# Community Token Economies (CTE)

Creating sustainable digital token economies within open source communities

Version 1.0, September 2017

## Abstract

This white paper is a review of the current state of the 'ICO' (initial coin offering) phenomena that has emerged since 2013, and has now gone mainstream in the early part of 2017. It discusses its benefits as an innovation, primarily to better enable open source communities to self-finance and realise new decentralised digital economies that are inherently less fragile when compared to traditional venture capital backed models.

It looks pragmatically at the flaws of ICOs and how they can be improved upon. In particular, we provide an analysis of a trend we are seeing organically emerge from the space we have termed 'Community Token Economies' (CTE). This is where multiple parties join forces to realise what we have refer to as Minimum Viable Community (MVC), in order to achieve network effects more efficiently and rapidly compared to going it alone.

Finally, we describe the implementation of a new framework being developed at Outlier Ventures to allow this to happen in a more structured and effective manner. Our aim is to ensure these new digital economies are increasingly self-sustaining.

# Foreword by Jamie Burke, Outlier Ventures

Since the inception of Bitcoin in 2009 a growing global community has emerged taking many of its underlying technologies and principles and applying them beyond a simple 'Internet of Money' to a wider range of industries and use-cases. This community has broadly referred to itself as 'the blockchain community', even though in many cases there were technically no chains of blocks involved.

In large part these startups were financed conventionally through VC money and set out to build a mix of proprietary and open source technologies with conventional 'rent seeking' or software consulting business models around them. During that phase, most people - including those trying to build the businesses - felt a silent unease about trying to apply Web 2.0 thinking to what was clearly a new paradigm. Most importantly, trying to build sustainable moats with defensible IP on what was in essence an open-source movement.

The question 'what is blockchain's killer app?' haunted everyone, including my own VC firm Outlier Ventures. It wasn't until the early part of this year (2017) when the principle that all startups could, although not necessarily should, issue their own tokens through what is commonly referred to as an ICO (Initial Coin Offering, aping IPOs) became more widely accepted by the community.

This has seen a flurry of experimentation in token design and growing commentary exploring how this could fundamentally change the market dynamics of industries where tokens become the predominant form of financing. Whilst it is still early days it looks like one of the, if not THE, killer app for blockchain is the ability in and of itself for open source projects to tokenise value. This killer application has already begun to break out of the 'blockchain' echo chamber and go mainstream.

The critical innovation is that now a development team anywhere in the world can issue a unique and cryptographically secure digital token to underpin value within the protocol or application layer of a new financial system. Furthermore they can, if they so wish, directly hard code the rules and economic principles they would like to see in the system to incentivise or disincentivise certain behaviours.

This token financialises value directly and allows for liquid secondary markets of exchange. This value can be fractionalised to allow any level of participation down to the smallest of micro-transactions. In principle anyone, anywhere, can participate in these new digital economies before, during, or after they have been created; allowing all parties to have a stake in their success through a form of decentralised ownership.

This is a truly revolutionary moment which turns decades of financing technological innovation on its head. It is this exciting new world we want to explore with you...

# About the authors

Outlier Ventures is an investment partnership dedicated to the convergence of decentralised technologies with deep tech and has been investing in the blockchain space for over 4 years. This paper is the collective output from the Outlier Venture Platform, the main contributors are:

*Jamie Burke (CEO), Aron van Ammers (CTO), Lawrence Lundy (Head of Research), Eden Dhaliwal (Head of Crypto-Economics) & Greg Murphy (Head of Token Structuring & Compliance)*

*With special thanks to: Stephan Apel, Michael van der Meer, Tim Rule, Nick Ward, Toby Simpson, Jonathan Bergqvist & Cathy Mulligan*

# Contents

# 1 The Opportunities & Challenges of Tokens

## 1.1 A new way to finance open source innovation

Open source software has traditionally supported its development in three ways: contributions and donations from individuals and companies; premium services on-top of a “free” product; and fee-based industry consortia such as Hyperledger[1] in blockchain.

Cryptographic tokens offer a new, improved way to raise capital. For the first time open-source projects can self-finance with contributors, each proportionately rewarded in the future value created. Whilst open source has always had powerful network effects, the additional skin in the game through direct financial stake puts open-source token-backed initiatives on steroids. The token also becomes a powerful tool for coordination of efforts[2]; we believe making it extremely difficult for conventionally backed proprietary startups to compete.[3]

## 1.2 When startups fail

We believe ICOs could provide a significantly less wasteful way to finance innovation compared to the traditional venture capital (VC) model, if executed effectively. The current VC sees 90% of startups fail on average, with the top reasons[4] being:

1. No market need
2. Run out of cash
3. Not the right team

When VC-backed or bootstrapped startups fail, almost all value from IP to institutional know-how is lost forever. This is a highly inefficient way to deploy capital and we think that, as an industry, we can do better. In fact, it is hard to see how we could do worse.

Tokenised open source projects potentially offer a solution to this dilemma. If the project fails, others can continue using the existing code and tokens, allowing it to overcome the main reasons startups fail. This resilience gives companies more confidence to adopt their

---

[1] "Hyperledger." https://www.hyperledger.org/. Accessed 21 Aug. 2017.
[2] "Leveraging the True Power of Tokens for Early Stage ... - VariabL Blog." 9 Aug. 2017, https://blog.variabl.io/leveraging-the-true-power-of-tokens-for-early-stage-projects-52acccdde51. Accessed 18 Aug. 2017.
[3] Crypto Tokens and the Coming Age of Protocol Innovation - Continuations by Albert Wenger http://continuations.com/post/148098927445/crypto-tokens-and-the-coming-age-of-protocol. Accessed 15 Aug. 2017.
[4] "Top 20 Reasons Why Startups Fail [Infographic] - Forbes." 2 Mar. 2016, https://www.forbes.com/sites/groupthink/2016/03/02/top-20-reasons-why-startups-fail-infographic/. Accessed 18 Aug. 2017.

technologies. To start with “no market need”: that might be because the team focused on the wrong markets and gave up; more people targeting different niches with more time might succeed. If it’s because of running out of cash; others can fork the project and re-raise funding from token holders. Finally, if the founding team happened to be the wrong team to execute on an otherwise strong concept, it’s possible to either recruit a new team from the community based on the existing token, or fork the project code and issue a new token, respecting the existing token distribution. Notable examples of the latter include the forking of Ethereum into Ethereum Classic, and Bitcoin into Bitcoin Cash[5].

## 1.3 The rush to ICO

In the first half of 2017, financing projects by selling cryptographic tokens or ICOs went mainstream. So much so that for the blockchain sector it surpassed VC funding[6]. This was likely due to a combination of technological maturity and innovations like ERC20[7] (and the proposed ERC223[8]) in Ethereum; increased level of capital due to gains on crypto-investments that needed to be recycled; and the fact that the concept of financing projects by selling cryptographic tokens had reached a critical mass over the previous three years through a series of sustained experimentation in ‘alt-coins’ (2013-2016).

Just as the blockchain community has quickly pivoted to the token model, so too are startups from across both the wider deep tech and general startup ecosystem. Where network effect is critical for success, open sourcing preferable and upfront capital requirement high, tokenisation seems the obvious way for teams to finance the initiative without diluting control of their businesses, which may sit alongside an offering.

The amount of capital being raised through token sales breaks new records every week. At the time of writing (17th August 2017) the record is Filecoin which raised nearly $250 million, but by the time many of you read this it will likely already have been broken by the next big thing. This is causing many to label the phenomena a bubble causing an even greater rush to cash in before it pops.

We however do not think this is a one-off but rather a fundamental shift in how startups raise capital, and expect tokens fueled by highly liquid secondary markets to become as ubiquitous

---

[5] "Bitcoin cash is already the third most valuable cryptocurrency — Quartz." 2 Aug. 2017, https://qz.com/1044413/bitcoin-cash-is-already-the-third-most-valuable-cryptocurrency/. Accessed 11 Aug. 2017.
[6] "Top 20 Reasons Why Startups Fail [Infographic] - Forbes." 2 Mar. 2016, https://www.forbes.com/sites/groupthink/2016/03/02/top-20-reasons-why-startups-fail-infographic/. Accessed 18 Aug. 2017.
[7] "Top 20 Reasons Why Startups Fail [Infographic] - Forbes." 2 Mar. 2016, https://www.forbes.com/sites/groupthink/2016/03/02/top-20-reasons-why-startups-fail-infographic/. Accessed 18 Aug. 2017.
[8] "ERC223 token standard · Issue #223 · ethereum/EIPs · GitHub." 5 Mar. 2017, https://github.com/ethereum/EIPs/issues/223. Accessed 21 Aug. 2017.

as early stage equities in the near future. Furthermore, whilst we don't necessarily think it is preferable we expect any startup that can issue a token to attempt do so. This will not just be limited to very early seed stage startups but also those that would otherwise have done an A,B,C or D Round.

This rush to ICO continues to hurt the quality of offerings. To date the large majority of ICOs have been poorly designed and executed in terms of readiness, team, product, governance, technical, compliance and commercials. Above all, the majority of ICOs fail to acknowledge the fact that creating a token is more than funding a startup; it is creating a new digital economy. Few have given much thought to how they want that new economy to behave and be sustained. It is this dilemma this whitepaper seeks to address and where possible remedy.

## 1.4 What could be improved?

The crypto-community is great at providing a crowd-sourced form of technical auditing but we think general quality can be significantly improved through the involvement of more professional investors performing proper due diligence, especially on the commercial assumptions, regulatory compliance, market sizing and team competencies. Furthermore, introducing established practices in governance structures like vesting would ensure teams are committed to long-term success. We are already seeing more institutional money flood into the market and standards are gradually improving. In fact so much so it threatens the original premise that these are community-financed initiatives at all with many of the pre-sale rounds, where capital is raised before a public sale, being largely filled by institutional purchasers drawn by the potential of an increase in value and anticipation of liquidity, rather than necessarily a strong conviction in a given innovation or community.

There is an entirely new skill set required, however, for cornerstone investors who will seed these initiatives and despite potential liquidity wish to take long positions and attempt to make the development of the network and token more sustainable. These new digital economies need specialist teams to invest due time and care in the token design process developing best practices in game theory and behavioural economics, including the simulation of the system's design pre-launch[9]. Over the course of 2017 we have invested heavily in this area to support teams to make the right design choices, combined with regulatory and compliance experts to navigate this rapidly evolving space.

We believe the above issues will be addressed by the market over time and are primarily a byproduct of its relative infancy. However the bigger challenge, and the point of this whitepaper, is: how can we better coordinate these initiatives to be as effective as possible in rapidly realising network effect in a more sustainable way?

[9] For example, Outlier Ventures is working on this with Imperial College London. See http://www3.imperial.ac.uk/newsandeventspggrp/imperialcollege/centres/cryptocurrency/newssummary/news_19-4-2017-14-30-54

As early investors native to the crypto-space, we are fortunate to be one of the first points of contact for startups aspiring to perform a token issuance. As such we are seeing multiple initiatives attempting to tackle the same problems from different angles, often unwittingly direct or indirectly in competition with one another.

Traditionally, in a proprietary environment because of the high failure rate previously discussed competition and diverse experimentation is not only good but necessary. In the token economy, however, this means many are either raising large amounts of capital to duplicate the open source infrastructure each needs to deliver value to their particular market segment, or they are building directly on general purpose protocols unable to optimally serve the needs of their specific use cases.

Either way, both can lead to waste through lost time, money and ultimately dilute community attempts to build better decentralised systems, momentum and network effect. When you understand token economies are community-financed and community-built initiatives, whose mission is generally to remove centralised monopolies and create more equitable systems, too much competition and early redundancy is counterproductive to the overall mission. It is important to stress it is not just the startup ecosystem that seeks decentralisation in the emerging Web 3.0 environment but is something many incumbents require at both a software and data level to avoid any one party monopolising the system. This is critical when that data is used to power increased automation through machine learning and AI.

A further drawback to not taking a more collaborative approach is a duplication of work where there is a very scarce talent pool for the community to draw from. The combination of expertise in cryptography, smart contracts, and game theory is hard to find for blockchain startups and corporates alike. We believe joining up early to build common infrastructure is a better allocation of scarce human resource and will better benefit the advancement of decentralisation technology as a whole.

# 2 Stronger Together: the Community Token Economy

Because of these reasons, we champion an alternative approach to siloed innovation called a ‘Community Token Economy’ or ‘CTE’ where otherwise competing teams, including startups and possibly incumbents, combine their efforts early on within a focused theme. Doing so helps realise common infrastructure to contribute towards building network effect and economies of scale more quickly via a collectively owned protocol and shared ‘Community Token’. This is the key distinction between the CTE approach and for example Hyperledger[10], R3[11] or Ethereum

[10] "Hyperledger." https://www.hyperledger.org/. Accessed 21 Aug. 2017.
[11] "R3." https://www.r3.com/. Accessed 21 Aug. 2017.

Enterprise Alliance[12]. Importantly, this can be in parallel to development of their own more nuanced App Tokens to avoid restrictive dependencies and allow for skin in the game at the various levels.

## 2.1 The principles of a CTE

So far we have laid out why the market requires a CTE model, but what exactly is it and how could one be structured?

First, it is worth reiterating that for us the overriding purpose of a CTE is to optimise a pathway for a select community to realise an equitable, open source, decentralised market. Therefore, a CTE is not trying to centralise a decentralised economy through a top down, rigid command-and-control structure, nor to duplicate existing efforts or technologies with the same goal. Instead, it attempts to provide a dynamic framework to incentivise collaborative behaviours early in the birthing cycles of these new digital economies. This is in order to make them more likely to succeed, whilst simultaneously allowing for each group of participants the freedom to explore their own paths as it matures.

A CTE should be inclusive, seeking to build a powerful centre of gravity that brings the rest of the ecosystem into its orbit. Initiating this in a manageable way requires pragmatism over dogmatism.

We propose the starting point is something called ‘MVC’, or ‘Minimum Viable Community’ (borrowing from the conventional startup world, MVP or Minimum Viable Product). This is the idea of having the participation of enough of the community in the CTE’s design and subsequent launch to make it meaningful. This is often less about numbers and more about quality. This should include parties culturally aligned with the team's mission, who they will likely already be collaborating with in one way or another. The focus should be on those who can provide the most immediate value to the project and are well respected by their peers and are of high repute.

Once onboarded, all parties collectively form a non-profit foundation to govern the shared protocol. The committee agrees on the allocation of capital raised to realise the shared mission statement and governs if and how that should change over time. At its formation each founding team commits brand, know-how, code and / or IP in return for a portion of the tokens, typically distributed at issuance to the founding team (circa. 15-25%, depending on value committed). The design should be inclusive and allow all parties to leave as easily as new ones can join with the approval of others, taking into account the contribution of each party and the appropriate risk to reward in the vesting tokens.

[12] "Enterprise Ethereum Alliance." https://entethalliance.org/. Accessed 21 Aug. 2017.

## 2.2 CTE In Action: Autonomous Mobility

To illustrate the CTE concept and its properties we'll use a fictitious use-case throughout this document. We'll consider three fictitious startups that want to do an independent token sale (ITS) related to an Autonomous Multi-Modal Mobility Web Economy.

- Electric Charging Grid Company (GridCo): operator of charging grids for electric cars
- Autonomous Car Company (CarCo): manufacturer of autonomous car technology
- Ride Sharing Co (ShareCo): offers a ride sharing network using a mobile app

Each of these startups have arrived at the idea of building an open, token-based marketplace for autonomous vehicles for themselves each with it's own native app token built on say Ethereum. The alternative being instead they might join up and follow the CTE approach. We'll explore both alternatives throughout this document.

**GridCo,** wants to make its charging grids accessible to autonomous cars.

**CarCo,** has the vision of making tokenised ownership of its cars possible, allowing multiple people to own a fraction of a car and get proportional revenues from its services.

**ShareCo,** wants to scale and open up its ride sharing network.

## 2.3 Designing for MVC - Minimum Viable Community

The founding teams of a Community Token Economy Sale (CTES), when a CTE looks to 'offer' tokens through a community sale, they should always first look to their immediate network of partners they know and have worked with before to try and achieve MVC. The reality is a Community Token Economy Sale (CTES) is infinitely easier if the founders are already well known actors in an ecosystem, and as such carry weight and gravitas.

The first port of call if you are an established business is existing advisors, suppliers, customers and technology partners. The simplest first step towards building momentum is to create a Slack Channel (or an open alternative like the Matrix network[13]) with public and private channels to migrate potential partners and contributors through clearly defined stages, from education to onboarding, and then on to direct collaboration.

Founding members need to be clear about the direction they want to take the community, and to make sure the crypto economic design is inclusive and open to input, allowing for collective participation and a sense of ownership. The most important factor when building an inclusive

[13] "Matrix.org." https://matrix.org/. Accessed 10 Aug. 2017.

community is trust. Trust is hard to build but easy to squander. Trust should be won with transparency and dialogue from the early stages.

Achieving MVC is just the first step in a much bigger mission to win over an entire market to join a new digital economy. MVC assumes the initiators are able to recruit 2-3 meaningful partners from their immediate ecosystem for it to become relevant. Rather than each party creating their own incompatible token-system it is better to be pragmatic. If token sales are a known fundraising approach in the target community, others are likely to already be planning one and a discussion on joining forces can be opened. For VCs known for expertise in token issuances this is a value added service that can be offered.

A method to help with the sequencing of how the community as a whole is engaged (which extends well beyond the CTES, the sale itself) is mapping the universe with an **Orbit Chart** (as below in figure 1). To use the analogy of physics and space, an Orbit Chart has 3 elements; home planet, orbits and zones.

- **Home Planet -** defines the small grouping of entities, including the initiating party, that is required to realise MVC as a meaningful point of gravity to pull others into its orbit.

- **Orbits -** defines the stages of community roll-out before, during and after a CTES. The outer reaches can extend to 3+ years into the future. The idea being the centre of gravity, that is the token economy being built, absorbs each ring over time as it grows making it harder for seemingly far off limits to resist its pull.

- **Zones -** defines the stakeholder segments of community that need to be engaged to build gravity. Whilst they may be weighted differently they should all be covered here and be used to plan and importantly track progress.

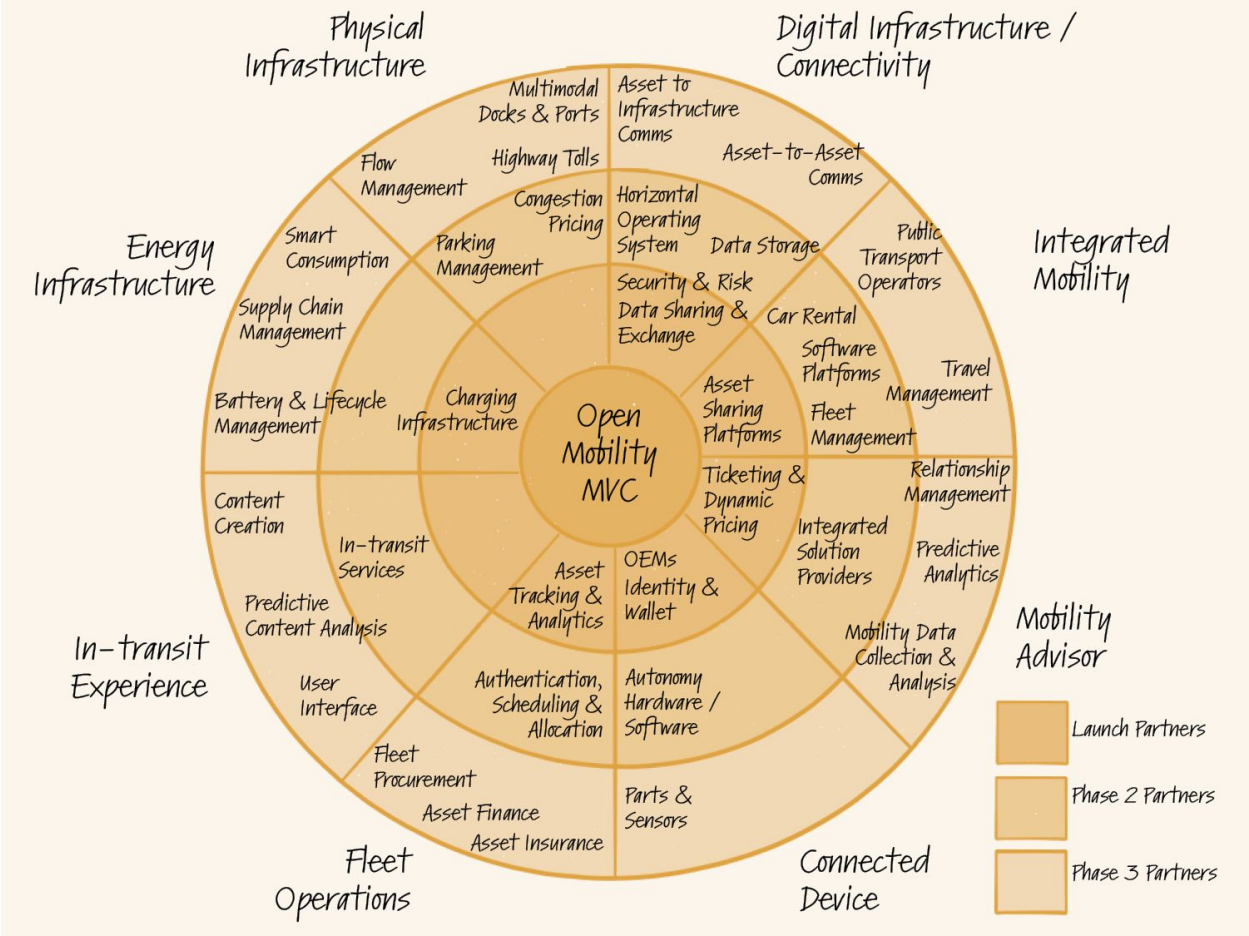



**Figure 1 - Orbit chart for Open Mobility MVC**

The graphic above is an example of how an Open Mobility Minimum Viable Community (MVC) might develop.

Closest to the centre are a few core solution areas that are needed to kick-start a viable open mobility ecosystem. Solutions from all categories are needed to eventually build a long-term sustainable ecosystem, but the objective of the MVC is to identify the core pieces that are required almost immediately at launch. Here solutions within physical infrastructure and in-transit experience can wait until phase 2 partners are engaged to enable scaling and growth. Critical launch partners include OEMs, security & risk, asset sharing platforms that enable the project to reach customers quickly, safely and cost-effectively.

***In Action: the three founding members of the Autonomous Mobility CTE attract a vibrant community of around 250 participants on Slack and Reddit. The MVC consists mainly of engineers, enthusiasts, software developers and early investors.***

## 2.4 CTEs augmenting existing platforms

It's important to stress the CTE is a governance and coordination model, not a technology. CTEs are meant to augment rather than replace generic protocols, blockchains or distributed ledgers like Ethereum or IOTA[14] that solve their own particular but generalised problems. A CTE is always industry specific and not limited to a specific ledger technology but may use a combination, which we elaborate on in **Section 6** below. By providing a framework for entities to collaborate in a mutually beneficial way, CTEs are a powerful mechanism to enable market-specific economies to be built on top of existing general purpose communities and will aid their further growth and development.

The Community Token in a CTE brings contributors together, aligning their efforts toward a common goal. To illustrate the point it could be considered at a higher level this happens in Ethereum, with Ether as its Community Token and its ERC20/ERC223 tokens as specific applications under the unifying theme of "decentralised computing". The Ether token aligns the economic incentives of contributors to the overall Ethereum ecosystem to collectively realise decentralised computing. For other, more specific goals, we believe new additional Community Tokens are required to cater to their respective shared requirements of more niche economies.

For example, based on lessons from previous blockchains and token ecosystems we believe that more market based requirements should be encoded into the Community Token of a CTE to directly align stakeholder incentives. The needs of the transportation industry are very different to those in the healthcare industry; therefore the economic principles and incentives need to be designed differently. CTEs are part of the broader trend - R3 in finance, B3i in insurance and Hashed Health in healthcare - to design market-specific protocols and tokens rather than directly building on general purpose systems like Ethereum or creating application-specific blockchains. However a CTE looks to capitalise on this need whilst reducing redundancy.

Fundamentally, CTEs introduce a business model innovation by creating a shared environment to reduce operating costs and promote the sharing of resources more efficiently. We expect CTEs to accelerate further open innovation into smart tokens, decentralised governance and crypto economics which will lead to an increasing amount of building blocks for tokenised economies.

### 2.4.1 CTEs reinforce the platforms they build on

CTEs reinforce the underlying platform they build on in several ways. Firstly, just by adopting it they make the platform more valuable, directly by using its token and indirectly by enriching its ecosystem. Secondly, we expect CTEs to contribute to the development of the underlying platform by working closely with its core developers, possibly donating a part of the CTES

[14] "IOTA - Next Generation Blockchain." https://iota.org/. Accessed 21 Aug. 2017.

proceeds to the platform foundation or a development fund where these is a critical dependency.

# 3 Main Concepts

## 3.1 Value retention in open tokenised protocols

Tokenised open protocols like Bitcoin and Ethereum have innovative governance systems for how they achieve consensus, either by proof-of-work (computing power committed to the protocol), proof-of-stake (capital committed to the protocol) and other consensus algorithms. Governing their development goes well beyond the conventional governance models we have seen in anything we have seen before, like say Linux or HTTP.

In this case, whilst there are still foundations led by a team of dedicated core developers, they primarily have to seek consensus from other stakeholder groups, commonly referred to as miners in the case of proof-of-work, that ultimately secure the system by committing resources. If they are unable to keep the majority happy (51% of those stakeholders), they will likely choose to reallocate that resource where possible to alternative protocols potentially leading to a hard fork, which effectively drives a split in the community.

Each protocol will likely deploy different consensus mechanisms with different levels of decentralisation. It's impossible to say there will be a standard governance model for a CTE, only that it should be hardcoded into the design of the protocol and its native token directly forming a constitution of sorts. However what we can say with surety is that whilst there may be a foundation or similar corporate entity governed by the founding members, they serve at the behest of the community. Importantly, they can't stop any part of the community setting up a competing protocol with an alternative foundation. It is this principle that makes these systems inherently less fragile because they allow for any number of subsequent realisations and interpretations of the founding CTE vision.

Therefore the objective is not to attempt to predict, restrict or control the potential for CTEs to fractionalise. Because for any fork, even though it may split the market cap proportionate to the size of the community that chooses to follow it, all value up until that point held by its founders and investors is in theory retained in any new versions[15]. Therefore there is only the requirement to be a token holder in the genesis protocol, and for that protocol to build enough momentum by delivering foundational value to gain from any and all future mutations. With these powerful yet conflicting characteristics of aggregation and fractiousness we see these systems increasingly mirroring biological lifeforms, which mutate and evolve.

[15] Or as in the case of the Bitcoin/Bitcoin Cash fork, the value seems to have been purely accretive. The value of BTC + BCH is greater than the value of BTC before the fork. The market seems to have rewarded choice despite fractionalisation. This is a clear demonstration of antifragility.

***In Action: The three founding parties of the Autonomous Mobility CTE decide to form a foundation where each has a seat with equal voting rights to decide on the core development roadmap. Board meetings and decisions are recorded on a public blockchain for transparency.***

## 3.2 Core Protocol

We'll refer to the common infrastructure being built in the CTE as the "Core Protocol". We maintain a wide definition: the Core Protocol is an open network with a native token and a shared data layer, on top of which applications can be built. Depending on the scope and needs of the project this might be a low-level protocol like Bitcoin[16], Ethereum[17] or IOTA[18], or a higher level protocol like Bancor[19] or Augur[20].

An essential characteristic of the core protocol within CTEs is that it must be upgradeable, so that additional characteristics to it and its tokens can be added iteratively with community consensus.

## 3.3 Token economy design

Creating a token means designing a new digital economy, therefore token design requires expertise in behavioural economics and game theory to better ensure long-term viability and sustainability. Through the design process many of the flaws seen in blockchain 1.0 protocols can be avoided with the hindsight we now have. For example, ideally there should be no neutral state in the system, with both incentives or disincentives to direct behaviour.

Various design principles can be built into tokens for both protocols and applications with some common roles for tokens, besides transfer of value, being access, staking, voting and rewards. This can allow for increasingly complex systems of multiple tokens in concert, interacting with each other through their unique properties[21,22] including other protocols to trade and convert tokens[23].

[16] "Bitcoin - Open source P2P money." https://bitcoin.org/. Accessed 21 Aug. 2017.
[17] "Ethereum Project." https://www.ethereum.org/. Accessed 21 Aug. 2017.
[18] "IOTA - Next Generation Blockchain." https://iota.org/. Accessed 21 Aug. 2017.
[19] "Bancor protocol." https://www.bancor.network/. Accessed 21 Aug. 2017.
[20] "Augur." https://augur.net/. Accessed 21 Aug. 2017.
[21] "Steemit." https://steemit.com/. Accessed 11 Aug. 2017.
[22] "Lunyr." https://lunyr.com/. Accessed 11 Aug. 2017.
[23] "Bancor protocol." https://www.bancor.network/. Accessed 11 Aug. 2017.

Types of Tokens:

| TYPE | FUNCTION | EXAMPLE | PROGRAMMABILITY |
|---|---|---|---|
| Crypto-Currency | Facilitation of payments & transactions | Bitcoin | Monetary policy, multisignature, time locked transactions |
| Crypto-Commodity | Used to operate the distributed application platform | Ethereum | Functionally unlimited (limited in complexity by gas usage), through Turing complete smart contracts |
| Protocol Token | Provide cryptographic access to an open network with a shared data layer | Bancor | Fee rates, time-based demurrage |

### 3.3.1 Example of a multi-token economy: SteemIt

To illustrated the point a real-world example of a more complex system with multiple tokens is the SteemIt[24] protocol. This is not an endorsement of complexity or their particular approach but rather to show what is possible.

SteemIt aims to reward content creators, curators and consumers for their contributions through it's Steem protocol token. Steem is instantly convertible into two underlying tokens, Steem Dollars and Steem Power:

- Dollar is used to reward content creators/curators for their contributions.
- Power is used to incentivise network participants to commit to the platform long-term and holds more voting power and financial value over time.
- Dollars and Power are both required to incentivise short term and long term behaviors, and as such are distinctly separated.
- Meanwhile, Steem is used to access the network and hoarding is disincentivised through daily depreciation.

[24] "Steemit." https://steemit.com/. Accessed 16 Aug. 2017.

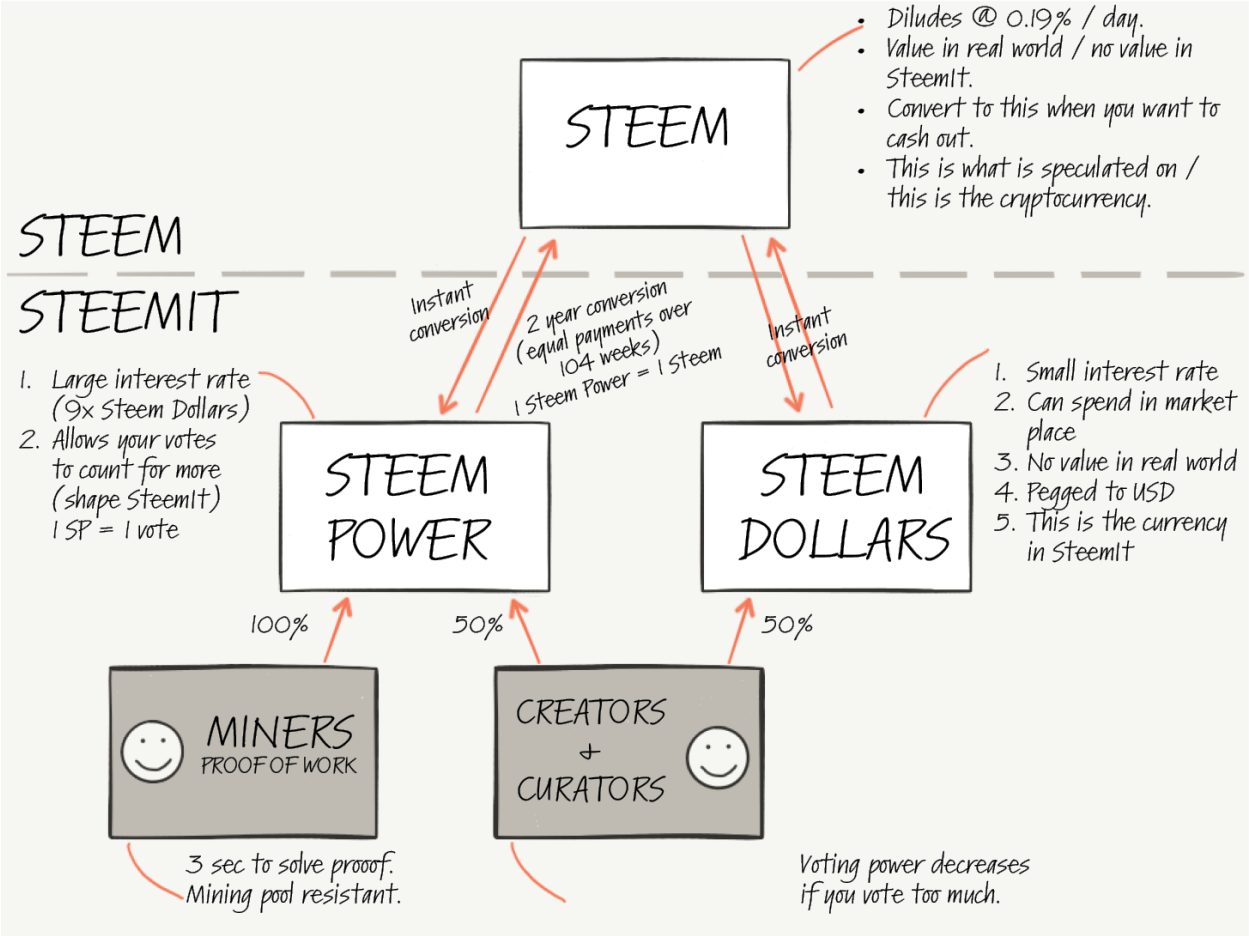



**Figure 2 - tokens in the SteemIt protocol**

### 3.3.2 CTEs as meta economies

The best way to think of a CTE is as a larger meta economy with a series of complementary tokens interacting with one another within it. A first important distinction to make is the difference between the Community Token and various App Tokens within the system.

The primary distinction is that the Community Token should deliver a clear utility function to the overall network, at a minimum allowing access. By design it should fulfill the principles its founders collectively want to see realised in the digital economy it enables. These principles could be ethical and / or practical but should ideally seek, whenever possible, balance and alignment of incentives for all its constituent stakeholders.

Whilst the Community Tokens need to enforce the principles of the community, it's important to stress they should not be overengineered to try to account for every possible behaviour to the exclusion of nuance. Instead it's preferable to start simple, with only those principles the founding parties agree on as fundamental to their vision, and experiment outwards over time. A good protocol layer captures the greatest common denominator between each of the founding

members of the CTE. This is both to discourage too many compromises forced on app developers, creating possible tension down the line with their own evolving vision. This allows for greater levels of complexity to be delivered at the application layer.

As such core applications and services within the community can issue their own App Token on top of the protocol to align their economic incentives towards specific subdivisions. The App Tokens can be traded independently to the Community and Community Tokens and have their own price set by the open market, relative to the value they deliver. However if a party chooses to have their own tradable App Token, free market forces will keep their prices somewhat loosely connected, much like the Ether and its aggregation of associated ERC20 tokens. This provides a way for independent groups and companies within the wider community to compete whilst still being aligned to the mission of the overall success of the network. The Community Token subsequently represents the overall strength of the community and is directly linked to the collective success of its ongoing cooperation, plus a premium because they are working as one interoperable ecosystem.

App Tokens built on top should act as an interface for specific user groups both within and outside of the protocol, to carry out more complex actions which require custom functions or allow for a simpler user experience. This could simply to have a non-tradable App Token that is pegged to a fiat currency to allow for ease of use from none crypto-savvy users. They however must do so within the fundamental rules of the system as dictated by Community Tokens. Those App Developers that come into orbit early receive a portion of Community Tokens and so have a hedge on their particular project failing, removing the zero sum game typical in startups.

***In Action: an Autonomous Mobility Token (called "AMT") is issued, and a proportion of it reserved for early contributions. In the early stages of building out the project, community members are rewarded with AMT for their contributions. The Core Protocol is scoped to support trade between autonomous vehicles, devices that serve them (such as charging stations) and clients they serve (such as ride sharing users or users that send a package).***

## 3.4 The practicalities of multiple tokens

On various occasions we have described the use of multiple token types within a system or within subsystems, such as Community Tokens and various App Tokens. Some consideration of the practicalities of working with potentially a large amount of different token types is in order.

Tokens unite and economically align people around a common purpose. However introducing a new token is not without drawbacks. Using a multitude of tokens in a system can be confusing to its users and contributors. Furthermore new tokens will be less liquid than existing ones, as there are no functioning markets for them yet.

To end users of the system who only want to use its services much of the confusion can be taken away by abstracting the various tokens and presenting values only in a currency of choice.

The potential issue of “token overload” is not unique to the CTE concept and we foresee the creation of solutions for it. At time of writing there are already over 800 cryptographic tokens and assets, with a considerable number to be added over the coming months. Irrespective of the addition of a number of new tokens as part of a Community Token Economy, there is a need for the creation of frictionless ways to convert between tokens. Besides the concept of smart tokens as described in the section below, we see a role for advancement in wallet technology and exchange services to better support a world of many tokens.

To contributors within the Community Token Economy as a whole and the various sub-initiatives, the various tokens provide options to economically align with specific centers of gravity within the wider community.

***In Action: when using an app built on the Autonomous Mobility Protocol, Alice chooses to see all values converted to Pounds Sterling and pays for them with the debit card from her bank, while Bob chooses to see values denominated in Bitcoin, and pays with a Bitcoin wallet. Charlie, who is an active contributor to the Electric Charging Grid app, holds a number of its app tokens and a number of AMT Community Tokens, and actively tracks their respective value.***

## 3.5 Smart tokens

Tokens built using smart contracts can have advanced properties and behaviour that go far beyond a basic monetary system. These are called ‘smart tokens’ and we will explore some possible functions relevant to a community token economy. Smart tokens are a new concept which deserves experimentation; which we will explore them at a high level in this section.

Firstly, there is a role for smart token contracts to convert the various token types within the CTE. This could be delivered in a number of ways.

- Using a system like the Bancor[25] protocol, on the condition that it has been proven in large-scale use, where the community provides reserves of Community Tokens.
- By building conversion functionality into the Core Protocol to mint App Tokens in return of Community Tokens.
- The creators of an App Token might want to convert it back to Community Tokens if, for whatever reason, the initiative did not lead to the desired results.

[25] "Bancor protocol." https://www.bancor.network/. Accessed 11 Aug. 2017.

Secondly, tokens can have smart properties like time-bound demurrage. This means simply stated: “use it or lose it” whereby the token needs to be used regularly or it will lose some of its value. In more advanced forms they can track, analyse and automate previously human-mediated decisions, including large parts of traditional monetary and fiscal policy.

Furthermore smart tokens can play a role in other more nuanced ways at the application level. For example a ride sharing app which has an agreement with a specific city to provide free parking for cars. Or a city specific App Token that automatically pays taxes at the point of use with given vendors.

## 3.6 Token Types: Core Utility and Apps

Below is a high-level overview of the various token types that can exist in a CTE system and how they could relate to one another:

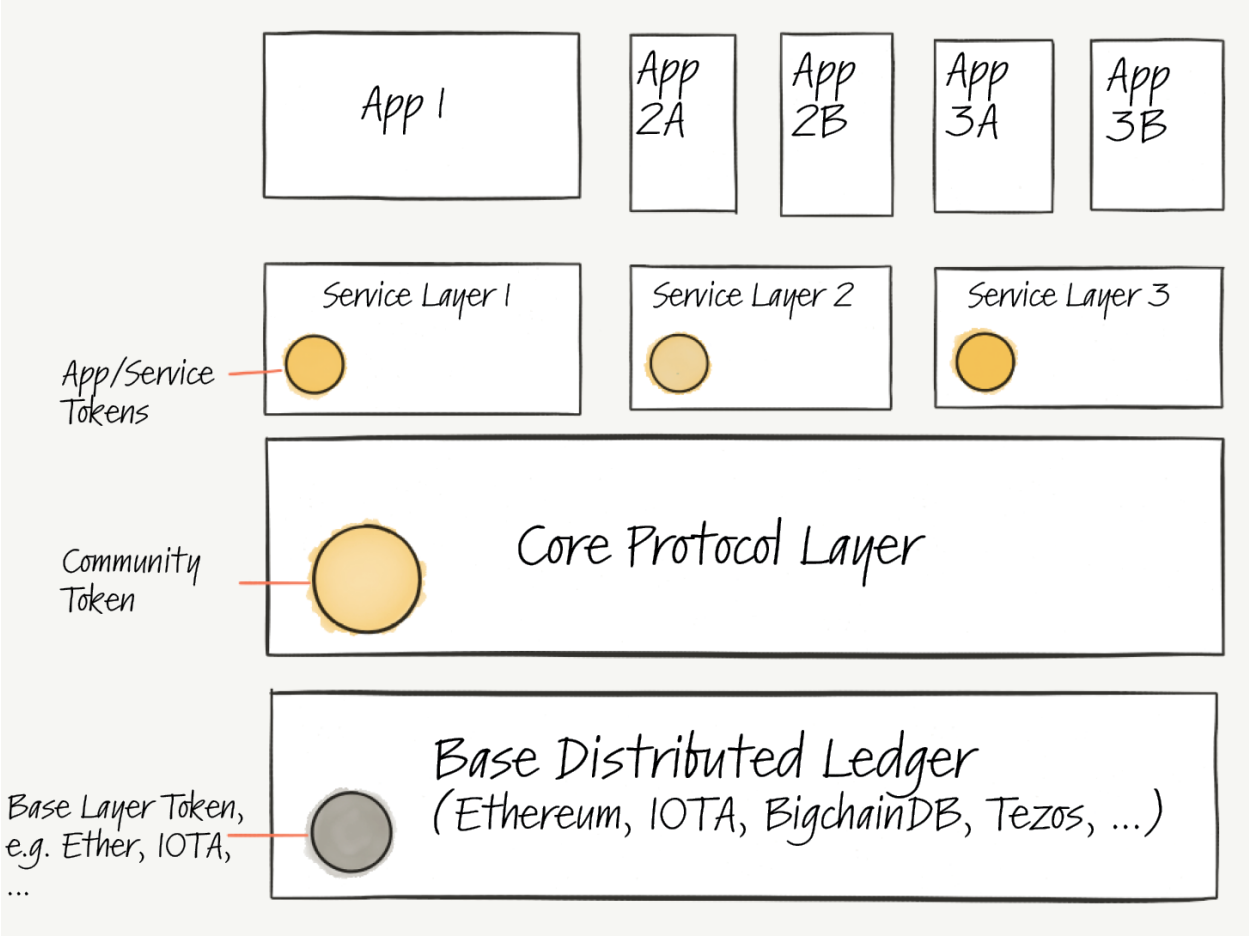



**Figure 3 - token types in a CTE system**

### 3.6.1 Community Tokens

The Community Token is a utility token, required for using the core protocol layer as developed in the project. The Community Token is the token that binds the entire CTE community; its value aligns the interest of all community members.

The function of the Community Token can evolve throughout the lifetime of the CTE. At the inception of the CTE, no core protocol exists, because it has yet to be designed and built. In the early stages it can be used to reward all types of contribution to the core protocol and organisation like design, development, marketing and governance. As the core protocol is developed, additional properties are added to it, reflecting the common principles of the community. Each new version gets deployed after approval through the chosen CTE governance structure, giving the community control over the development of the token itself.

***In Action: the Autonomous Mobility community has issued a Community Token called AMT (Autonomous Mobility Token). Each of the three founding members receives a proportionate amount of AMT. In a process of iterative design the token economy and core protocol are designed. Additional properties for the AMT token are developed and incrementally deployed under community governance.***

### 3.6.2 App Tokens

Applications and services built on the Core Protocol form an important part of the ecosystem. The founding partners will likely have their own apps, either pre-existing or developed during the CTE lifetime. Additional apps and services are added as the community grows and attracts more projects to its orbit.

Each of these apps are smaller sub-communities in their own right for which the same dynamics are at play. To align their specific incentives towards the development of the app, an App Token is issued for each. Here the same iterative model might be applied as for the core protocol: initially the App Token is relatively simple in structure. Later on when the app and its token model have crystallised it gets additional properties. If the conclusion of the design process is that the app shouldn't use a token at all, the App Community Tokens can be converted back to Community Tokens of the core community.

***In Action: the three founding members of the Autonomous Mobility community each create an app on top of the Core Protocol, with a corresponding App Token. These are respectively named GridToken (GRDT), CarToken (CART) and ShareToken (SHRT). As the apps are finished and their tokens generated, community members convert their AMT to GRDT, CART and SHRT through smart token contracts according to their confidence in these apps. The app tokens can be used in production and traded.***

### 3.6.3 Hierarchies of tokens

The principle of sub-tokens might be extended to further layers in a hierarchical fashion over time. An app might become a platform in and of itself upon which another set of applications is built. Each of these platforms can follow the same dynamics and sub-token issuance mechanism.

In the analogy of the center of gravity attracting projects into its orbit, the apps become smaller constellations revolving around the core protocol, which attract their own projects around them.

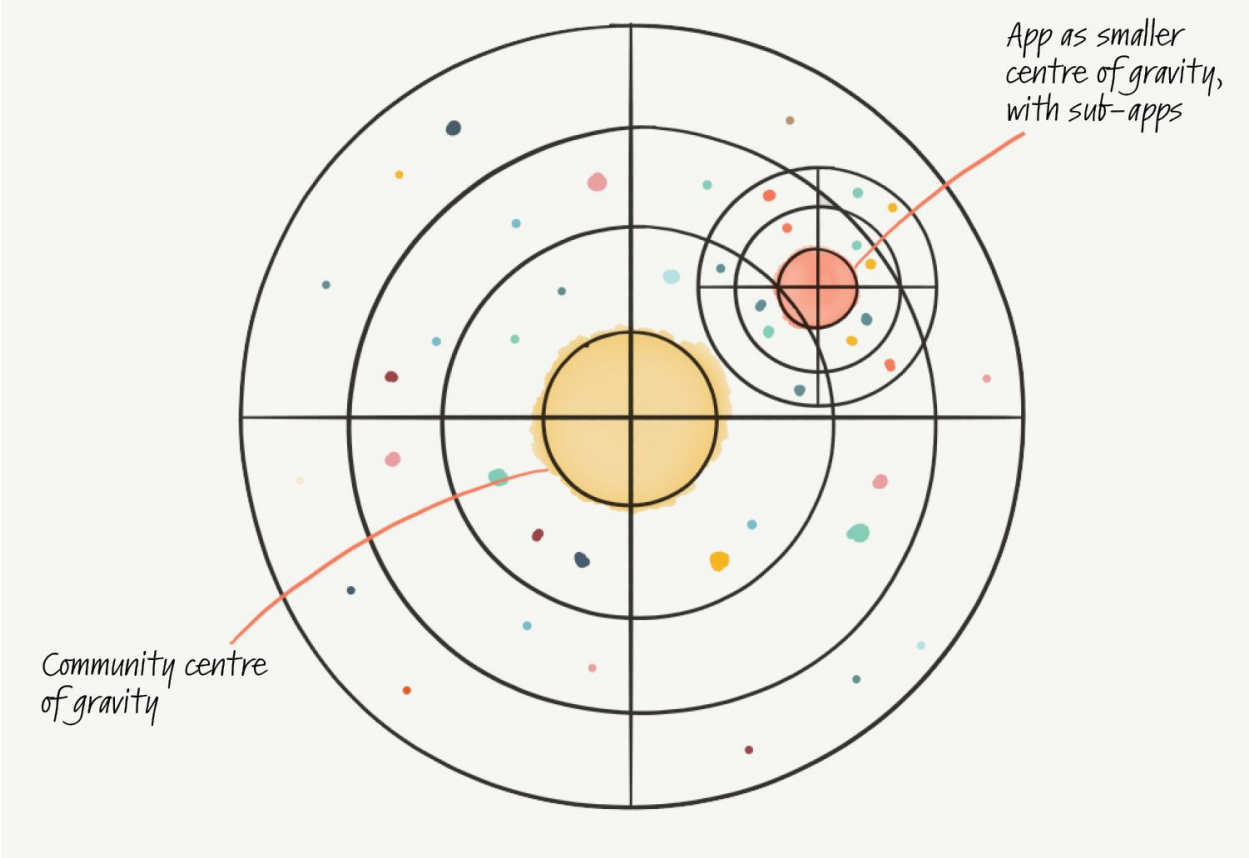



**Figure 4 - the Community Constellation**

## 3.7 Token issuance & distribution

At the inception of any CTE, a number of teams and companies participate as Founding Members (FMs). These teams propose to deliver a core application or service, and their combined commitment in aggregate forms the wider CTE. They also agree on a process to distribute capital from the CTES for the ongoing furtherment of the community. Acting as

curators, as envisioned in The DAO[26], by way of bounties (or as increasingly is being seen in the wider ICO market), pots of money for the acquisition of existing companies for their code, users and / or licenses, which may expedite the community's growth through aggressive expansion into the orbits as described in **Section 2.2**.

### 3.7.1 Value Contribution

Founding teams and companies commit assets including code and physical infrastructure to connect to the protocol, know-how, ongoing developer resource as well as licenses and users to the 'community protocol initiative' through a foundation in return for a share of the Community Tokens it issues. This is proportionate to their contribution and the value ascribed by the foundation at its genesis. The role of the foundation is to further the rapid realisation of a widely adopted, shared, open infrastructure with clear governance and standards.

Those parties that seed the foundation earn a fixed number of permanent seats to vote on its direction and leadership. If relevant this is reviewed periodically against the continued success of their own App Token as minimum market cap threshold (taken, for example, as a mean over the previous 6 months) as compared to the Community Token.

### 3.7.2 Vesting & Community Funds

All App Tokens raise a capped amount of capital from the CTES which is then distributed proportionately via vesting agreements. Token sales generally currently lack best practice agreements and tools for the vesting of founder tokens. However good recent examples include Tezos and Filecoin with a 4 year and 6 year linear vesting period respectively.[27] With the CTES concept we aim to raise the bar in this respect through applying well-known best practices from the startup world encoded in smart contracts.

Any surplus capital of the token sale is invested for the advancement of the community through partnerships, bounties, acquisitions and mergers by way of a special purpose vehicle we can refer to as a Community Fund. Early examples of token-funded projects creating such a community fund already exist[28,29]. As discussed earlier it may even seek to donate to related open source foundations of key technical partners and related non-profit user communities that support its ongoing health and goals, including activities like user education and lobbying.

---

[26] "What Are The Roles of DAO Contractors and Curators? – The Merkle." 15 May. 2016, http://themerkle.com/what-are-the-roles-of-dao-contractors-and-curators/. Accessed 11 Aug. 2017.
[27] "Tezos." https://www.tezos.com/. Accessed 11 Aug. 2017.
[28] "IOTA Ecosystem Fund ($10 million) – IOTA." 5 May. 2017, https://blog.iota.org/iota-ecosystem-fund-2-million-f6ade6a4d8ba. Accessed 11 Aug. 2017.
[29] "Tezos Stiftung – August Update - tezos.ch." https://www.tezos.ch/august-update.html. Accessed 11 Aug. 2017.

### 3.7.3 Bounties

The remaining capital will be distributed via bounties against successfully executed projects by the wider community, including founding companies. To create core applications and services on top of the network, a tendering process is used. On the broader community level, Requests for Proposal (RFPs) are issued to describe services and components to be built within the wider community.

### 3.7.4 Liquidity of App Tokens

If preferable to all the parties, the community may agree that for a period App Tokens for founding teams would not seek to be listed directly on exchanges, so the public can only participate at the Community Token level while the system stabilises.

A portion of each issued App Token can be reserved to be only available for purchase with Community Tokens. This reinforces the cohesiveness of the app community to the wider CTE.

# 4 Planning and Phases

## 4.1 Scenarios

New participants should be able to join a CTE before or after the protocol is issued and that is something which can be catered for at inception. We have detailed below the various scenarios and considerations for each below.

### 4.1.1 CTES executed first

The common model to create a Community Token Economy is to start with the CTES, Community Token Economy Sale, as described above. The founding members and working groups build their apps in parallel with the core protocol. Individual App Tokens are issued later.

This scenario gives the most benefits from the CTE approach. Common infrastructure is created by all the members, and applications are designed so that they optimally work with the common infrastructure.

### 4.1.2 App Token sale executed first

Another possible scenario is where the CTE is initiated, but one or more founding members run a their own App Token first, with the explicit commitment of their project being part of the CTE. A reason to do this could be that the member’s sale was already planned and under way before the opportunity of creating a CTE surfaced or members want to avoid waiting for the completion of the process in setting up the CTE before progressing with their own app and token.

A member running their own token sale generally will not receive any of the proceeds of the CTE, rather they swap an amount of their tokens with Community Tokens. Furthermore they contribute to the development of the core protocol as any other member, such as by committing development capacity.

This approach carries the risk that members who do their token sale first diverge from the Community Token Economy. It is therefore of increased importance that development of the app and the core protocol happen in parallel, keeping a close alignment between the two.

A possible advantage of this approach is that it will make the process of valuing each member's contribution easier, because there is already a token with a current value.

***In Action: one of the three founding members for Autonomous Mobility, ShareCo, is already in the process of running a token issuance of their own. They decide to join the Autonomous Mobility CTE, but progress with their own issuance independent of the CTES. The issuance is executed and an amount of ShareToken (SHRT) is sold. ShareCo holds the proceeds of this token sale.***

***Subsequently the CTES is run and an amount of Autonomous Mobility Token (AMT) is sold. The part of the proceeds of the CTES dedicated to issuing companies is split between GridCo and CarCo. ShareCo swaps part of its SHRT holdings for AMC.***

### 4.1.3 Blending in an existing token

CTEs must build an irresistible centre of gravity that over time pulls App Tokens and their communities away from competing protocols into its own. When an existing project and community, with its own existing token, wants to join the network at a point after its own token issuance, the project's existing token can be converted into a new CTE App Token after approval according to the Foundation governance model. The community could choose to offer an automated way to do this through a smart token contract.

Because all token economies are, to an extent, decentralised, the issuer of the existing tokens can't unilaterally decide to bring in their project and token into the CTE. Instead the token holders have control over their tokens and need to decide whether they want to join or not.

An option to cater for this is a "token swap": a smart contract can be provided which allows an existing external token holder to burn their tokens and receive a number of Community Tokens proportional to their holding as part of the "buyout". When the new App Token is issued, they also receive a proportional amount. Some existing token holders might choose not to burn their tokens, effectively keeping a fork of the external project alive. A solution for decentralised exchange such as 0x[30] might be used to facilitate the token swap.

[30] "0x: The Protocol for Trading Tokens." https://0xproject.com/. Accessed 21 Aug. 2017.

The above might be performed even by existing startups which haven't yet issued any tokens of their own. The startup might instead tokenise itself by converting its shares into cryptographic tokens[31] or performing a "reverse ICO"[32], then following the assimilation process for App Tokens, although this will have considerable legal and regulatory consequences that need to be worked through.

## 4.2 Phases of a Community Token Economy (CTE)

### 4.2.1 Inception

The inception of a CTE starts with identifying a common community theme, and consequently the critical mass of founding partners needed to bootstrap the initial community (MVC). The best way to do this is to map the ecosystem. This is a similar exercise to defining a market size, but instead of defining the opportunity by the size and volume of a particular market, an ecosystem map identifies all the stakeholders within a particular community and maps their interdependencies. This exercise seeks to understand the key partners and solutions required to bootstrap the MVC.

### 4.2.2 Foundation

The second step is defining the organisational structure that best supports a Community Token Economy. In our view, a foundation type structure allowing direct human involvement and discussion is best to align all the interests of a community. This step will finalise the foundation participants, the valuations of the founding partners and set a vision and roadmap for the project.

### 4.2.3 Alpha Product Building

Technology of the founding partners is combined and an alpha version of the core protocol and product(s) are built. Early community members contribute value in ways such as testing the products, providing feedback, helping each other out and writing documentation.

### 4.2.4 Community Token Sale (CTES)

The CTES is executed much like existing token sales based on best practices developed by the industry and leading reputable players. This should include; legal and regulatory preparation; crypto-economic planning and design; technical development; token preparation; marketing and PR; investor disclosure; purchase and delivery.

---

[31] "Tokenize the Enterprise – The BigchainDB Blog." 6 Jun. 2017, https://blog.bigchaindb.com/tokenize-the-enterprise-23d51bafb536. Accessed 10 Aug. 2017.
[32] "'reverse ICO': How existing businesses will start tokenizing - VentureBeat." 17 Aug. 2017, https://venturebeat.com/2017/08/16/the-reverse-ico-how-existing-businesses-will-start-tokenizing/. Accessed 18 Aug. 2017.

### 4.2.5 Core Products Building

After execution of the token sale, the Core Protocol and products are realised in their final form. The base protocol is built according to the CTES white paper. The core apps and services of the founding partners are built partially in parallel with and informing the core protocol.

The issuance and sale of App Tokens can follow are issued following the relevant parts of a well-structured token sale. App Tokens need to be bought with the wider Community Token, leading to fair rewards for early community members. If the base protocol is good or promising, its token price will be higher. If the base protocol does not deliver on promises, its token price will be valued lower by users and there is more opportunity for new contributors to share in future growth.

### 4.2.6 Ongoing Operation

Once the Core Protocol and several apps are operational, further development can continue. The community can grow even further now it starts to attract larger amounts of end users and partners.

# 5 CTE Economics

Today, token sales derive most of their value by the potential that a token will increase in utility (the discounted expected utility value[33]). This anticipation is what motivates early participation and contribution to the network. As utility value of a network increases, the network grows larger and is able to capitalize on its enhanced network effects. The market value of the token transitions from its expected utility value to its realised utility value. Early participants benefit from enhanced access to products & services which are transferable by selling their access rights to the network (i.e. tokens).

For most tokens, the current utility value (post-issuance) is low for a considerably long period (usually lower than 5% of its price). The reasons for this are:

1. The complexity of the infrastructure and innovations being built requires a long runway; and;
2. Early network participants (early adopters, developers, enthusiasts) may not be the same as the longer term users of the network (corporates, institutions) and thus adoption of services lags.

This period of low current utility represents a significant risk and uncertainty. Until a protocol layer can be built out and network effects achieved, the value of the project is highly uncertain.

[33]"The Crypto J-Curve - Chris Burniske" https://medium.com/@cburniske/the-crypto-j-curve-be5fdddafa26 accessed 15 Aug. 2017.

Technical feasibility and team execution loom as unknowns. Through CTES, infrastructure development can be shared and considerable time and cost is saved, whilst significant risk and uncertainty can be mitigated for collaborators and network participants by creating MVC first.

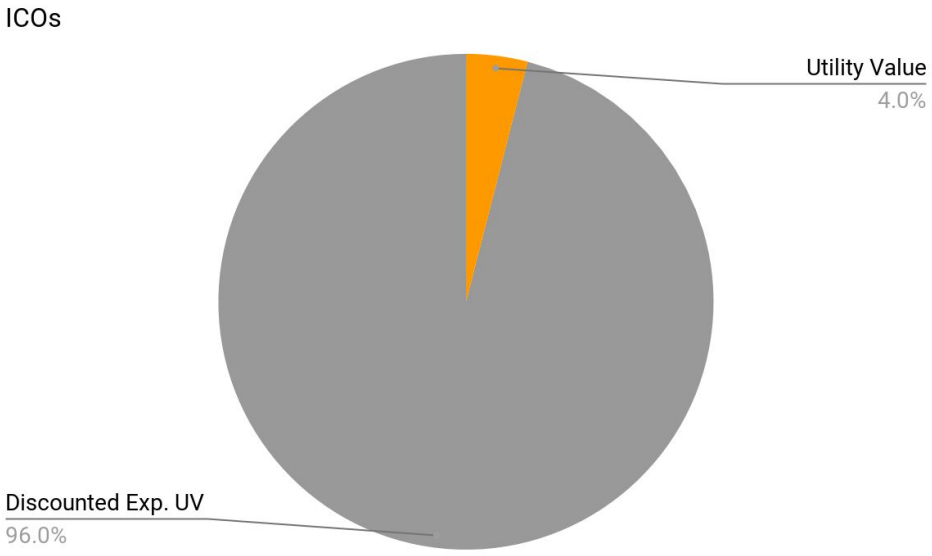



**Figure 5 - Utility Value versus Discounted Expected Utility Value in ICOs**

## 5.1 A shared economy for greater utility value

The premise of CTEs is to introduce complementary products & services into a shared economy to offer greater utility value for the Community Token, as quickly as possible. By having 2-3 collaborators co-create a common economy for their complementary services, we estimate that the initial utility value of its Community Token will be greater than 5%, and can range between 8-15% of token price during its early development phase. The more IP, resources, revenue and pre-existing services each collaborator can contribute, the sooner token holders can make use of their tokens. It's important to remember that these contributors can be mature, revenue generating companies.

A good example of this is the Kin token, to be launched by Kik. Kik is an established mobile social messaging service that converted its reward program into a token economy to re-ignite growth for its company. The Kin token allows for Kik users to use and earn tokens for things like premium user-generated content, bot monetization, tipping and more. This relatively higher utility is important because it provides early evidence of the economic viability of the network. Collaborative companies that merge together complementary services will likewise be able to provide more use cases for a Community Token and demonstrate greater economic viability (as

compared to the vast majority of Independent Token Sales, ITS) while benefiting from the enhanced network effects.

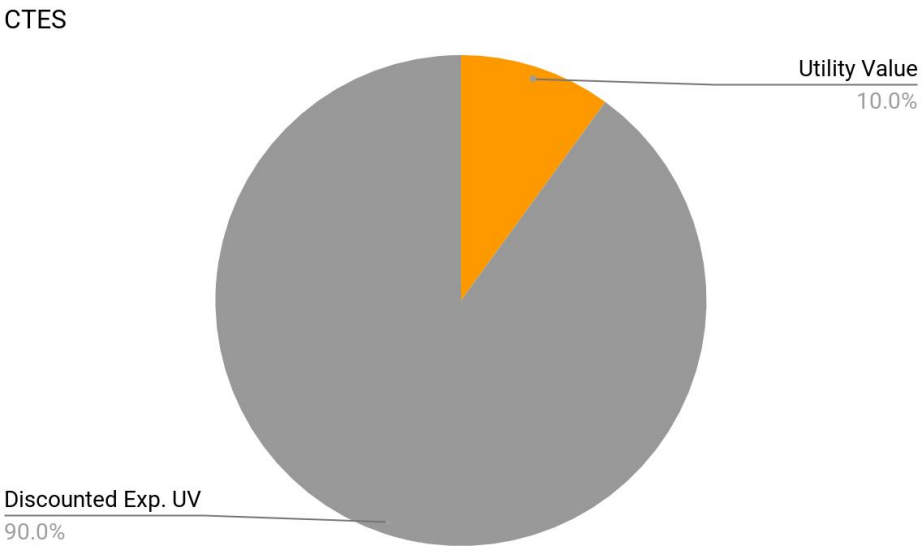
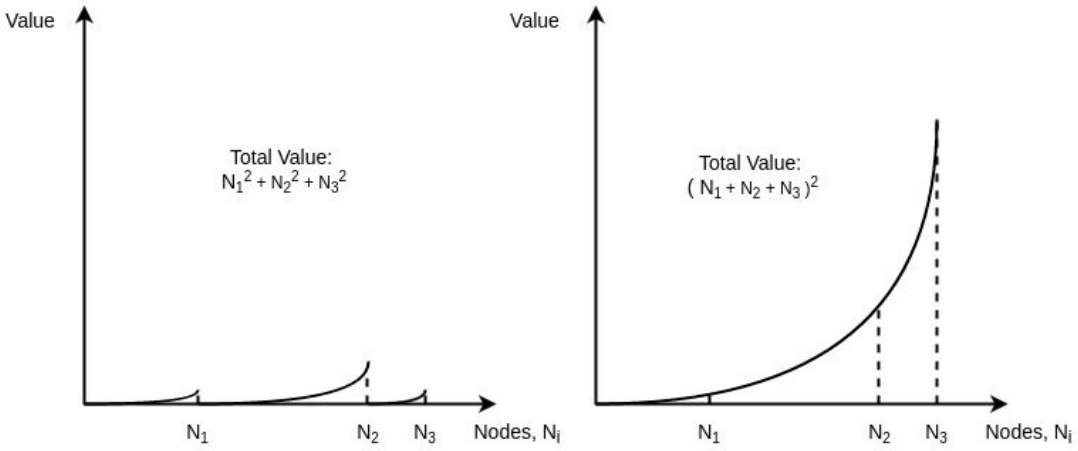



**Figure 6 - Utility Value versus Discounted Expected Utility Value in CTES**

## 5.2 Influence on network effects

Through CTES, networks can immediately be merged to kickstart a new economy rapidly and potentially grow much larger than most Independent Token Sales, (ITS). Some app tokens today do align incentives well for both developers and participants, but most tend to offer redundant implementations of similar infrastructure. This imposes a net cost on the network by fragmenting users and developers according to the particular application that each happens to be using. This ultimately limits the network effects, taking longer for the project to take shape or not to take shape at all. By providing standardization through a shared protocol, CTES eliminate this type of redundancy.




ITS CTES

**Figure 7 - comparison of total value against network nodes**

Graph: “The Difference Between App coin and protocol tokens” - Will Warren[34].

From an economic perspective, the biggest/main advantages of a CTES are:

1. Higher utility value due to early bundling of services;
2. Greater network effects through a shared protocol;
3. Larger overall economy by combining markets

The following graph illustrates these advantages:

[34] "The difference between App Coins and Protocol Tokens - 0x Project." 2 Feb. 2017, https://blog.0xproject.com/the-difference-between-app-coins-and-protocol-tokens-7281a428348c. Accessed 1 Sep. 2017.

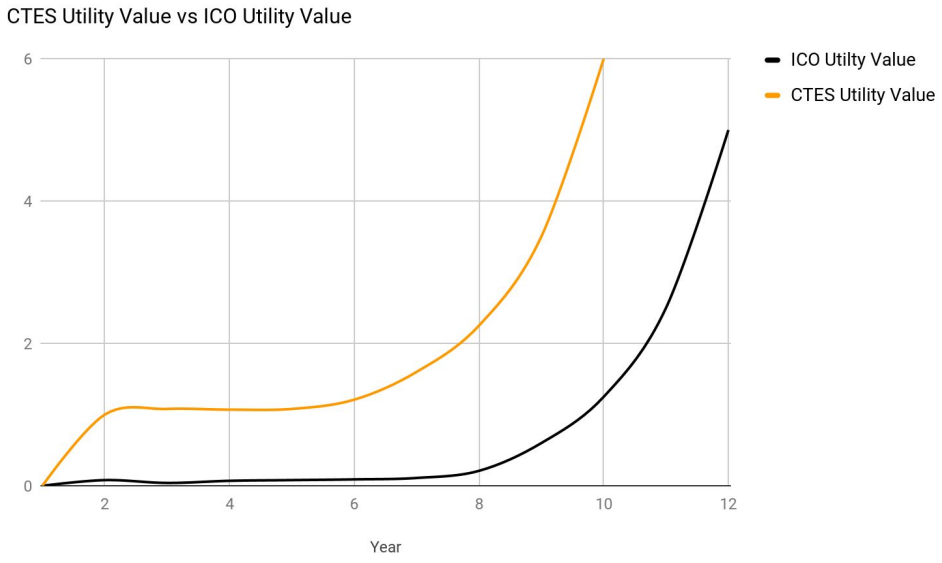



**Figure 8 - comparison of utility value over time**

## 5.3 CTES vs multiple ITS

We'll compare the scenario for separate competing parties running their independent token sales (ITS) to the scenario of collaborating and running a joint CTES.

***In Action: Two startups (GridCo and CarCo) are each seeking to raise funds by launching an ITS to build an Autonomous Mobility marketplace. Looking at real-world examples in 2017, raising $15-30M in a single token sales is not uncommon. Here we assume they raised $20M and $30M respectively, with the following token allocations:***

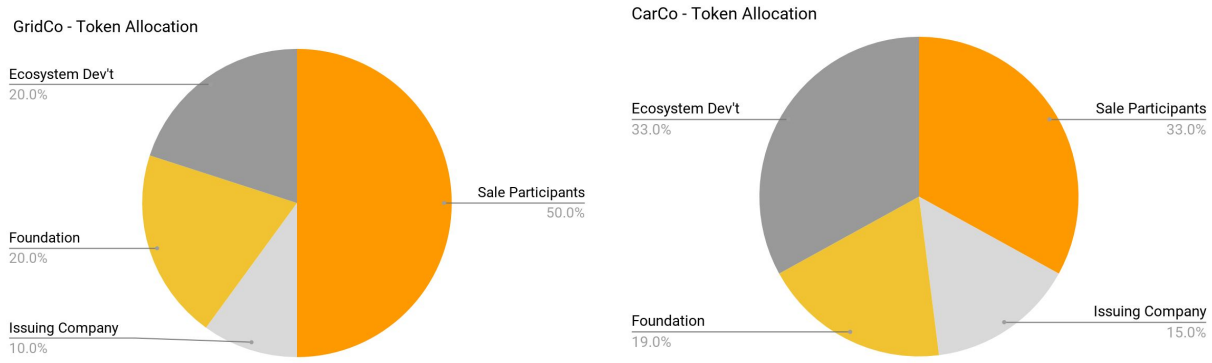



**Figure 9 - example token allocations in ITS**

***Now, instead let's suppose these two platforms agreed to co-create the launch of an Autonomous Mobility economy through a common CTES. We believe the market would recognize the utility value and economic potential of this new Autonomous Mobility***

***Community Token and value it higher than the independent projects, and will therefore assume an uncapped $100M fundraise.***

***A purposeful token allocation of this CTES could be as follows:***

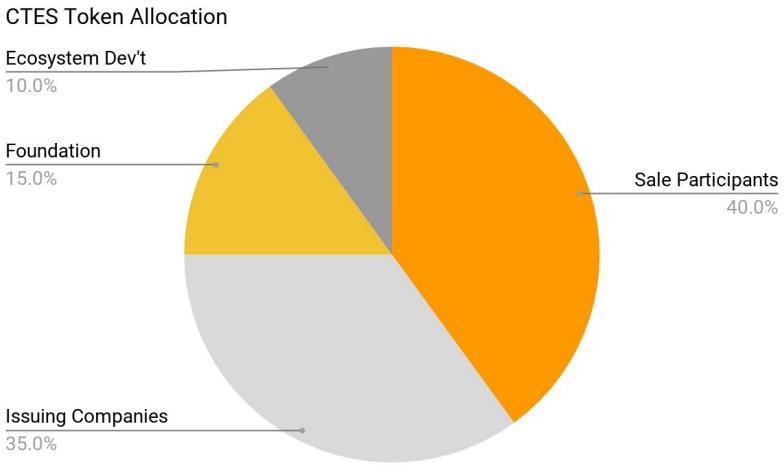



**Figure 10 - example token allocations in CTES**

**Notes:**

- Issuing Companies; refers to allocation to the companies initiating the CTE
- Foundation; refers to the budget allocated towards platform development, operations, etc
- Ecosystem Development; refers to allocations for grants, partnerships, acquisitions and bounties
- Sale Participants; refers to allocations made to network participants via token sale

## 5.4 Use of Proceeds Comparison

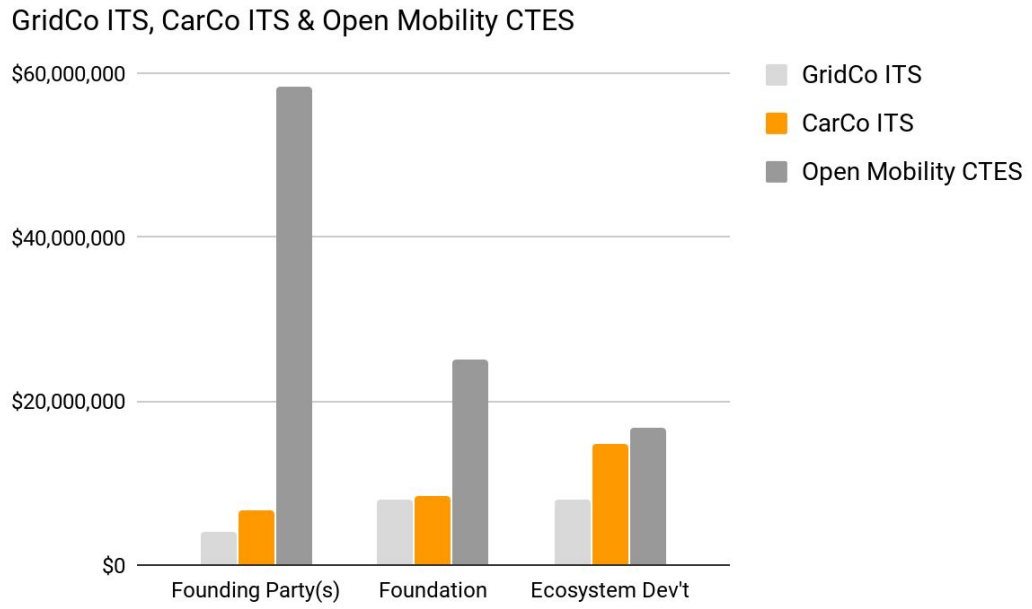



**Figure 11 - use of proceeds comparison**

Main Takeaways:

- Issuing parties (founders, companies, etc.) can in theory retain a much larger stake of the tokens in return for contributed IP, resources, etc.
- These tokens can be used strategically to reward community members for contributions, capitalize issuing organizations, attract other major companies etc.
- CTE Foundations will produce a much larger long-term operating/development budget than those of ITS.
- Management of token interoperability between Community Tokens and App Tokens can be adequately budgeted into the foundation as a reserve (re: smart tokens).
- Launching with more than one founding member immediately enhances the economy and therefore CTES require proportionally less allocation to ecosystem development.
- The total capital amount dedicated to ecosystem development with a CTES is still on par with ITS.
- Ecosystem development can benefit from being professionally managed, much like Tezos' venture fund because the capital under management is greater and so management fees as a fixed percentage are higher

# 6 Technical Scoping & Decision-Making

The CTE needs to decide which technology to build on, which to adapt, and which to build itself. Because its mission is to realise its goals as efficiently as possible it should not seek to duplicate technology that already exists - as long as it doesn't undermine or complicate its mission through various dependencies or trade-offs.

We have found the classification below Web 3.0 stack by Trent McConaghy[35] to be helpful in the technical scoping of decentralised projects:

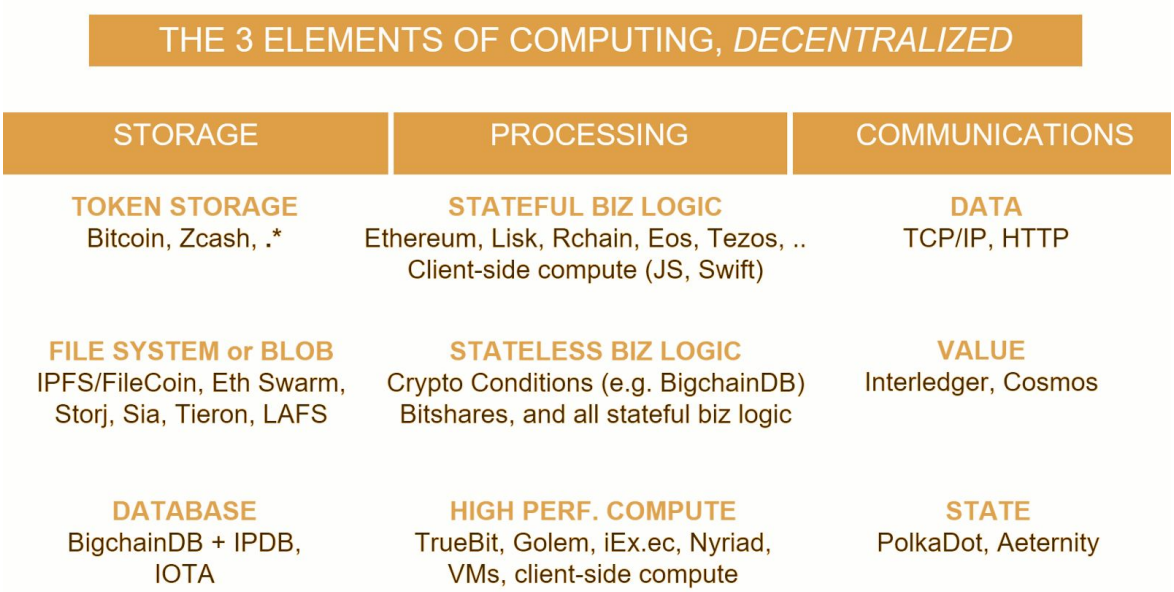



**Figure 12 - web 3.0 classification by Trent McConaghy**

Development teams need to consider to what extent each of these categories are relevant to the project and which building blocks will be used - or built - in the project.

## 6.1 Build or use an existing base layer?

The lowest technical layer upon which to build the community protocol can be an existing distributed ledger, or an entirely new one to be built by the CTE community. This is a "make or buy" decision to be made on a project level, depending on the requirements of the use case, the available options and the available capacity within the founding partners. "Making" includes the option to fork the code of an existing decentralised ledger technology.

[35] "Blockchain Infrastructure Landscape: A First Principles Framing." 15 Jul. 2017, https://blog.bigchaindb.com/blockchain-infrastructure-landscape-a-first-principles-framing-92cc5549bafe. Accessed 16 Aug. 2017.

Existing options include but are not limited to:

- Ethereum
- IOTA (with custom token functionality added)
- Tezos (under development)
- EOS (under development)
- Bitcoin with colored coins (e.g. Lykke)

For a CTE that builds on an existing distributed ledger as the base layer, an overview of the various layers and tokens is shown below.

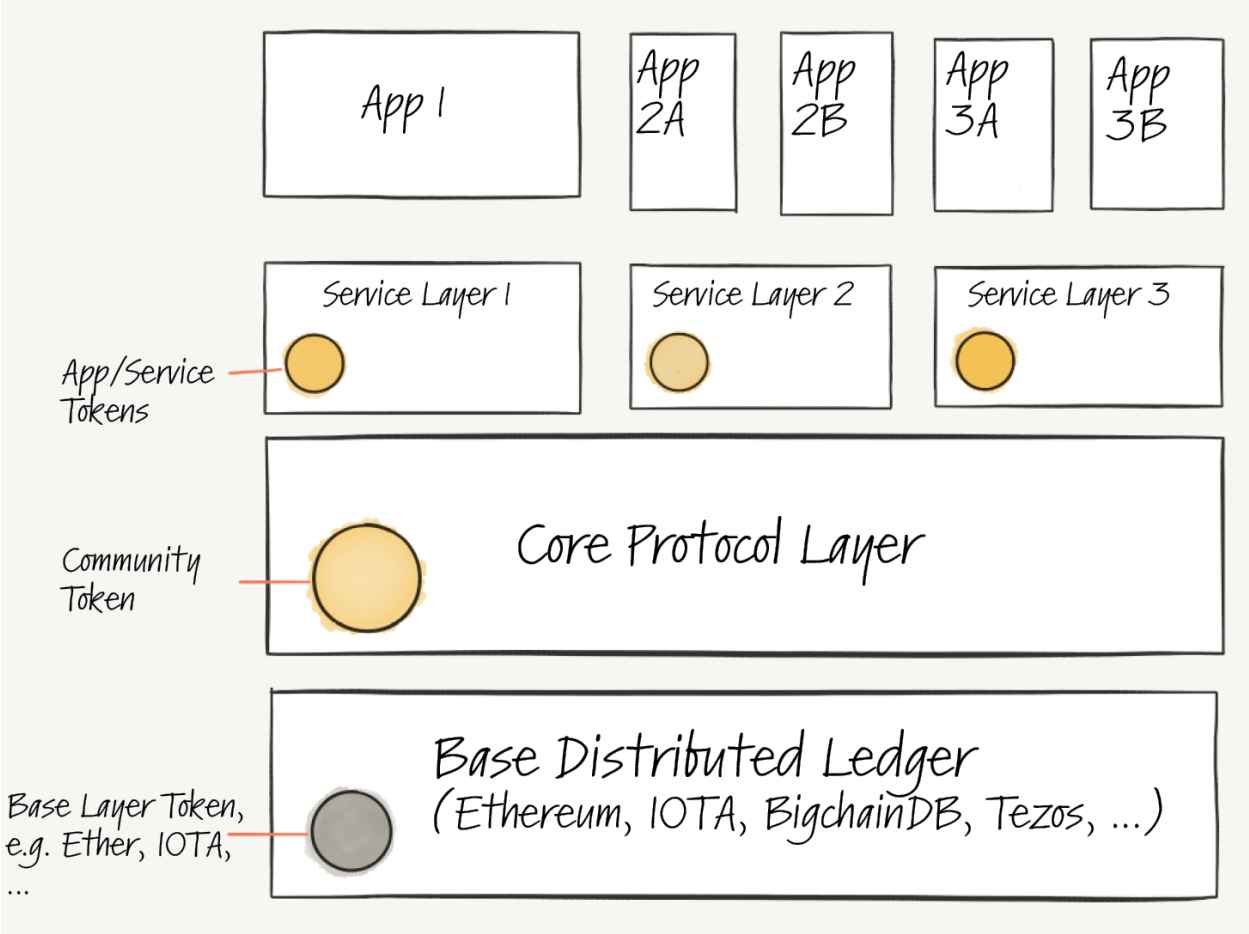



**Figure 13 - tokens and layers in a CTE system**

A consequence of using an existing base layer is that it generally uses its own tokens. This means the community Core Protocol Layer needs to transact in this lower-level token, and transaction economics need to be considered to not be prohibitive to possible use-cases.

A CTE which builds its own distributed ledger technology does not require an additional base layer, as shown below.

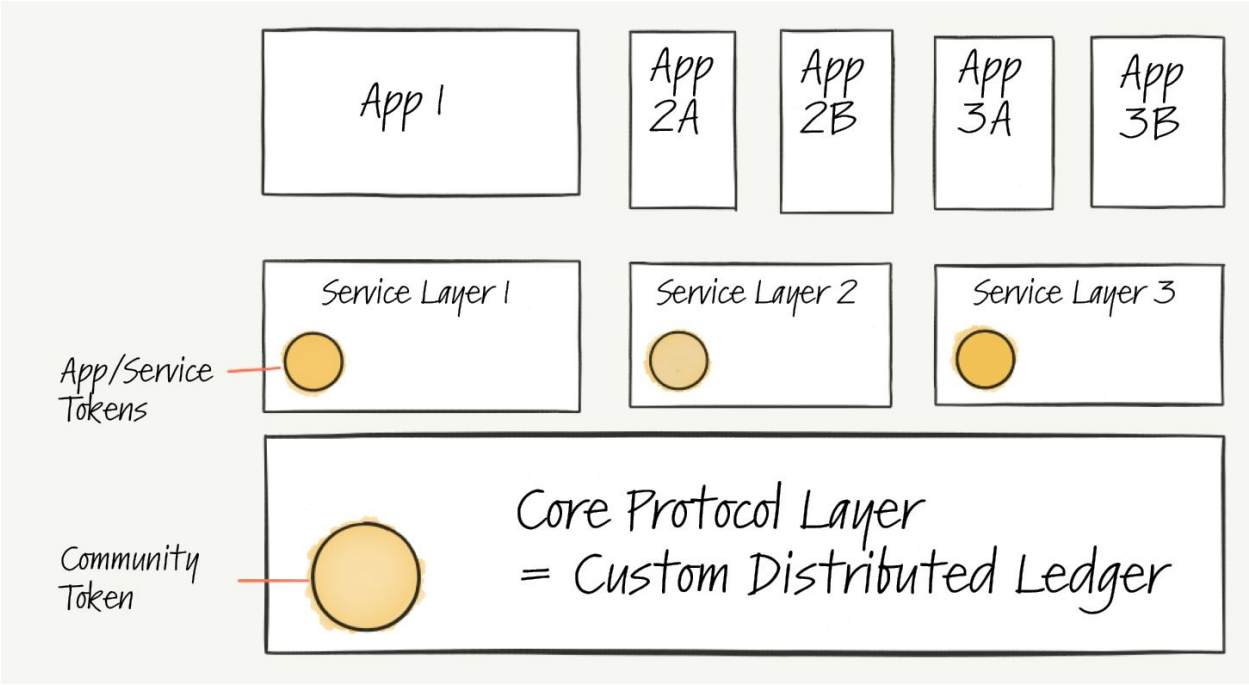



**Figure 14 - tokens and layers in a CTE system building a custom DLT**

## 6.2 Requirements to the base layer

The CTE concept is not limited to any single decentralised ledger. The essential requirements are the ability to issue custom tokens as required by the Community Token and App Token mechanism, as well as a form of upgradeability of the core protocol. Optionally the base layer might make additional functionality possible to support more advanced forms of smart tokens.

Besides that, a suitable base layer technology should be chosen that's specific to the CTE scope. Some criteria to take into account are:

- Scalability
- Maturity
- Performance
- Adoption level
- Transaction cost
- Richness of functionality

# 7 Governance Models

Currently the blockchain community has chosen for governance to happen at two levels. One is consensus mechanisms (decisions by consequence) hardcoded in the protocol layer and usually paired with a more dynamic governance models on top. This allows for ongoing

decision-making, including revisions to the consensus mechanisms themselves. However, the design of the consensus mechanism informs how the community can respond and directly influence any proposed changes to its constitution.

Decentralisation isn't a binary concept but rather is best thought of as a spectrum. Governance should be oriented by the degree the community believes that decision making would be most effective: on one extreme The DAO (as originally envisaged) and on the other extreme a private centralised committee (Ripple).

We recommend something in the middle where there is still a group of people ultimately responsible and accountable for strategic decisions, where relevant with appropriate licenses if conducting a regulated activity, but that the group is open and inclusive at appropriate stages. App tokens like Golem / Augur have their own 'prediction market' like governance but that doesn't extend to the protocol itself.

## 7.1 Consensus Mechanisms and concerns for governance

The form of consensus of the core protocol has consequences for the possibilities for governance. The same is true for the consensus mechanism of the base layer that the core protocol is built on. We explore the most common consensus mechanisms in decentralised systems and some of the consequences they have on governance.

### 7.1.1 Proof of Work

Example: Bitcoin. Computational work by "miners" is required to validate transactions in return for newly generated tokens. By consequence this results in (centralised) power over the further development of the network and a tension between two distinct groups, miners and users. This leads to a very stable but slowly evolving network, as miners have to be convinced to adopt changes.

### 7.1.2 Tangle - Distributed Proof of Work

Example: IOTA. Computational work is required to submit transactions to the ledger by each user. This takes away the tension between the distinct groups in traditional Proof of Work (miners and users). Protocol evolution can be faster because it only depends on user adoption.

### 7.1.3 Proof of Stake

Example: BlackCoin[36], Bitshares[37], Ethereum Casper[38] (to be released). Transactions are validated by token holders putting value at stake. Effectively this distributes voting power over

[36] "BlackCoin | Currency of the future." http://blackcoin.co/. Accessed 22 Aug. 2017.
[37] "BitShares: Index." https://bitshares.org/. Accessed 22 Aug. 2017.
[38] "Proof of Stake FAQ · ethereum/wiki Wiki · GitHub." https://github.com/ethereum/wiki/wiki/Proof-of-Stake-FAQ. Accessed 22 Aug. 2017.

those who have the largest holding of tokens and are willing to take an active participation in voting and dispute resolution.

### 7.1.4 Leader-based consensus

Including federated consensus, Proof of Authority, Leader-based consensus (including PAXOS/RAFT-based).

Examples: IPDB, Ripple, Sovrin[39]. A known set of public validators validates transactions. Validators have a legal relationship with the foundation. This avoids the risk and overhead of being resistant to anonymous validators. With a sufficiently large set of validators spread over many jurisdictions the network can reach levels of resilience and censorship resistance close to that of anonymous public blockchains.

### 7.1.5 Upgradeable consensus

Example: Tezos[40] . The protocol itself includes explicit support for upgrading itself with support from the user base, according to one of the other algorithms (in the case of Tezos, Proof of Stake). This can lead to rapid improvements and evolution of the protocol.

## 7.2 Options for decentralised governance

Decentralised governance mechanisms have advantages and drawbacks. The risks of protocols where the rules of the protocol itself might be adapted or upgraded through decentralised governance are not well understood yet. We recommend a middle ground on the spectrum of decentralised decision making, starting from a well understood governance structure whilst leveraging the transparency benefits of open governance tools and experimenting with forms of decentralised governance.

Below is a possible governance structure of the Core Community and the respective App Communities:

[39] "Home - Sovrin." https://sovrin.org/. Accessed 22 Aug. 2017.
[40] "Tezos Crowdfunding." https://www.tezos.com/. Accessed 22 Aug. 2017.

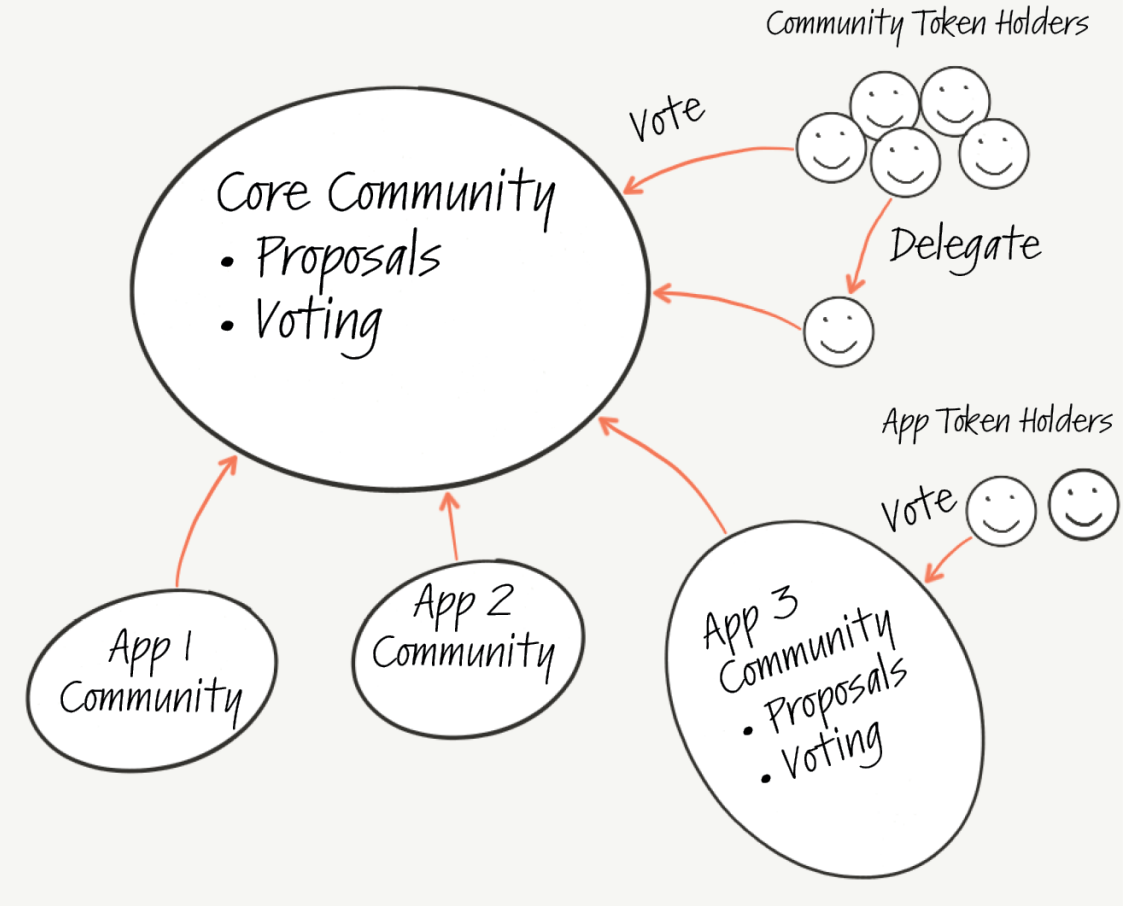



**Figure 15 - a possible governance structure for a CTE**

Some current options to facilitate decentralised governance include:

- Aragon - “platform for the deployment of unstoppable virtual organizations and entities”, i.e. a DAO framework and “digital jurisdiction” on Ethereum
- District0x - “A network of decentralized markets and communities” which builds on Aragon
- Wings DAO - platform to crowdfund a project and govern it using a DAO
- Boardroom - a solution for proposals and voting closely bound to Ethereum.
- Backfeed - the vision is in line with the CTE philosophy, however there is no usable version yet.

***In Action:*** *We would recommend a middle ground on the spectrum of decentralised decision making. Federated nodes (Proof of Authority) like for example IPDB and Sovrin.*

## 7.3 Comparison to non-tokenised technology consortia

Technology consortia like W3C, the Apache Foundation and the Linux Foundation have traditionally not followed a tokenised approach, yet have overlap with some of the characteristics of Community Token Economies. Their largest source of funding is by corporates rather than an economically incentivised community.

A tokenised approach could offer a number of improvements over traditional technology consortia. From the perspective of the consortium, funding through an economically incentivised community reduces the dependency on corporates, whilst corporates still have the opportunity to fund and take part in those communities relevant to them. The distraction of raising capital instead of executing on the vision is reduced, possibly entirely eliminated. Value is captured directly by participants and contributors rather than third parties.

A tokenised approach gives corporates the ability to attract the best developers because they can contribute and be remunerated directly through the appreciation in token value rather than a salary or illiquid equity. All participants are incentivised to build a protocol and economy that is a public good rather than something that can be bought or sold quickly and easily to meet quarterly targets and investor demands.

# 8 Corporate Structuring

We believe in each case form should follow strategy. So structuring would follow both the design of the token, its required governance model and if it is or isn't a security. Below we have listed out some of the possible ways to structure a CTES, and our preferences based on current thinking. Whilst we always try to design for the future, from a regulatory perspective this is a rapidly evolving space as you move from jurisdiction to jurisdiction, so it's impossible to predict every instance.

## 8.1 Current standards & norms

It's important to clearly state we do not endorse any particular market norms but feel it is important to at least list them as alternatives. Furthermore, what is contained here does not constitute legal advice, for which you should seek professional counsel.

The common methods for a token issuance are as ERC20 tokens on Ethereum are often either issued out of a Swiss foundation, generally organised in Zug, or a corporate entity organized in Singapore or similar jurisdiction. Tokens may or may not be considered securities in the jurisdiction of issuance.  Notwithstanding rules or guidance in the jurisdiction of issue, however, distribution of tokens into other jurisdictions must consider rules or guidance in the jurisdiction of the buyer.

# 8.2 Recent Rulings & Implications

## 8.2.1 To security or not security

Recent communications from The US SEC, Singaporean and Canadian equivalents (the MAS and CSA respectively) provided some guidance and clarity on token issuances.

The SEC report of July 25[41] focused on the ICO of The DAO (a Swiss foundation) and determined that DAO tokens are securities under the Securities Act of 1933 and the Securities Exchange Act of 1934.

- The analysis was limited to the DAO token but was a warning to other DAO-like tokens that they must be issued in the US as though they are securities.
- The SEC has made clear that the mechanism and technology used doesn't impact its view of what is, and is not, deemed a security.
- The SEC also states that tokens offered into the US must be compliant in their offering. Determinations on other tokens will depend on the facts and circumstances, including economic realities of the transaction, indicates that well-structured business models should still pass muster and not require SEC registration. However all sales into the US must be conducted pursuant to US securities laws – registration of the issue or exemptions.

The MAS issued a press release[42] on August 1 providing guidance on how it intends to treat token offerings.

- It is one of the first governmental regulatory statements that formally recognizes the role of token offerings as a potential new capital-raising strategy for emerging and established companies or a Blockchain-based technological innovation that is here to stay.
- It states a token offering may well be subject to regulation if the features of the token are such as to bring it within the scope of existing laws. Consequently, issuers and their intermediaries should not assume that no regulatory constraints apply and are encouraged by MAS to seek legal advice.

[41] "Report of Investigation Pursuant to Section 21(a) of the ... - SEC.gov." 25 Jul. 2017, https://www.sec.gov/litigation/investreport/34-81207.pdf. Accessed 1 Sep. 2017.
[42] "MAS clarifies regulatory position on the offer of digital tokens in ...." 1 Aug. 2017, http://www.mas.gov.sg/News-and-Publications/Media-Releases/2017/MAS-clarifies-regulatory-position-on-the-offer-of-digital-tokens-in-Singapore.aspx. Accessed 1 Sep. 2017.

The CSA issued a further staff notice[43] on August 24 which, while not focusing on a particular issuance of a token, largely echoes the SEC report.

## 8.3 High-level recommendations

The typical perception is most capital going into tokens today is from unsophisticated retail investors; however, for reputable token sales, we are seeing it increasingly being raised from sophisticated high-net-worth individuals knowledgeable in the space, dedicated crypto-currency funds and “institutions”, placed through select sales administrators in structured pre-sales. Whilst many increasingly complain this is at the expense of the wider community it is none the less the reality.

Keeping this in mind it is our view that token sales should generally be conducted pursuant to the securities laws of the jurisdictions into which they are sold. This may potentially limit the universe of potential buyers and possibly the speed and size of the development of any secondary market in the short-term. Although innovations in decentralised exchanges many change this.

The use of a sale administrator who has the capability to undertake KYC and AML to ensure the token sale is made to compliant buyers in certain jurisdictions becomes critical as well as to select the jurisdictions into which the tokens can be sold with legal surety.

## 8.4 Proceeds receipt & deployment

As articulated above, there is no one way to perform a CTE. There are far too many nuances to consider in each instance and structure should always follow strategy - not the other way around. However, below is an example of how a CTE could be structured at a high-level.

[43] "CSA Staff Notice 46-307 Cryptocurrency Offerings." 24 Aug. 2017, http://www.osc.gov.on.ca/en/SecuritiesLaw_csa_20170824_cryptocurrency-offerings.htm. Accessed 1 Sep. 2017.

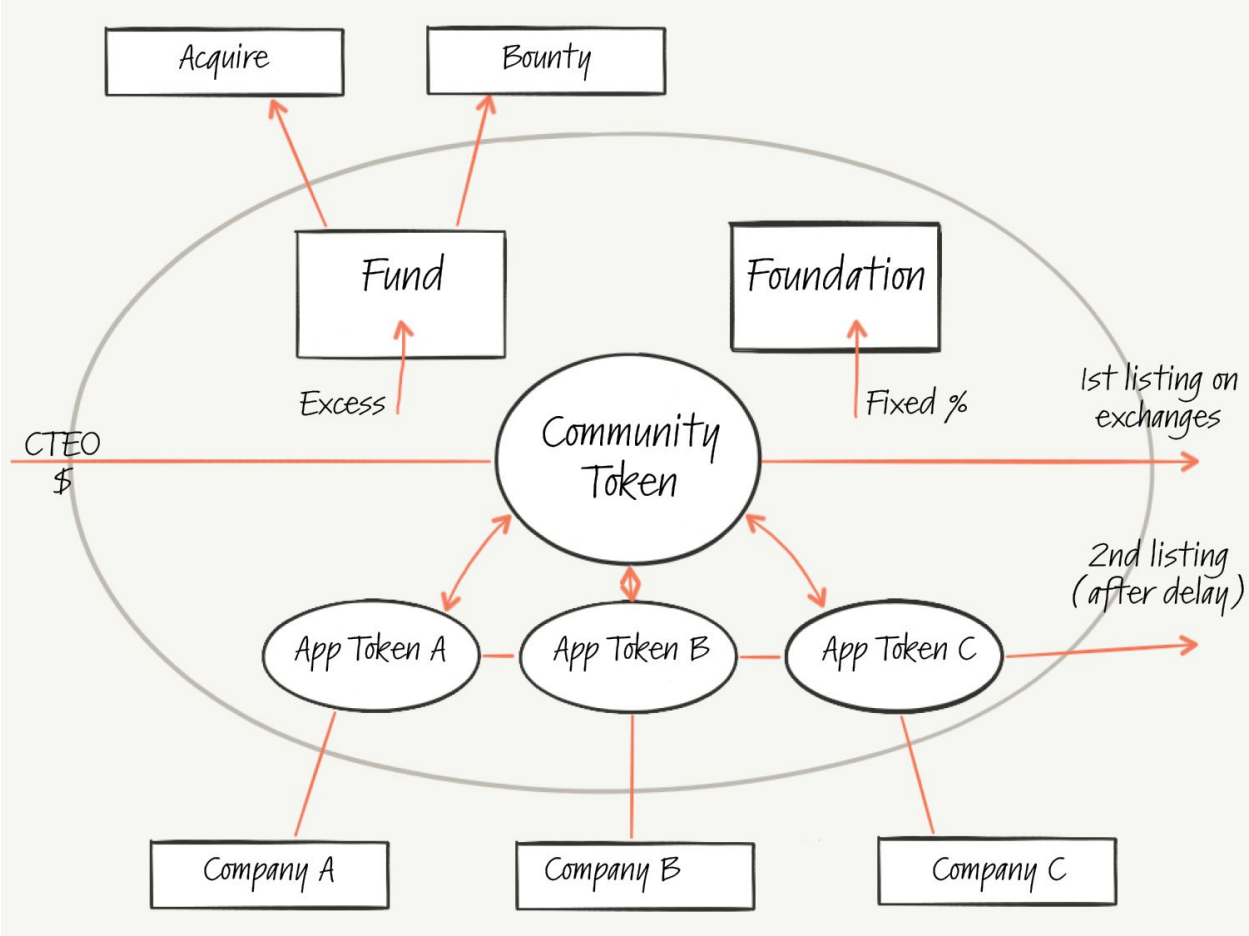



**Figure 16 - overview of possible proceeds receipt and deployment**

As you can see we believe there is a very good argument to run uncapped raises for CTES if the team has a clear and well articulated upfront plan for how the surplus capital will be put back into the community to further its acceleration and network effect, as has been seen realised[44]. This includes the Blockstack Signature Fund[45], Tezos Fund[46] and IOTA Ecosystem fund[47], with proceeds being used for everything from M&A, donations to developer events and conferences.

[44] "The Rise of Native Protocol Funds – Token Economy – Medium." 18 Aug. 2017, https://medium.com/token-economy/the-rise-of-native-protocol-funds-848df98f020d. Accessed 21 Aug. 2017.
[45] "ICO Meets VC: Blockstack Raises $25 Million for Decentralized ...." https://www.coindesk.com/ico-meets-vc-blockstack-raises-25-million-decentralized-internet-fund/. Accessed 21 Aug. 2017.
[46] "Tezos Stiftung – August Update - tezos.ch." https://www.tezos.ch/august-update.html. Accessed 21 Aug. 2017.
[47] "IOTA Ecosystem Fund ($10 million) – IOTA." 5 May. 2017, https://blog.iota.org/iota-ecosystem-fund-2-million-f6ade6a4d8ba. Accessed 18 Aug. 2017.

This is sometimes visualised in token sale promotional material as levels of ambition, sometimes from ‘moon shot’ to ‘mars shots’[48].

tezos.com — IF THE FOUNDATION IS ENDOWED WITH...

| Note: all amounts in $1,000 | CURRENT | $6,000+ | $12,000+ | $20,000+ | MOONSHOT | MARS-SHOT |
|---|---|---|---|---|---|---|
| Engineering | Continue development with our current team. | Push work on v2 by the foundation. Attempt a secondary issuance in conjunction with the release of the new version. | Directly hire additional talent from ETH Zurich for full-time code maintenance in Switzerland. | Grow the team with other experienced, academically oriented engineers. | Hire talented teams of engineers and designers to build direct consumer applications through strategic acquisition of tech companies. | Deploy and silo several teams of engineers to build different candidates for upgrades. Evaluate empirically the best proposals and merge them. |
| Headcount | 6 | 6 | 10 | 15 | | |
| Yearly rate | $900 | $900 | $1,500 | $2,250 | | |
| Research | Continue our use of PhD candidates to work on formal verification. | Keep our current approach, strategically engage the formal verification community. | Contract a team of academics to research and help build v2 consensus algorithm, followed by research on zk-STARKs. | In addition, join the IC3 team as a sponsor. | Offer competitive salaries to attract experts on formal verification to work exclusively on the protocol. Set up an institution a la IC3 in Europe. | Sponsor a leading computer science department with endowed professorships and extensive grants to graduate students in the field of formal verification. |
| Yearly rate | $0 | $0 | $300 | $700 | | |
| Communications & Marketing | Continue working with our communications consultancy. | Continue working with our communications consultancy. | Host an annual developer conference in Europe and retain current communications consultancy. | Conduct three annual developer conferences (EU, US, Asia), retain current communications consultancy, run ad campaigns. | Sponsor an online magazine to cover major debates. Pay to publish a hash of the Tezos blockchain in a reputable outlet like the Financial Times or The New York times (à la Guardtime). | Acquire mainstream print and TV media outlets to promote and defend the use of cryptographic ledger in society. |
| Yearly rate | $120 | $120 | $370 | $1,000 | | |
| Legal Services | After the fundraiser, the Foundation will pay for its own legal expenses through MME. | Retain our counsel and start exploring, as a failsafe, alternative legal structures or advocacy for the Foundation beyond the Swiss Cryptovalley. | Retain our counsel and start exploring, as a failsafe, alternative legal structures or advocacy for the Foundation beyond the Swiss Cryptovalley. | Retain our counsel and start exploring, as a failsafe, alternative legal structures or advocacy for the Foundation beyond the Swiss Cryptovalley. | Lobby municipalities and local governments to use formally verified smart contracts as a form of binding legal contract. | Fund efforts to digitize and map transaction logic from traditional legal prose to a Tezos language. |
| Yearly rate | $100 | $250 | $250 | $250 | | |
| Business Development | Kathleen Breitman manages all non-technical efforts. | Hire one strong former management consultant to assist in interfacing with vendors and service providers. | Hire two seasoned former management consultants and a community manager to engage with token holders. | Hire a blend of junior & senior business development talent, as well as a business development person in China and a community manager. | Purchase a banking license and deploy the Tezos blockchain as a backbone for business operations. Experiment with automation using a blockchain for basic processes. | Negotiate with a small nation-state the recognition of Tezos as one of their official state currencies, which would immediately give Tezos favorable treatment in terms of financial regulation. Attempt negotiations to purchase or lease sovereign land. |
| Yearly rate | $0 | $250 | $450 | $750 | | |
| Education | | Produce a series of online Michelson tutorials with videos and exercises. | Produce in addition an OCaml MOOC geared towards increasing our potential developer base. | Also run a quaterly Tezos school focusing on protocol development in OCaml and smart contracts. | Offer student grants for conducting projects related to the Tezos ecosystem and subsidize OCaml education in universities. | Run a development school with emphasis on functional programming and safe smart contract construction. |
| Yearly rate | $0 | $50 | $125 | $350 | | |
| Annual Rate | **$1,120** | **$1,570** | **$2,995** | **$5,600** | **$10,000 - 15,000** | **$20,000 and above** |

**Figure 17 - example of roadmap dependent on token sale proceeds**

The entity issuing the tokens and manner of funds raised will generally be structured so the proceeds received do not attract tax in the jurisdiction of issue although. There may however be minor slippages depending on particular circumstances.

Deployment of proceeds from the issuing jurisdiction to other jurisdictions may attract tax in the jurisdiction into which the funds are moved for use and will require specific review with tax and accounting counsel. Tax efficient structures will be specific to the use and jurisdictions into which money flows from the issuer.

# 9 Bringing the CTE Concept to Life

As we have hopefully now shown there are many different scenarios for how a CTE could come into being and how various participants could join at different stages in their evolution. We have listed some of those below to help bring thing to life:

[48] "The self-amending cryptographic ledger - Tezos." https://www.tezos.com/static/papers/Tezos_Overview.pdf. Accessed 21 Aug. 2017.

## 9.1 Examples from the blockchain world

FIrstly let's look at blockchain 1.0 projects that, with hindsight, could and maybe should have joined a CTE if they had existed:

- Lazooz → Pivoted to Backfeed because in order to build a DAO, you need a DAO framework first.
- Onename → Pivoted to Blockstack because an identity solution alone backed by Bitcoin proved to be too restrictive; they needed to build a wider decentralised application stack now presented as a "New Internet".
- Ethlance → pivoted to district0x and are now working to migrate Ethlance over
- Various "better than Ethereum" blockchains including Aeternity, QTUM, EOS could team up rather than launching their entirely separate projects.
- Various "financial inclusion" and "open banking" services including HumanIQ, WeTrust and OmiseGo could combine forces on a common infrastructure layer.
- Swarm.fund is arguably an instance of a CTE where each of the subtokens is an App Token.

## 9.2 Examples from the non-blockchain world

There are also a number of non-blockchain open source initiatives that could have looked a lot different had they had the opportunity to join a CTE:

- RethinkDB[49] (an open source NoSQL database) failed as a business[50], then the Linux Foundation bought their IP[51] and will support the project onwards.
- Basho[52], another NoSQL database was put into receivership[53] after failing to meet its obligations.

## 9.3 Overlap between CTEs

Whilst each project is a distinct community we do expect there to be plenty of overlap across CTEs. Especially when supported by a VC like us, as a consequence of a focused investment thesis. However we must assume if CTEs become the norm this will increasingly be the case.

---

[49] "RethinkDB." https://www.rethinkdb.com/. Accessed 1 Sep. 2017.
[50] "RethinkDB: why we failed - defmacro." 18 Jan. 2017, http://www.defmacro.org/2017/01/18/why-rethinkdb-failed.html. Accessed 1 Sep. 2017.
[51] "Linux Foundation - Wikipedia." https://en.wikipedia.org/wiki/Linux_Foundation. Accessed 1 Sep. 2017.
[52] "Enterprise NoSQL Database | Scalable Database Solutions | Basho." http://basho.com/. Accessed 23 Aug. 2017.
[53] "End of the road for Basho: Court puts biz into receivership • The Register." 31 Jul. 2017, https://www.theregister.co.uk/2017/07/31/end_of_the_road_for_basho_as_court_puts_biz_into_receivership/. Accessed 23 Aug. 2017.

So how do organisations and teams select the most appropriate primary economy for their business whilst allowing for interoperability between communities?

For example, a peer-to-peer ridesharing company might want to be involved both the Open Mobility Economy and a new Sharing CTE that looks at collective ownership. An AI assistant chatbot provider might feel a Knowledge Markets Economy is the most appropriate at first, but over time might move into the same Sharing Economy CTE. The open-source nature of the economies enables entities to engage in more than one economy by holding different tokens depending on the stage and strategy of the business.

Whilst we don't propose to solve that issue here, because each case will be too nuanced to predict, decision-making for an app maker could play out as below:

- Should we be part of a single CTE?
- Can we use services of other CTE's services/apps?
- Should we invest in other CTE's tokens?
- Should we launch smaller seed projects into other CTEs?

***In Action: ShareCo is a founding member of the Autonomous Mobility CTE. It has encountered another CTE around the theme of The Sharing Economy, which is already established and has its own token called SHARE. ShareCo decides to join the Sharing Economy CTE by swapping a number of SHRT for SHARE, and use the services of its core protocol for its ride sharing application.***

## 9.4 Summary

Hopefully by now you feel we have tried our best to give full and proper consideration to this new emergent approach. This is based on our direct experience with communities looking to realise a CTE, which is limited because it is such a new environment. However we strongly believe for something so complex it is almost impossible to take into account every variable nor impose a standardised approach. This document is intended to stimulate a debate within the broader token community about how we can best ensure this exciting mix of technical innovations can create a more sustainable startup space for us to realise a more decentralised, open and therefore equitable Web. We look forward to sharing this journey with you and welcome your feedback.

If you would like to make any recommendations please do get in touch on @OVioHQ or email contact@outlierventures.io