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THE HUT34 PROJECT

Powering the Global Knowledge Economy

Abstract

This white paper details the scope and vision of the Hut34 Project. The project aims to build and provide the technological and economic infrastructure to power the growth of the open global knowledge economy. Its objective is to build an ecosystem, in which each and every participant has access to the collected data, information, knowledge, services and processing power of the entire network; a system that encourages participation from end users whilst incentivising and fairly rewarding developers and producers for their contributions and efforts. We call it the Hut34 Network, or simply, Hut34. Built using emergent blockchain technologies with the ERC20 compliant Entropy Token (ENT) being the native currency for transacting in this ecosystem of connected services.

Key Concepts

Distributed Computing, Blockchain, Sidechain, Cryptocurrency, Ethereum, State Channels, Chatbots, Natural Language Processing, Artificial Intelligence, IOT, Web3.0

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Introduction

During WWII, Bletchley Park UK was the centre for the Government Code and Cypher School (GC&CS) and was responsible for decoding messages largely encrypted by the enigma machine. The buildings labelled 'Hut 3' (German Army & Air Force) and 'Hut 4' (German Navy) were tasked with the translation interpretation and distribution of messages deciphered in Huts 6 & 8, respectively, Hut 8 being made famous by Alan Turing, one of the fathers of modern computing and Artificial Intelligence.

Just as the Huts 3 and 4 distributed data to where it was needed, the Hut34 Project is intended to provide a unique and useful connection between those who have information and those who wish to use it.

At its heart The Hut34 Project aims to build and provide the technological and economic infrastructure to power the growth of the open global knowledge economy. This is not an economy for economy's sake, but rather, as a means of incentivising and driving the entire global knowledge base to new levels. This means that users are empowered by access to even more useful data, information, knowledge, and services whilst the the creators of these are fairly rewarded for their efforts.

We believe economic incentives are equally as important as technological enablement. A network driven by technological and economic incentives serves all participants better, making everyone smarter and more fairly rewarded.

The Hut34 Project's unit of exchange applied to information transactions is the ERC20 compliant Entropy Token (ENT). Information, or Shannon's entropy, as introduced by Claude E. Shannon in his 1948 paper "A Mathematical Theory of Communication", can broadly be thought of as the measure of uncertainty of information in a system. In a state in which an outcome is most uncertain, its information level is highest and it has the highest level of Shannon's entropy.

The Hut34 economic system abstracts this concept. In this system data, information or knowledge which is more 'uncertain' or more difficult to obtain attracts the highest ENT value as its information content is highest. On the other hand, data which is commonplace, known or easily obtainable has a lower information content and hence less ENT value. Another way to look at it is if a user on the Hut34 Network has some new or valuable data, it should have a higher ENT value than something known or commonplace.

Background

We are in the midst of massive and accelerating digital and lifestyle change.

Global population growth, mass adoption of digital lifestyles, and the ever increasing ability to record and store information are driving massive growth in data volume and internet traffic, which is expected to exceed 61,000 Gbps by 2020.

The Internet of Things (IOT) impacts the global economy in ways not seen before, with data measurement and collection growing at an exponential pace. This market alone for the hardware, software and comprehensive solutions is expected to be worth over $470 Bn by 2020, let alone the market for the data it produces.

Monetisation of this ever expanding data currently remains in the hands of the few, with companies such as Apple, Google and Amazon leveraging their huge data sets to centralise both the control and the financial benefits of the emerging knowledge economy. Hut34 offers a different paradigm.

Messaging is the new platform, and bots are the new apps. End users now spend more of their time in messaging services, and reasonably expect more functionality within those services. This is building to a massive radical change in how users interact with data, and the latest crop of developer frameworks are paving the way forward. Global chatbot market is expected to grow at a CAGR of more than 37% during the period 2017-2021.

Nascent technologies in Artificial intelligence are taking us to areas only few dreamt possible. AI will inform, not just perform, across many industries and

users will start having hyper-personalized conversations at scale using AI agents. The AI market is estimated to grow from $8 billion in 2016 to more than $47 billion in 2020.

Blockchain and token technology provide breakthroughs in design of decentralized, open networks and systems, serving and powering the growth of the democratisation of knowledge, and access to the world's digital resources.

Problem Domain

The acceleration of these trends creates dislocations and massive opportunities. It also creates brand new problems, whilst existing problems are exacerbated and entrenched.

Fundamental problems remain around data and information, including ever increasing volume and fragmentation, how to access it, its usefulness, who owns it and how its owners and producers can monetise it.

For users, in this environment, rapidly finding bespoke or useful data or information can be difficult. Users are often forced to access multiple data silos to find what they require. Further, where this data is mostly controlled and monetised by the few, obtaining any quality data from independent and trusted sources remains even more of a challenge.

Rapid increases in the use of messaging platforms, and improvements in chatbots and AI have gone some way to making information and services more readily accessible and useful for these end users, but significant problems remain.

The number of chatbots is growing at an expanding rate. Most bots have a narrow domain of expertise, forcing users to interact with a suite of bots to even get near any desired outcome, or alternatively users can choose to only interact with a bot service controlled by a large corporate, with the development resources to make a generically useful bot. Most still lack the sophistication to answer much more than the most basic queries, or anything outside their domain expertise. Even the most 'intelligent' bots, which are controlled or monetised by traditional large corporates or institutions, are limited in functionality, and fundamentally their purpose is to profit the company's shareholders. Due to this, the experience is weak, and the user is really the 'product' of the company, not the recipient of the knowledge they desire.

These trends further drive the ever increasing challenges for developers in providing services that keep their users' attention and provide even greater user utility. They also afford new opportunities for developers to profit, to maintain control of their product, and to interact with their customers, unconstrained by the traditional gatekeepers.

For domain experts - the holders of unique and valuable datasets, information and knowledge - the successful monetisation of this ever expanding resource remains their primary challenge. In the current system, this data, information or network access is commonly controlled, distributed and monetised by the corporate or institutional "gatekeepers".

The Hut34 Project offers a different paradigm, to solve these problems.

The Hut34 Network

Embodying the ethos of open computing and through use of distributed ledger technology the Hut34 Project aims to redistribute the power of data, information, and knowledge out of the hands of the few back to the many.

The Hut34 Network aims to be the conduit that links the world's decentralised silos of data, information and knowledge through its network of nodes or "Huts". The network will be open for all, and economic incentives will drive the entire global knowledge base to new levels. Users will be empowered by access to even more useful information whilst contributors are fairly rewarded for their efforts.

The Hut34 Network is designed to provide utility to end users, domain experts, bot and service builders, and IOT data providers, while also providing a valuable resource for businesses and marketers.

We don't propose to solve all the issues surrounding information routing but we do aim to incentivise and empower network users to connect, resolve and be fairly rewarded. Hut34 aims to minimize friction with easy connectors, easily and successfully resolve queries and critically make it easy to monetise information transactions. The core concept involves connecting network participants though Huts and resolving their queries through intelligent routing and ranking.

Each Hut on the network is a switch for the new open global knowledge economy. Huts will facilitate the connection, routing, ranking and monetisation of not just data, but information and knowledge. Similar in concept to a TCP/IP router sending and receiving traffic, but allowing all users of the network to profit from their data, information or knowledge contribution.

Each Hut will contribute or utilise valuable information. Types of information routed through the Hut34 Network could include simple text based queries such as questions and answers, requests for more "curated" answers, routing to process driven queries, access to datasets, IOT device data or multimedia files.

Key features

Connect

- Connection provides instant access to the user bases of all connected platforms and services eg. Facebook, Skype, Slack.
- Connection is simple and straightforward. It can be done through operating your own Hut or connecting to the Hut34 Platform.

Route

- Route your queries into the Hut34 Network according to your needs.

Resolve

- Use your Hut, our managed service or another 3rd party service to rank answers returned from the network to resolve your queries.
- Successful resolution adds utility and value to your service and end customer.

Monetise

- Earn Entropy by providing others access to your data, information or knowledge.
- Access a global network to deploy your expertise or marketing.
- Add utility to your existing service, making it more useful and again more valuable.
- Build on our layer - sell services that improve network features in exchange for Entropy.

The Hut34 Protocol

Introduction

In the following sections we outline the guiding design principles on which we are building the Hut34 Network, and the Huts upon which it is built. The core of our team has been assembled and they have broken ground on executing this vision, working hard towards the goal of building the global knowledge network.

The Hut34 Network is built upon Huts, or nodes. Each node at a minimum acts as as a multi layered switch that distributes and transacts in digital services and information. We describe the layers of this switch using the OSI model as a reference as it is aligned with our product offering while being a familiar stack to developers. As with any switch there are a defined set of rules and regulations that determine how data is transmitted.

Protocol Architecture

Data Link Layer

When analysing the requirements from our design principles we find the two main drivers are trust and

efficiency. Transactions on the Hut34 network are achieved through the transfer of an ERC20 token on the ethereum blockchain. We are building the Hut34 Protocol to be a first class citizen on the Ethereum public blockchain.

Network Layer

Routing

When a Hut passes data or a data request, the system must route it to a set of Huts which can use the data or answer the query.

Specific routing options can be set by the developer, whether connected individually to the Hut34 Network via their own Hut or to the Hut34 Platform. These options limit the scope of Huts consulted by considering particular requirements.

These routing options may include: * Free services only * Specific Hut types * Age restrictions, 'safe search' * Specific services or providers; users may have a personal 'fly/no fly' list * Location specific services * Only primary data, for instance IoT hardware

Service providers will also supply contextual information regarding their identity, location and capabilities. This metadata, similar to website search indexing, will provide the network with a means to reduce total system demand due to irrelevant routing queries.

Use of metadata and routing criteria allows the network to narrow down the full network into a shortlist of potential connections, possibly sorted by quality of metadata. These Huts can then be probed directly to ascertain their suitability to the connection, at which point some may classify the data as out-of-scope. This allows the network to further narrow the search space, allowing for effective real-time ranking and connection.

Ranking

When the network routing has provided a filtered list of potential connections or results, they must be ranked according to some criteria or method in order to provide the querying Hut with the best choice most of the time.

Ranking methods can again be set up by the developer whether connected individually to their own Hut, or the to the Platform. Preferences may include, but are not limited to:

- Speed of response, particularly suited for high-frequency factual queries.
- Local reputation, namely how your Hut has valued previous answers from potential suppliers.
- Global reputation, namely how Huts worldwide have valued potential suppliers.
- Cost of response.
- Income from response, particularly relevant when handling raw data or advice.

Additionally, developers can setup their own ranking algorithms and generate Entropy revenue by providing this compute power as a service to other participants on the network.

Accurate and useful ranking of potential answers improves the quality of the network as a whole.

Transport Layer

The Hut34 Protocol requires transient publication and subscription of messages with exceptional levels of privacy.

We need a design that supports data flows across state channels and node to node or user to user. We are exploring the 'Holy Trinity' infrastructure, comprising of the ethereum blockchain, with Whisper used to exchange messages, and Swarm for data storage. The Hut may also use existing technologies providing distributed datasets with high availability, and we plan to be active participants in the delivery of new decentralised technologies and applications to power our network.

Session Layer

A Hut34 transaction occurs when entropy (ENT) is transferred by a Hut on behalf of a user, as payment

to a servive(Bot), which has supplied the response / knowledge.

Transactions must be completely secure, but since some Huts are connected to chatbots, who may service thousands of queries per minute, these transactions also need to be as close to real-time as possible. Hut34 will build upon emerging state channel technology in order to handle these microtransactions, for example allowing each Hut to perform very fast transactions in a local ledger which is periodically processed on the blockchain, allowing real-time interactions without compromising trustless security.

As an information transfer platform, it is near-impossible to estimate how much a transaction is worth. Some information, from a niche context or with high value potential, is intrinsically more valuable than other information. For instance, a Hut providing raw, unique satellite imagery may be more valuable than one which can answer simple factual queries by checking Google. The fact is, any information traded on Hut34 should be worth as much as users are willing to pay for it.

Due to these considerations, the market will largely decide the value of data transferred. Service providers will be able to set a price, and as with any market economy, they will be incentivised to provide as low a price as possible to compete with similar Huts. In this way, Huts which provide a unique and valuable service will be able to value their information at a higher Entropy than Huts which are simple or commonplace, while the latter Hut can distinguish themselves through competitive pricing.

Presentation Layer

Clearly, the data transferred through a global network cannot reasonably be in any data format decided by the user. For the purposes of speed, security and generality, some number of standard or acceptable formats must be defined for network passage.]

Data transferred across the network will undergo some translation provided either by the Hut34 API or third party providers following specific data models for formatting, encoding, compression and encryption. Essentially the core Hut software will define, for example, a JSON model for data. This will provide the desired independence from the Application layer while ensuring efficiency and privacy.

Application Layer

We call a node on our network a “Hut” and this is a developer’s first point of contact with the Hut34 Network. Huts provide developers with a network interface to which they can connect their client facing applications. There are two distinct Hut types avaible for developers to use.

1. Download and run your own Hut participating in all the benefits of the ethereum public blockchain.
2. The Hut34 Platform - run your hut in the cloud - : Simple, straightforward connection provides frictionless access to all connected platforms and services. The platform will also contain additional proprietary code to facilitate, for example, the onboarding of bots, and financial details to facilitate the purchase and use of Entropy tokens. The platform is a turn-key solution to join the Hut34 network.

The Hut34 Platform

The Hut34 Project seeks to lower the barrier to entry and encourage broad adoption of the Hut34 Network, and it’s to this end that the Entropy Foundation will be developing a managed cloud service or “Hut as a Service” (HaaS) product offering - The Hut34 Platform.

In much the same way that a website developer can decide to host their project on a high-reliability, high-uptime service rather than assembling their own servers, developers can make use of the Hut34 Platform. Platform Huts are hosted and will provide all the features that are available in a downloaded Hut, whilst eliminating the efforts involved in deploying,

hosting and maintaining an individual Hut. As detailed above, the Platform also contains additional proprietary code to allow a 'quick start' for any user to operate a Hut.
The Hut34 Platform will seek to provide a frictionless user experience, with the maximum simplicity for developers, especially those new to web3 and dApps.

Bots and services built in a variety of platforms will be supported, in order to simplify connection to the Hut34 Network. Integration tools are planned for a variety of existing Bot development platforms, for example;
* Microsoft Bot Framework
* Facebook Bot Engine
* API.AI - now owned by Google

Thus, the Hut34 Platform will be an ideal way join the Hut34 Network.

The Hut34 Platform is now in alpha/proof of concept, with a range of bots and services connected and transacting information. These include @elwood, @jokebot and @weatherbot. More information can be found by asking @elwood on the Hut34 Slack channel.

The Roadmap

The team behind Hut34 have mapped out a roadmap of product milestones that builds iteratively on the work completed for the Hut34 Platform release v0.5 which demonstrates proof of concept of the core product offering while also providing supporting features for the Entropy Token sale. Our product development vision is consistent iteration with maximum agility.

Upon successful completion of the token sale we immediately commence build of the Hut34 Network stack, targeting the first pre-alpha release of the network with basic network routing by the end of 2017. A limited set of developers will then be invited and incentivised to develop Bots and set up Huts using Entropy Foundation ENT, with zero-cost transactions. This release will be inline with an update release to the platform that introduces new features along with bug fixes to existing features.

An alpha version of the monetised Hut34 stack will be released in Q2 2018. At this stage, developers may establish Huts and purchase ENT, with the first release of the ranking and routing functionality.

By the end of the third quarter of 2018, the Hut34 Platform will be made available to bot builders and marketers, along with a full beta version of Hut34 networking capabilities. A portion of Entropy Foundation currency will be used to discount transactions during this time to encourage development, and feedback and usage statistics will be collected in order to improve features and network performance.

The fully-functional Hut34 network will be released Q4 2018. Network operations will have been significantly tested and iterated and the entire system will have a year ofl user testing.This will ensure the network is robust and ready to scale, prerequisites for a successful project.

Benefits

We foresee a wide variety of benefits of the Hut34 network, some of which may include the following.

Benefits to End Users

The Hut34 Network is designed to provide consumers with the information and services they want in the most convenient, user-friendly way possible.

Users talking to a service, connected to the Hut34 Network, have near-instant access to the Hut34 global knowledge base through a single chosen point of interaction. Whether users tap into the network through a domain-specific site, an everyday messaging client or a voice assistant, the networks information will always be easily available, without the need for specific search queries or phrasing.
Each connected service on the network becomes a powerful distributed AI, only differing by the routing and ranking preferences set by its developer creator and any local implementation features.

Benefits to domain experts and academia

Connection to the Hut34 network allows experts in their fields, or those with unique domain knowledge, to distribute this knowledge to a potentially wider user base: the entire Hut34 Network. Concurrently, the Network provides them a direct means of monetising this hard won expertise or academic knowledge.

By distributing expert and academic knowledge, Hut34 also provides academics with new avenues for exploring research and the cutting edge of knowledge. Economic incentives encourage researchers to make new (and therefore unique) data available to the Network, and thus to the wider academic community.

Benefits to Bot and Service Builders

Developers have had the ability to build bot services for years, and these continue to improve. However they are still fundamentally limited by the resources of their team and the reach of their influence.

A developer can create a service which is incredibly useful to users in a very specific way, but their work remains unappreciated beyond the users they can personally attract.

The Hut34 Network empowers these developers by providing them access to a global network of information and users. It supports developers by providing further channels for the monetising their knowledge or service.

By connecting to the network, any developer can turn their project, process, idea or knowledge into a globally distributed enterprise without personally needing to sell to 'big fish' or even market to users, enabling them to focus on their technical work.

By collaboratively expanding the usefulness of all network connected bots, developers can maximise user retention through minimising situations where users are forced to go to other services.

Benefits to industry

By connecting a worldwide user base, the Hut34 Network provides direct access to a vast number of consumers, who can be easily and automatically targeted by demographic, location, native language and interests. Clearly this is of immense value for marketing purposes, but could also be used in a broad array of situations including recruitment and statistical analysis.

Businesses connected to the Hut34 Network also have access to a global base of expertise for their own use. Employees can utilise network provided services to improve productivity, or customer service can be improved by providing clients with contextually relevant content, which crucially does not need to be generated by the business.

For instance, an online flight booking business could access the Hut34 Network to provide hotel/car bookings, weather prediction, trip planning, or local news from a destination, all with little to no effort and some cost of ENT, proportional to the amount of usage, which they could likely offset by providing flight booking services back to the network.

Applications

Hut34 is a network built on Huts. Each Hut is a network connected node, and is the point of communication between an array of potential services connected to each Hut.

Huts may fulfil a variety of roles, as a combination of several or one exclusive role. The scope of potential applications which can be connected to, or built upon, a Hut is fairly broad, though we classify them as contributive (adding resources into the network) or extractive (removing resources from the network).

For the Hut34 Network and ecosystem to be successful, a healthy mix of the two is required.

Following are the higher level uses for Huts and some practical uses cases for services or applications to be built on these Huts.

Bot Service Hut

Chatbots interact with end users by direct communication, and could be seen as a natural fit for the Hut34 Network. Local AI or other development provides the intelligent behaviour of the bot. However, even the most powerful of bots available are limited by the vision and effort of their creators. Simple queries are commonly not problematic, but complex or out-of-scope requests are rarely handled well. Some bots are excellent in particular areas, but poor in others.

By connecting to the Hut34 Network, a bot's knowledge base and functionality expands in line with the entire Hut34 Network, providing significant improvements over standalone bots.

To the extent that chatbots interact with the Hut34 Network, they would generally be considered contributive, as the network as a whole would be able to access their functionality and knowledge base, while they use the network to service their clients.

Use case:'Expert' bot

*I have built an "expert" bot specialising in provision of information on the native fauna of Guatemala and deployed it to my target audience through Facebook messenger and Skype.

I need ways to improve and monetise my bot service. I connect my bot to a Hut on the Hut34 Network, allowing me to grow my user base instantly, and configure the Hut such that my bot's knowledge is available in exchange for ENT payments.

Concurrently, my bot's knowledge base becomes much larger as a result of connecting to the network. My users now have the option of using my bot for other purposes, increasing their engagement.

Through proper management any ENT costs incurred by my bot through providing "off domain" answers, can be offset will be more than offset by ENT earned from my domain knowledge, possibly additional marketing earnings and the increase in utility and value of my service.

Use case: Marketing Bot

I create a simple "dumb-bot" through a third party bot building service, i.e. this bot contains no specific domain expertise or proprietary information.

I deploy it to my Hut on the Hut34 Network. I set my Hut34 preferences such that any advertising deployed by my bot to my end users offsets the ENT cost of retrieving "off domain" knowledge.

My primary real-world efforts are spent on marketing my bot service, increasing my user base and thus my value to advertisers. My bot continually improves as capabilities are added to the Hut34 Network as a whole; so I have no ongoing development costs. As users interact with my bot, I can approach advertising specific Huts on the network to request contextual materials, increasing their sale rate and my user experience.

Use case: Routing Referrals

I am a developer who operates a popular bot on a social media platform and users often consult my bot for a range of issues.

I connect my bot to a Hut on the network and preference it such that, for all travel enquiries on my bot, I route them to a large corporate travel company from whom I will receive a referral fee in ENT for each query specifically routed to them.

Data Service Hut

Another form of contributive service, these would provide the Hut34 Network with a unique stream of data. This data can provide unique opportunities for developers, academics and market analysts who can make use of large distributed data pools.

Data suppliers may be primary sources, such as an IoT bot which measures and reports local weather conditions. Alternatively, they may be secondary or tertiary sources, such as a web crawler which aggregates information related to the number of published articles on a particular topic. A service such as this will be straight forward to connect to the Network,

and will provide benefit to the developer from the flow of ENT proportional to the value and usage of the data supplied.

Use case: IoT dataset collection

I have an interest in tracking exact temperatures across mainland Europe.

I assemble, market and sell cheap IoT temperature sensors that anyone can set up in their house and easily connect to the Hut34 Network.

My consumers, for a small outlay to purchase the sensor(s), can earn a small ongoing revenue of ENT by providing me (and anyone else on the network) with accurate temperature data on request, automatically.

Processing Service Hut

These services effectively provide specific computational services to other Huts on the Hut34 Network, such as advanced routing and ranking for queries. This may also involve provision of computing resources for generic large-scale data processing, or specialised handling of complex queries; for instance, analysing a web of financial data to produce some form of suggestion or recommendation for action.

It may also involve directly improving the network; an example of this being an intelligent ranking system for Hut lookup, which improves the speed or quality of answers through the network given a large volume of potential connections. These services would contribute to the network without necessarily communicating directly with end users.

Use case: AI Engine

I deploy a Hut on the Hut34 Network that is connected to my proprietary AI ranking function.

Other services on the Hut34 Network can elect to use my proprietary ranking function, due to perhaps its improved results. The use of my service has an ENT cost which I collect every time my ranking service is used.

Users of my service would make the economic decision that the ENT cost I demand would be offset by the improved ranking results which would allow them to better monetise their own service.

Marketing Service Hut

As with any large network infrastructure, we imagine there will be interest from participants looking to market to end users.

Huts can be used to inject marketing materials into the network in exchange for ENT. Through the provision of this sponsored content, client-facing Huts requesting information from Hut34 can avoid paying ENT by agreeing to receive an equivalent amount of advertising material instead. Marketing providers are extractive as they pay to receive network benefits without adding to the knowledge pool.

Use case: Digital Marketing Agency

I operate a digital marketing agency representing a range of clients.

I set up an account on the managed Hut34 Platform. I contribute fiat to my integrated wallet which is then converted to ENT with minimal friction via the Hut34 payment gateway. I setup my preferences so that contextual advertisements are sent to services which have demonstrated user interest in particular topics.

The Huts distributing these advertisements to their users and network receive ENT payment. I can start selling my marketing services to real-world clients who have an interest in accessing potential new customers from the Hut34 Network.

Some other potential use cases, that fall outside the above categorisations, but nevertheless may add utility to the network.

Use case: Managed Hut layer

I build a platform by setting up all the required Hut34 Network infrastructure and offering Hut hosting to clients.

All the Huts I manage get fast and cheap connections between each other, and anytime they consult or supply solutions to the full Hut34 Network, I take a cut.

I then raise ENT by managing local routing and by providing my network's knowledge to the Hut34 Network as a whole.

Use case: Curated Expert Service.

I connect my chosen messenger interface to a Hut on the network.

I preference it such that, I only receive higher level domain queries requiring expertise response.

I may only respond to a limited number of daily queries however due to their extremely high information or knowledge content I receive high ENT payments for both.

I could, for example, return these high value answer with advertisements (agreed to by querying user or Hut) thus further increasing the ENT I earn for each response I give.

Hut34 Transaction Pricing

The Entropy Token (ENT) will be the unit of exchange by which Hut34 participants are either rewarded or charged, depending on whether they add or extract value from the network.

Connection to, and creation of, the network is primarily a technical challenge, but motivation to participate is driven by market behaviours, including costs and incentives.

A single data transaction could be classified as a successful resolution of a routed query.

Q. "What is the capital of France" + A. "The capital is Paris" = Data Transaction

Pricing of these transactions between participants will be left to market forces whereby each contributive participant can specify the fees they wish to receive for their information or service. Meanwhile, those who extract or demand value can specify the maximum ENT cost they are willing to pay for information or services.

Reward and cost will be a function of supply and demand for participants' information or services. Profitability in this system will be dependent on uniqueness, quality and speed of responses.

Fundamentally, putting a value on any individual knowledge transaction is near-impossible, as knowledge exchanged is worth only as much as people are willing to pay for it. Overall, the market will decide.

The Entropy Foundation

The Entropy Foundation will be incorporated following best practice with final details being established immediately following the Token Sale. Its core objective is the facilitation of the implementation, sustainability, and success of the Hut34 Project: That being the Hut34 Network, Platform and the associated Entropy Token ecosystem.

Any ENT earned by the Entropy Foundation will be utilised solely to advance the Hut34 Project. Resources will be allocated to platform maintenance, technology upgrades and development and ongoing marketing or any purpose the foundation deems will advance the interests of the project.

The Tokens

The creation of a token based economy offers unique benefits and utility to the Hut34 Project. A successful token sale will afford the Entropy Foundation the full opportunity to fund the Hut34 Project to its release and implementation.

Entropy tokens will be the sole means for services to participate on the Hut34 Network. ENT will provide both access rights and act as the sole medium of exchange for the network. *Ownership of ENT Tokens does not however entitle holders to any earnings of the Entropy Foundation, provides no voting or ownership rights, nor does it confer holders any legal recourse to the Entropy Foundation.*

A total of 100 Million Entropy Tokens will be created prior to the token sale. This supply will be fixed with no more to be issued.

As part of its roadmap, The Entropy Foundation intends to build or partner with appropriate technologies and gateways to facilitate full and, where possible, frictionless interoperability of the ENT Token with other cryptocurrencies. In a sense opening up the economics of our system further; whilst of course protecting the needs of the Hut34 Project, its participants and associated Entropy Token holders.

The Entropy Foundation and will actively monitor the stability of the Entropy Token ecosystem and if required, take actions to protect the integrity of the Hut34 Project.

The Token Sale

Hut34 will make use of a pre-sale event in combination with a market based pricing event in order to provide the fairest mechanism for participation. The pre-sale event allows early supporters of the project to receive an incentive for their support in the form of a guaranteed allocation and a pricing bonus, while the auction event allows the market to fairly price the Entropy Tokens for all.

1. The PreSale The pre-sale will run for a period of 28 days. It will utilise the more commonly used approach of recent token sales whereby cryptocurrency is sent to an address in exchange for an amount of tokens.

During the PreSale, Entropy Tokens can be pre-purchased with ETH only, which will be received and held in a multi-signature wallet until ENT is allocated. Participation in the presale ensures each purchasor a guaranteed allocation of ENT at the final price, as set by the auction process detailed below. Further, pre-sale participants will also receive a 10% bonus allocation of ENT.

2.The Auction A smart contract based 'dutch' style auction will begin at the completion of the pre-sale period. Its intention is to establish the fair equilibrium market price for ENT token for all participants. The Auction will be conducted in ETH, and during this step participants will only be able to send ETH to the token auction address; committing to buy ENT at or below the current ENT price at the time of their purchase.

The Auction will continue either (i) for a period of 7 days, or (ii) when the total sale cap is reached. Once the Auction is launched the price of ENT will decrease from its starting price through every block that elapses until it ends after 7 days. The price per ENT sold in the final block, when either ending criterion is satisfied, will be the price that will be applied to all preceding sales for The Auction.

Auction participants are committing to a maximum price per ENT token, and will receive tokens at this rate or lower whilst pre-sale purchasers will receive both a guaranteed allocation of ENT at the final auction price, and an additional 10% bonus allocation of ENT.

Distribution of Entropy Tokens

100 Million Entropy will be generated in total, to be distributed as follows:

1. A maximum of 50% to token sale participants.

- In the instance the ETH sale cap is met prior to the the percentage cap, excess ENT tokens will be transferred to the Entropy Foundation for purposes described at 2 below.

2. A minimum of 30% will retained by the Entropy Foundation for:

- platform partnerships,developer incentivisation programs
- Entropy token management initiatives,
- employee expansion and future development,
- token sale related expenses.

3. 20% will be allocated to the Entropy Foundation team members and advisors which will be subject to a two year vesting schedule with a 6 month

cliff. This means we will mature one-quarter of our tokens every 6 months.

All tokens will be held according to industry best practices and token issuance will occur at the completion of Step 2.The Auction.

Use of Funds

All funds received through the Entropy Token sale will be utilised by the Entropy Foundation as follows:

Development

Hut34 Project development will build upon Ethereum, it's ecosystem of qualtity open source projects and then layering our core feature requirements of Routing, Ranking and Monetisation utilising Dapp micro services.

Marketing and Business Development

Focus will be on marketing Hut34 to its potential user base through increasing awareness and knowledge of how it can add value to its participants. Business development efforts will be focused on identifying and forming relationships with new projects.

Legal, Finance and Treasury

Building Hut34, the Entropy ecosystem, and the global knowledge economy is a long term project and will require sensible capital management strategies and management of the Entropy Token marketplace. Funds will be allocated to achieve this. Legal requirements include corporate setups and legal contingency expenses.