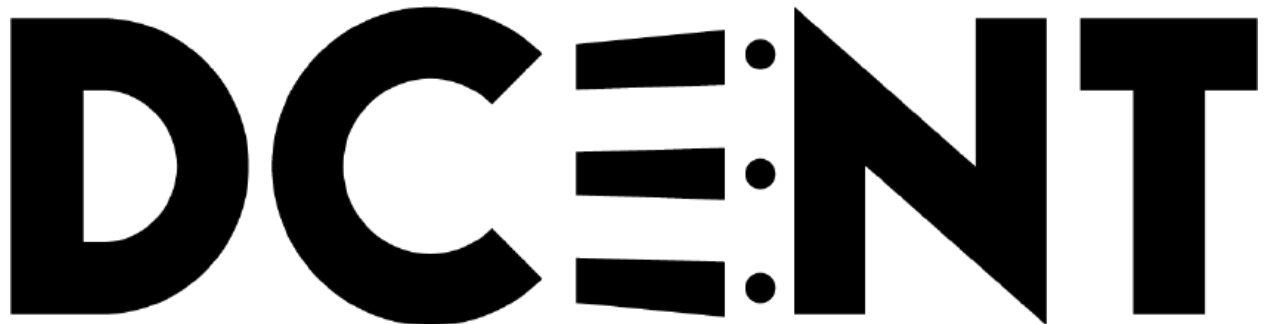


# DCENT—Decentralizing Cloud Data Storage for a Greener Filecoin Network

DCENT is the Filecoin storage provider that's demonstrating how to go green and make green at the same time.



## The TL;DR on DCENT

DCENT is a Filecoin storage provider with its founding roots in Ethereum mining. What sets DCENT apart from other storage providers? The team is committed to minimizing its carbon footprint by generating plenty of renewable energy, and is extremely active in the Filecoin community. DCENT in 2021 designed and established its own data center—an impressive feat accomplished by a talented team in a very little time.

Another way that DCENT stands out is by offering a diversified range of services. The Filecoin storage provider not only holds many large, public data sets, but also provides enterprise-grade data preparation and transport services for other Filecoin storage providers.

Keep reading to find out more about DCENT—the storage provider that's leading by example in many different ways.

## What is DCENT?

[DCENT](#) is a Filecoin storage provider that specializes in onboarding data to the Filecoin network. DCENT operates in a way that is efficient, profitable, and environmentally friendly.

**Assets.** DCENT is heavily invested in hardware and infrastructure. The company both operates and maintains its own data center and is co-located in shared data center space.

- *Global Switch Data Center*—DCENT is co-located inside the Global Switch Data Center in Amsterdam. In this location, DCENT operates six 42U racks and routers that use

Border Gateway Protocol (BGP), a technology that enables DCENT to choose the fastest, shortest, and most economical paths to networks worldwide.

- *DCENT Data Center*—DCENT's wholly owned data center is located in the Heerhugowaard region of the Netherlands. The data center contains 120 48U racks plus 850 square meters of office space, and is geo-redundantly connected to DCENT's data center operations in Amsterdam.

DCENT's data center infrastructure is built with full redundancy for all critical components. DCENT in both data center locations has direct access to the largest broadband fiber network in Europe.

**Geographies.** With its data center operations in the Netherlands, DCENT is strongly focused on central Europe but also is highly connected to Filecoin storage providers worldwide. DCENT's optimized BGP network enables the storage provider to receive data quickly and economically across continents. The DCENT team is headquartered at its own DCENT Data Center in the Netherlands' Heerhugowaard region.

**Industry verticals.** DCENT frequently serves the scientific community, as many researchers have large, valuable datasets and limited budgets for data storage. DCENT stores many publicly available datasets.

**Storage capacity.** DCENT's raw storage capacity currently stands at 45 pebibytes (PiBs). In 2023, the Filecoin storage provider plans to increase its raw storage capacity to 100-200 PiBs.

**Funding.** DCENT first received funding from its founders and a small group of angel investors. As the business grew, the storage provider diversified its funding sources to include:

- *Venture capital*—DCENT has accepted funding from venture capital investors with a focus on environmental sustainability and Web3.
- *Grants*—The Filecoin storage provider has received grant funding from organizations that support the development of renewable energy and battery technology.
- *Other storage providers*—DCENT is the recipient of a direct investment by another large storage provider. The Netherlands-based storage provider also occasionally barter with other storage providers to trade hardware and other resources.
- *Ecosystem sponsors*—DCENT has received compensation from both Protocol Labs and the Filecoin Foundation, in exchange for performing software development work and hosting public events.

**Environmental sustainability.** DCENT is committed to providing decentralized data storage to the Filecoin network in a way that is minimally impactful to the environment. The DCENT Data Center is powered by 800 solar panels of 385 watts each, which collectively provide sufficient power in the summer months for all of the data center's operations. DCENT is actively developing a solar-powered battery system to further decrease the company's reliance on the national electric grid.

**Community involvement.** DCENT is extremely active in the Filecoin community, having participated in many Filecoin-sponsored initiatives. DCENT has engaged with these programs:

- [Filecoin Plus](#)—a Filecoin incentive program designed to attract high-quality data to the network
- [Filecoin MinerX Fellowship Program](#)—a Filecoin-sponsored program designed to accelerate the development of tools and services in the Filecoin ecosystem
- [Filecoin Storage Provider Working Group](#)—a Filecoin Foundation-sponsored initiative that brings together many different storage providers for ongoing collaboration and problem solving
- [Slingshot](#)—a Filecoin community program with the goal of preserving open datasets on the decentralized web
- [Evergreen](#)—a Filecoin initiative established to guarantee the permanence of data onboarded through the Slingshot program
- [Solar- & Battery-Powered Storage \(SBPS\) Project](#)—a current project sponsored by DCENT and Filecoin Green to educate storage providers about how to keep their operations running during times of electrical grid uncertainty
- [Solar Solutions Project](#)—another current project sponsored by DCENT and Filecoin Green that provides documentation and other support to storage providers wishing to install solar power systems
- [Project Grand Prix](#)—a Filecoin-sponsored program dedicated to improving data onboarding speeds, with a focus on the digital transference of data
- [Project Ferrari](#)—another Filecoin-sponsored program dedicated to improving data onboarding speeds, aimed at making physical data transfers more efficient

DCENT is also a Filecoin notary, meaning that it audits and validates data to support specific initiatives like the Filecoin Plus incentive program.

## Why does DCENT exist?

DCENT is on a mission to reliably provide decentralized data storage in a way that is both profitable and minimally harmful to the natural environment. DCENT views technology companies as being among the most impactful in the modern world, with significant potential to transform how enterprises and people operate.

DCENT also says that the current data storage landscape “is in desperate need of reinvention.” The Filecoin storage provider views the decentralization of data storage as being directly relevant to creating “a decentralized, trustless world, where verifiability and ownership of data is central” to the user experience.

The DCENT team, previously mining Ethereum, chose to work with the Filecoin network because it viewed the Filecoin protocol as both useful and viable. DCENT perceived the

usefulness of Filecoin for enterprise clients in particular, and leveraged the team's technical expertise to discern the viability of the software.

DCENT's passion for data runs deep. "We secretly also love data storage and networking with large volumes of data," says Hidde Hoogland, a co-founder of DCENT.

## DCENT's services

DCENT provides a range of services beyond just data storage. Let's take a closer look at the services that DCENT offers—

- **Decentralized data storage:** DCENT uses the Filecoin network to store data in a decentralized way for large-scale scientific data sets.
- **Data preparation:** DCENT's data preparation service covers all aspects of onboarding data to the Filecoin network. The storage provider independently finds valuable data sets, brings data sets into data centers, and converts data into the appropriate file format. DCENT also disburses files to trustworthy entities and ensures storage redundancy per clients' preferences.
- **BGP development services:** With its own BGP network, DCENT can choose the shortest and most economical path to networks around the globe. DCENT provides BGP development services to assist other storage providers and ecosystem participants with establishing their own BGP networks.
- **Data center colocation:** With its own data center, DCENT offers colocation services to other Web3 projects including other Filecoin storage providers.

## How DCENT stores data

Are you wondering about how exactly DCENT stores data? Keep reading to learn more about the data storage process for this Filecoin storage provider—

- 1. Client inquires about decentralized data storage:** DCENT fields many inquiries from prospective clients seeking a secure, decentralized, and trustless way to store data. The Filecoin storage provider works with clients to answer all of their questions and address any concerns.
- 2. Client provides data:** When the client is ready, DCENT receives one or more data sets from the client. DCENT can use its optimized BGP network to facilitate the data transfer.
- 3. DCENT processes the data:** After downloading a client's data set to its servers, DCENT further processes the data by converting it into Compressed ARchive (.CAR) files. The converted files are compatible with replication across the Filecoin network.
- 4. DCENT replicates the data:** In keeping with a client's preferences, DCENT replicates the data to be stored with multiple Filecoin storage providers. Clients can specify geographic locations and other requirements for storing the data copies.
- 5. DCENT randomly tests for retrievability:** DCENT ensures that replicated data is held by only the most reliable storage providers, by randomly testing for data retrieval speeds and

completeness. Storage providers holding replicas of clients' data are expected to perform consistently well on these random tests.

You may be also curious about the hardware and software that DCENT uses to store, process, and serve data to clients. Here's a glimpse—

- **Lotus:** the [reference implementation software](#) that's core to the Filecoin ecosystem
- **Ubuntu:** an open-source operating system built on Linux for enterprise servers
- **Juniper:** networking equipment hardware
- **Seagate:** hard disks for data storage capacity
- **Supermicro:** server equipment

## A brief history of DCENT

DCENT was founded by Hidde Hoogland and Wijnand Schouten in March 2021. DCENT's roots are in Ethereum mining, with Hidde first mining for the cryptocurrency in 2016.

Hidde's Ethereum mining operation, at its peak, consisted of 6,000 GPUs consuming 6.5 gigawatt-hours of electricity per year. Wow! But Hidde was challenged by the dramatic price fluctuations of Ethereum, and troubled by the high rate of power consumption associated with proof-of-work mining.

Enter Wijnand, who teamed with Hidde to begin supporting various other Web3 projects. The duo was on the hunt for a blockchain project that used energy in an efficient and profitable way, even in Europe where energy costs are frequently high. Filecoin quickly became a focal point, and by August 2020 the team had launched a node on the Filecoin test network.

The DCENT founding team quickly realized that Filecoin is a “useful and viable protocol [with] potential for large-scale customers and over 90% more [energy] efficient than current proof-of-work models.” Shortly after joining the Filecoin network, DCENT successfully raised a seed funding round that enabled the team to further develop its Filecoin storage business.

Only a few months later, in January 2021, DCENT made the important decision to shift completely away from Ethereum mining and focus only on Filecoin data storage. The team sold its entire Ethereum mining operation of 6,000 GPUs and invested the proceeds into building a Web3-focused data center.

DCENT by late summer 2021 had successfully established its independent data center, and the rest is history! Let's take glance at these important milestones (so far) in DCENT's history:

- **Established Filecoin testnet node:** The DCENT founding team in August 2020 first established a node on the Filecoin test network to begin storing decentralized cloud data.
- **Raised seed capital:** The DCENT duo in December 2020 raised \$400,000 in seed capital from friends and professional acquaintances.

- **DCENT formally established:** Hidde and Wijnand established DCENT as a business entity in March of 2021.
- **DCENT Data Center constructed:** Also in March 2021, the DCENT team began construction of its data center. The construction effort was completed in August of the same year.
- **Secured angel funding:** In August 2021, just as the data center was completed, DCENT raised \$3 million from a group of angel investors.

## Who is the DCENT team?

Let's get to know the DCENT team, which includes its founders Hidde Hoogland and Wijnand Schouten along with Lucas van Schouwen, a Web3-focused software engineer.



### Hidde Hoogland, Founding Partner

[Hidde Hoogland](#) is a DCENT founding partner and the organization's technical director. Hidde began focusing on Ethereum mining in 2016, later transitioning to Filecoin data storage with the establishment of a Filecoin node and DCENT. Hidde's expertise extends to designing, overseeing construction, and maintaining large-scale mining and storage operations. Hidde studied at the Amsterdam University of Applied Sciences.



Wijnand Schouten, Founding Partner

[Wijnand Schouten](#) is a DCENT founding partner and software engineer. Wijnand is a veteran of the internet, having held a leadership role with an internet provider as early as 2002. In the decades since, Wijnand has developed particular expertise in Linux systems, BGP networks, and PHP code. Wijnand in 2009 also founded the Netherlands-based solar energy company MetDeZon. He holds a degree in electrical engineering from The Hague University of Life Sciences.





## Lucas van Schouwen, Software Engineer

[Lucas van Schouwen](#) is a software engineer for DCENT and BGP network expert. His background includes work as an Operational Service Manager for an IT service provider, in addition to several roles as a senior network engineer. Lucas' expertise is oriented toward analyzing and solving complex IT problems, especially those pertaining to BGP networks. Lucas is certified in IT service management.

DCENT describes its team culture as “very direct.” The team operates with the shared goals of maximizing revenue, minimizing expenses, and reducing carbon emissions. Efficiency and environmental sustainability are important values for DCENT.

## Who uses DCENT?

You may be wondering about the public datasets stored by DCENT. Here's a glimpse at some of the data that DCENT stores—

- **NIH Clinical Center:** DCENT stores data for the National Institutes of Health (NIH) Clinical Center. This medical facility is the nation's largest hospital devoted entirely to clinical research.
- **DANDI Archive:** DCENT also stores data for the DANDI Archive's BRAIN Initiative. This project is a data archive designed to support the publication and distribution of many types of neurophysiology data.

DCENT specializes in large data sets because of its expertise in large-scale data onboarding to the Filecoin network. With an onboarding capacity of up to 80 Gbps, DCENT is well positioned to support a variety of organizations with massive data sets.

## How DCENT approaches marketing & sales

DCENT takes a unique approach to marketing and sales, combining some traditional strategies with an emphasis on environmental sustainability. These are the primary marketing tactics that DCENT is using—

- **Awareness building:** DCENT is active in the Filecoin community, engaging in many ecosystem-sponsored initiatives. This participation directly benefits DCENT, including by raising awareness about the storage provider.
- **Digital marketing:** DCENT has developed and maintains [a website](#). Operating this website is currently the storage provider's primary form of digital marketing.
- **Service differentiation:** The Filecoin storage provider differentiates itself from other storage providers by emphasizing its heavy use of renewable energy. Service differentiation is another important way that DCENT markets itself.



DCENT describes its marketing efforts as “focused on reputation, engagement, and execution.” The team does not devote any resources to paid marketing activities.

Being a revenue-driven organization, sales are important for DCENT. The Filecoin storage provider focuses on the sales tactics that have proven most effective, including—

- **Relationship building:** The DCENT team treats the sales process as an exercise in relationship building. With a long sales cycle and high-touch process, DCENT welcomes the opportunity to form close working bonds with its storage clients.
- **Emphasis on execution:** DCENT isn't afraid to jump in—because the team understands that sometimes the best path forward isn't always the clearest. Employing a “just build it” mentality has proven effective for DCENT during the sales process.
- **Targeting the right clients:** With Web3 and decentralized data storage in its nascency, DCENT focuses on clients with tolerance for risk. Selling to clients who aren't overly risk averse is another tactic that's proven effective for DCENT.

## Operations at DCENT

Now let's dig into operations at DCENT. The team organizes its daily operations into four key business areas:

- **Hardware:** DCENT's hardware division ensures that all of the storage provider's hardware is operational and well maintained. The hardware division also oversees the addition of hardware to DCENT data centers.
- **Security:** DCENT has a strong focus on security, with a business division devoted to maximizing the security of its software systems.
- **Client support:** The DCENT client support division provides 24/7 customer service to respond to any problems in a timely manner.
- **Finance:** DCENT's finance team monitors and controls the storage provider's finances to ensure that the organization is profitable.

Each member of the three-person DCENT team plays multiple roles based on their areas of specialty. After a daily standup meeting to start the day, Hidde focuses on many aspects of hardware in addition to finance. Wijnand is responsible for implementing Filecoin network protocol changes, and Lucas oversees the BGP network and data throughput optimization. Wijnand and Lucas together develop and implement new software and onboard new datasets to the Filecoin network. The whole DCENT team takes responsibility for client support and maximizing revenue opportunities.

## Challenges for DCENT

DCENT is a pioneer in the decentralized cloud storage space, so it's not too shocking that the Filecoin storage provider faces some challenges. Let's dig into the three biggest challenges for DCENT, and what the team is doing to overcome these obstacles.

## Challenge #1—Address software shortcomings

DCENT understands the importance of the data that it stores for its clients, but can face challenges with the Filecoin software. DCENT explains that “it is very difficult (read: impossible) to get a protocol and project as large as Filecoin and IPFS working well globally from the beginning.” DCENT is challenged by software issues, which frequently result from software updates.

To overcome this challenge, DCENT uses its own development expertise to address network-scale problems. DCENT has the ability to rewrite, script, and monitor all software processes that it deploys—and is “practically always aware” of live events occurring on its hardware. Taking this hands-on approach enables DCENT to anticipate and frequently resolve problems before they occur. “Prevention is better than any cure” is the team’s attitude toward software shortcomings.

## Challenge #2—Remain consistently profitable

DCENT is a for-profit entity that’s obligated to care about the bottom line. Remaining consistently profitable is a challenge when the price of Filecoin dramatically fluctuates.

DCENT is addressing this challenge in multiple ways. The team offers a diversified range of services, rather than only storing decentralized cloud data. DCENT serves other storage providers by specializing in data preparation and transport, plus providing data center space. The team is also ruthlessly focused on optimizing its hardware for profitability, and constantly seeks to minimize business expenses.

## Challenge #3—Provide an enterprise-grade product

DCENT knows that enterprise clients expect their data storage solution to be user friendly. With the Filecoin network currently best suited for archival data storage, DCENT is challenged to meet the needs and expectations of many prospective enterprise clients.

DCENT is addressing this challenge by pivoting much of its focus to the aspects of decentralized data storage where the team can ensure enterprise-grade quality. DCENT stands out for its data preparation and transport services, which are supported by a BGP endpoint developed by the team. DCENT anticipates that the Filecoin network will become increasingly user friendly, creating opportunities to store data for enterprises with sophisticated requirements.

## DCENT successes

DCENT has experienced plenty of success in its short history. Keep reading to learn about DCENT’s three biggest successes, plus what the storage provider is doing to build on these awesome accomplishments.

## Success #1—Created an independent data center

DCENT designed and constructed its own data center. Excellent! The data center serves as the team's headquarters, supports a portion of DCENT's operations, and provides space for other Web3 and data storage projects.

The DCENT team succeeded at establishing its own data center due to several key factors. The team possesses the crucial technical expertise to design a data center and oversee its construction. DCENT was also able to procure the required funding, and has a "willingness to take risk" that is necessary to pursue such a project.

DCENT is building on this success by working to double the useful space in the data center. The team is also actively working with Filecoin Green to create a solar-powered battery system that will further decrease the facility's reliance on the national electric grid.

## Success #2—Developed enterprise-grade data services

DCENT has distinguished itself as a data preparer and transporter capable of processing high data volumes for both enterprise clients and other storage providers. DCENT operates a highly optimized BGP network, which is a major factor underlying this achievement.

DCENT initially got a boost as a data preparer by participating in the Filecoin-sponsored Slingshot program. But the DCENT team then made a conscious choice to develop data preparation as an enterprise-grade, standalone service. The DCENT team describes this choice as being among their "best business decisions" of the past year.

DCENT is building on this success by continuing to prioritize its data preparation and transport services for storage providers and enterprises. The storage provider plans to further increase its maximum data throughput speed—currently 80 Gbps—while simultaneously boosting its data storage capacity.

## Success #3—Added 35 PiBs to the Filecoin blockchain

DCENT has a current raw storage capacity of around 45 PiBs, and has already added 35 PiBs ([quality adjusted](#)) of valuable data to the Filecoin network. DCENT can add an average of 0.5 PiBs of useful data to the Filecoin network every day. Impressive! The Filecoin storage provider attributes this success to its focus on research data and other large, high-quality data sets.

DCENT is building on this success by increasing the rate at which it onboards useful data to the Filecoin network. The storage provider, every day, is accelerating its rate of data onboarding by 200 terabytes (TiBs) on a quality-adjusted basis. By year-end 2023, DCENT plans to store 200 PiBs (quality adjusted) of useful data for Filecoin clients.

## What's ahead for DCENT?

DCENT is cognizant of its challenges but optimistic about its business trajectory nonetheless. Let's close out by finding out what DCENT hopes to accomplish in the months and years ahead.

**In the next six months**, DCENT is investing about \$5 million—as part of a joint venture—to add more Filecoin hardware to its data center. The team aims to add another 75 PiBs (quality adjusted) of useful data to the Filecoin network, and expects to increase its maximum data throughput capacity to 100 Gbps. DCENT also plans to hire another software developer.

**In the next two years**, the DCENT team has ambitious plans to grow. The storage provider intends to add infrastructure for four more BGP endpoints, and expects to increase its on-chain data storage to over 250 PiBs (quality adjusted). The team is working toward an electric power supply that is 100% renewable, and wants to hire five more engineers.

**In five years**, DCENT envisions being a Filecoin storage provider that's capable of processing “millions of [gigabytes] of data daily from customers in every region on earth.” The storage provider has aspirations to trace the carbon emissions journey from start to finish for all of its hardware and services. DCENT expects that its engagement with the Filecoin network will continue to grow, with DCENT participating as both a leader and collaborator. The Filecoin storage provider intends to leverage its expertise in networking software solutions for both its own benefit and that of other ecosystem participants.

Regardless of the timeframe, DCENT is committed to just a few key priorities:

- Adding hardware
- Growing the team
- Minimizing carbon emissions
- Generating profit

DCENT would be “very satisfied” with serving as a leader in the Web3 landscape over a long time horizon. How long? Maybe that depends on the Filecoin network, and maybe it depends on how many other storage providers choose to go green. DCENT is a Filecoin storage provider that understands the imperative of environmental sustainability, and is a talented team with a proven ability to act.



