



Narwhal

Abstract: The DeFi FounNATion is developing Narwhal, a blockchain specifically dedicated to decentralized financial applications. By focusing on the functionality of the blockchain and dedicating it specifically to decentralized finance, Narwhal provides unparalleled high transaction throughput, reduced risk of errors, and intelligent feature development specifically for the fulfillment of financial services on the blockchain.

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This document does not constitute nor imply a prospectus of any sort. No wording contained herein should be construed as a solicitation for investment. Accordingly, this whitepaper does not pertain in any way to an offering of securities in any jurisdiction worldwide whatsoever. Rather, this whitepaper constitutes a technical description of the functionality of the Cake products and the development and distribution of Narwhal.

This Document is not a final technical specification

This document does not constitute nor imply a final technical specification of Narwhal. Information presented on this

whitepaper, technical or otherwise, is meant to outline the general idea of Narwhal, its design and its use-cases and is subject to change with or without notice. For the latest up-to-NATe technical specification, check out the upNATes and documentations on the official website <https://Narwhal.pro>.

Executive summary

The cryptocurrency industry is based on a simple premise: people should be fully in control of their finances. While it seems like a simple and obvious statement, the current systems are far from providing financial services that are truly under the control of the people who use them. The mission of Narwhal is to give people (and in the future, machines, and devices) seamless access to decentralized financial services.

For that purpose, we are introducing Narwhal, a dedicated blockchain specifically for decentralized finance (DeFi) www.Narwhal.pro.

Narwhal Solution

Staying in the Ethereum Ecosystem

The cryptocurrency market as a whole is difficult to predict. Most of the coins have become valueless, and it remains to be seen how the system will sustain itself after cash runs out from many of the major ICOs.

Despite this, our outlook on Ethereum specifically is extremely optimistic. Over the last year, through market volatility, including instability in traditional financial markets, Ethereum has retained its value, demonstrated its impermeability to attack and hackers, and gained increasing respect from traditional financial players.

Ethereum is increasingly being seen as a store of value, and it is perceived as the standard by which other cryptocurrencies are measured. While people's portfolios vary widely, Ethereum remains the standard currency that almost every crypto investor holds as a major part of their holdings. The tremendous community and ecosystem around Ethereum bode well for its long-term viability as a store of value.

For that reason, creating decentralized financial services around Ethereum represents a tremendous opportunity that has yet been untapped, partially because of the difficulty of creating smart contracts that work with the Ethereum network, and partially because of the fractalization of the development community to many side projects. We believe this tendency of the development community to jump on the newest developments has drawn attention away from the real story: Ethereum is here to stay.

Thus, we believe, building a DeFi Blockchain on top of Ethereum would bring the best out of both worlds: Ethereum's stability and immutability and DeFi-chain's scalability and functionality.

Benefits of Narwhal: Summary

- Development of a variety of financial operations & vehicles for cryptocurrency economy.*
- High throughput for all transactions*
- Safer, more secure blockchain specifically for decentralized finance..*
- Rapid development of dApps for decentralized finance.*

- Peace of mind that the blockchain is not used for any types of non-financial dApps, thus decisions of FounNATion and core developers are focused 100% on decentralized financial use-cases and nothing else.
- Rapid development of dApps with dedicated calls specifically for finance applications.
- Minimal attack surface of financial smart contracts developed on the platform.
- Reliable governance (off-chain and on-chain).
- Highly immutable – by periodic anchoring to Ethereum blockchain.

Initial dAppSets

- The initial function set includes:
- Decentralized lending
- Decentralized wrapping of tokens
- Decentralized pricing oracles
- Decentralized exchanges
- Transferable debts and receivables
- Decentralized non-collateralized debt
- Asset tokenization
- Distribution of dividends

This chapter provides an overview of each of these functions and the following chapter covers the technical details in how this is achieved.

Decentralized Lending

Decentralized lending allows individuals and groups to borrow and lend without the intervention of a bank. Through collateralized systems, decentralized lending on Ethereum reached over a quarter of a billion dollars in 2018.

All of these systems are based on Ethereum, meaning they are addressing only 15% of the market based on market capitalization. The DeFi platform will be addressing the entire 100% of the market by leading with Ethereum, but also including the entire market through wrapping and pooling as described below.

The major decentralized lending platforms (Compound, Dharma, dYdX, and Maker) provide lending at rates ranging from 0.5% through 6%. Because everything is managed through smart contracts, the overhead of banks is eliminated, and the platforms are able to provide much better rates than banks. As these types of decentralized lending services become

safer, it's likely the market will also see an increase in peer-to-peer lending opportunities through dedicated applications.

The power of decentralized lending lies in the market efficiencies available by eliminating the middlemen and administration involved in lending. Furthermore, with investors concerned about minimal or even negative interest rates, decentralized lending protects the investors from that potentiality, providing market rate interest while giving borrowers better rates than they can get in the existing financial markets. Given the magnitude of credit and the role it plays in the economy as a whole, decentralized lending offers the potential for many more initiatives to borrow money based on open markets and favorable conditions. Easier access to lending translates into a faster-growing economy.

Initial implementations of decentralized lending are fully collateralized, and because of the volatility of cryptocurrency, most platforms require double or more collateral on loans. This allows people to take loans based on cryptocurrency they hold. They can manage their cash flow problems without having to

sell their crypto holdings, and meanwhile get favorable conditions on the loan.

Decentralized Wrapping of Tokens

An important issue for DeFi is the ability to work with a variety of cryptoassets, directly, on-chain. While the transaction on the chain is done via the native \$NAR coin, Narwhal can use Ethereum, Ethereum, ERC-20, or any other cryptoasset through wrapping.

Wrapping allows the utilization of any digital asset such that the underlying asset is maintained, but it can transact on a different blockchain. Narwhal provides a decentralized wrapping mechanism which allows the owner of the cryptoasset to maintain pegging to the asset and utilize a trustless wrapping mechanism that does not rely on any third party as a guarantor of the wrapping or asset. The wrapped tokens can be easily exchanged for their original value on their respective blockchain.

Creating a wrapped token on Narwhal is a rewarded activity, such that there is incentive for cryptocurrency holders to create wrapped tokens on the DeFi network as a form of rewarded decentralized financial investment.

Wrapping is a key capability of DeFi due to the need for interoperability of different types of cryptocurrencies and assets. To NAtE, there are no interoperability standards between different currencies, and the only way to interoperate between currencies is by using wrapping or collateralization, which has to be provided by a third party. The entire point of decentralization is that people do not need to trust an authority, yet, today that is the main way that investors can interoperate between Ethereum and Ethereum without converting from one coin to the other. The Polkadot protocol provides a platform for the development of interoperable apps, but not specifically for DeFi. As a new protocol, it is yet to be seen how it will be leveraged.

Without wrapping, holders would need to convert their cryptoasset to the DeFi currency in order to use the services offered. Obviously, for most investors, that's unacceptable. The investor has put their money into Ethereum, or Ethereum, or whatever else, because that is the currency they want to hold. The main purpose of Narwhal is to enable financial transactions in any type of crypto asset, such that people can use the assets and coins they hold, as currency for investment in other types of financial vehicles.

The decentralized wrapping function is crucial in allowing people to hold any asset and perform investments in another currency. So, for example, someone holding Ethereum could make a loan to someone who wants to borrow ETH, or someone who wants to hedge against the cryptocurrency they have could do so using a wrapping function to use some of their assets to purchase options in other types of assets.

Decentralized Pricing Oracles

Narwhal will include pricing oracles to collect NATa from outside blockchains. Oracles are used to collect NATa such as pricing of other cryptoassets⁴. Oracles are an important way for blockchains to collect accurate information from both other blockchains and from non-crypto markets⁵.

Participating as an oracle allows earning of tokens based on the accuracy of the oracles. The built-in oracle function will allow smart contracts to determine the number of oracles, consensus percentage, and the parameters for rewarding oracles for the NATa they provide.

Oracles are eventually meant to be decentralized. However, Narwhal will be launched with a few appointed trusted pricing

oracles that periodically submit pricing NATa from trusted source onto Narwhal.

Decentralized Exchanges

The decentralized exchange function will allow atomic swap of cryptocurrencies in a peer-to-peer fashion⁶. The decentralized exchange function matches people for trading directly, without the need to buy and sell currency through an exchange. Using decentralized exchange reduces the risks associated with using exchanges, and ensures that the cryptoasset doesn't leave the custodianship of the token-holders. It also removes the risk of custodianship from the exchange itself, because the mechanism is peer-to-peer based on an agreed-upon price or on the market price at the time of the exchange.

While a number of decentralized exchanges are available on the market today⁷, Narwhal solution allows integration of atomic swap capabilities in third-party applications by creating a decentralized exchange as a service.

Transferable Debts and Receivables

Narwhal will offer a set of calls to work with transferable debts and receivables. In the centralized finance world, debts and accounts receivable can only be managed through financial institutions that handle loans. The lack of transparency of these transferable debts was one of the factors leading to the financial crisis of 2008.

For small and medium enterprises, this can be a particularly powerful tool. For example, Jane's widget factory supplies widgets to a large car manufacturer, but the car manufacturer pays for those widgets on a basis of invoice +60. Meanwhile, Jane has to pay for the materials to produce the widgets, and, of course, regular salaries to her workers on a monthly or weekly basis. The car manufacturer will pay the invoice, but not in time for Jane to pay all of her expenses. Without Defi, Jane needs to go to the bank and pay whatever interest rates they demand, because she has no alternatives. The transferable receivables function would allow anyone to offer Jane a loan based on the receivables. Since many people would be able to see that the car manufacturer is a low-risk customer, and that they will pay their invoices, anyone who wants can make an offer to Jane for a better rate than the bank, creating a competitive market for debts and receivables

based on the real risk and market assessment of that risk. Jane now can get a loan with great rates, and the lenders, likewise get excellent returns on their loans, despite the fact that they are loaning the money for only 30-60 days.

Blockchain adds transparency to the exchange of debts and loans based on receivables or other types of financial promises. Narwhal will include the capability for organizations to create smart contracts that allow straightforward investment in such assets, so that peer-to-peer loans can be made without the need for a financial institution to guarantee these types of financial assets.

Decentralized Non-Collateralized Debt

In the future, it will be possible to provide non-collateralized loans based on the reputation and other factors about borrowers. Through different forms of verifiable credentials, and records of an individual's borrowing and repayment history, non-collateralized systems can be developed. Many of the identity solutions being developed today are looking at anonymous and pseudonymous reputation-reporting systems, based on a Decentralized Identifier (DID) issued by the individual, and Verifiable Credentials (VC) issued by known

authorities who are reputable to provide information about the individual's credit history.

The appropriate reputation based systems and risk assessment systems will need to be built out. While this will take time, perhaps years, it is foreseeable that this kind of system could supplement or replace today's credit ratings scores.

Another potential application of this feature would be the ability to create non-collateralized decentralized stablecoins. The success of DAI and MakerDAO show the desirability of pegged stablecoins, yet the high level of collateralization is a deterrent to creating more such projects. It is feasible that through market mechanisms and staking, decentralized non-collateralized stablecoins can be created.

Asset Tokenization

Asset tokenization is the representation of an asset, such as real estate or company equity, in immutable tokens on the blockchain⁸. This particular area of decentralized finance has tremendous potential and is one of the most exciting areas of investment for holders of cryptocurrency⁹.

While several attempts have been made at asset tokenization in the blockchain space, most of them have pivoted and now provide services not directly related to asset tokenization (LAtoken, Etherparty). Tokeny and Tokenize-IT advertise themselves as tokenization platforms, but as of the writing of this paper, their processes are still fairly manual, and are heavily reliant on specific localities and regulatory requirements for those specific jurisdictions. Other blockchains, such as Tezos, have been mentioned as good platforms for asset tokenization, but, as with other multi-use blockchains, the Turing-complete set of commands will create complex smart contracts that are unnecessary when using Narwhal. Narwhal will provide a module specifically designed for asset tokenization, and will be particularly easy to use to tokenize assets such as company equity, real estate, and other valued holdings.

Recently (October 2019), the Lichtenstein Blockchain law created the legal basis upon which any asset can be tokenized and legally bound to tokens or “containers” that represent the right to the asset. The law is precise in its wording, describing how a container issued by a trusted party now can hold the legal rights to the disposal over the asset. Disposal over the

asset is distinct from ownership or rights to the asset, or even control as a specific concept. The careful wording of this law is a breakthrough for everyone in the world of asset tokenization, because it will now allow someone to go to a court of law with a token and expect to have legal legitimacy for assets that are tokenized (as long as the authority granting the token is recognized as a trusted authority to do so). It also opens up a space for Narwhal to apply for this trusted status, such that the Asset Tokenization capability described here can be offered as a decentralized, legal and authorized capability that people can trust, without having to depend on any centralized authority.

Examples of assets people can now tokenize using the blockchain:

- Securities, such as ETF investing, stocks and shares.
- Shares in privately held companies.
- Energy and income generating devices, such as wind turbines, solar farms, satellites.
- Ownership in food means of production (new forms of cooperative farms where non-farmers could own food supply instead of commodities traded on exchanges)

- Self-driving cars, vending machines, ATMs, pinball machines, and other types of revenue-generating self-regulating devices.
- DAOs (Distributed Autonomous Organizations).
- Small real estate investments (time shares, short-term rental apartments, etc.)
- Large real estate investments (airports, amusement parks, apartment complexes, business parks)

Distribution of Dividends

Any tokenized asset with return on investment can use the dividends distribution module to create smart contracts that pay out returns on the investment automatically. Using Narwhal will allow a leap in the functionality of dividends distribution. It will be possible to implement models similar to today, where payouts are performed on a weekly, monthly, or quarterly basis, or models where payouts are on a daily, hourly or even minute-by-minute basis.

Distribution of dividends would be relevant in any type of tokenized asset, as described above. For example, today, a municipal government might do a bond issue to invest in a wind turbine to supply electricity. The government would take

care of everything, and repay that bond according to the schedule. With distribution of dividends, the community could purchase the wind turbine directly, and distribute the dividends to the investors in the wind turbine. Instead of going through the administration required through the centralized authority (government), every citizen who wanted to could invest in that wind turbine, and dividends would be paid according to each person's contribution to that investment. Eliminating overhead and fair distribution of profits would be major benefits for the community owning the wind turbine. In this case, the wind turbine is a public good, but it could also simply be a private investment.

Any private investment could be run this way: a pinball machine, self-driving taxi, real estate investment, etc. Automatic distribution of dividends reduces the need for administration and overhead, as well as eliminating uncertainty about payouts and control by a centralized authority.

The need for joint dividend investing is becoming increasingly relevant with IoT. Devices are able to create tremendous value. A self-driving car will be able to provide taxi services. Vending

machines, sensors, satellites, etc., are all potentially revenue-generating devices that people can own together and share in the profit of together, yet until now the legal and financial complexity of doing so has been prohibitive. DeFi can simplify those processes.

Similarly, distribution of profits for a private company can be implemented. One of the first experiments in this area is a DAO (Distributed Autonomous Organization) called dOrg.

dOrg is a collection of programmers (as well as a sales/operations team) who co-own their software house.

Distribution of salaries is through a DAO that functions as a multi-sig, such that every 2 weeks, the whole organization submits their payment requests for work contracted, and the team votes to pass one another's salary requests. Inside dOrg, each person holds a "reputation" that represents the percentage of ownership each person has earned (they earn ownership according to the amount of work done since the inception of the company). But what will happen to the profit at the end of the year? Presumably, each individual will have to submit a request for their percentage of the profits, and everyone will have to vote on that, too, because the DAO does not allow for automated distribution of profits. Using Narwhal,

the team could easily implement a quarterly or annual function that would automatically distribute the profits of the company to each person, according to their holdings in the company. This scheme would work even for people who were active in the past, but are no longer active, so they aren't in the DAO any longer, but they still hold a percentage based on their past contributions. Other contributors might be an investor who puts money into the company, but does not participate.

The examples above seem logical and straightforward, but today are extremely time-consuming and complex. People who want to make an investment together in companies, real estate, or other income-deriving assets type of dividend distribution today is complex and requires a lot of manual calculations. Through the DeFi Distribution of Dividends functionality, it becomes not just simple, but automatic for companies to distribute dividends to equity owners.

Narwhal Design

Design Parameters

Looking at the business requirements from the chapter before, Narwhal needs to meet the following requirements:

- 1. Robust and secure: built on a proven and secure blockchain.*
- 2. Fast and scalable.*
- 3. Includes decentralized consensus mechanism.*
- 4. Provides extensible smart contract support, without a Turing-complete instruction set.*
- 5. As immutable as possible (Block anchoring enabled.) .*

Each of these design principles is described in detail below.

DeFi Building Blocks

To achieve our goals of enabling decentralized finance transactions on Narwhal, the following build blocks will be included as a base native components on Narwhal.

\$NAR

The NAR will be the integral unit of account in Narwhal ecosystem.

The DeFi FounNATion will be issuing the DeFi utility token, NAR, capped at 60,000,000 for throughout its lifetime.

There will only ever be 60 million DFIs created.

NAR is divisible up to 16 decimal places.

\$NAR coin Utility

- NAR is used for fee payment for all transactions and smart contracts on Narwhal.
 - Fee payment for decentralized exchange transactions
 - Fee payment for token transfers
- Fees payment for DeFi activities:
 - DEX fees
 - Lending loan interests payment
 - etc.

Fees from DeFi Activities

Fees from DeFi activities on Narwhal are burned and redistributed through new token minting over a period of time as laid out below. This ensures that DeFi stakers enjoy the benefits of earning rewards from facilitating trustless DeFi trades on Narwhal in a fair manner.

Marketing

Target Market

Unlike most other DeFi-focused initiatives, Narwhal being built on top of Ethereum can harness almost the entire crypto market without being limited to “smaller” chains like Ethereum etc. Thus, as of publication, the target market for Narwhal are over 60-80 million cryptocurrency owners and we can expect that hundreds of millions of other users will join in the future. This group of investors is investing and holding cryptocurrency due to the returns as well as their belief in the future of the industry. As investors, they have widely done well with the rise in many of the cryptoassets, however, they are

not able to use their holdings in order to get better returns. Providing DeFi services will allow these investors to hold the coins they believe in, and increase their holdings over time based on investments that go deeper than just currency trading.

Go-to-market Strategy

The initial Narwhal team is made up of some of the top names in the cryptocurrency industry, people who have made a name for themselves not just by delivering on their promises, but by creating a following. The team has built up a variety of marketing channels and has an established following on social media, wide distribution of books in the area of cryptocurrency, and deep contacts within the cryptocurrency industry.

With the experience of building up social media followings of hundreds of thousands of users in the course of just a few years, the team plans to leverage their current followers and bring them onto specific channels that will be the domain of Narwhal. The team will build up a complete marketing engine and staff, using the same proven competence they displayed in the past.

Unlike other blockchains, Narwhal will be balanced between marketing and technology expertise. Building the best network is only half of the job. NAR holders can rest assured that the marketing team has the proven experience in building up a marketing engine that is required for product success and that the tech team will be able to deliver on the roadmap.