51% Attacks

The ETC network was victim to three 51% attacks in Q3 of 2020. An attacker mined thousands of blocks offline, then broadcasted that work to the network which caused large block reorganizations. ETC Cooperative explored the matter along with BitQuery.

July 31st Attack

The first attack occurred on July 31, 2020, which generated more than 3500 blocks. In addition to the 51% attack, Parity/ Open Ethereum nodes did not process the attacker's blocks which caused a fork in the network. Parity/ Open Ethereum nodes were unable to synchronize to mainnet and half of the network had to consolidate their nodes to Hyperledger Besu, Multi-geth, or Core-geth.

BitQuery Analysis: [Ethereum Classic 51% Chain Attack July 31, 2020](#)

August 5th Attack

The same attacker from July 31 followed up with another 51% attack on August 06, 2020, which generated more than 4000 blocks.

BitQuery Analysis: [Ethereum Classic Attack, 8 August: Catch me if you can](#)

August 31st Attack

On August 31, 2020, another 51% attack nearly double the previous attack size caused more than a 7000 block reorganization.

As reported on CoinDesk: [Ethereum Classic Hit by Third 51% Attack in a Month](#)

Lessons learned

The majority, or 51% attack vector, is a feature of Proof of Work consensus, but Ethereum Classic is a minority chain and does not specialize in its hardware class. With a low hash rate and easily sourced mining resources, it was trivial to attack ETC. In light of these attacks, the ETC Cooperative has changed its priorities solely on core protocol infrastructure and improvements.

ECIP Comparison for 51% Attack Resistance

IOHK, and ETC Coop have collaborated to provide Ethereum Classic stakeholders and the broader community with the knowledge and understanding on how to resist these issues. To support this activity, we have created an [ECIP Comparison for 51% Attack Resistance](#) document to showcase and summarize the different 51% attack mitigations. In it, ETC community members will be able to assess each proposal, understand any concerns, and be advised on how the ETC community can solve ETC network security issues together.

Treasury, Checkpointing, Keccak-256 (Sha-3)

The ETC Cooperative particularly supports the proposals for a *Treasury*, *Checkpointing*, and *Keccak-256* (Sha-3). We've provided the following documentation to substantiate our support in greater detail:

- Keccak-256: [Why change the Ethereum Classic Proof of Work algorithm to Keccak-256 \(Sha-3\)](#)
- Treasury: [Why Ethereum Classic should adopt a treasury](#)

Keccak-256

ETC Cooperative has supported the Keccak-256 proposals since it's introduction in January of 2019 which was in reaction to the 51% attack in the same month. ETC is a minority chain. Therefore, ETC cannot rely on the security assumptions of Proof of Work. Majority chains that specialize in its hardware class have not been successfully 51% attacked. In the case of Ethash/ Etchash, ETC is a minority chain in that environment and other networks tailored to general purpose hardware can be turned onto ETC. Changing the algorithm decouples ETC from this insecure environment to position it to dominate its hardware class in the foreseeable future.

- Become a secure PoW majority chain.
- Keccak-256 is more secure, faster, and more efficient.
- Keccak-256, formerly the Sha-3 standard, is well documented and well supported by hardware.

Treasury

ETC Cooperative is supportive of the proposal for an Ethereum Classic Treasury to establish sustainable funding for independent teams to both maintain the core protocol and evolve the Ethereum Classic platform, as well as grant pools for wider community development. IOHK brought the Treasury proposal back on the table in [ECIP-1098](#) and implementation of a treasury is live on the Sagano Ethereum Classic testnet. We're writing this to substantiate our support for this proposal and hopefully answer some questions.

Blockchain protocols are complex systems that are expensive to research, develop, and to maintain in an increasingly competitive market. Ethereum Classic has been supported on the model of donation, benefactors, and no formal governance, but year after year ETC has struggled to have the incentives for developers to deliver to the ecosystem.

Sagano Testnet

IOHK launched the new Sagano ETC testnet along with their revival of the Mantis client. ETC Cooperative and IOHK are collaborating on shared infrastructure and we hope to join the Sagano testnet with Besu in 2021. A *proto-treasury* and *checkpointing* are already on the Sagano testnet with more novel and new features to come in 2021.

- Watch Mantis Launch Event: <https://www.crowdcast.io/e/mantis>

Challenges

There is much-needed work to secure the infrastructure of the protocol. ETC has intentionally been coupled to ETH 1.0 for the past few years, but this has led to low security and stifled innovation. ETC Cooperative and IOHK are supporting novel and new features to offer ETC. It is unclear what the ETC Lab technical strategy is going into 2021.

Collaboration – Partnerships

DCG and Grayscale

On January 22nd, it was announced that Grayscale were extending their funding for ETC Cooperative for a further two years. Since the creation of the ETC Cooperative, Grayscale has been the primary funder, and their ongoing generosity is much appreciated. Beyond the funding they provide, Barry Silbert has been a board member and great help from the very start.

At the 2020 AGM, Craig Salm joined the board and has met with Bob and Alison each week. His support and counsel has been invaluable.

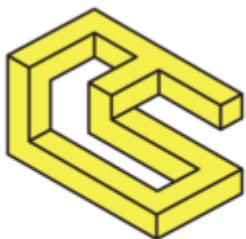
Grayscale to Fund Ethereum Classic Developers for 2 More Years



ChainSafe

Chainsafe has been a continued partner of the ETC Cooperative through 2020, providing development resources for our work on Hyperledger Besu. We are excited to continue that relationship.

ChainSafe have also been involved in the Gorli/Kotti testnet initiative, for maintenance work on Geth Classic and more recently with [Chainbridge](#), used to implement WETC "Wrapped ETC" on the Ethereum network, for use within the Defi ecosystem.



ChainSafe

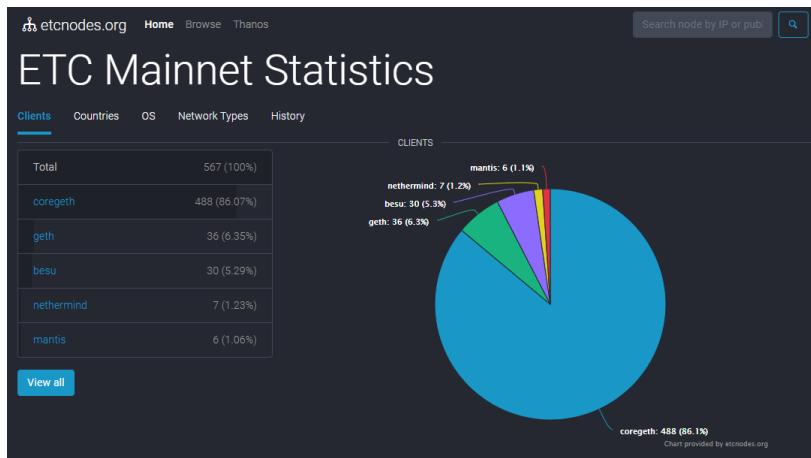
Whiteblock

ETC Cooperative partnered with Whiteblock on a [protocol](#) of the proposed Keccak-256 mining algorithm change ([ECIP-1049](#)) in February. That work included a POC implementation of the algorithm support in the Besu client together with the creation of a testnet using their Whiteblock Genesis project.

In 2021 we will be picking this work up again with another vendor, aiming for production ready Besu integration this time.



Bitfly



www/etcnodes.org provides mainnet node statistics such as type, version, and visualizes this information to the community. It is the only publicly available ETC node resource and plays a critical role in coordinating fork coordination.

ETC Cooperative supports Bitfly to provide this service to ETC.

IOHK

The return of IOHK to active participation in the ETC ecosystem is a huge positive for the project. It had been a primary goal for the ETC Cooperative in 2019 and especially at ETC Summit in October, where there was significant IOHK attendance, and Charles gave the closing keynote.



Charles made a series of videos through August in addition to his active participation on the ETC Discord server. They are listed below:

- [Bailout?](#), August 10th
- [ECIPs and the Treasury Meeting](#), August 13th

- [51 Percent Attacks and ETC](#), August 14th
- [More on ETC's Treasury Idea](#), August 18th
- [Process for Decision Making and Innovation in ETC](#), August 20th
- [Securing Proof of Work Ledgers via Checkpointing](#), August 20th
- [The Future of ETC](#), August 22nd
- [Securing Ethereum Classic via Checkpointing](#), August 25th
- [Proto Treasury System For Ethereum Classic](#), August 28th

ETC Cooperative has a vision which is very aligned with IOHK. We are supportive of the Treasury, of Checkpointing and of Keccak-256. IOHK have created a new testnet called Sagano for their testing of these new features in the Mantis client. It is the intention of the ETC Cooperative to implement all of these features in Besu as well, so that we can join that testnet, and prove multi-client consensus on these features.



Bob and Charles at ETHDenver in February 2020.

Challenges - DFG and ETC Labs

One of the most primary goals for ETC Cooperative during 2019 had been relationship building with ETC Labs, both for its own merit, and also in the hope of new funding from ETC Labs.

Friction between ETC Labs and other ETC ecosystem participants has been an ongoing theme through 2018, 2019 and especially in 2020.

In the absence of an active IOHK, ETC Labs were the primary commercial legal entity within the ecosystem and they made significant investments during those years, both with the creation of an incubator and investments and also with the ETC Labs Core team, later relabelled as ETC Core.

James Wo, the ETC Labs Chairman and Founder was a board member of the ETC Cooperative during 2018 and 2019 but we parted company at the 2020 AGM in March after several months of radio silence. The relationship between ETC Cooperative and ETC Labs has been generally tense since that time, though a joint statement was made in the aftermath of the 51% attacks and Bob has been in contact with Terry Culver periodically.

ETC Labs generally seem to be in favor of a “status quo” approach to the future roadmap, which puts them at odds with IOHK, ETC Cooperative and many others within the ETC ecosystem. The market is showing its judgement and it does not like what it sees.

Governance – Internal Processes

AGM and new governance

The major event for ETC Cooperative during Q1 was the AGM held on March 17th where months' worth of work on governance came to fruition with the adoption of the following documents by the Board Members:

- [Governance Manual](#)
- [2020 Budget](#)
- [2020 Roadmap](#)
- [2020 Goals and Objectives](#)
- [Whistleblower Policy](#)
- [Gift and Donation Policy](#)
- [Document Retention Policy](#)

Elaine Ou, Roy Zou and Craig Salm joined the board.



Alison Alexis replaced Simi Wurtzel as Treasurer.

See [ETC Cooperative AGM 2020 – new governance in place](#) blog post for links to all of the documents above.

Staff changes

We bid a fond farewell to Yaz Khoury, who served as Director of Developer Relations at ETC Cooperative from October 2018. He wore many hats, both within the ETC Cooperative and in the broader ETC community.

Kevin Lord joined the ETC Cooperative as Community Manager and Stevan Lohja joined the ETC Cooperative as Director of Developer Relations.

See [Announcement of staff changes](#).

Challenges

Yaz's departure was unexpected, but we were able to make a contingency plan which has kept all the infrastructure running. We were very lucky that Stevan was available at the time, given the depth of his involvement with ETC.

Governance – Finances

In early 2020, the transition of book-keeping and finances from Grayscale to ETC Cooperative was completed. We also opened a new bank account with Signature Bank. Having full access to the financial records and ability to create reports, enabled better financial data and transparency.

Due to both Covid-19 and the 51% attacks on ETC, spending was kept to a minimum and all travel was halted after Q1 2020.

Financial reports commenced in Q1 2020.

See the Finance section at the end of this document for more details on the income and expenditures.

Governance - Transparency

Throughout 2020 the ETC Cooperative have been publishing reports on our activities every month, with more detailed reports each quarter:

- [ETC Coop Q1 2020 Transparency Report](#)
- [ETC Coop April Board Package](#)
- [ETC Coop Q2 Board Package](#)
- [ETC Coop July Board Package](#)
- [ETC Coop August Board Package](#)
- [ETC Coop Q3 2020 Transparency Report](#)
- [ETC Coop October Board Package](#)
- ETC Coop November Board Package



Our board member Roy Zou was kind enough to translate the AGM and Q3 reports to Chinese, as well as some other blog posts and articles.

- [AGM and New Governance \(Chinese version\)](#)
- [Q3 report \(Chinese version\)](#)

Grantmaking Process

The ETC Cooperative has been operating a grants program since 2018, though without much formal structure.

The 990 filing with the IRS exposed that our processes were not meeting basic regulatory requirements. In particular we had no formal mid-project progress reports or means of evaluation. We have implemented progress reports, however a formal grantmaking process and manual was not done in 2020. Due to focus on 51% attacks and conserving capital, all funding was diverted to projects that could assist in these aims and therefore fleshing out a full grant program, with processes and procedures was not deemed to be necessary.

If a treasury model is implemented and further funding is available, with which to issue grants, a more robust system will be implemented.

Financial Section

For the year ended December 31, 2020

While following general accounting principles, these figures and charts are not in compliance with IFRS (“*International Financial Reporting Standards*”) or FASB “*Financial Accounting Standards Board*”).

Fiscal 2020 Financial Results

Expenditures in \$US

	F2020 Actual	F2020 Budget	Variance \$ F2020 vs F2020 Budget	F2019 Actual	Variance \$ F2020 vs F2019
Overhead & Management	\$209,264	\$252,250	\$(42,986)	\$212,716	\$(3,452)
Development	\$128,603	\$120,000	\$8,603	\$120,997	\$7,606
Protocol	\$70,350	\$85,000	\$(14,650)	\$87,000	\$(16,650)
Comms & Marketing	\$42,325	\$57,475	\$(15,150)	\$86,884	\$(44,558)
Finance	\$38,083	\$83,900	\$(45,817)	\$35,316	\$2,768
Infrastructure	\$60,919	\$60,420	\$499	\$9,315	\$51,604
Partnerships	\$8,792	\$0	\$8,792	\$750	\$8,042
ETC Summit	\$1,978	\$0	\$1,978	\$181,929	\$(179,952)
Total Expenditures	\$560,314	\$659,045	\$(98,731)	\$734,906	\$(174,592)
<i>Non-cash Items</i>	\$28,686	\$0	\$28,686	\$0	\$28,686
Total Operating Expenses	\$589,000	\$659,045	\$(70,045)	\$734,906	\$(145,906)

Overall, F2020 actual costs were 100K less than budget, on a cash item basis. This was expected, as due to Covid-19, most travel and some technical work was cut down, but the significant difference was due to lower finance costs, as processes and procedures became more streamlined and less work was required. Compared to F2019, the main differences were minimal ETC Summit costs and significantly lower comms and marketing costs.

The following breaks down what is generally allocated to each category:

Overhead & Management

This category includes salaries and payments for the Executive Director as well as all overhead, office, legal and related expenses.

Development

This includes salary for the developer relations role and costs of all in-house development work.

Protocol

This includes all work related to client software and protocol-level work – primarily Hyperledger Besu for 2020.

Communication & Marketing

This includes salary for communication manager and all advertising, promotional work, marketing, conference sponsorship, website costs, and all related travel.

Finance

This includes costs related to filing form 990 with the IRS, accounting software, and finance salaries.

Infrastructure

This covers costs of hosted services which we provide to the ecosystem.

Partnerships

This was very minimal for 2020, but included Connex work on State channels.

ETC Summit

There was no ETC Summit in 2020, therefore ETC Summit costs were under-accrued at December 31, 2019.

Non-Cash items

This consists of accounting items that are not considered cash-costs, such as gain/loss on foreign exchange, gain/loss on sale of cryptocurrencies, and direct write-off of prior year receivables.

2020 Expenditures

Expenditures in \$US					
	Q1 2020	Q2 2020	Q3 2020	Q4 2020	F2020
Overhead & Management	\$53,784	\$52,220	\$51,723	\$51,537	\$209,264
Development	\$30,000	\$32,249	\$40,014	\$26,340	\$128,603
Protocol	\$25,550	\$13,300	\$21,000	\$10,500	\$70,350
Comms & Marketing	\$20,887	\$829	\$7,361	\$13,248	\$42,325
Finance	\$10,845	\$5,290	\$15,428	\$6,521	\$38,083
Infrastructure	\$9,335	\$17,377	\$10,715	\$23,492	\$60,919
Partnerships	\$4,792	\$750	\$750	\$0	\$6,292
ETC Summit	\$1,978	\$0	\$0	\$0	\$1,978
Total Expenditures	\$157,170	\$122,015	\$146,992	\$131,637	\$557,814
<i>Non-cash Items</i>	\$16,629	\$7,057	\$5,000	\$0	\$28,686
Total Operating Expenses	\$173,799	\$129,072	\$151,992	\$131,637	\$586,500

Each fiscal quarter in 2020, was relatively consistent and most variances relate to timing of specific projects or regulatory filing requirements. Q1 2020, had the highest costs due to protocol work and Q1 travel and conferences, before Covid-19 restrictions.

Overall, 2020 expenditures reflected the major events that occurred in the world and the ETC ecosystem; namely the 51% attacks and Covid-19. This focused any spending on staff costs and protecting the network, rather than new projects, grants, or new development.

Ecosystem & Technical Projects Break-Down

	Q1 2020	Q2 2020	Q3 2020	Q4 2020	F2020
<i>Chainsafe/Besu</i>	\$15,550	\$3,300	\$21,000	\$10,500	\$50,350
<i>Whiteblock/Keccak 256</i>	\$10,000	\$10,000	\$0	\$0	\$20,000
<i>Bitfly/Ethernodes</i>	\$3,503	\$3,440	\$3,618	\$3,690	\$14,251
<i>Connext/State Channels</i>	\$0	\$2,500	\$0	\$2,500	\$5,000
<i>Vyper</i>	\$1,000	\$0	\$0	\$0	\$1,000
Total	\$30,053	\$19,240	\$24,618	\$16,690	\$90,601

The majority of the technical and ecosystems funds in 2020 were allocated to Hyperledger Besu development work and to the Keccak-256 proof-of-concept. Our expectation is that Besu will continue to be our highest priority in 2021 and the largest component of our discretionary spending. If the Treasury proposal is passed then we would expect to hire multiple full-time developers in-house to work on Besu.

Net (Loss)/Income

Net (Loss)/Income in \$US			
	F2020 Actual	F2020 Budget	F2019 Actual
Income	\$713,431	\$566,760	\$363,677
Operating Expenses	\$589,000	\$659,045	\$734,906
Net (Loss)/Income	\$124,431	\$(92,285)	\$(371,229)
<i>Non-cash items</i>	\$28,686	\$0	\$0
Adjusted Net Income	\$153,117	\$(92,285)	\$(371,229)

Note that the net (loss)/income does not include the unrealized (loss)/gain on the re-evaluation of ETC at market rates. See description of Non-Cash items above.

Income

The ETC Cooperative earns income from the arrangement with Grayscale LLC, as well as donations and sponsorships. Under the current arrangement, 1/3 of fees collected by Grayscale, related to their Grayscale Ethereum Classic Trust, are contributed to the Cooperative. Sponsorships related to the ETC Summit, are either included in income, if they are general purpose, or offset to expenses, if they are for a specific event/activity. In 2020, there was no ETC Summit and thus no sponsorship income.

The income received for the year ended December 31, 2020 of \$713K is significantly higher, than the income received for the year ended December 31, 2019, which was \$364K as well as what was budgeted at \$567K. Higher ETC prices and fund investment, resulted in a higher income and therefore higher cash balance.

In 2020, a new fee arrangement with Grayscale for up to a 2-year period was agreed. The current agreement would end in April 2022. In 2021, there is a focus on changes to the protocol as well as potentially a treasury model, to support development and client teams and therefore the role of the ETC Coop and Grayscale will continue to evolve.

Unrealized (Loss)/Gain on ETC

These figures represent the difference between the book value of ETC, included in the financial information and the market value as of a certain date. The book value is the value or exchange rate at which the ETC was purchased and recorded to the financial records, in US dollars. This value will remain on the books, until the ETC is sold. However, it over or understates the actual value of the ETC held, at a certain point in time and thus the liquidity of the ETC Cooperative. To present a more accurate picture, the unrealized gain or loss is presented, which shows what would have been reported, if the ETC held, had been sold. Each period, this will change to reflect the current rate at the end of the reporting period (i.e. September 30, 2020 for Q3 2020).

Financial Position

Financial Positions in \$US				
	31-Dec-20	31-Dec-19	31-Dec-18	31-Dec-17
Assets				

Cash & Cash Equivalents	\$303,313	\$146,318	\$530,268	\$0
ETC (at book value) ¹	\$78,115	\$154,363	\$154,363	\$0
Accounts Receivable	\$0	\$12,057	\$7,057	\$0
Due from Grayscale	\$51,914	\$18,808	\$(6,729)	\$371,505
Prepaid Expenses & Deposits	\$0	\$2,250	\$0	\$0
Total Assets	\$433,341	\$333,796	\$684,960	\$371,505
Liabilities				
Accounts Payable & Accrued Liabilities	\$18,507	\$44,393	\$20,305	\$0
Due to Grayscale	\$0	\$(1,000)	\$3,022	\$131,864
Total Liabilities	\$18,507	\$43,393	\$23,328	\$131,864
Equity				

Retained Earnings	\$290,403	\$661,632	\$239,640	\$0
Net Income/(Loss) for the year	\$124,431	\$(371,229)	\$421,992	\$239,640
Total Equity	\$414,834	\$290,403	\$661,632	\$239,640
Total Liabilities & Equity	\$433,341	\$333,796	\$684,960	\$371,505
<i>ETC at Market Value¹</i>	\$46,284	\$72,540	\$81,430	\$0
Liquid assets²	349,597	218,858	611,698	0

¹ Book value is the value when the ETC was originally purchased. Market value is the value at the end of the reporting period (prices from Yahoo finance)

² Liquid assets consists of Cash & Cash equivalents plus ETC at market value.

Assets

There has been an increase in cash, in 2020 as the Cooperative continued with 2020 activities, due to increased income received from Grayscale and selling 7,500 ETC (50% of the Coop's balance).

Liabilities & Equity

Accounts payable and accrued liabilities, was predominantly composed of accrued salaries for the month of December, which were paid in January.

Due to higher income levels, the ETC Cooperative was in an income position for 2020.

