Filecoin Foundation 2022 Annual Report

A Retrospective and Look Ahead



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Despite challenges for the blockchain space in 2022, **the Filecoin network has continued to thrive** — storing an unprecedented amount of humanity's most important information and demonstrating the value of blockchain technology.

Filecoin Foundation (FF) is one of many organizations in the thriving Filecoin ecosystem. Our mission is to facilitate governance of the Filecoin network, fund critical development projects, support the growth of the ecosystem, and advocate for the decentralized web. Despite challenges facing our industry, the Foundation remains focused on supporting the Filecoin ecosystem and advocating for decentralized storage technology that we believe is the backbone of the next generation of the web.

This report is a brief look at what the Filecoin ecosystem has achieved in 2022, and what's ahead for the Filecoin Foundation in 2023.

The Filecoin ecosystem could not have continued to grow and succeed last year without the support of an incredible community of developers, storage providers, storage clients, project partners, advocates, and more.

Who We Are





Filecoin is a decentralized storage network designed to store humanity's most important information. The InterPlanetary File System (IPFS), which is the technology underlying the Filecoin network, was launched in 2014, and the Filecoin Mainnet launched in October 2020.



Filecoin Foundation facilitates governance of the Filecoin network, funds research and development projects for decentralized web technologies, and supports the growth of the Filecoin ecosystem and community. Its mission is to preserve humanity's most important information.

Board of Directors

Marta Belcher ——

President, Filecoin Foundation

Brian Behlendorf -Linux Foundation

Marcia Hofmann Electronic privacy attorney

Nicole Wong Former Deputy U.S. CTO









Advisors

Joe Lubin ——— ConsenSys, Ethereum



Brewster Kahle — Internet Archive



Sandra Ro —— Global Blockchain Business Council



Denelle Dixon ——— Stellar Development Foundation



Wendy Hanamura -Internet Archive



Katie Biber — Paradigm



Georgia Quinn — Anchorage



Kurt Opsahl

Electronic Frontier Foundation



Veronica McGregor — Exodus



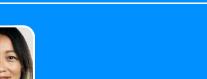
Alex Feerst — **Murmuration Labs**



Colin Evran —— Ecosystem Advisor | Protocol Labs



Dietrich Ayala — Ecosystem Advisor | Protocol Labs



Michelle Lee Ecosystem Advisor | Protocol Labs







A Better, More Decentralized Web

Let's build the internet of everyone.

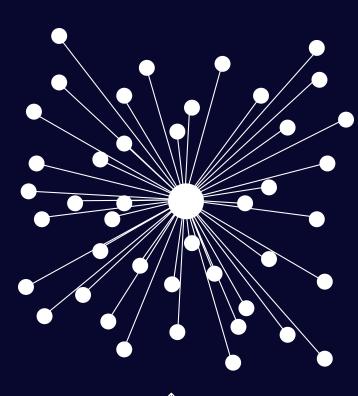
Our vision for a better, more decentralized web stems from the problems brought about by today's internet. Today's internet is largely centralized — with control and distribution of information in the hands of a few, ultra-powerful companies.

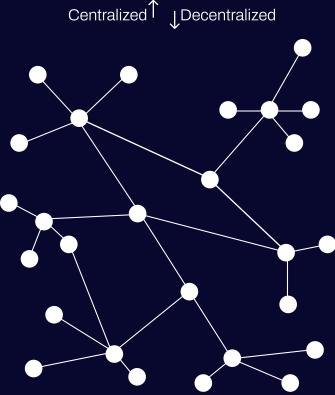
When power is concentrated, **data availability** is vulnerable to single points of failure — making information susceptible to internet blackouts and link rot.

The bottom line is that **centralization makes the internet fragile.** Everything from personal information to historical records to critical research is at risk in a vulnerable data infrastructure.

We need a better, more resilient version of the web. Decentralized technologies can put people in control of their own data, protect user privacy and security, and permanently preserve critical information.

We're helping put power back into the hands of people rather than a few large corporations. And we are committed to building a decentralized internet that serves as a resilient, secure platform for humanity's most important information.





A Healthy, Growing Ecosystem

A look at the growth and impact of the Filecoin ecosystem

Filecoin is the world's largest decentralized storage network. The network's total storage capacity is nearly 19 exbibytes (EiB). That's big enough to store over 12,000 years of continuous video calls. In 2021, just one year after the Filecoin Mainnet launch, Filecoin represented 1% of total global storage capacity, and we have continued to see storage capacity growth this year.

According to a <u>recent Messari report</u>:

[N]early 211 PiBs of data were stored on the Filecoin network through active deals at the end of Q3'22 — an 82% increase relative to the previous quarter. This positive growth trend has continued since Q4'21.

Data storage is the backbone of the internet. Today, the majority of internet data is stored by a handful of cloud storage providers who manage and operate storage as a service. The **Filecoin network offers a better alternative.** It creates opportunities where businesses – of any size – can thrive, and consumers have more choice over how they want to interact with the web.

The Filecoin network makes decentralization, at scale, a real possibility, and we look forward to supporting the ecosystem's continued growth in 2023.



Developer Grants Program

Empowering builders: The impact of the Filecoin Developer Grants Program

The Filecoin Network includes many stakeholders, including developers, storage clients, storage providers, users, and more.

The Dev Grants program inspires more builders to engage with the Filecoin network to build their dApps and tooling and solve open problems. In FY 2022, Filecoin Foundation approved more than 150 grants to encourage developers to build in the decentralized web ecosystem.



GainForest — This sustainability project is working to build a decentralized Transparency Hub that makes environmental data and models accessible for everyone by leveraging the power of decentralized storage on the Filecoin network. The hub will allow anyone in the world to explore the quality of any nature-backed asset, and also provide an economic opportunity for local communities to participate in the digital economy by empowering them to contribute field-based data.



Algovera — This project developed a framework for the creation of major Data Science community support tools like python libraries for decentralized storage, an integration of python's interface with data science frameworks, like HuggingFace, Activeloop and JupyterLab. They also built a Web3 Al hub as a tool for data scientists to easily build on top of IPFS and Ocean Protocol.



LedgerMail — This project integrated Filecoin to the email transfer protocol enabling users to directly store generated data on Filecoin. The team has also designed features for custom @fil Filecoin usernames. More details at https://ledgermail.io/

MORE

Arlequin — A community-driven 'Paint-to-Earn' system where users can collect NFT 3D animals, known as 'Arlee,' in a creative ecosystem powered by the Flow blockchain and using IPFS via nft.storage. Looking ahead, the Arlequin team plans to build a 3D Metaverse.

SamePage — This is the ultimate collaboration tool that serves two broad use cases, either as a sync or for cross-notebook queries. With integrations to Roam, LoagSeq, Obsidian, RemNote and Craft, it enables teams to share thoughts across the same network regardless of organizing tool of choice. More details at https://samepage.network/blog/ the_vision_for_samepage

Ukraine Art Collective — Aims to unite artists around the world to contribute their creative talents to support the Ukrainian people in their fight for freedom. The group deployed its fundraising platform using IPFS and Filecoin to create, mint, and sell NFTs, with proceeds donated to Razom for Ukraine, a nonprofit providing critical humanitarian war relief. Next, the group is looking to establish blockchainnative nonprofit organizations with their own charitable programs.

Zondax — Developing an easy-to-use software development kit (SDK) for the developers that are more familiar with Javascript-like languages. Currently, there are two SDKs for FVM smart contracts: Go and Rust. Zondax will add the popular and widely-used Javascript/Typescript family.

Portrait — The first open-source web page builder, which allows people to turn their blockchain address into a website, was awarded a grant to turn its proof of concept into an established, viable product. Portrait web pages are automatically pinned to IPFS and Filecoin, allowing the sites to be secure and resilient by design. Portrait's goal is to enable the community to express creative work in a decentralized way — from custom blogs for writers and online portfolios for designers to landing pages for podcasts hosts.

Renovi — A metaverse marketplace and design studio that works with global brands and businesses to create, develop, and implement their Web3 strategies. Enabled in part through a Filecoin Dev Grant, future functionality will include a more robust storage solution, an Ethereum bridge, the ability to collect onplatform and cross-platform royalties, upgradable smart contracts, and a DAO.

Webrecorder — A project that builds and maintains an ecosystem of open-source Web archiving tools that can be used by anyone to create high-fidelity and accurate archives of any web content. Webrecorder received a grant to improve areas of its open-source web archiving ecosystem while focusing on growth and team expansion opportunities.

Yatima — The Yatima project is integrating a programming language for Turing-complete recursive zkSNARKs with the Filecoin Virtual Machine to enable zero-knowledge proofs written in Lurk to be verified natively on Filecoin. Yatima plans to create several novel applications of the Lean-Lurk-FVM stack, such as an on-chain marketplace where parties can trustlessly buy and sell verifiably-correct typed programs and data.

Grant Initiatives

Expanding the Web3 stack: An overview of Joint Grant Initiatives



Filecoin Foundation and Electronic Coin Co. (ECC)

Filecoin Foundation and ECC are working together to empower the Filecoin, Zcash, and greater Web3 ecosystems through a new agreement that creates a joint grants pool for Filecoin and Zcash projects. The program seeks proposals for projects that lead to additional utility for both FIL and ZEC chains and their respective ecosystems.

In June, **Filecoin Foundation and Unfinished launched the Explorer Awards**, a joint program to support the growth of the decentralized web movement and help others catalyze their Web3 learning.

Chainlink and Filecoin's ongoing joint grant initiative supports teams building and researching hybrid smart contract applications powered by tamper-proof file storage and universal connectivity. These cosponsored grants are designed to extend the Web3 stack beyond on-chain computation to include decentralized off-chain computation, data, and storage.

Some of the Chainlink joint grantees in 2022:



DZK Foundation Awarded Chainlink-Filecoin Joint Grant to Support zk-Rollup Research

DZK Foundation's grant will support research into how zk-Rollups can prove that specific data has been stored on Filecoin using a Chainlink External Adapter.



<u>Chainlink-Filecoin Joint</u> <u>Grant to Create Blockchain</u> Data Storage Protocol

Linkstorage's grant will help build a unified data storage protocol that enables developers to synchronize, track, and monitor data between blockchains and IPFS/Filecoin through a Chainlink External Adapter.



FilSwan Awarded Chainlink-Filecoin Joint Grant to Create MultiChain Decentralized Data Storage Payment Solution

FilSwan's joint grant will help create a multi-chain decentralized data storage solution that allows smart contracts on Polygon to pool together funds for the storage of data on Filecoin/IPFS.

Storage Providers

Powering the Network: an overview of Filecoin's storage provider community

Storage Providers (SPs) are an integral part of the Filecoin ecosystem. Currently, almost 4,000 storage providers contribute data capacity to the Filecoin network. The Foundation helps provide SPs the resources and tools they need to serve clients and store large amounts of data on the Filecoin network.

In 2022, the Foundation hosted community events for Storage Providers to gather, connect, and learn from one another in Austin, Lisbon, Seoul, Singapore, and more. We also support hands-on training for incoming SPs, including via the Enterprise Storage Provider Accelerator (ESPA), which offers 7 months of training for new SPs to build enterprise-level storage capacity on the Filecoin network.

The regional Storage Provider Working Groups in North America, Europe, the Middle East, and Africa (EMEA), China, Japan, Korea and Singapore allow SPs of all sizes to work collaboratively with other storage providers on the Filecoin network.

SPs in the News:

<u>Seal Storage</u> has over 20PiB of capacity across the U.S. and Canada, with plans to add an additional 100PiBs to its network. At FIL Lisbon, <u>Seal Storage Technology</u> announced a pilot project with <u>the ATLAS Experiment at CERN</u> to explore decentralized storage as a costeffective and efficient option for archival data storage.

Lucky Storage is an SP headquartered in the former Lucky Strike Tobacco Factory near Research Triangle Park in North Carolina, making it well-situated to store data for research organizations in that region. They're working with organizations such as universities, research institutions, and life sciences companies that have large data storage needs. The Shoah Foundation at the University of Southern California is working with Lucky Storage to store a massive archive of testimonial data from survivors of genocide, relying on the Filecoin Network to store the testimonials in a secure and decentralized way. Lucky Storage is among several Filecoin storage providers that maintain copies of the testimonials for the Shoah Foundation.

GREATERHEAT's long-standing expertise as a Filecoin storage provider dates back to 2018 when Filecoin was still in its testnet phase.

GREATERHEAT currently operates about 3% of the storage capacity on the Filecoin network, and since 2019 has expanded its decentralized storage capacity by ~500% every year.

GREATERHEAT works with organizations with large datasets and enterprises to onboard, replicate, and store their data using Filecoin.

They also work with other storage providers by offering general consulting services to new Filecoin storage providers, and by customizing and selling data storage hardware systems.

Storage Use Cases

A look at the variety of storage use cases in the Filecoin ecosystem

The Foundation works with storage clients including individuals, organizations, and governments to make data more resilient, permanent, and cost-effective, while also increasing the accessibility of data.





UC Berkeley Underground Physics Group

stores neutrino physics research data on the Filecoin network. Putting this data on Filecoin ensures it is verifiable and will help support the development of a novel detection technology.



MORE USES





GenRAIT uses the Filecoin network as their default archive to store non-sensitive genomics and scientific research data, so scientists can spend more time analyzing the data than uploading it. GenRAIT will initially host over 100 terabytes of genomic research data on the Filecoin network and enable scientists and researchers to upload their own genomic files they can then retrieve, analyze, and put into action.

ATLAS Experiment at CERN partnered with Seal Storage Technology, a Filecoin storage provider, for a pilot project to explore Seal's decentralized cloud storage platform as an efficient and cost-effective option for archival data storage. In this R&D project, Seal has provided the ATLAS Experiment with 10 Pibibytes (PiBs) of cloud-based storage capacity, hosted in Seal's data centers. Seal's data platform uses the Filecoin network to ensure all data stored is immutable, verifiable, and has a chain of custody.



<u>University of Utah</u> Center for Extreme Data Management Analysis and Visualization (CEDMAV) is storing scientific research data encompassing combustion, simulations, earth, and satellite data on the Filecoin network.

Advancing the Filecoin Ecosystem

Growing the network in a transparent and community-driven manner

In addition to supporting different communities building on and contributing to the Filecoin network, the Foundation helps govern the ecosystem in a way that's community-driven and transparent, in line with the protocol's open-source ethos.

Security: Building a strong security culture in the Filecoin project has been one of our core goals from day zero – to protect against vulnerabilities and maintain the integrity of the network.

The Foundation assists in facilitating protocol security throughout every phase of its development. For example, public programs like the Filecoin Bug Bounty Program were created to reward security researchers, hackers, and security professionals that invest time into finding bugs in the Filecoin protocol and its respective implementations. In addition, specialized audits from core developers work to ensure the network is operated, and upgraded, with resiliency.



Governance: The Foundation facilitates a governance process by hosting open forums and soliciting feedback from the community to advance core protocol upgrades. Most recently, the Shark upgrade is expected to incrementally introduce the Filecoin Virtual Machine (FVM) and the ability for programmable smart contracts on the Filecoin network. In 2022 alone, the Foundation helped steward 20 FIPs, including FIPs 30, 31, and 32, which collectively laid the groundwork to implement the Filecoin Virtual Machine. Additionally, we updated documentation on the FIP workflow to help align internal and external community members around expectations for authoring FIPs — including step-by-step rules for updating documentation, responding to reviews, and navigating the 'last call' process.



Filecoin Plus: Filecoin Plus is a layer of social trust on top of the Filecoin Network to help incentivize the storage of real, valuable data sets. Clients looking to onboard storage onto the network apply to community-selected Notaries to receive DataCap, which can be used to incentivize storage providers to take storage deals. The Filecoin Plus program has substantially expanded the amount of data stored on Filecoin, accounting for more than 97% of all new data that is being onboarded to the network. Today, more than 300 PiB of data is stored on the network through the program and 214 active large dataset clients have been onboarded.



A Defining Year for the Foundation

The Foundation's accomplishments and impact on the Filecoin ecosystem







Last year, we helped some of the biggest Filecoin events to-date come to life, from Bangalore to Singapore.

And the Foundation hosted the community's first cornerstone events, FIL Austin and FIL Lisbon, creating exciting opportunities for the community to come together and foster the growth of the ecosystem.

FIL Austin was the first major in-person meetup of the Filecoin Community hosted by the Foundation. The event featured a week's worth of programming, including a **Storage**Provider Meetup, Fil+ Day, a full day of mainstage programming at the

Coppertank Events Center, keynote speakers on the Consensus main stage, and more.

FIL Lisbon, also hosted by the Foundation, convened hundreds of attendees from across the Filecoin ecosystem and beyond.

Highlights included the Crypto and Policy panel and Seal Storage's announcement about its collaboration with ATLAS at CERN. Additionally, at FIL Lisbon, we announced the Decentralized Storage Alliance alongside Protocol Labs, bringing together Web2 organizations, like AMD, EY, and Seagate, to support the adoption of decentralized storage at the enterprise level.

Awareness and Building Community

Notable events and initiatives to promote decentralized storage technology

We also established a presence and convened the Filecoin community at notable events to raise awareness around the importance of decentralized storage technology and introduce Filecoin to a broader tech audience.

The Foundation's Decentralized Web Gateway at SXSW (March 2022) drew a mix of academics, government officials, Web2 and Web3 technologists, and journalists to discuss a policy path forward for blockchain technology and cryptocurrency. We also hosted events for storage providers during the week, including a full day of workshops, a networking reception for current and prospective storage providers, and an appreciation dinner.

In partnership with CNBC, Filecoin
Foundation hosted the Decentralized Web
Gateway at the World Economic Forum in
Davos (May 2022). More than 1,000
attendees streamed through the space –
across the street from the WEF Congress
Centre – throughout the week. Programming
included sessions on Filecoin Green,
Networking in Space, and Web3 and Digital
Accountability in Ukraine.

During Consensus (June 2022), the
Foundation hosted the NFT Gallery, where
Jonathan Victor presented on NFT.Storage.
Additionally, we hosted *Filecoin*Foundations, a 90-minute presentation on
the latest updates from across the Filecoin
ecosystem. Marta Belcher took the stage
to interview Frances Haugen on "The
Meta Dilemma," and Juan Benet
presented on "The Web3 World
According to Filecoin."

The Foundation also sponsored Dweb Camp (August 2022) to share our message about the benefits of decentralized storage with hundreds of leading voices in the space.

At Unfinished Live, we set up a Social Impact Lounge (September 2022), where the Social Impact team hosted project partners and invited Unfinished attendees to learn more about the decentralized web and the Foundation's social impact work.

At Web Summit (November 2022), the Foundation hosted Filecoin Station, a space-themed booth that featured interactive storytelling through a decentralized swag machine, fireside chats with ecosystem experts, and a chance to publish a photo booth snapshot to the Filecoin network. Over 3,000 visitors cycled through over three days, and we recorded the highest 24-hour social media engagement to date for Filecoin Foundation.





















Decentralized Storage in Space

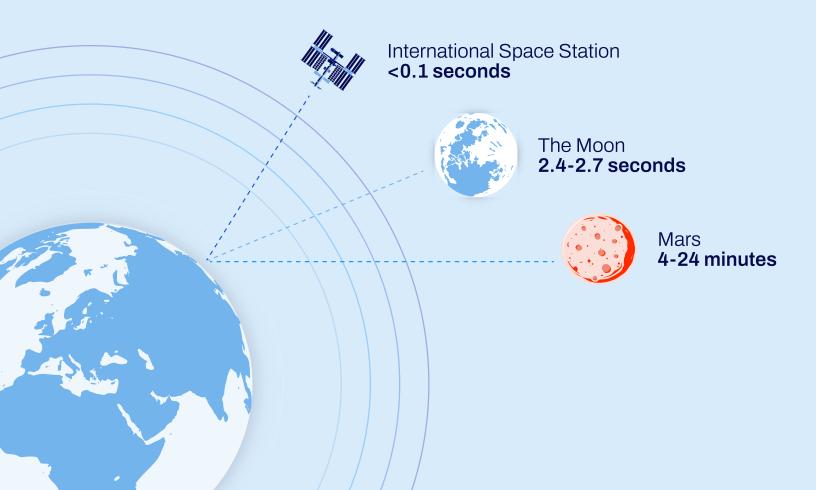
Exploring the potential of IPFS to transform data sharing in the space economy

The Foundation also secured critical partnerships to drive more widespread adoption of decentralized storage technology. In Davos, we announced a project with Lockheed Martin to deploy the Interplanetary File System (IPFS) in space.

The space economy is <u>rapidly emerging</u>, and building out communications infrastructure in space is key to ensuring the space economy can thrive. This collaboration is the next step in establishing critical infrastructure that will transform how we share and access data in space.

IPFS is a decentralized protocol for storing and sharing data using contentaddressing to uniquely identify files.

Ultimately, by minimizing the number of times that data has to be transmitted to Earth and return to space, IPFS's decentralized storage model will enable more efficient data transfer and communication in space.









Public Data Commons

Data storage that is more resilient, because open data shapes our future

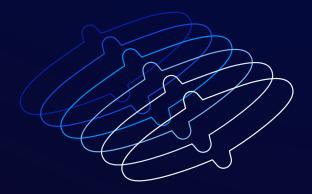
We continued our work with the Internet
Archive to preserve their collection of digital
history and are <u>supporting their new</u>
<u>Democracy's Library initiative</u> to make
public government data more accessible.

The Internet Archive has spent the past 26 years building the world's largest digital library. Democracy's Library is an extension of that effort, and the Archive has committed to working with government agencies, libraries, and universities to preserve government data online.

Working hand-in-hand with the Internet Archive, the Filecoin Foundation and Filecoin Foundation for the Decentralized Web (FFDW) will help to store these collections on decentralized technologies like the Filecoin network to ensure robust and secure long-term preservation — in line with the Foundation's mission to preserve humanity's most important information. This builds on Filecoin Foundation's other work with the Internet Archive.

The first initiative between Filecoin Foundation, FFDW, and the Internet Archive to advance the Democracy's Library project will focus on the collection, preservation, and accessibility of U.S. and Canadian government documents in partnership with the Internet Archive Canada.

This collaboration dovetails with Filecoin Foundation's <u>Public Data Commons</u> initiative, a program focused on making storage for government datasets across the globe more resilient, permanent, and cost-effective using the Filecoin network.



Changing the Narrative

Shifting the perspective: a new outlook on environmental impact

This year, we saw the **Filecoin Green** initiative gain momentum. While there is ample focus on the energy expenditure of Proof of Work chains, like Bitcoin, there is much less discussion about how blockchain and Web3 technologies can enable more accountable, transparent tracking for green technologies. Filecoin Green is leading the charge with a push for radical transparency and a goal to make the Filecoin blockchain verifiably carbon-neutral.

Filecoin Green aims to **measure the environmental impacts** of the Filecoin network, but more effectually, they are pioneering open-source tools and developing a playbook that can be used by other blockchains and organizations beyond the Web3 ecosystem to decarbonize.

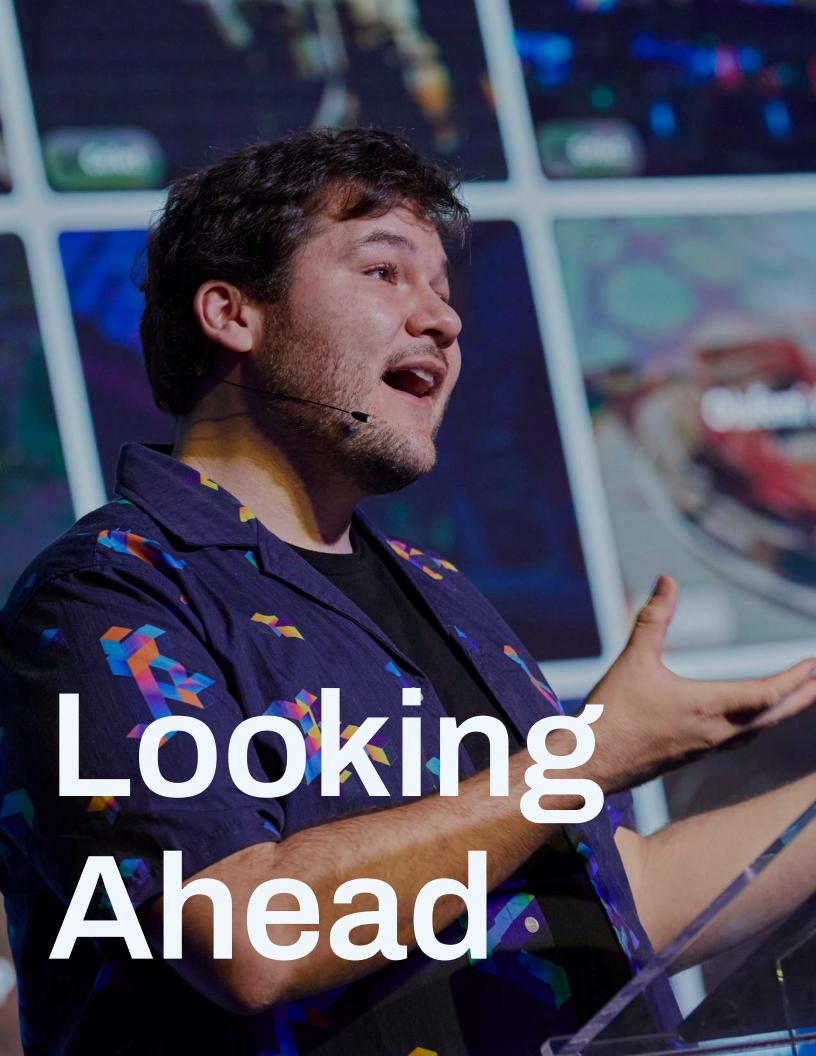
Throughout the year, Filecoin Green hosted three <u>Sustainable Blockchain Summits</u>, across three different continents. The goal of each Summit is to bring together a community of people in order to work towards stronger, verifiable sustainability claims in crypto and to build Web3 infrastructure that will help accelerate decarbonization of the broader economy.

In October, the Filecoin Green team announced the launch of **CO2.Storage**, the first Web3 data storage solution to enable transparency for comprehensive environmental attributes underlying carbon offsets. Since launching, the team has seen great adoption and is excited to be working with a variety of partners. This includes the 16 largest carbon offset providers in the Web3 space, who are all dedicated to tokenizing carbon offsets to ensure that their data is transparent and verifiable.

Most recently, at the **COP27 climate summit** in Sharm El Sheikh, Egypt, Filecoin Green's Alan Ransil talked about the program's mission to use Web3 technology to solve the complex challenges of carbon offset data storage and environmental verification.

The <u>filecoin.energy</u> dashboard aims to raise the bar for energy transparency across Web2 and Web3, allowing anyone to view and estimate the energy use of any node in the network and bring full data transparency, verifiability, and interoperability to the industry.

Lastly, looking to 2023, Filecoin Green is planning several **Sustainable Blockchain Summits** and scaling efforts to decarbonize Filecoin SP operations.



Looking Ahead

What's in store for the ecosystem in 2023

We're looking forward to 2023, packed with community events and exciting network updates.

Additionally, in Spring 2023, the Filecoin Virtual Machine (FVM) will be a ground-breaking update for the Filecoin network. For the first time, developers will be able to deploy user-defined smart contracts on top of Filecoin's blockchain and storage network, unlocking countless new use cases.

And FVM is just the start of what's in store for the Filecoin ecosystem. 2023 will bring new releases in Filecoin's Retrieval Market, Computer Over Data, and Interplanetary Consensus.

There will be a focus in 2023 on data and enterprise onboarding onto the Filecoin network. As an alternative to costly cloud storage, the Filecoin network offers efficiently priced and geographically decentralized storage. Partnerships like the Decentralized Storage Alliance will bring together top-tier leaders across Web2 and Web3 to collaborate and explore the unrealized potential of decentralized storage technology, Filecoin, IPFS, and libp2p.

And 2023 will bring another year of global <u>Filecoin community events!</u> In February, we're headed to ETHDenver, and save the date for the Filecoin Foundation-hosted Protocol Village at Consensus 2023.

All this work is driving toward the <u>Filecoin Master Plan</u>, shared by Founder and CEO of Protocol Labs Juan Benet to:

- 1. Build the world's largest decentralized storage network
- 2. Onboard and safeguard humanity's data
- 3. Improve compute and retrieval capabilities to build applications



2022 Annual Report

A Retrospective and Look Ahead

Learn more about the Filecoin Ecosystem









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