



Datum Network

The decentralized data marketplace

White Paper V12

Roger Haenni roger@datum.org

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datum

noun

1. singular of data
2. a piece of information

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Executive Summary

Abstract: The Datum network allows anyone to store structured data securely in a decentralized way on a smart contract blockchain. The DAT smart token enables optional selling and buying of stored data while enforcing data usage rules as set by the data owner.

Every day we create 2.5 Quintillion bytes of data, and 90% of the world's data today has been created in the last 2 years alone. Data stored grows 4x faster than the world economy and contributes to a substantial shift in economic power and source of economic value.

A lot of this data is created by each individual while browsing the internet, interacting on social networks and shopping online. This data is owned and stored by large private companies in huge data silos where it is susceptible to selling, tampering, extraction and other exploitation. The originator of the data mostly loses control over his data when signing up to various services such as Facebook, Google, Instagram, Snap, Twitter etc., that offer free services in exchange for exploitation of a user's personal data, e.g. Google's Gmail service reading your emails and showing targeted ads as a result.

Datum proposes a network run on a secure smart contract blockchain that allows users to retake control of their data, not just the personal and habitual data they produce every day, but also data from the Internet of Things that they control.

Datum encompasses the following key elements:

A fast decentralized data store allowing users to store structured data securely running on a smart contract blockchain

The DAT token enabling this data storage and sharing

The data marketplace, enabling individuals to monetize their data on their terms

Datum leverages BigchainDB and IPFS to provide an infinitely scalable, decentralized data storage backend.

Data storage and data sharing is paid for by the DAT token.

The Datum network will consist out of 3 Billion DAT tokens, with 1.53 billion DAT tokens available in a public token crowdsale.

The Datum network aims to provide entities such as researchers, companies or individuals the most efficient and frictionless access to data while respecting the data owner's terms and conditions. By becoming a dominant data marketplace, Datum aims to revolutionize the existing data market where data creators are rarely paid for the data and the monetization happens by middle men who do not add any value.

The Datum network will support initiatives that aim to increase control of data by their sources (e.g. individuals). We aim to work towards a future where data is first and foremost owned by their creator (e.g. an individual posting an image) and where the creator can choose to share, monetize or destroy this data based on their own purview.

This is in stark contrast with current data silos which collect vast amounts of humanities data under restrictive licensing terms, e.g. an individual giving up most rights to their image when posting it on Instagram. We feel that legislation in many regions is being worked on towards giving back more control of user data to the users themselves and feel the Datum network is an important facilitator and technical solution for such a future.

The Datum network aims to disrupt current data broker model by giving more direct and better value access to users data. This in turn empowers users by regaining control of how their data gets used and shared. Users are incentivized to use the Datum network for data storage not only by privacy but also by monetization incentives. The more users using the Datum network the more powerful the momentum becomes, eventually users are able to insist that data is stored and handled through the Datum network.

Datum can be thought of as a decentralized version of Apple's HealthKit, but for any type of data instead of just healthcare data. HealthKit has led to a massive opening of data by participating apps, however it is stored with a centralized entity, Apple, and is only available within Apple's ecosystem. We expect to see the same rapid adoption effect with the Datum network once it gains critical momentum.

Background

We live in a knowledge economy where data is a strategic asset that allows companies to acquire and maintain their competitive edge. The value of raw data varies from a hundred cents to over a hundred dollars per individual. The more it is enriched, analyzed and leveraged for specialized uses, the more its value increases.

Despite the large-scale monetization of personal data, the only player in the chain that is currently not getting paid is paradoxically the individual him/herself - who happens to be *the* source of harvested data.

Your personal data is worth a lot of money. Facebook, Google and co. all happily collect this data in return for nothing. This is the chance to gain back control of your personal data and determine if and when you want to sell it.

There are two quotes which most certainly define the world we all live in today:

“If you are not paying for the product, you *are* the product.” - Andrew Lewis, 2010.

The Datum network model could provide a basic income for everyone by allowing them to monetize their anonymized data.

As user of Facebook, Google, LinkedIn, Twitter, Yahoo and similar services - every year you create an excess of USD 2000, created directly from your personal data alone. This is only the value represented by data in each of these “data silos”, when you connect this data, the richer and wider the information, the more money it is worth.

What if you could monetize this data yourself, deciding yourself how much you are willing to share in return for rewards.

There is already a worldwide data market enabled by various data brokers that collect all types of personal data from various databases, Datum is the secure and decentralized alternative.¹

Datum is Open Source and Free to participate. Fees are paid to store data, access stored data and rewards are paid out for submitting data.

¹ <https://techcrunch.com/2015/10/13/whats-the-value-of-your-data/>

Stakeholders

Users

Submit data. Data can be personal data and collections thereof or data from IOT devices and any other data source

Storage Nodes

Provide compute power and storage capacity to store data in the de-centralized network. Storage Nodes are part of the BigchainDB cluster that allows Datum to provide global scale storage of submitted data.

Data Consumers

Any entity wishing to access data. Users can grant data under their precise terms, either for free or for a fee.

DAT Token Holders

Govern the Datum network and provide the “fuel” enabling transactions on the Datum network.

Datum focuses on empowering the users (the source of data).

Privacy

Each piece of data in the Datum network is marked with usage terms during the encryption. This way the user (the source of the data) can control in what way their data is to be shared and used by others. The usage terms are controlled by the DAT token smart contract.

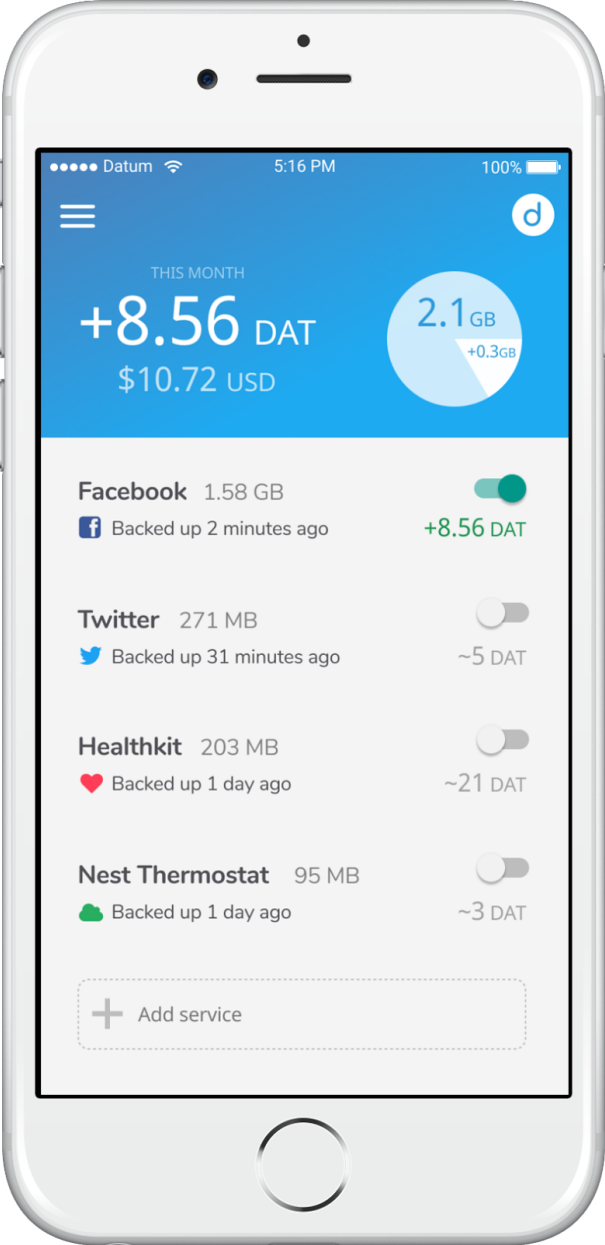
Users have full control over whom to share data with and can fine tune their privacy settings:

1. Share disabled
2. Share with specific, identified and known data consumers
3. Share with specific, identified and known data consumers for a minimum fee
4. Share with everyone
5. Share with everyone for a minimum fee

Datum Client

The Datum Client empowers users to take control of all their data and optionally share or sell their data through the Datum network.

The Datum Client is being designed for a large number of various platforms such as mobile and desktop. We are also designing support for embedded device platforms used in IoT devices, electric cars etc. to unlock the value of such device data.



In the first phase the datum client will be offered as mobile app for iOS and Android.

Focusing on the following key development goals:

- Overview of stored data
- Overview of DAT token holdings
- Simple privacy controls
- Detailed data access reports
- Focused on end user adoption

Full Transparency means users can inspect the data that is being transmitted at any time.

Traceable Access: Users can trace who accessed their data at any time.

Open Data

To allow humanitarian and other legitimate projects access to the data, these can register as projects. The user clients shows currently running projects requesting data access and users can control whether to give access or not based on their decision.

An example could information from digital health devices to medical institutions and researchers, or IoT devices in case of accidents such as natural disasters.

Datum - The Data Network

Datum solves the following key problems. By focusing on data represented as key/value pairs, Datum ensures that availability, latency and query-ability/searchability are preserved and incentivized/rewarded.

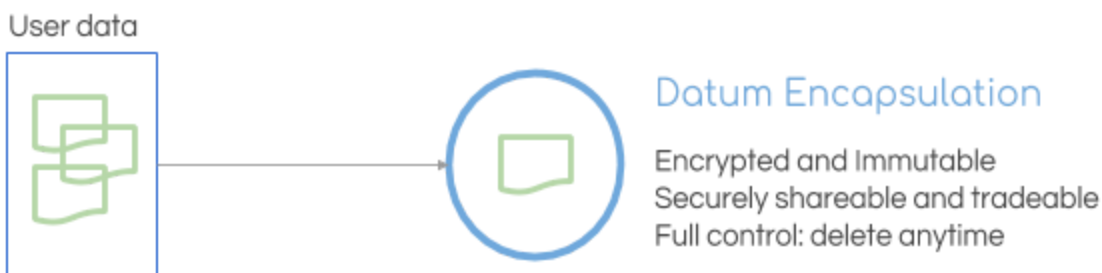
All data is encrypted and protected using AES256-GCM with 256-bit key size for every 128-bit block, ensuring data integrity.

1. Data Storage
 - a. Decentralized: Not controlled by any single party
 - b. Secure: Encrypted at source and immutable
 - c. Performant:
 - i. Latency
 - ii. Throughput
 - d. Functionally Rich:
 - i. Able to query data
 - ii. Able to search data
2. Marketplace
 - a. Request data
 - b. Bid for data
 - c. Sell data

User Specs

The user (source of data) is looking to solve the following criterias:

1. **Secure:** Data is encrypted at source
2. **Tamper Proof:** Data is immutable
3. **Unlock value:** Data can be monetized
4. **Storage:** Decentralized storage
5. **Privacy:** Data is stored anonymously
6. **Control:** User stays in control of critical points such as:
 - a. Life of data
 - b. Detail of data
 - c. Future use of data



Data Consumers

Data Consumers can request for data. Ultimately, it is down to individual users to grant access to data. The credibility of data consumers is an important aspect. As such data consumers should be incentivized to build a trusted track record in handling data responsibly.

The Datum network puts great importance on “Know your Consumer”. While there is an industry focus on “Know your Customer (e.g. YOU), there is hardly anything advocating user’s right to know their counterparty. The Datum network fixes this by empowering users to determine who gets access to their data.

Data Consumers can choose to disclose the following (or nothing):

1. Identity
2. General Privacy Policy
3. Use of Data
4. Lifetime of Data
5. Datum Network Trust Rating

Regarding data requests consumers can specify further data specific items:

1. Use of Data
2. Lifetime of Data

Data Network Incentives

The various parties and stakeholders making up the Datum network have different incentives.

Users:

1. Control of use of data
2. Secure and infinitely scalable data storage
3. Monetization of data

Data Consumers:

1. Direct access to validated and verifiable data
2. Lower costs by eliminating "data broker" middlemen

Storage Node:

1. Rewards for hosting data and providing compute power

Data Validation

Initially the Datum Network will rely on buyers to validate data and regulate fake or invalid data. However, the data validation mechanism can be implemented going forward and Datum also plans to implement a trust ranking system for all users (this includes owners of data and buyers of data as well as storage node operators).

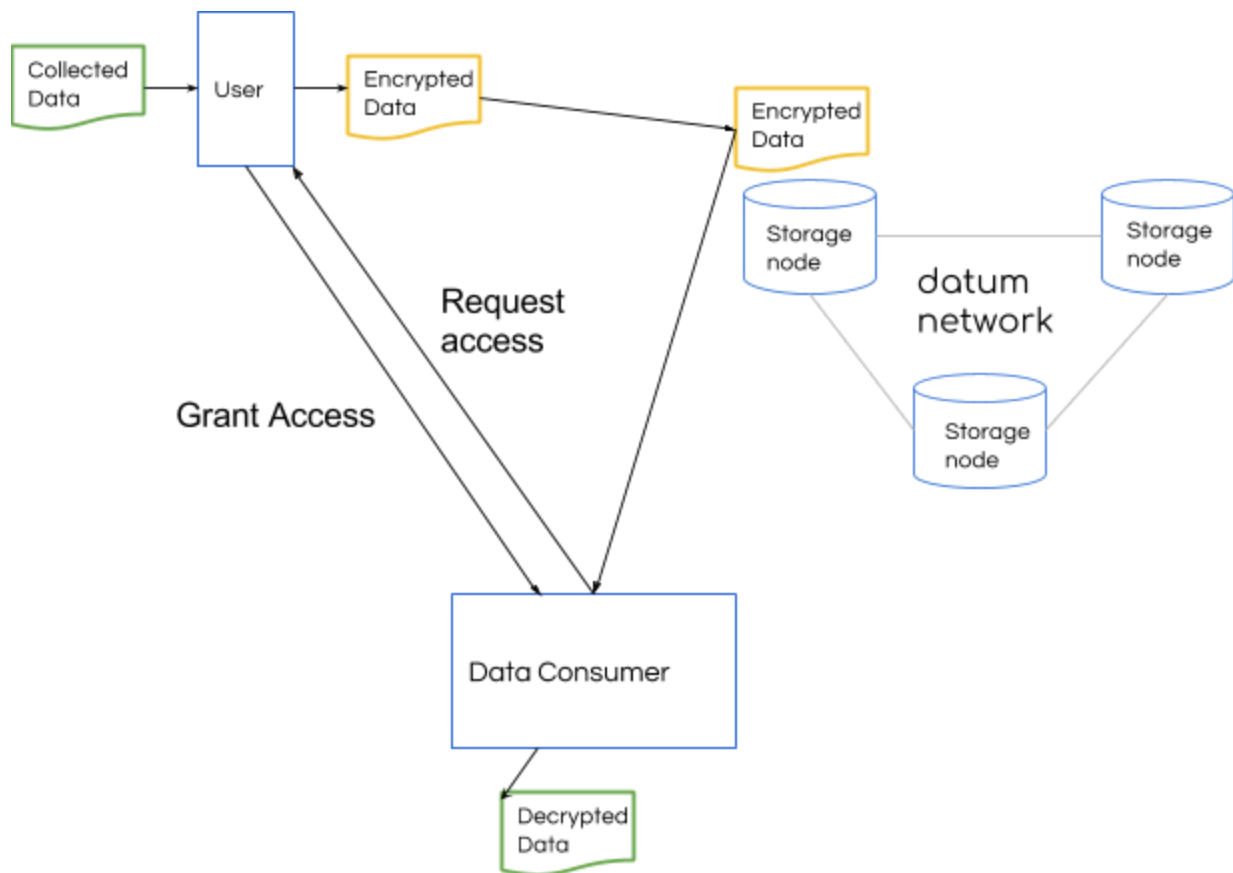
1. Users can link their data to their verified identity such as uPort or Civic.
2. Users can enrich their data with social media and other profiles.
3. Users can enrich their data with trusted 3rd party validators.

An algorithm based on scientific method consensus, such as DSensor SenseMaking, can be implemented.

Use Cases

User submits data and gets paid by a consumer

1. User submits a piece of data to the Datum Network using the client software. The user pays gas to submit the data. As the data is encrypted, only the user can provide a decryption key to all the interested parties.
2. A Storage Node receives the data and stores the data. The data is replicated to many other storage nodes.
3. A Data Consumer declares interest to purchase the piece of data.
4. The User receives a data purchase request with the details such as purchaser and price offered. He can agree to the purchase request or counter offer with a modified proposal.
5. The User accepts the proposal, the user receives DAT Tokens and the decryption key is sent to the Data Consumer who pays in DAT Tokens.



Data can be purchased as one-off, or on an on-going subscription basis.

Token Economics

DAT is a utility token that can be exchanged for certain privileges on the Datum Network. Such as participation in the data market and registration as the storage node etc. Tokens exchanged for these activities shall be destroyed, as the supply of DAT is fixed at issuance the net effect of these activities is that the supply of DAT will decrease over time (deflation).

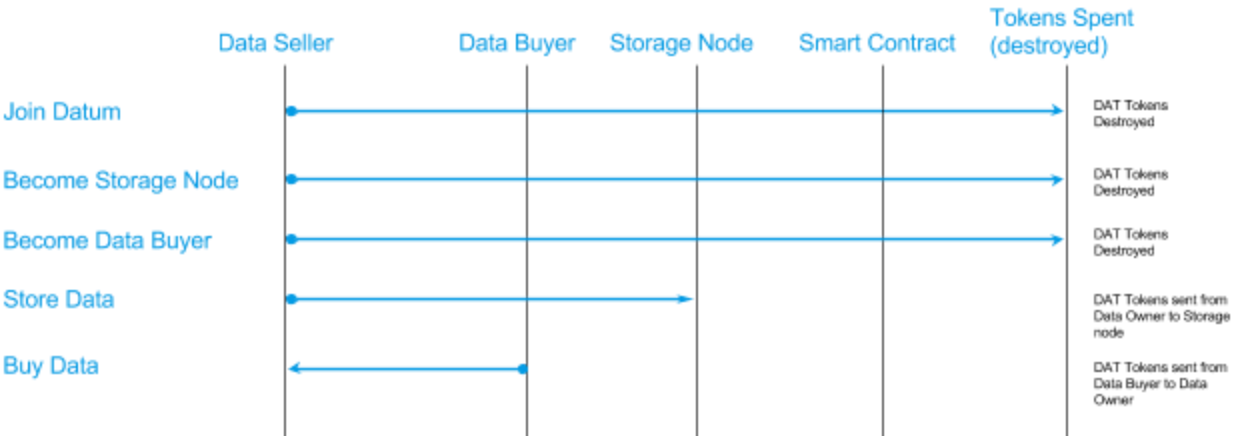
- Marketplace participation and activity drives spending (destruction) of tokens for privileged services

Storage Nodes are paid fees for storing and transmitting data.

An overview of the DAT Token role in various processes on the Datum Network

Process	Role	Feature
Join Datum Network	Participation Right	Become a user of the Datum Network
Become a Storage Node	Participation Right	Become a storage node on the Datum Network
Become a Data Buyer	Participation Right	Become a data buyer on the Datum Network
Store Data	Value Exchange	Pay DAT Tokens to store data
Buy Data	Value Exchange	Pay DAT Tokens to buy data

Overview of DAT Tokens flows in the Datum Network



Mechanics of the Token Economy described in this section are under review by our legal counsel and subject to change.

Storage Nodes

Storage nodes require 3 resources:

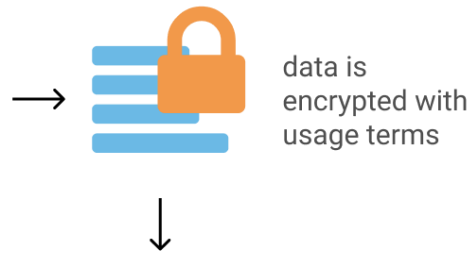
1. Compute Power
2. Storage Capacity
3. Bandwidth

Storage Nodes are economically incentivized by DAT Token rewards, paid out as a fixed percentage of each transaction and shared amongst storage nodes according to their contribution of resources.

Smart Contract

The Datum network smart contract governs the following aspects;

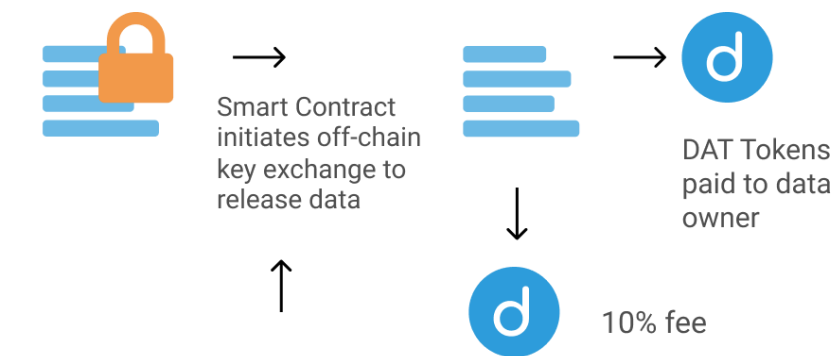
1 User submits data



2 Storage node miners save data



3 Buyer acquires data under terms



4 DAT token holder fee distribution

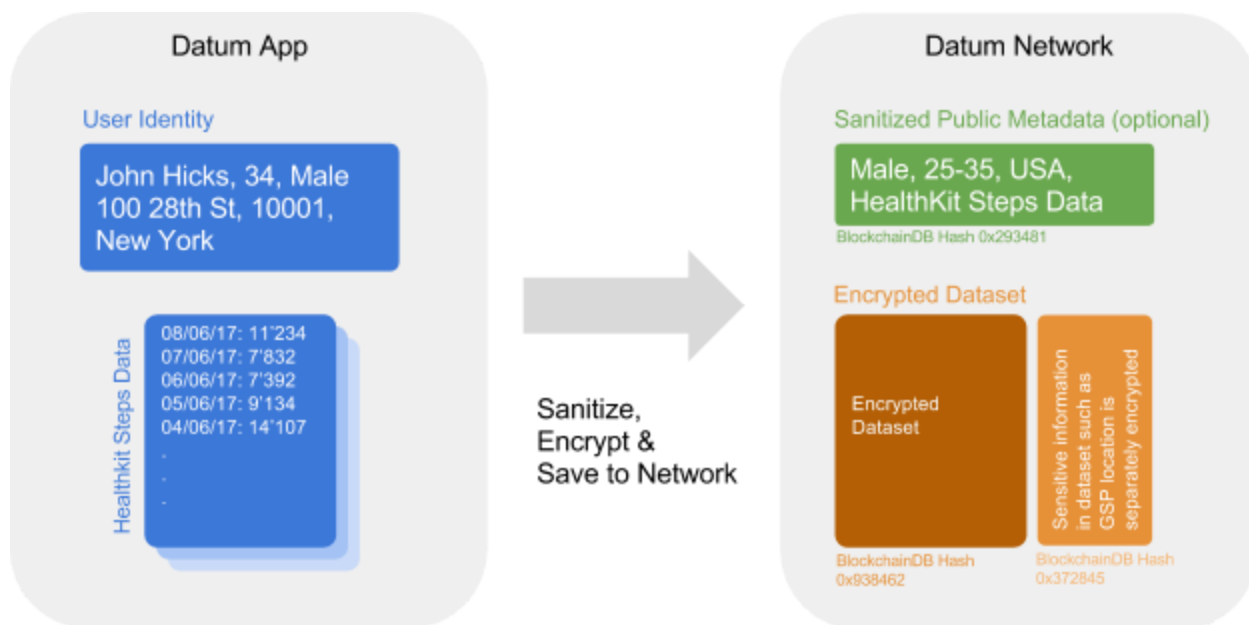
DAT Tokens are MiniMe enabled and as such allow for upgradeability.

Datum Artifact Structure

The Datum structure is as follows

1. **Owner**
 - a. Can have no owner, one owner or several owners
 - b. Can be encrypted
 - c. Can be public
2. **Metadata**
 - a. Can be encrypted
 - b. Can be public
3. **Time Stamp**
 - a. Can be encrypted
 - b. Can be public
4. **Data Payload**
 - a. Any arbitrary JSON structure

Data Network data storage structure example:



Data Retention

Storing data costs money. As such, Storage Nodes are incentivized to store data, and the following section provides answers on questions around retention, e.g. how long is data stored?

Datum proposes the following mechanisms;

Data is stored as long as storage is paid for, by either:

- Data Source
- Data Consumer

Different levels of availability and retention:

- **Backup Safety:** How many copies of the data exist in the Datum network
- **Latency:** Where do copies exist
- **Retention:** How long are copies retained

Project Roadmap

The Datum team has one focus: Creating a viable data marketplace to start returning value to token holders in the shortest time possible.

September 2016

Concept Development

Founders start exploring large scale data storage for IOT devices in the medical and smart home sector and devise first prototypes of structuring *unstructured* data.

June 2017

White Paper & Concept Validation

With the release of the white paper and the resulting community feedback we have fine tuned the concept and laid out the roadmap for the Datum Network.

11th August 2017

Pre-Sale & Alpha Version

The Presale for the DAT Token starts, DAT allows users to participate in the new data economy.

October 2017

Datum Token Sale

The Datum Token Sale is planned to launch from 29th October till 29th November or until the hard cap is reached. Datum will also release an early alpha release of the Datum app before the launch of token sale.

Meanwhile development of the Datum test network continues.

December 2017

Test Network Launch

The launch of the Datum test network marks the beta release and will allow basic functionalities to be explored by developers and the community.

March 2018

Release Candidate

The feature complete release candidate will be deployed to the test network and undergo intensive testing and bug fixing over the next three months.

June 2018

Datum Launch

The launch of the Datum Main Network marks the start of the new data economy. At this point the Datum Network will consist

of the decentralized Storage Layer, the Datum App, Open API's to submit and consume data and a full fledged trading system.

DAT - The Datum Network Token

The DAT token facilitates transactions in the Datum network, providing value to the data on the network.

The DAT token sale will enable full development of the Datum network and provide an efficient, transparent and secure smart contract token to facilitate exchange of data on the network.

DAT Token Crowdsale

Role of Token	Enable trade of data between data owners and buyers
Symbol	DAT
Supply	3,000,000,000
For Sale	1,530,000,000
Emission Rate	No new tokens will be created
Price	10'000 DAT per 1 ETH
Sale Period	29/10/2017 13:00 UTC to 29/11/2017 13:00 UTC
Accepted Currencies	ETH
Token distribution date	4th December to 11th December 2017
Minimum goal	5000 ETH
Maximum goal	153000 ETH

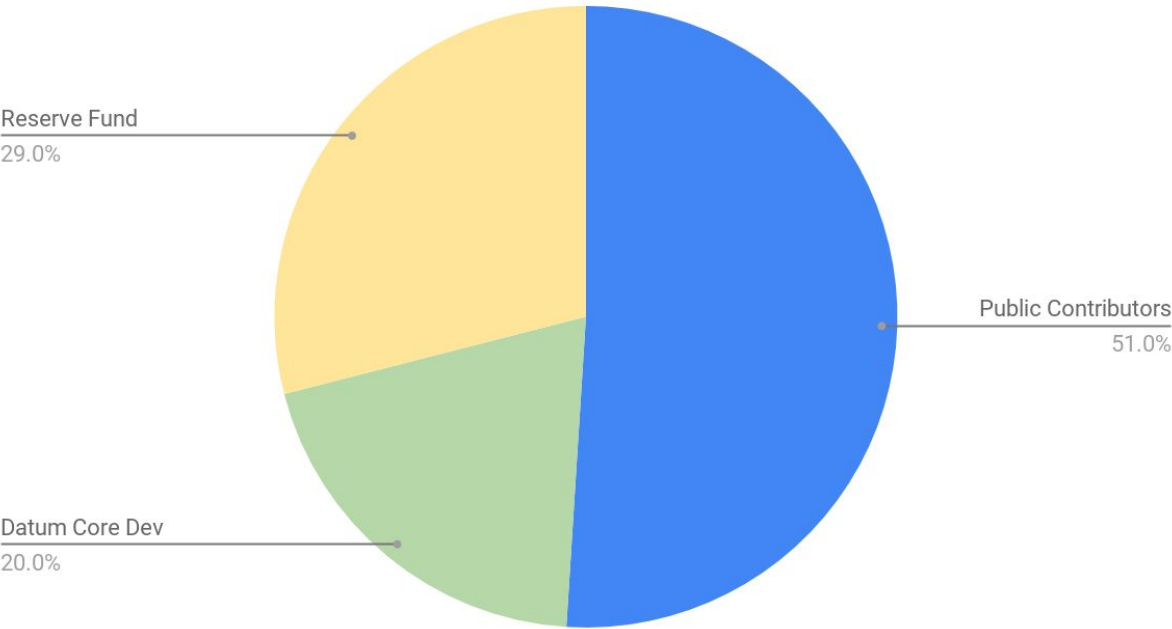
DAT Allocation Overview

51% of all minted DAT tokens will be offered for purchase by the public under the ticker symbol DAT. The crowdsale will take place on 29th October 2017 at 1 PM UTC (GMT+0) and stay open for 31 days or until the hard cap of 153000 ETH is reached. 75000000 (75 million) DAT Tokens will be offered to selected investors and the public as part of a Presale starting from 11th August 2017, this represents ~4.9% of the tokens for sale .

29% of minted DAT tokens will be held in a reserve by the Datum Network GmbH for community initiatives, user growth, business development, academic research, and future market expansion.

20% of raised DAT Tokens will be allocated to DAT core developers, founders and advisors over a two year vesting period as incentive to ensure long term alignments of interest and commitments towards the future value of the tokens.

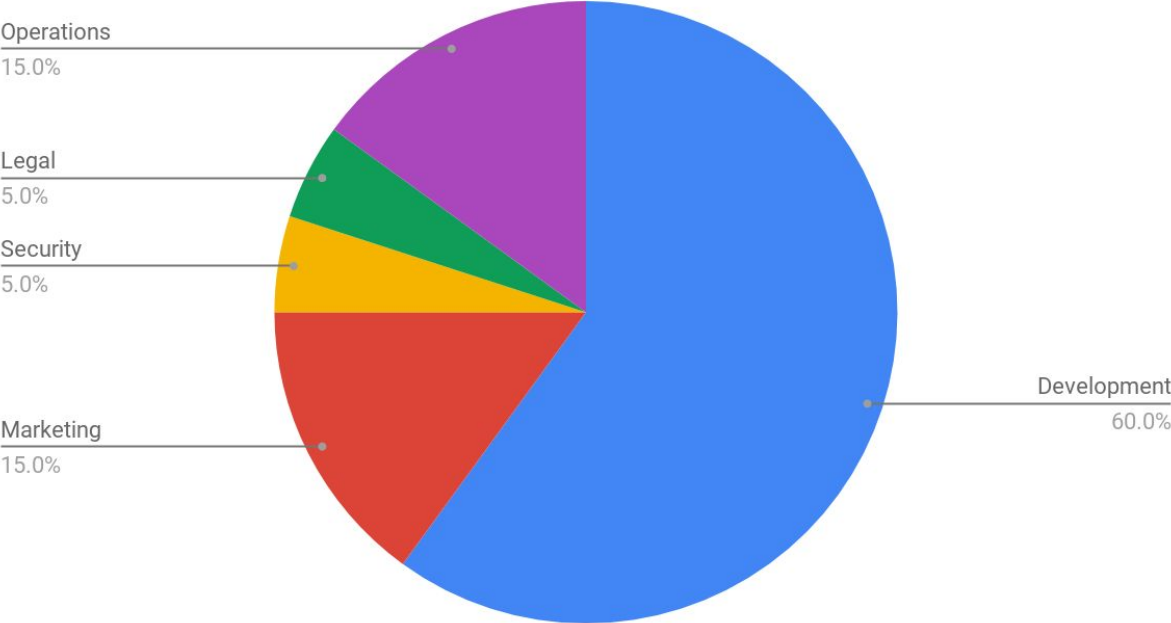
DAT Allocation Summary



Datum Budget

Funds raised will be allocated as follows. To mitigate volatile cryptocurrency markets and to provide Datum Network GmbH with a runway of 24+ months, up to 40% of raised funds will be hedged in USD/EUR/BTC. A budget is outlined below assuming a scenario where the first ceiling of 5000 ETH equivalent has been reached.

Allocation of funds



Datum Foundation Governance

Initially the Datum network governance is handled by the Datum Network GmbH, a limited liability entity incorporated in Switzerland.

Longer Term we plan to migrate governance to a DAO empowering users and stakeholders with direct influence and control over the network and its development by transferring network governance to a Non-Profit Foundation registered and supervised by authorities in Switzerland.

User Growth

Datum allows anyone to monetize their data on their terms. We plan to leverage this in our user growth strategy. By rewarding users from the very beginning for submitting data we expect to be able to drive accelerated growth. A referral program will provide additional incentives to existing users to spread adoption.

Conclusion

Datum will initiate a change in how people think about data. By empowering data creators with a secure way to store and exchange their data, and a vibrant marketplace to monetize this data, a new economic model will be created that empowers consumers instead of large private companies.

The DAT token will facilitate compensation of data sources and storage nodes and enable a new era of secure and decentralized data storage and exchange.

Team

Our diverse core team has over 80 years experience building data systems and successful products. We are based in Switzerland, Singapore and Hong Kong and combine the best of these worlds: Swiss Quality with Singaporean Efficiency and Hong Kong's Dynamism.



Roger Haenni
Co-Founder, CEO

Tech Wizard & Serial Entrepreneur, 17 years experience in big data systems. Co-Founder of StockX, SwissInvest, PCP.ch and Kosi.



Gebhard Scherrer
Co-Founder, Operations

Product and Service Specialist, 20 years experience in operations and sales. Co-Founder of Gelid Thermal Solutions and Arctic Cooling.



VC Tran
Co-Founder, Marketing

Brand and Marketing Expert, 10 years marketing experience taking Gelid from launch to one of the leading CPU Cooler & Fan brands.



Theo Valich
Head of Growth

Entrepreneur & Analyst, 21 years experience in technology, from GPU to supercomputer design. Co-Founder of Space Image Network, Robotic Systems and VR World.



Florian Honegger
Smart Contract Expert

15 years experience as enterprise document and data management architect in automotive, defense and micromechanic sectors.



Vitaly Krinitzin
Community Manager

Dreams and bleeds technology, years of experience as community liaison and online marketer building engaged audiences in Russia and abroad.



Tevon Strand Brown
Blockchain Engineer

Stanford University '19, B.S. Computer Science with a focus on Artificial Intelligence. Blockchain and financial marketplace



Luis Fernando Varela
Blockchain Engineer

Stanford University '19, B.S. Computer Science with a focus on Artificial Intelligence. Software Engineer with a strong interest in blockchain and financial technologies.

Advisory Board



Daniel Saito

Co-Founder of RIMNET K.K., MySQL K.K., RedRobot K.K.

Managing Director for MySQL in Asia. Co-Founder of MariaDB (formally known as SkySQL), Daniel is a seasoned Marketing and Sales Executive with decades of big data experience and blockchain / crypto.

Further team members and the advisory board will be disclosed soon.

Acknowledgements

We would like to express our thanks and gratitudes to the numerous people who have supported us in defining the Datum network vision and strategy.