The Friend Whitepaper

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Changelog:
2018-02-16 TGE dates changed (StartBlock and EndBlock), FNT token ticker changed to FRND token as FTN has been used several times already and we want a unique and Friendly token name, minimum contribution changed from 1.0 Eth to 0.1 Eth. Some minor corrections related to Value Added Tax etc.
2018-01-18 Minor corrections
2018-01-10 Updated use cases, team members, added more details around the TGE and final adjustments to the budgets in preparation of finalizing the smart contract.
2018-01-03 Revised the ICO budget size due to the appreciation and volatility of Ether. Updated status of the Token Generation Event vs. moving the ICO to take place in Norway. Updated information vs release of FriendUP V1.1
2017-12-10 small changes to reflect that we have decided to conduct the ICO from and in Norway
2017-11-21 some changes to wording here and there, some minor error corrections
2017-10-31 spooked out some minor errors
2017-10-27 Token Generating Event section added; some sections rewritten to match that

Introduction

The Friend Unifying Platform is a powerful open source framework that will allow developers to decouple their applications from technology silos. It will empower developers to swiftly deploy on and integrate with **Ethereum** and other decentralised technologies in a new blockchain based cloud infrastructure, the **Friend Network** - where participants share ownership over the infrastructure and get rewarded in tokens.

Friend can be described as one of the first Blockchain operating systems. It can be accessed online in a browser tab or installed natively on top of Linux, allowing users and developers to sign in with their Friend accounts online or on their notebooks offline.

The **Friend Network** enables **secure, global access to personal virtual Friend Cloud Computers** that simplify, augment and enhance the use of and access to the Ethereum blockchain for everyone that is connected to the internet. Through this cloud computer network, decentralised applications can be deployed and distributed in seconds.

Friend makes it easy to **connect to diverse technologies** and deploy them on the internet. It **reduces development overhead** by providing a functionality that covers user access, distribution, file management and much more.

Friend lets developers connect their applications to other apps running on the network to unleash functionality never seen before. Its technology enables creation of distributed systems that allow applications to share data and functionality - code, compute, and storage - dynamically and cooperatively among two, or many nodes to offer scale, efficiency, and truly best-of-breed features and capabilities across any work domains.

Friend version 1.1 has already been built to run on existing infrastructures. It is ready for anyone to try at https://friendup.cloud/demo.

We publish this whitepaper now to get feedback on the way we communicate and to check if our mission is understood as we intend it to be. Feel free to give feedback to any of the authors via email or post onto our developer forum or IRC channel #friendup on Freenode.

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Vision

This section describes our vision for the Friend platform. In the second section we give an overview of the current status of our development as well as our plans for the future.

Imagine a world where cloud infrastructure is as free as the internet itself. Imagine being able to distribute and deploy a cloud solution without having the obstacle of cost. Imagine not having to agree to a policy or license agreement to use cloud infrastructure. Imagine being able to retain your anonymity while publishing your software in the cloud. Being resistant to DDoS attacks. Having a rich toolset without having to download software, experiencing smooth, fluid, rapid operation, without requiring a powerful, high-spec computer or access device.

Imagine a network where people are fairly rewarded for sharing their resources – where ownership is distributed to the participators while the cost is kept low for users.

This is the **Friend Network** - decentralised virtual Friend Cloud Computers in a network based on blockchain technologies. Friend gives you a virtual cloud computer instance that allows you to widely deploy your applications and services in a node network, accessible to anyone with a web browser, from high performance desktop workstations, down to mobile phones that fit in your pocket - and everything in between.

Read more about our vision here.

Mission

Overview:

- The Friend Unifying Platform(FriendUP/Friend) has three years of prior development
- The next phase aims for decentralisation and stronger security
- Friend makes Ethereum more accessible and developer friendly
- Access Friend apps and functionality on any PC or smartphone, any time
- We allow rapid deployment on Friend's free and open cloud infrastructure
- Users can immediately access applications, resources and services
- FriendUP gives users and developers a decentralised computing grid
- Users get strong data ownership through encryption and blockchain technology

After having developed Friend as a server platform for commercial use for over three years, we are now following our intended plan for the next phase of development and turning it into a server node network using encryption, decentralisation and blockchain technology. This means that anyone will be able to access their Friend Cloud Computer securely, at any time. **It means that people's computing needs can be serviced independently from any specific hardware or software company.**

We believe the Ethereum blockchain will continue to evolve and become the de facto standard for global scalable blockchains. Current limitations are being worked on and the potential inherent in the Ethereum blockchain will continue to materialize with respect to improved computation capacity, lower cost of transactions and faster transaction execution.

We will build on top of and augment the Ethereum blockchain with an expansive cloud computing stack that is free and open to everyone, making it easy to deploy and reach users wherever they are. We aim to make the decentralized web accessible to everyone, and make it easier to integrate with for developers.

The steadily growing market for mobile applications has an expected volume of almost 340 billion USD[1] by 2021. The enterprise integration market has an expected volume of 387 billion USD[2] by 2021. With Friend, we help these markets flow into the new world of Blockchain technologies in a big way, allowing developers to reach a wide and growing audience without having to rely on centralised infrastructure to participate.

Friend is open source and has been released on Github. It is available under a mixed license scheme where the server - Friend Core - uses the MIT license, while the libraries and modules are using LGPLv3. The user interface and web components are licensed under the AGPLv3 license.

Rapid application development

Developers need to create applications that are device agnostic to maximise the number of users they can reach. As an equivalent to .NET for the decentralised web, Friend will accelerate the process of making the decentralised web available to everyone everywhere.

Our framework will allow developers to quickly develop applications that take advantage of decentralised technologies, Ethereum and other blockchains. By creating easy to understand APIs and cross integration structures, the power of web 3.0 will be easier to wield and we will see rapid adoption in the form of a large number of great new end-user applications and solutions.

Our decentralised Ethereum connected node network will respond to standardized RESTful APIs for all core functionality of the platform. This allows developers to have predictable results when moving their application from a local test network to the global Friend Network.

Collaborative testing across geographical boundaries is important in decentralised teams. Friend will make it easier to debug, test and collaborate on software projects online – removing the need for expensive infrastructure and agreeing to prohibitive license agreements. We will offer a multi-user enabled Integrated Development Environment for developers so that they can form entire development teams in the Friend Network.

1 https://www.appannie.com/en/insights/market-data/trillion-dollar-app-economy-only-beginning/

2 http://www.marketsandmarkets.com/Market-Reports/system-integration-market-1304.html

To maximise the usefulness of our platform, we will integrate with the best suppliers of various different decentralised technologies such as e-wallets, identification- and computing power providers as well as decentralised storage solutions.

Simple global deployment

The Friend Network consists of decentralised kernel nodes, or Friend Cores. Application requests are processed by these Cores in a grid. This means that applications can be run on the node network, allowing users from all over the world to enjoy fast response times on servers close to them.

Private information is encrypted both in transit and at rest, ensuring security and retainment of digital property for users.

When you deploy to the Friend Network, your application will immediately be made available across the world using decentralised technologies to transport your files and business logic. By utilising the Friend Store, developers can monetise without needing a middleman (see description below).

```
1. Home:> cd myProject/
1. Home:myProject/> deploy

Are you sure you want to deploy your app? [yes|no] [yes]
Validating project [done]
Generating package...
   b2ab5251d02656b5103c03e0fed63d6a3cfd2180560f8383b55644c7cfa1d73d (myProject) [done]
Connecting to master node... [done]
Uploading your app for distribution 0% [------------>              ] 100%
```

Once an application has been deployed, access can be distributed using a web link.

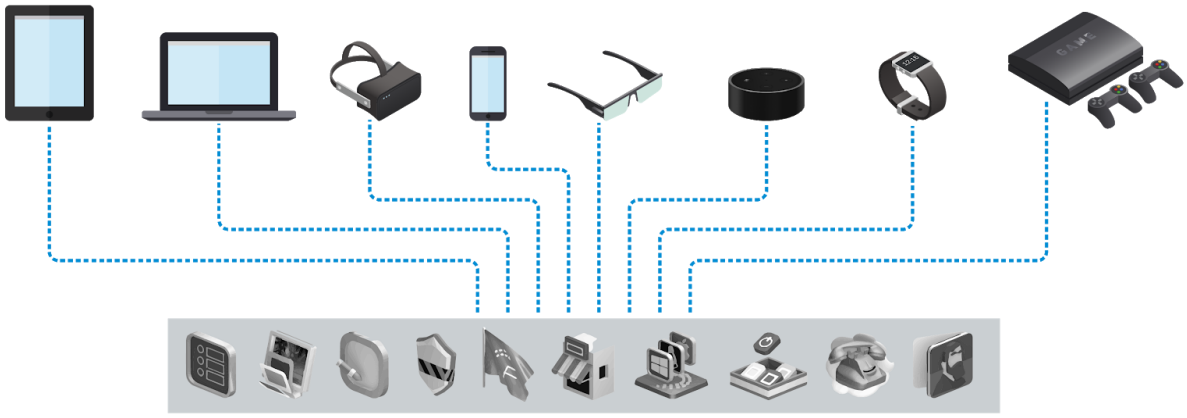
```
Upload complete. Please access your app using the following link:
   https://friendsky.cloud/b2ab5251d02656b5103c03e0fed63d6a3cfd2180560f8383b55644c7cfa1d73d/
```

Read more about simple global deployment on our website.

The virtual Friend Cloud Computer

Friend is built to allow for the easy creation of virtual Friend Cloud Computers. These can contain both application and storage setups, themes and workgroup memberships. These virtual Friend Cloud Computers will be accessible from any web enabled device.

Friend aims to fully support mobile, notebook/PC, TV, VR and audio user interface formats. This way it can be used on everything from smartphones to emerging voice services like Siri and Alexa.



Data ownership and security

Friend provides flexible options to store data in the cloud. We give users and developers **freedom to choose the storage provider** that they prefer. We have developed a standardised way to integrate any storage solution and make it accessible to the users in a coherent and cross compatible way. Users can connect to services like Google Drive, Dropbox, Storj, IPFS or IPDB, in addition to the built-in storage that resides on a Friend node.
Friend uses client side encryption for authentication and offers the possibility to encrypt data at rest using our file system drivers. JavaScript applications are executed in secure sandboxes that have limited access to various functionality (using per-application permissions). This allows for safe interactions between multiple applications running on a single device.

All communication between clients and servers is secured using industry standard SSL/TLS encryption.

The Friend technology has already passed initial penetration testing by an external third party[3]. We have established a partnership with them to ensure a continued high level of security when it comes to user accounts, ownership, stored data, apps and services. We will stay vigilant and actively engaged with security communities to help ensure that our platform maintains a security-first posture that resists attacks and intrusions.

3 RedScan - https://www.redscan.com/.

The Friend Unifying Platform today

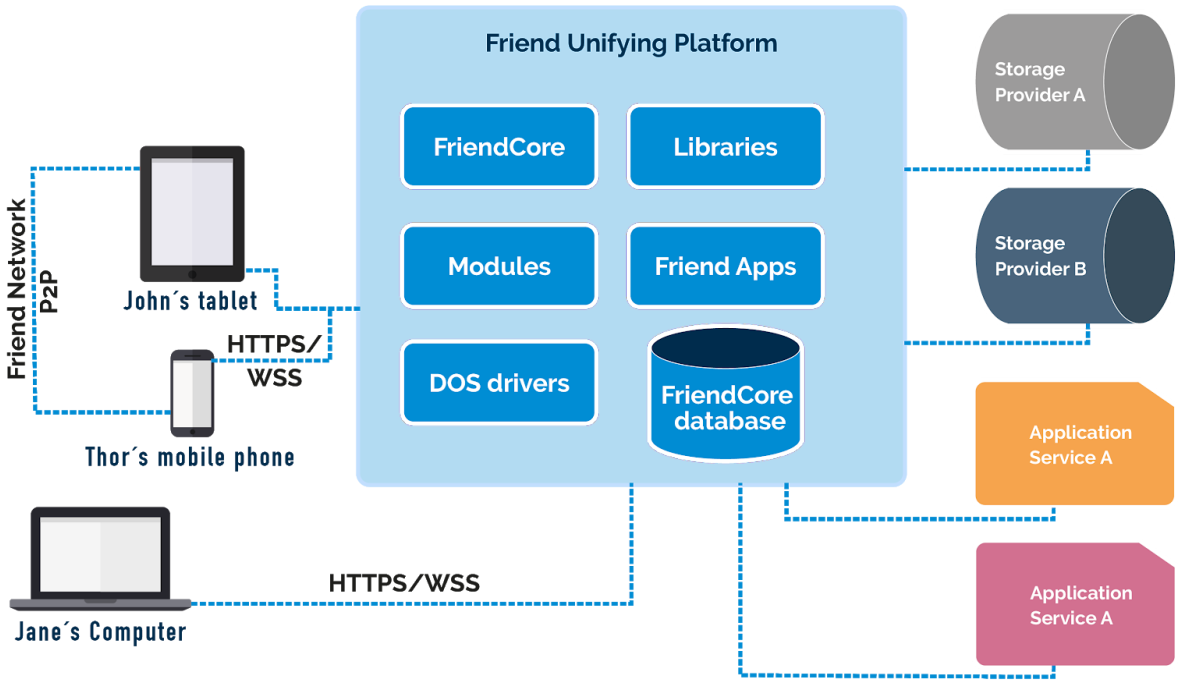
Overview:

- Friend is already a versatile open source platform for application development and deployment
- Developers can build rich, distributed multi-platform applications
- Friend allows for zero deployment cost on existing infrastructure
- Friend Network offers a peer-to-peer and server-to-server network
- Friend Workspace is a fully fledged, responsive HTML5 based desktop environment, proving the versatility of our framework
- We have built several core applications on top of the Friend Workspace that help you design and use your cloud infrastructure
- Our existing components have been heavily tested by users

The Friend platform has been in development since February, 2014. It is currently at version 1.1, having been released as open source software on GitHub. It is still in its infancy, but has reached an advanced stage of development and is operationally ready to use.

The platform supports a wide range of cloud technologies and integrates them in one easy to use framework, simplifying how developers deploy and distribute applications to users.

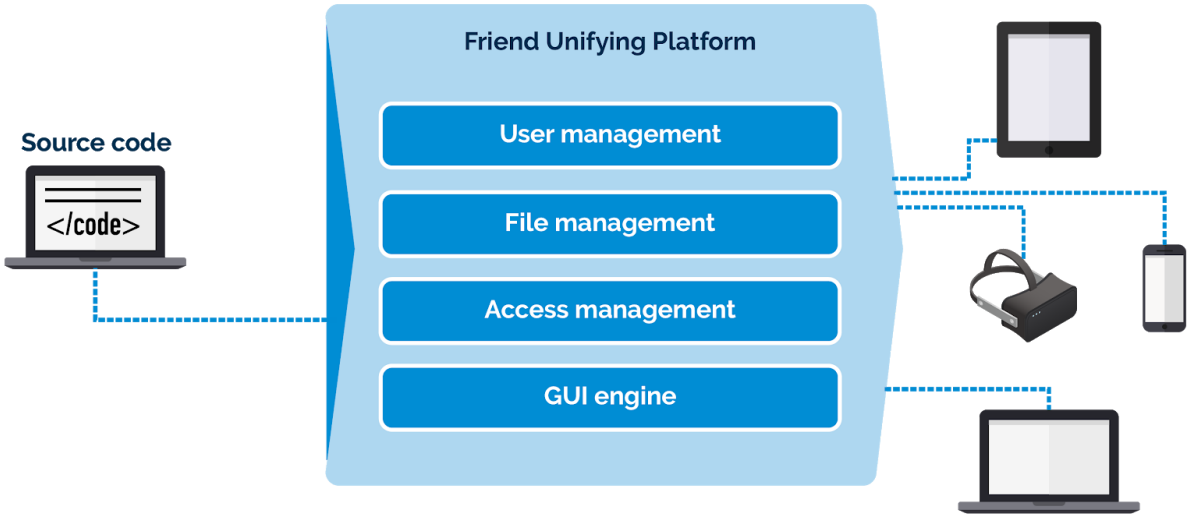
The platform is heavily influenced by the Cambridge Distributed Computing System, which was developed in the early 80s as a distributed operating system at Cambridge University. This system was an early re-think of Unix with several innovations on user interface and resource management. More on this in our tech paper.



The Friend platform connects the user from any device using HTTPS or secure Websockets and provides simple and unified access to any application or storage service the user might need. Everything may be accessed through the same simple device adaptive user interface.

Empowering developers

Friend already allows developers to **create applications that are accessible on any device** capable of running a browser. This includes smartphones, tablets, VR systems, points of information/kiosks, PCs and TVs. The software can also be accessed using customized apps for both mobile and desktop operating systems.



Friend lets developers write code once and deploy it easily to all web enabled devices.
The platform provides a range of functionality and tools to simplify application development.

More information on how Friend empowers developers can be found on our website.

Zero deployment cost

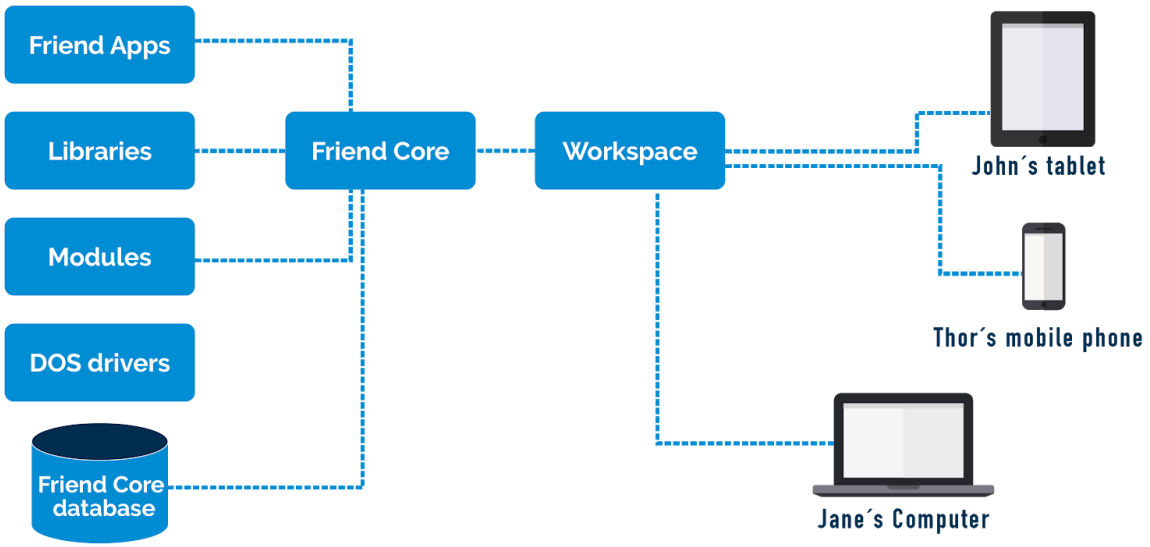
Friend gives users access to a virtual cloud computer that is ready for use immediately upon logging in. It is a multitasking environment where organisations can create custom configurations for their different user groups and **make onboarding fast and hassle-free**. All aspects of the virtual Friend Cloud Computer can be modified: default applications, themes (Windows, iOS, Friend, Linux, other), and storage access control (both user- and group specific as well as personal and shared drives). Different sets of settings and links to resources can be stored as configuration or provisioning Templates. This way, your users will be able to focus on their tasks instead of losing time on setting up their personal accounts.

More information on how Friend reduces operational cost and increases security can be found on our website.

Main components of the Friend Unifying Platform today

Friend offers a framework that consists of these components:

- Friend Core - our *serving kernel*
- App distribution framework
- Libraries - runtime linked - written in C
- Modules - using piped processes - written in languages like PHP, Node.js and Python
- File system drivers
- Application APIs and command serving
- Friend Network for connecting systems and apps together
- Workspace - a rich desktop environment and user interface in HTML5
- Core applications - allowing system management for a user or administrator



Friend Core

Friend Core is the server component in the Friend operating environment. It manages the server side of the Friend Network and handles encrypted connections between servers and clients. It manages user sessions and resources that are available on the server and simplifies client interactions using a standard command set. Friend Core,

being primarily written in C, is very lightweight and fast. This gives us speed and flexibility and enables it to handle requests on a 5G network with < 2ms response time.

Read more about Friend Core on our website.

Libraries

The aim is to make Friend Core completely modular over time. At present, some of its core functionality is implemented as runtime linked libraries. The idea is to allow for the **exchanging of pluggable libraries** while Friend Core is running. This provides advantages when sandboxing and handling decentralised data flows.

Initially several libraries are built to allow Friend Core to pool certain component functionalities - like accessing a database. Libraries are built for speed. Thus, time critical function calls that are frequently used on a Friend node are programmed as a library.

Modules

Developers can easily connect their applications to Friend Core through modules. In doing so, they are able to **securely exchange data between the server and the client**.

Friend modules allow developers to build server side components in multiple languages, like PHP, Node.js, Python and others.

Application APIs and command serving

Every application running on a Friend system has the ability to serve as a Friend Network host with a couple of simple commands. The host is immediately visible to the entire network. Hosts can be open, or protected against attacks by using encrypted passwords. Any client can get a list of the available hosts and connect to them if permitted in a matter of seconds.

File system drivers

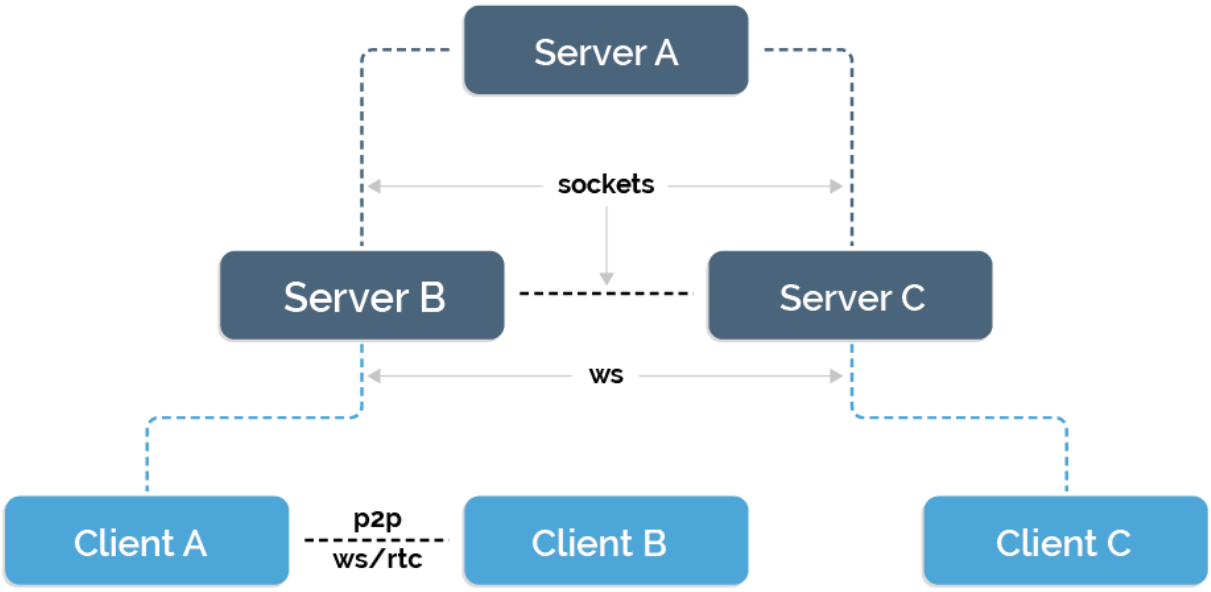
The Friend system architecture uses the concept of file system drivers to abstract file systems or APIs as mount points inside Friend. This allows a user to connect to any structured or unstructured storage engine and make it available in a coherent interface

– as a disk. These disks may have their files cached and shared online to users that are outside of the Friend ecosystem.

Read more on our file system drivers on our website.

Friend Network

Today, the Friend Network allows applications to exchange data between two or more users, connecting systems and apps together. The data can either flow through the server or use a peer-to-peer connection between the client computers. We use coturn as a TURN server that acts as a network catalog.



Everyone in the Friend Network can be a peer.

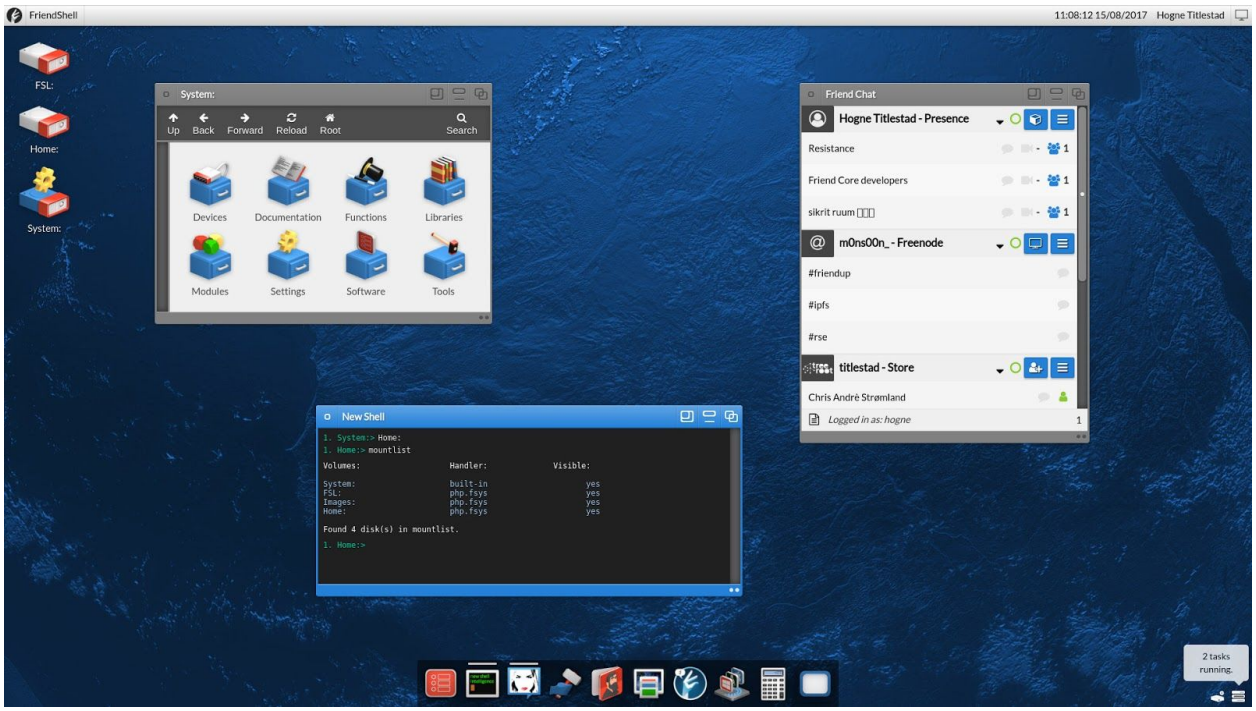
Friend Workspace

The Friend app framework is powerful – and it has allowed us to build an entire desktop environment with all the bells and whistles that you'd expect from a standard desktop operating system. It is a great benchmark of what is possible for developers with applications in mind.

The Friend Workspace is a responsive desktop environment that allows for **multitasking in one tab** and runs in any modern standards-compliant web browser. It allows full access to the Friend Cloud Computer on any device.

Even though Friend applications are distributed separately, the Friend Workspace offers a useful capability to **run multiple applications and services using a single sign-on in an integrated environment**. It can serve as a powerful distribution solution, featuring a compelling collaborative environment for work groups and teams. At the same time it allows administrators to design and maintain their cloud infrastructure with GUI tools.

The Friend Workspace showcases all of the features found in Friend Core, and makes heavy use of its various supported protocols, allowing users to experience a complete workflow online, wherever they are, whenever they want.



One of the themes for the Friend Workspace.

Read more about the Friend Workspace on our website.

Core applications

We have created a selection of smaller applications that enable users to adapt the system to fit their needs. These applications may also be considered as demonstrations of the many possibilities found in the platform.

You can find a complete list over our core apps on our website.

Business model

Overview:

- Friend Store is the marketplace for products and services
- Friend Network and Friend Store will facilitate a market for cloud computer templates to be traded
- Service companies and organizations can integrate with the Friend Network and participate in the market
- Support services from Friend and other providers
- A multifunctional token applied to on the Friend Network
- Users can earn tokens by sharing resources and run Friend Core servers

Anyone can gain access to Friend Cloud Computers in seconds. Users can utilize the Friend Network to run applications, access services and use data resources. The Friend Store is where you can augment the resources available in your baseline Friend Cloud Computer with additional free or commercial apps, expanded storage and compute capabilities (e.g. extra disk space, cloud processing services, etc.).

Friend will help developers and organisations with the creation of Friend Templates and will make available tools and services lowering the entry-barrier for others wanting to develop their own Templates.

Integration is key, and various servers and data sources will be connected to the Friend Network using our community of experts. As awareness grows, proficient users will create their own templates, e.g. for own use, in a company, in an organization or other group. The owner of the template may sell the use of it in the Friend Store or distribute it for free in the Friend Network at large.

Friend will become a desired route to the cloud for many companies, organisations and individuals. The Friend Network will be one of the most accessible deployment targets, and Friend Software Corporation (FSC) will assist in getting solutions integrated with the Friend technologies as one of the first commercial players offering services to get things started.

As we grow, we will focus more on third line support for service providers and partners and make sure that commercial adoption by organizations and companies is accelerated with the aid of capable and versatile third parties.

In the Friend Store, users can utilize products and services using a token. All vendors and service providers, blockchain based as well as fiat-based, can offer their products and services to all users (b2b and b2c) for use on and within the Friend Network. Particular terms will apply for consumers according to the applicable regulations on consumer protection.

If Value Added Tax (VAT) obligations or other indirect taxes will apply as a result of trade of products/services provided by Friend or by third parties, we reserve the right to adjust the product/service price by adding a VAT/ indirect tax as applicable for each respective country (e.g. 25% for Norway and as applicable in other jurisdictions) which are sold from the time the VAT / indirect tax obligations comes into place. We will spend time and resources with experts to structure the Friend Store legal structure optimally to ensure transactions flow as efficient as possible.

Competitive landscape

Friend is a leading edge technology project that works in a new paradigm. There have been several attempts at creating cloud computers or web based operating environments before. In some of the areas we intend to operate, the most obvious competitor could be seen as Chrome OS and derivatives, especially with Chrome Enterprise. However, with the add-ons in the field of decentralisation described below in this document, Friend will be able to offer a unique and independent open source offering which will be hard to match by any provider.

Friend has already been delivered in some commercial products and services into verticals in the fiat realm based on our current technology. Key advantages we play on are integration, customisation and deployment.

There are many service providers in the Software-as-a-Service (**SaaS**), Desktop-as-a-Service (**DaaS**) as well as the Platform-as-a-Service (**PaaS**) space which could be considered as competitors. However, the common denominator of most of these providers is that they focus on access to Windows applications or proprietary cloud storage. If they integrate web apps into their solution, they tend to focus on a

single stack with no access to competing technologies. This market is dominated by large companies like Amazon, Google and Microsoft that use **vendor lock-in** to ensure future revenues. None of them offer a truly decentralised infrastructure that is owned by their users.

With the flexibility of the Friend Cloud Computer, our internal analysis of potential competitors has found a definitive positive gain over existing solutions. With the clear freedom of choice, Friend offers a distinct opportunity for highly customisable solutions that is rarely found in other cloud technologies.

We believe that users and organisations want to be able to choose freely among both application, service and storage providers, and have legacy Windows software and productivity suites working seamlessly beside multiple cloud-served modern web apps. We have created our platform from the ground up to be open and to enable **access to everything - across supplier boundaries.**

Our plans for the future

Overview:

- Friend will become the simple and unified on-ramp to decentralised applications, functionality and storage
- Friend Network will be the global decentralised protocol for our cloud computers
- Friend Cloud Computer templates will allow distribution in organisations
- Friend Store will be a marketplace for templates, applications, data and knowledge
- Our Initial Contribution Offering will enable us to realise our vision

This chapter will mention some core components of our roadmap explaining how we will add to the existing infrastructure and realize our Vision. On our website, you can find more in-depth information about the extensive work planned for the short to medium term period.

Unified access to a decentralised world

As originally intended in 2014, we will use the platform in its current form as a foundation and re-engineer some components for the purpose of realizing our full vision.

All the components that store data on a central server will be replaced with technologies that make use of the decentralised cloud, such as IPFS, Filecoin, Golem, Fluence, Sonm, IEXEC, Storj and BigchainDB, to mention a few. This way, each web address or **access node** becomes an entry point through which you can access your virtual Friend Cloud Computer and solutions. We will closely and continuously monitor ongoing developments and be opportunistic when considering evolving technologies that can complement our offering.

Our goal is to enable developers to deploy applications to a global audience by making the best technologies and services easily available. It will give developers the freedom

to choose which components to use whilst being able to change components at a later stage. Friend will combine existing web technology with the new emerging world of Blockchain to help developers build and deploy applications that use functionality across the technology stacks - both the established web application solutions as well as new and exciting decentralised and/or Blockchain based technologies.

Friend will also become an increasingly capable gateway between the fiat realm and Blockchain based technologies - helping accelerate the transition to a more decentralised and Blockchain based infrastructure.

Friend Network v2

The Friend Network will be extended to enable organisations to easily deploy applications, data and services on a decentralised cloud infrastructure. Most of the heavy lifting will be done by adapting our Friend Core to allow for different primary storage media and authentication mechanisms.

We will continue to develop all aspects of Friend to make it the platform of choice for modern application distribution and access, and we will strive to make it highly secure by continuously working with security specialists from all over the world to harden its resistance to attacks. Friend Network and the Friend Store will be the cornerstones of our efforts.

Our system architecture allows users and organisations to set up their own Friend Networks as they see fit. In normal operation, the Friend Network will use simple geolocation mechanisms to find nodes close to the user. This allows applications to access free infrastructure with low latency command execution.

By making use of the Golem Network, users will be able to select “high performance” networks where they can access server processing power for various CPU intensive tasks.

Read more about the Golem Network here.

Virtual Friend Cloud Computer Templates

Friend Templates aggregate choices in functionality (supplied software), resource configurations (compute, storage, and network provision), and design (capabilities and access to departmental or enterprise assets, databases, etc) so that Friend Cloud Computers can be rapidly rolled out for various different purposes. This will allow organisations to **easily distribute template based cloud solutions** to heterogeneous user groups with minimal effort. We see huge benefits for educational institutions as well as for other distributed entities like NGOs, special interest or research groups.

We believe that these Friend Templates will play a substantial role in energizing and populating the Friend Store, making it easy for developers and others to tailor environments that are optimal for certain groups of users.

Read more about Friend Templates here.

Friend Workspace v2

As we develop the Friend Network, we will offer an advanced Workspace that allows users and developers to tune and manage the cloud resources used in their environment – an easy to use control panel for administrators. For users, it offers a simple single sign-on where applications and services may be used inside a browser sandbox.

Over time, this Workspace will represent a significant deployment channel in its own right, allowing users to access multitasking cloud applications on any device.

Read more about the Friend Workspace here.

Friend Store

Friend Store will be the global marketplace in the Friend Network. We will allow developers, service providers and vendors to easily publish their applications and services directly to the Friend Store, and additional mechanisms will allow for flexible monetisation models. All transactions in the Friend Store will be executed using a token.

To promote high quality apps in the store front, we will establish a group of official reviewers that validate, test and rate apps based on an open checklist with objective criteria. The official review and testing group will provide, for a service fee, rigorous app testing and evaluation in the areas of security and performance. These apps will be displayed with a badge representing their final rating.

Friend Store will also provide support for customer community usability and satisfaction ratings and reviews, though these may be moderated for region, language, and appropriateness. It is our clear aim to be as neutral as possible in this, and we will solicit developer and user community input as to how such ratings and reviews should be carried out in an objective and fair manner.

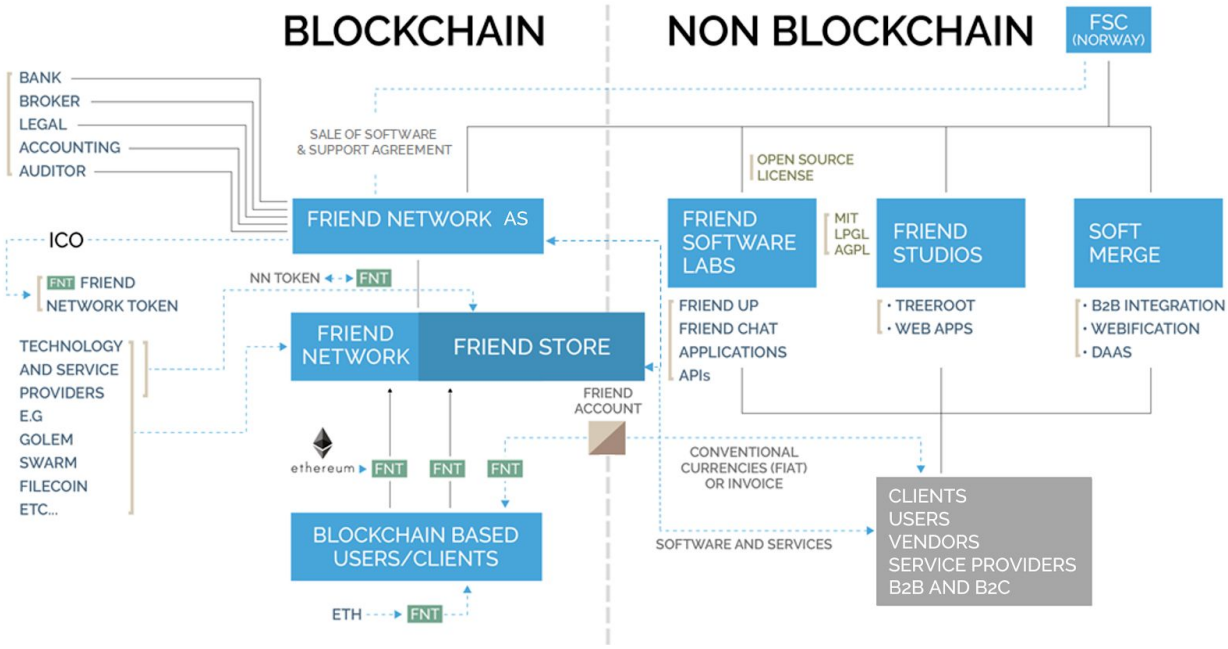
Why do we need a token for Friend Network and Friend Store?

In order for the Friend Network and Friend Store to become a true unifying platform for blockchain based as well as off-chain based technologies, the Friend Network will need to integrate the Friend Unifying Platform with a range of blockchain- as well as off-chain technology and service providers - and at the same time facilitate direct and seamless use of and trade between these parties. To accomplish this, the Friend Network and Friend Store need to facilitate automatic and instant exchange between a large number of tokens (see "NN" token in the diagram below) as well as various off-chain payment methods and channels (see "Friend Account" in the diagram below).

We intend to integrate the Friend Network and Friend Store with recognized transparent decentralised exchanges, e.g. OmiseGO and other parties as deemed efficient and relevant.

The **Friend Network Token** (**FRND**) will be created as an ERC 20[4] compatible token during the Initial Contribution Offering and be attributed a variety of functions in the Friend Network. The general conditions for using FRND will be set in the transaction framework, but specific parameters of these interactions will be customizable within each software integration.

[4] (or even ERC 23 if this is proven successfully before we start our token generating event).



Friend Store will be a marketplace bridging the blockchain and off-chain based users and clients with technology- and service providers: **one digital marketplace for all**

The Friend Account and Friend Store

The Friend Account is a core component of the Friend Network. It will be designed to ensure flexibility and control for the users and will support exchange of digital products and services between blockchain based and off-chain based providers and users. As part of our roadmap, we will establish a Friend Account as shown in the figure above, which will hold the Friend Wallet and enable payment for services in Friend Store with fiat and invoice (automatic exchange to FRND).

Exchanges may be leveraged to allow paying for items directly in the Friend Store, converting fiat and other crypto currencies to FRND while shopping.

For FriendUP users, the Friend Account front-end will allow the user to buy FRND using various on- and off-chain (fiat) payment methods, and view exchange rates in the currencies they are familiar with, while also being able to access transaction histories and account data in their account.

This structure will allow for off-chain technology and service providers to enter into agreement with **Friend Network AS (FNAS)**, integrate with the Friend Network and

offer their services in the Friend Store, alongside blockchain technology and service providers. All trade will be automatically converted between various tokens, FRND tokens and fiat.

The Friend Network and Friend Store will provide developers as well as technology- and service providers access to a unique global market via an effective and neutral marketplace. The Friend Store will present users with high quality products and services in the network. Users will be able to rate and review. Reviewers will filter out the bad and certify the good. This way, users can trade with confidence.

In creating the Friend Network and Friend Store, our aim is to be as foresighted as possible. However, we realize that we may be unable to predict all the opportunities our platform may provide to application developers, service providers and the users. We are aware of the rise of various remuneration models that move away from the classic practice of buying something by paying a certain amount of money/tokens once.

Example transaction framework components that will be available in the Friend Store:

- Diverse payout schemes such as nano payments, batching
- Subscription models for both software and services
- Integration with various off-chain payment channels (**fiat, invoice, etc.**)
- Custom receipts
- Per-unit use of software (**per user, per hour, per function, etc.**)
- Custom revenue models, e.g. a case for a virtual class about some topic could be remunerated like this: 25% to the software developer, 30% to the service provider and 45% to the content provider/topic expert

As the total volume for online software is a rapidly growing multi billion dollar market we expect our platform to have explosive growth. As Blockchain technology without a doubt will take a major piece of the emerging web application market - due to its no middle man needed and direct transactions possible capabilities Friend will be the ideal platform to make applications available for a global market without the need to run own infrastructure or many many service providers.

FRND is required for interactions with the Friend Store:

- For making payments to service providers for usage or subscriptions

- To pay for software and services

FRND will be awarded to users who run Friend Core servers. The amount of FRND tokens awarded will be based on;

- bytes transferred to users
- completed requests on certified services registered in the Friend Store

Users' FRND will be registered and only transferred (or released) from escrow once a Friend Core server request has been successfully executed.

The Friend Unifying Platform can connect to almost anything digital and it is therefore not possible to predict all the different ways developers, software and service providers and users will utilize it in the future. We not set out to design a one-size-fits-all payment system for Friend, nor will we attempt to force one upon authors and developers.

Today, we already have several different payment models in place in our off-chain commercial business. We expect many more new ones will be created by the users when the Friend Network and Friend Store are established. Friend will therefore continuously aim to facilitate flexibility for the marketplace with regard to choice of revenue models.

When a developer integrates applications with Friend, the freedom to decide about transaction model(s) is only limited by their compliance with our framework and basic requirements.

The Transaction Framework will take the form of a set of requirements to follow. Basic requirements may include:

- Entry in the Friend Store
- Use of FRND for remunerating software and resource providers
- The use of our Friend Store API

Governance

As current maintainers of the Friend code base, Friend Software Labs will ensure that the initial version of FriendUP for Ethereum will be built according to this White Paper – guaranteeing adherence to the vision and roadmap. Upon successful completion of the ICO, this responsibility will be transferred to FNAS.

Once a stable version of the Friend Network and the Friend Store runs on top of the decentralised version of the Friend Unifying Platform, we will establish a nonprofit entity to manage the open source project so that it comes closer to the grassroots. At the same time, it will comply with the founding principles of Friend written into its charter (read our Five Pillars of Friend).

The nonprofit will make sure that the Friend Network protocol is evolved graciously and that it remains robust and predictable. The OS template, describing the base feature set in the Friend operating environment, will be developed at a steady pace to keep up with new technology trends and requirements.

Active members of the Friend community will be invited to join in key positions to maintain side projects and important community roles. We will make sure that the nonprofit has an international footprint and that it maintains a healthy feedback loop with both the users and the developers through conferences and other public events.

Robust and flexible supporting structure

FNAS has been established in Norway and will be operated as autonomously as possible, increasingly so over time. The chosen structure (see diagram above) gives ample flexibility with regards to future-proofing of the continued operation of Friend Network and Friend Store. FNAS will buy software and services from Friend Software Corporation (FSC) as well as other suppliers, vendors and developers as deemed necessary to achieve its goals – both technically and operationally.

To ensure that Friend Network can continue its operation in perpetuity, FNAS will own and accumulate its own IP. If at some stage it may want or even need to completely disengage itself from FSC and become truly autonomous, it is structured to do so.

Friend Network Token summary

- The supply of FRND tokens will be limited to the pool of up to 2 000 000 000 tokens created during the Token Generation Event.
- FRND is the operating multifunctional token for the Friend Network and the Friend Store. Together, they will form an efficient platform for trade between blockchain and non-blockchain based technology providers, service providers and clients alike.
- Users running Friend Core in the Friend Network will be rewarded FRND for their participation in handling service requests.
- Friend Unifying Platform is already in commercial operation in v1.1, and the technology and execution risk of our strategy is considered low.
- As no new FRND tokens will be issued, and the activity in the Friend Store and Friend Network increases, the value of the FRND is expected to appreciate over time.

Go to the Initial Contribution Offering section to learn the details and see how to support the Friend Project.

Initial Contribution Offering (ICO)
Token Generating Event (TGE)

Note, 16th of February 2018
TGE Dates pushed:
StartBlock 09.00 CET 16th of April 2018
EndBlock 15.00 CET, 16th of May 2018 (or Max Eth)
Friend Network token ticker changed from FNT to FRND
Bounty program launched

Please see video and text announcement on our web-pages.
End Note

Note, 3rd of January 2018
During our planning process we have learned a lot. We came to the conclusion in Q4 2017 that it would be greatly beneficial for the ICO and the token holders if the ICO itself is carried out from Norway. As Norway is a very transparent and digitally friendly nation, we believe that the Friend Network and the Friend Store, as well as all holders of FRND will benefit largely from this move. Private companies in Norway have to disclose more information publicly than what is required by public companies in many countries comparable to Norway. In an all-out effort, we have contacted all relevant authorities, liaised and contracted the best suppliers helping us ensure compliance. We are currently working hard to pave the way and hope our ICO can create an example for other companies to follow. In December, after some careful investigation, we were able to make a qualified decision to conduct the ICO from Norway.

Pre-Sale
We are now planning accordingly and at time of writing this, we will open for accepting fiat Pre-Sale 4th of January 2018 - and for Ether Pre-Sale shortly. The ICO itself is at this stage planned to start in mid-February 2018.

Budget size vs. Ether appreciation
Due to the very strong appreciation of ETH over the last 3 months as well as the accompanying volatility, we have decided to adjust our ICO target budgets as follows;
Minimum: 25 000 ETH
Medium: 50 000 ETH

Maximum: 75 583,3 ETH (previous 100 000 ETH)

We will keep the number of FRND tokens unchanged at 2 000 000 000 FRND
(if Maximum) ***Therefore, 1 ETH = 20 000 FRND***

*We recognize that future ETH volatility greatly affects our budgets and the ICO as a whole. At the same time, any and all last minute changes to the Token Generating Event may increase risk for errors. Therefore, unless we see extreme changes in ETH before StartBlock, we do not intend to make any further adjustments to the ICO budgets on the basis of ETH volatility. *End Note**

In order to realize our Vision, we intend to arrange an initial contribution offering and create a token for use on the Friend Network and in the Friend Store.

The ICO of Friend and the corresponding TGE are organised around smart contracts running on Ethereum. Participants willing to support development of the Friend Network can do so by sending Ether to the designated address.

By doing so they create Friend Network Tokens (FRND) at the rate of 20 000 FRND per 1 ETH. A participant must send Ether to the account after the start of the TGE period (specified as the block number). TGE ends when the end block is created, or when the amount of Ether sent to the account reaches the maximum.

TGE summary

FRND created per 1 Ether	20 000 FRND
Minimum Ether*	25 000 ETH
Medium Ether*	50 000 ETH
Maximum Ether	75 583,3 ETH
% of tokens generated to the Friend Team	6%
% of tokens generated to FNAS	12%
Approximate date of start (StartBlock)	16th of April 2018
Approximate date of end (EndBlock)	16th of May 2018
Minimum number of FRND generated	500 000 000 FRND
Maximum number of FRND generated	2 000 000 000 FRND
-of which TGE participants	1 640 000 000 FRND
-of which Friend Team and FNAS	360 000 000 FRND

*Minimum financing is not implemented in the TGE smart contract. If minimum financing is not reached, refunds will be implemented by a separate contract.

The TGE address will be announced at the start of the TGE. It is expected that the Pre-Sale Token Generating Event will start in February 2018, through the following channels:

- Project webpage - friendup.cloud
- Official Twitter - twitter.com/friendupcloud
- Official Blog - blog.friendup.cloud
- Reddit - reddit.com/r/friendup

Please, double-check the address before sending ETH.
For security reasons, we advise to confirm the address using at least two different sources above. On the project webpage, you will also find a detailed guide on how to participate in the TGE using either the My Ethereum Wallet or Parity.

The TGE is implemented as a smart contract with a few simple parameters:

- FNAS: controls the contract and the address to which gathered Ether will be sent (implemented as a multisig address)
- Percent of pre-allocated tokens is 18%
    - 6% - Friend Team, with vesting over 3 years
    - 12% - FNAS
- StartBlock, EndBlock: these block numbers indicate the start and the end of the TGE process
- maxCap: maximum cap for this TGE, denominated in FRND
- FRND creation rate, denominated in ETH

The TGE smart contract conforms to a few important rules:

- Before the TGE starts, no Ether can be sent to the TGE smart contract (see PreSale)
- After the TGE (either maxCap was reached or the TGE deadline passed), no Ether can be sent to the contract
- During the TGE, participants simply send ether to the TGE contract which results in FRND creation
- All created tokens are **locked** during the TGE

Only after the TGE period has ended:

- Any user can initiate the transfer of Ether to the specified address of FNAS
- The TGE smart contract creates an 18% endowment of tokens such that TGE participants' tokens constitute 82% of supply, regardless of the level of funding
- The TGE contract finalizes funding which results in an allocation of founders' tokens and unlocking the created FRND

There is no minimum financing specified in the contract code. If minimum financing is not reached, then after the TGE period, Ether is sent back to the participants from the FNAS account. Because FRND is locked by default, if minimum financing is not reached then Ether return procedure is simple and straightforward. Participants should note this and take necessary precautions.

The Token Generation Event leads to creation of FRND, a backbone token for the Friend Network. FRND implementation follows widely adopted token implementation standards.

Migration is to be used if it turns out at some point that token upgrade is needed for whatever reason (e.g. changes in Ethereum, or changes in Friend's design). The upgrade will need action from token holders and cannot be imposed by FNAS.

Pre-Sale

In order to ensure that contributors with genuine and deep interest in the Friend Unifying Platform, our Vision and Mission, the Pre Sale will make it possible to ensure that contributors deemed important to our success can get tokens via the ICO.

All participants in the **pre-sale will receive an additional 20% of tokens** on top of their contribution as a sign of our gratitude for their commitment to Friend. Contributors who wish to participate in the Pre-Sale can register and indicate their interest.

Pre-Sale summary

FRND to be created per 1 Ether in the TGE smart contract for Pre-Sale contributions	24 000 FRND
Minimum Ether per pre-sale contribution*	0.1ETH
Maximum Ether allowed in pre-sale smart contract	3 334 ETH
Approximate date of start pre-sale	Fiat contributions: contact us ETH contributions: Open
Approximate date of end pre-sale	Max Eth for Pre-Sale

Incentives and bonus tokens

Bonus tokens during TGE

Participants helping us reach the Minimum goal of 25 000 ETH will receive 15% additional bonus FRNDs

Participants helping us reach the Medium goal of 50 000 ETH will receive 10% additional bonus FRNDs

Marketing primer and to increase democratic distribution of FRND

If we reach Medium we will “air drop” 5% of total FRND to the community
If we reach Maximum we will “air drop” 10% of total FRND to the community

Creation of the FRND and initial FRND account functionalities summary

- The Friend Network Token is a token on Ethereum platform. Its design follows widely adopted token implementation standards. This makes it easy to manage using existing solutions such as My Ethereum Wallet (MEW), Parity and Ledger Nano S.
- Maximum number of tokens created during ICO period:
  - Total: 2 000 000 000 (100%)
  - ICO participants: 1 640 000 000 (82%)
  - Friend Team 120 000 000 (6%)
  - FNAS 240 000 000 (12%)
- Sending 1 Ether to the FRND account will create 20 000 FRND
- No token creation, minting or mining after the ICO period.
- Tokens will be transferable 30 days after the TGE is successfully completed.

Budget and levels of funding

The Ether raised during the Token Generating Event will be used by FNAS in accordance with our roadmap. As the level of financing we will achieve is hard to predict in advance, we have divided our Roadmap into three categories of funding; minimum to achieve our goals, medium to expand scope and increase speed of delivery and maximum, the high-end plan described below.

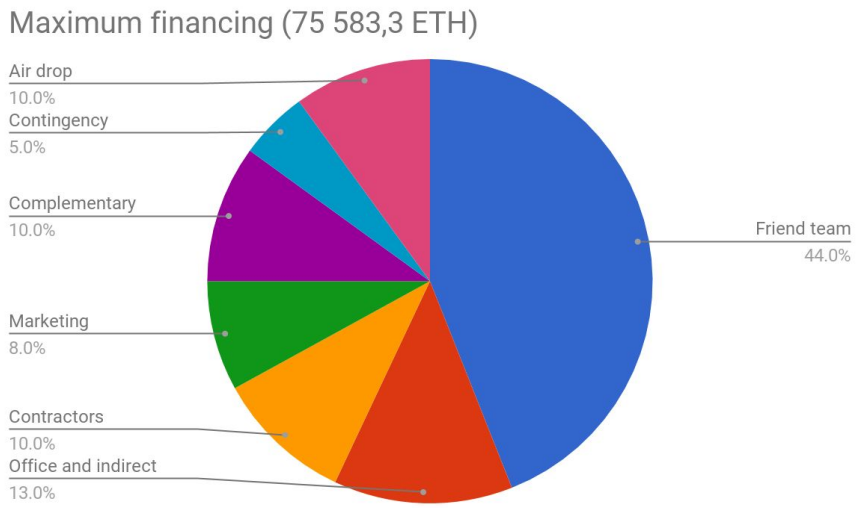
If we achieve full funding, we will realize our ultimate goals, making Friend into a fully functional computing platform with its own open source hardware. In this scenario, you will be able to migrate fully to the Friend platform for all your computing needs. We will partner with a hardware development project to build a secure version of Friend that can be used in an offline environment – based on Linux – that can synchronise with the Friend Network once online. This way, we will make our contribution to alternatives that challenge the current hardware hegemonies.

10% of the budget for support to projects deemed to be complementary to Friend. Depending on the level of financing, we will expand our team with talented employees that we handpick for designated tasks. In this way we make sure our product development is done in the best possible way. We will also hire skilled business developers and architects who can help onboard new technology projects to the Friend Network and assist them in utilizing the Friend Store to best fit their needs.

Maximum goal 75 583,3 ETH (see note below)

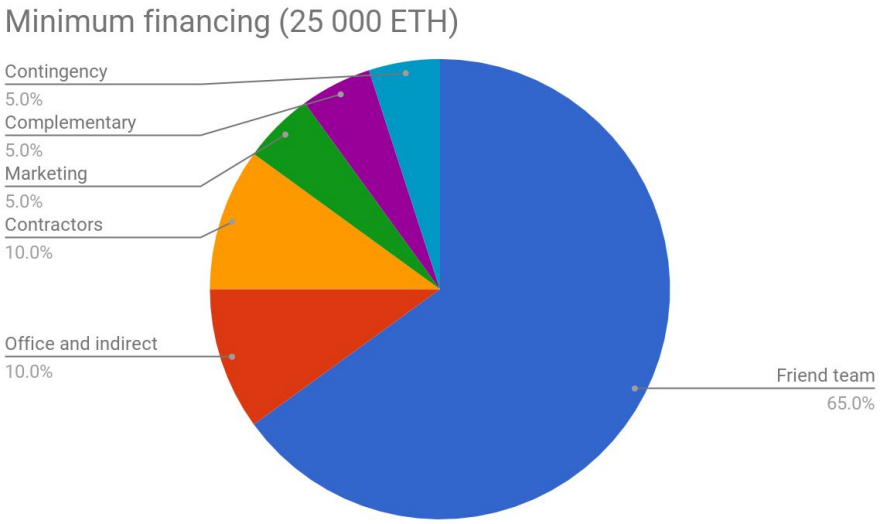
In order to further accelerate the activity in the Friend Store, we will “air drop” (i.e. democratically distribute) 10% of the contributed amount in FRND to all accounts holding more than 0,5 ETH.

Immediately after the TGE is complete, Friend Network will buy back 10% of the FRND tokens and set up a smart contract to distribute these tokens when ready.



Minimum goal 25 000 ETH

Even though Friend has reached version 1.1 already, it is still in its early days. There are so many possibilities to explore and actualize. Over the last three years we have learned a lot and have gotten a clear vision of what we want to achieve. By reaching a funding level that will satisfy our minimum goal, the Friend Network, and the Friend Store will be fully realised and we will start integrating with various technology and service providers. It will be ready for mass adoption for developers as well as end users.



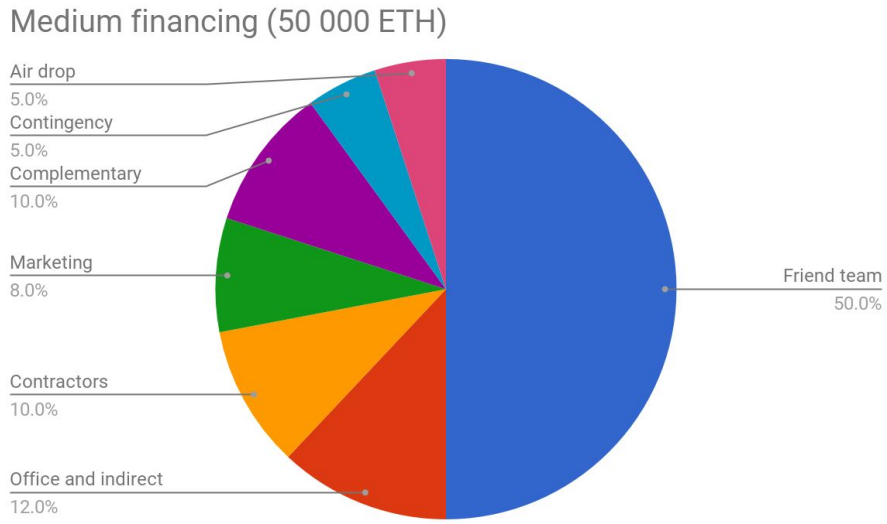
Medium goal 50 000 ETH

If we reach medium financing, we will add more team members and widen the use of bounties and sub-contractors. We will thus be able to deliver a richer and more complete Friend Network and Friend Store experience faster.

We will increase our support capabilities, making Friend Network a “go-to-place” for projects needing decentralized infrastructure. We will increase our support for technologies like gaming, AR and VR. Our standalone Linux distribution will be much richer and interesting to a wider audience. We will be able to put Friend on the map as an alternative to distributions like Ubuntu on the desktop.

In order to accelerate activity in the Friend Store, we will “air drop” (i.e. democratically distribute) 5% of the contributed amount in FRND to all accounts holding more than 0,5 ETH.

Immediately after the TGE is complete, Friend Network will buy back 5% of the FRND tokens and set up a smart contract to distribute these tokens when ready.



Notes to budgets

Our budget calculations are based on an ETH/USD ratio of 800 to 1 - the exchange rate that was valid as of early January 2017, setting Maximum to 60 MUSD.

Friend team: employment costs.
We estimate that with maximum financing, we will be able to finance a truly exceptional international team of more than 40 people for a period of 5 years.

In case of our medium scenario (50 000 ETH), the number of employees budgeted for in this document is 30 employees in 4 years

In case of the minimum scenario (25 000 ETH), the budget is 25 persons for 3 years.

The Friend Store will generate revenues which are estimated to exceed operational costs for Friend Network AS during year 3.

Office and indirect costs:
Includes costs for our offices in Stavanger, Oslo, London area and East and West coast US as well as other indirect employment related costs. International presence covering operations and support in other time zones are included in the Medium and Maximum scenarios.

Contractors:
cover all third parties that we will involve to help us in areas where we do not want to build own capabilities. Legal and accounting services as well as security auditing are part of this. For the security auditing we plan to continue our cooperation with Redscan in that area.

Marketing:
this section will cover a wide range of communication and other activities to help us bring Friend both to developers and to the end user market. These activities include participation in selected industry events both as sponsor and participant, own events and communication as well as competitions to increase interest around our platform as a preferred deployment and distribution channel for both Blockchain and other applications.

Complementary technologies:
this section covers expenditures that shall encourage external parties to adapt their technologies towards Friend. As a horizontal platform with a broad range of use cases we intend to approach both application developers and service providers to include them into the ecosystem.

Contingency fund is set to 5% of the total budget in each scenario.

More detailed budgets are available upon request.

Use cases

Data Analysis

John tries to optimise the workflow for his wood production company. He finds a suitable dataset about the costs involved in wood production. He finds a data analysis app in the Friend Store and buys access to that app using Friend Network Tokens. To enhance the speed of the analysis he chooses to use the Golem.Network to execute his analysis in parallel across many 'rented' compute nodes.

University

Mr. Peterson is the headmaster of a University, and every semester his technical team wastes countless hours on setting up students' computers. By accessing the Friend Network, he sets up a Friend Cloud Computer template that has all the software that a student needs. Additionally, he sets up access to the library of content by curriculum and a shared drive where students can submit papers. For live broadcasting of lectures, he sets up different conference rooms sorted by class.

Once the semester starts, he instantly creates five hundred unique user accounts, and each student is online and productive in minutes. They access the class on their smartphones, on their tablets or on their notebooks. A simple video introduction that greets them when they log in has a simple walk through for those who need it.

And the best thing is that Mr. Peterson has saved time, money and frustration so that he can focus on education.

Small host

Gary lives in an area where hosting and cloud services are in need, but where the local network has a low bandwidth to the outside world. Gary has invested in servers and has a great network infrastructure that offers good bandwidth to locals.

Gary downloads Friend Core and configures it to handle storage space and services for users. By connecting to the Friend Network and creating a 'provider' identity, he can

distribute his services on the Friend Store, earn FRND for use and offer great bandwidth and low latency for his local users.

Non-governmental organization

An NGO that has members across the globe needs to set up dedicated work- and collaboration spaces for members in different specialist groups. The organisation is conscious about privacy and at the same time has a limited budget for information technology.

The organisation sets up several workgroups in Friend, puts users into these groups and assigns them access to relevant specialist applications based on their group memberships. The organisation selects an IPFS based shared drive for storing their documents.

For complex data analysis the group uses the *Golem* app to buy calculation services only as needed by the different specialist groups. They use the *Streamr* app to access relevant aggregated sensor data for their analysis.

Friend Chat provides the organisation with inbuilt virtual conference rooms for each workgroup where they can share information in real time both via text, audio or video chat. All written information is encrypted client side and safely stored in the Friend Network's BigchainDB database.

Archaeological research group

A group of specialists in Viking history wants to collaborate on a newly received underwater imaging cloudpoint dataset to analyse it and see if they can make exciting findings.

They set up their Friend node and also set up a Windows server in the cloud to be able to run their specialist Cloud Compare software across all research group sites. This setup gives them a lot of value for their limited budget. They use the Liberator stack in Friend to give all their users fast and easy access to the Windows application - independent of whatever end user device the different team members may use.

They also use web native cloudpoint analysis apps to review the point cloud data on both their desktop computers and directly in VR, just using their phone and a high quality headset. This setup allows them to review the data across locations without the need to transport the multi-terabyte dataset to every participant.

The inbuilt collaboration functionality provided by Friend and Friend Chat allows them to have live discussion sessions looking at the same dataset. Shared presenter sessions allow everybody to see the exact same content on each team member's screen. They also use Friend Chat for live events to stream their findings to interested people around the world.

Large construction project

A construction company is planning a large office building project in a community with a need for extensive information sharing. They use Friend to allow their project partners to collaborate on a shared workspace and mount their cloud storage into the different users' workspaces with access rights according to project roles.

They also upload an interactive 3D model and allow guest access to the 3D view application - this way the community can review the planned complex both on mobile phones, desktop computers and in VR. A simple app is created that allows both guests and logged in users to attach comments directly to the relevant parts of the building. This enables easy remote preliminary inspections for building code compliance, accessibility, and general usability feedback.

They also use Friend Chat to live stream press conferences and share the interactive 3D view of the building and encourage community discussions and feedback. The simple user management in Friend allows specific stakeholder groups to access relevant information in a structured and user friendly manner without cumbersome administrative overhead.

Emergency response team

A large energy company with installations across the world needs a simple solution that enables the emergency response teams that work on location to interact and collaborate with the situation room at the central command center. They set up Friend

with global access and mount the relevant on-premise storage devices as drives for the response teams.
They create a couple of simple applications directly in Friend and pre-configure virtual cloud computer templates for the different roles and scenarios in emergency situations.

The responsive nature of the Friend Workspace provides all team members with access to the same apps across devices. This provides easy integration of both web based applications for maps and case information as well as access to specialised windows applications that can be run from on-premise Windows servers without the need to open RDP access to the internet.

General practitioner consultation

A general practitioner consults with a patient with circulatory problems. They do an EKG measurement using Friend's Liberator stack with remote access to professional software running on a Windows server. The initial results show the need to consult a specialist.

The practitioner now uses Friend Chat to check if a specialist is available right now. He sends a short text message to request help. The specialist receives a notification in his Workspace and reacts to the request. They do a screen sharing session and talk the patient through the results.

After a brief assessment, a separate evaluation with the specialist is agreed upon. The general practitioner securely shares the EKG dataset in the national health network. The specialist securely shares his consultancy evaluation with the general practitioner and they schedule a Friend Chat meeting with the patient to evaluate the results without any travelling needed. The time saved can enable shorter patient wait times, and reduced time to effective treatment, while further enabling more patients to be served by a limited pool of specialists. This streamlining of the patient engagement process can also provide cost efficiency benefits by making more effective use of care provider time and facilitating more immediate practitioner and specialist interactions.

Tech support

Traditionally, a tech support company has needed to license third party software to manage online support with customers. Remote desktop functionality, remote control and screen sharing are a few of the features provided. Additionally, customer and contact databases / CRM systems that need to work with the video conferencing software utilized to reach customers.

Friend allows any company or organisation to leverage its in-house technologies to create support services entirely online. Friend Chat will allow them to call any user over the internet and support them online. They will be able to offer their services on the wide array of Windows applications as well as web applications right in the browser. All they need is a Friend account. Our APIs allow them to integrate their existing solutions like CRM and two factor authentication solutions. Most of these tools can be made available right in the Friend Store.

Customers will be able to pay for tech support services using FIAT or tokens right in the Friend Network. The blockchain ledger keeps track of service transactions as well as transcripts and recorded video support sessions.

Now everybody can start up their own support business using nothing but the infrastructure available on the internet in the Friend Network.

The Team

Our team combines more than 130 years of engineering experience. Our management team includes several successful entrepreneurs with proven experience in building great companies. Our commercial team has vast experience in business development, operations and technical sales which will help us explore and realise new business opportunities and enter successful partnerships around the Friend Network, making it into a thriving ecosystem.

Our team is steadily growing and now encompasses over 20 dedicated individuals that work on our vision. Most of them are part of the core team, some work as external advisors. More information on our team can be found on our website.

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