The Riegel Way

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Abstract. The future of business is decentralized, and the future of exchange relationships is token based – using the blockchain as the technological enabler for safe, secure, transparent and private economic relationships. But how many crypto-tokens are wanted? How many can a free economy support? Does the emergence of new blockchain based tokens diminish the value of Bitcoin, Ethereum, and other more long-standing tokens, or does it enhance their value? In this paper we address these questions and propose a generalized exchange economics based on the work of E. C. Riegel.

1. Introduction

The crypto-economy is on a journey – a path of discovery and sharing. We are seeking to *open-source* the construction and development of liberty based communities – voluntary, ethical, free. "Free", in this context, does not mean zero-cost – it means that no coercive hierarchy shall be allowed to rule over these communities, and that, to the best of our abilities, we will develop strategies to avoid, eschew, and to distance ourselves from the *state*.

Of the many tools and methods we will need to develop, a bulk of the important strategies relate to how we will exchange goods and services with other liberty based organizations and communities – and how we will facilitate economic and trade relationships with the *outer-communities.* For any free people commerce and trade are the essential circulatory system, the life-engine. Trade is critical to human progress.

Our vision being laid out in this white paper is of a world where people are empowered to trade, to prosper, without the mechanisms of the state being involved. We seek to confront the classic problems involved in bartering, and to improve upon barter, in the Riegel sense, to use resource-backed tokens that are based upon the real production of some good, service, resource.

We see this path as inherently anti-fragile, and, by definition, resilient. It is a world of decentralized commerce and token storage – a world of many resource-token providers, *meta-token* providers, and no large central banks or corrupt "air conditioned" institutions to lord over this work, while providing zero or less value (less than zero value would be the state showing up, with machine guns, to arrest you, because you sell, transparently, unpasteurized milk – the state using force, is less than zero value, a.k.a. liability or cost). Finally, we will explain the vision of these free, liberty based, communities, and how this vision integrates with the crypto-economy, and why there need not be any limit on the number of tokens issued – other than those limits set by nature, not by imposing on free markets.

2. A Short History of Digital Money

Money has taken many forms throughout history – in almost all cases, what constituted money was based upon: a) utility, b) cultural norms, c) subjective perception of value, d) durability, and e) some

state or entity that forces people to use said money. The last item, [e], has not always taken center stage – but where and when the state was able, they exerted influence over the definition of "money", its allowed uses, issuance, etc.

Of course, physical gold and silver can be used as money – especially once they've been minted into coins of varying and useful denominations. Physical gold and silver, salt, beaver pelts, and other items of value have been used as money.

It is arguable that gold/silver could be used as money today – but there are problems. First problem with "real money" is convenience – we live in a technological age, and, sadly, an age of declining education – imagine the problems that could be involved if many different kinds of coins – silver, gold – were used in commerce. It is feasible to create "representative money", which is core to this white paper, but you have to have a reliable, audit-able, means of checking, verifying, that some person or entity isn't simply issuing "paper" that is unbacked by the underlying resource. Still - "representative money" or resource backed money seems the honest choice. Also, there are base metals that have the same density as gold and silver – and this makes the trading process, using precious metals, non-trivial.

One version of "money" is fiat currency. Fiat currencies date back to the Tang Dynasty (AD 618-907), when the Chinese authorities, under control of an imperial government, issued paper money. There have been many fiats, and these are inextricably linked to government or state power.

During the last 3 centuries, the world has experienced the institutionalization of monetary policy in a way that is unprecedented – leading to what we have now, a small collection of central banks setting policy and value for all the mediums of exchange. You can call this current system of "money creation" many things, but a free market is not one of them.

Digital money or digital currency is a form of wealth stored partially or totally in electronic form. A credit card, in many ways, represents digital money – of an incomplete form. A credit card by itself is not sufficient to conduct sound transactions, you also need credit-card networks – computers, connected together, centralized processing using mainframes, etc.

Following the rapid spread of credit cards from the 1960s to 1980s, came the arrival of "gift cards" in the 1990s. Gift cards were like credit cards, but they are "loaded cards" which means we use fiat currencies, like the U.S. Dollar ($USD), to load the gift card with funds. Once the gift card is loaded, the same centralized networks are required for verification. In the case of AMAZON or Best Buy or some restaurant, they, or whomever they outsource to, would manage their own verification scheme. The gift card is, in many ways, the closest analog to our WAY-token, and partially matches what E.C. Riegel envisioned. But, because gift cards are ultimately denominated in some fiat currency (meaning government sponsored money), they do not have the same power or effectiveness. Added to this, the centralization of their networks, and dependency on legacy banking and credit card systems, they cannot be used in the same way.

During the 1990s a number of innovations occurred, including several advancements with *digital money*.

In the early 90s, with the help of Tim Berners-Lee and other visionaries, the world was further "networked" - connected by a simple protocol, *HTTP*, and a basic means of "marking up" data so that

anyone, anywhere, with a *browser*, could view this data – and this data could be linked, connected, per this protocol and this markup language – *HTML*.

Additionally, in the 90s, Moore's Law's geometric function began showing dramatic increases for computer speed and capacity, concomitant with huge reductions in the cost of processing power, memory, and the price of whole computing systems.

Computing power is critical for many operations – not least of which are those involving *encryption*, and the advanced algorithms implementing public/private key pair encryption. Computing power was necessary for the implementation of SSL (arguably, a mixed bag). The basic parts of the blockchain – Merkle Trees, hashing, and private/public key encryption – are very resource intensive, which means processing, RAM, etc. We reached, in the late 1990s, a time when these resources were sufficient to the purposes of a digital economy.

"Digicash"
Digital cash was invented, conceptually, by David Chaum in 1982. His idea was to create a private means of electronic banking. Chaum's "Blind Signature Technology" was core to his vision. In 1990, Chaum founded the company *DIGICASH*, and it was his belief that they arrived too soon to the market, before the *eCommerce* revolution was in full stride. They went bankrupt in 1999.

"e-gold"
Oncologist Douglas Jackson and attorney Barry Downey founded e-gold in 1996, to allow safe, secure, transactions backed by physical gold. It was a centralized model – different from blockchain technology which is decentralized. They were very successful, some would say too successful, in their endeavor – by 2004, less than a decade later, E-Gold had over one million active accounts.

E-Gold held the gold in a trust, to protect the users and to secure the underlying basis of transactions. Jackson and Downey's company was attacked by hackers, scam artists, criminals – and because of the centralized control of transactions and the pseudonymous nature of the privacy, it was relatively easy, according to Jackson, to trace and identify malicious activity.

In the end, E-Gold was undone by a capricious and tyrannical system – following "9/11", many forms of standard financial arrangements became illegal. The banking system, with KYC (Know Your Customer) laws, required more paperwork to demonstrate "where money was going, and to whom". It was this Federal overreach and mania that ultimately sank E-Gold.

"Satoshi"
There is reason to believe that the demise of E-Gold was an impetus, one of many, for the creation of the first blockchain based digital currency – Bitcoin. The now famous paper, written by one or more individuals under the pseudonym "Satoshi Nakamoto", described how, using Merkle Trees, networked computers, private/public key encryption, a decentralized digital token would be possible. From that moment in 2009, the rest is, as is said, "history".

Since 2009, we've seen a burgeoning growth of other cryptos as well – Ethereum being one of the more noticed because of its implementation of a "smart contract", in a language that is *ECMASCRIPT* based and *"Turing Complete"*, that allows it to be "meta" in the sense that others can use Ethereum to

launch decentralized enterprises or *DAO*, and other new approaches to eCommerce that fit nicely into the realm of *crypto-economics*.

Crypto-economics is the corpus of knowledge, technologies, and strategies, that allow for decentralized and counter-economic activities. Crypto-economics is about using the tools of encryption to eliminate the "man in the middle" problem for standard finance – in this case, the "man in the middle" is some government employee, central banker, or other crony operative.

Crypto-economics is lighting the way forward, the only question now is "what's next?".

3. The Riegel Way, the Story of "Alan"
We are not proposing a currency or money. We are not describing a security, investment, bond, or other financial instrument. In many ways our path is a-financial – the "Way Token" will be, like any pre-paid product card or casino chip, a non-monetary representation of contextual, real, value. These tokens have no "interest rate facility", there is no board that oversees them – and if there were an "AMAZON Gift Card Board of Price Setters", setting value, wouldn't that be strange? The only institution that sets the value of a AMAZON gift card, or iTunes, or other gift card issuer, are the owners of those organizations themselves – privately, with the interest of the company in focus and not variable and counter-productive political agendas, or weird Wall Street based financial schemes.

Imagine if you will the poultry farmer, a specific one. This farmer raises chickens, and also harvests eggs. This farmer can use credit card merchant systems, and banks, and the standard distribution channels – but this places the work, the product of labor, into the realm of crony, manipulated, and unethical relationships. Let's call this farmer "Alan".

Alan wants to raise poultry, he wants to sell eggs, he is ethically, morally, an *agorist* - and he has no desire to participate in the mainstream economy – he is seeking counter-economics, and wants to sell his chickens and eggs in an *a-financial* way.

Alan has a few friends who also raise poultry, sell eggs, and would like to sell some or all of their production as barter or trade happening within the auspices of *counter-economics*. In the counter-economics world, this means that Alan and his friends need a means of exchanging their work for other useful items. Alan likes physical gold and silver, but has no practical means of trading them for those goods/services he wants. He, and his association (let's call them the "Chicken and Egg Association of Dayton Ohio" for descriptive purposes – again, a hypothetical co-op, created by Alan and his friends), is missing some important mechanisms to allow fluid exchange with *equilibrium pricing*. The association now exists, there is a co-op of agorist poultry farmers, but, still, they don't have all the tools – and they are unsure what to do.

What are they missing, "Alan and his friends"? :

   (1) A means of exchanging their eggs and chickens with others, to receive those items, services, resources, they do not have.

   (2) A way of saving, in a meaningful way, the product of their labor. Saving this for investment, entrepreneurship, and other projects.

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(3) Electronic, contemporary, point-of-sale, logistics, pricing, that would match or (most likely) improve upon the crony-markets that currently exist.

Alan has a friend, Betty, and Betty is a software engineer and *crypto-miner*. Betty has been running Bitcoin mining nodes for 5 years, she has earned enough from this to consider herself a small scale venture capitalist (though she calls herself a *venture-humanist*). Betty is looking for an opportunity to invest, and so she attends the first meeting of the Chicken and Egg Association of Dayton Ohio. In the midst of the discussions, handwringing, the back-and-forth arguments between the poultry farmers there, Betty decided to speak up …

"Listen, you want to sell your poultry, eggs, without other intermediaries or forces impacting how you sell these products – you can't use dollars to do this ..."

"What do you mean?", Alan asked from the podium.

"Once you enter into any financial arrangement you run the risk of other parties, authorities, wanting 'their cut', their piece of the action … you can't do finance as it is done … you have to be outside the 'financial economy' ..."

Alan invited Betty up to the stage where she continued to explain, extemporaneously, the pitfalls and problems of these poultry farmers going "outside the corporate system." At one point, she found herself describing what would be, should be, a specialized token for this association.

Alan and Betty are fodder, in a sense, for this general discussion of E.C. Riegel's vision. Riegel believed that "money" or "currency" or tokens in our context are a natural manifestation of human problem solving – and rational, when you consider the nature of human invention. Even in ancient times life was complicated enough that horse trading or simple barter schemes were not terribly effective for all commerce. But, the necessity of money, like the desire to have bridges or roads or hospitals, does not imply the need of any government action – the opposite, the state can only create obstacles, problems.

Riegel saw the invention of money as one of the great innovations of human development, and the proof of its usefulness is in the fact that many societies discovered the value of monetary relationships. But the usefulness of money is diminished within the context of central banking, crony business-government entities, and "magical" creation.

For any "money" or token to have value, for Riegel, it cannot simply be some fiat paper that has some value based upon manipulation – it should be, must be, directly related to some underlying service, resource, product of human activity. The criticism of Riegel's approach would have been more valid before the age of computerization and networking – but now, with the ability to move data around the globe nearly instantaneously? - Riegel's ideas come into their own.

It is, in Riegel's thinking, immoral to offer some token or currency that is backed by nothing. One would want a world where there were tokens to represent every kind of product, resource, service that would be conceivable. One might ask, "what if they cheat?" - and Riegel might reply, "the system is already a cheat". Yes – cheating, or creating "chicken tokens" when you have no chickens to sell is

wrong, and might very well happen. In this scenario, one or more farmers get caught, go out of business, likely lose all of their accrued wealth, and this punishment requires no state – simply a functioning marketplace absent the state's *perverse incentives* when it comes to banking and crony business practices.

Here are some positive features of a Riegel Way of creating/using tokens in a free-market:

(1) *Honest:* a resource based token is a promise to deliver one or more units of some item – a dozen eggs, loaves of bread, bottles of wine, hours of computer consulting, primary care physician fees. The *Surgical Center of Oklahoma*, for example, only accepts cash payment for services – in their case, they could easily issue, as a crypto-token, their own tokens that represent a promise to perform surgery. Since medical care can be quite expensive, their "surgical token" would likely be fractional – requiring more than one token to pay for the components of service.

(2) *De-centralized:* Riegel's world is an inherently de-centralized world of money. How many token blockchains might exist? - that's an alluring question, but not a good one. It is like saying, "how many mobile phones do we need next year?" - it is absurd. There could be, should be, thousands if not MILLIONS of token systems, all of which is balanced through token-trading markets. Yes – there will be meta-tokens, like Bitcoin, that possess (for good reason) a lot of cachet. But there will be, for every one meta-token, many more smaller scale but real value tokens – value determined not by whim or guesswork, but by the underlying resources, time, services, themselves.

(3) *Open-ended:* in a world where/when any person, man or woman, can issue their own tokens and be their own source of wealth through hard work, there is no practical limit to the expansion and progress of humankind. It's not hard to imagine a "Mars Token" - a token issued to fund Mars exploration and to be redeemed for products/services/resources that would result from this expedition. In this scenario – the "token presale" becomes the investment basis for humans to push out beyond the Earth, on our way to the stars.

(4) *Easy to audit:* this is discussed, as an idea, in other parts of the paper, but in Riegel's world of money figuring out if some farmer or fisherman or factory owner was lying would be a simple matter of comparing blockchain ledger entries to a simple review of capacity. Of course, in a free world no person is required to allow anyone to look into their private activities in any form, but this too has consequences. Even if we assume a "black box" producer or seller, eventually, people will seek to redeem their "automobile tokens", and if they find that there are no cars to be sold, this will be a nearly instantaneous signal, to the market, that this enterprise is a sham. No hearings, no cops, no courts, just the actions of your fellows and neighbors, keeping each other honest. This approach is what Riegel calls "natural governance" - the process by which society itself behaves as the only check required, the only consequence.

(5) *Simple and Scalable:* it is well known, in the blockchain communities, that there are some scalability issues for the major crypto tokens – Bitcoin, Ethereum, etc. Currently, it is estimated that Bitcoin can do 4-7 transactions per second, Ethereum 20 transactions per second, PayPal claims to be able to 450 transactions per second and VISA between 4,000 and 40,000 transactions per second. But, if we were dealing with a world of many crypto tokens (and the implied nodes), it stands to reason that the workload, and bandwidth, would improve – not

solely on a per-token basis, but rather when we take the market basket of blockchain based tokens as a whole. The Riegel approach would necessarily take pressure off the major crypto tokens, like Bitcoin, while allowing the natural expression of catallaxy, of human voluntary activity, to arise.

(6) *Interest rates, as such, are also based on real competition:* there is debate, among those deep in the crypto-economy, whether "interest" exists in a real-asset, resource-token, world. The real issue is "fractional reserve banking", separate from a rate of interest, and it is this feature of modern banking that is most likely to be impacted. What would be the "fractional reserve" behavior of a chicken farm? - produce 100 chicken tokens, when you only have 50 chickens on hand? This would be absurd and fraudulent, in a transparent resource based exchange economy.

As you can see, laid out, the features of a Riegel monetary system, or *token-system*, are positive, liberty enabling, and fundamentally opposed to any form of corrupt manipulation, fraud, or control.

We've introduced Alan and Betty – assume we're 5 years in the future, and they, the "egg and chicken association", a voluntary co-op of poultry farmers, are doing well, thriving, what does that look like?

We would need more than just "chicken tokens" and "egg tokens". We would need tokens for every and all forms useful services, and a means to interact with the outer-economy from the counter-economy. The general exchange, in these instances, could be something like [SilentVault (Silent Vault.com)](), or a similar system, designed to operate as both a token-trading market AND a general token exchange.

"Alan and his farm ..."
Alan wants to expand his farm, buying additional property from one of his neighbors – a friend who is still deeply invested in the *outer-economy* (the financial, crony, mainstream economy). Alan's friend with the land, "Chuck", well … Chuck wants cash. It's true, the dollar's value had dropped (crashed) recently, but Chuck is a believer and cannot be convinced to use any crypto wallets – let alone a meta-wallet like the one Alan is using. Alan needs dollars – and this is where the counter-economy, in our current world, needs a means of exchanging value.

Alan heard about SilentVault, or something like it, and opened an account. Alan's been trading his chicken-tokens, egg-tokens, and other resource tokens he's been paid with for miscellaneous work, and has bought Bitcoin and Ethereum. He logs into SilentVault, and opens up a trading account – because SilentVault technology also supports secure chat, he can converse, secretly, with trading partners and determine how he will take his 10 Bitcoin and convert that to something Chuck will accept.

A new player on SilentVault, "Meta Money Inc.", does private, and local where available, crypto-2-fiat exchanges for crypto tokens. After about an hour of chatting securely, and some research on Alan's part, the Meta Money consultant finds Alan a local agent for concierge token-exchange. Alan and the local agent meet, Alan gets the cash from the agent and then meets with Chuck. Chuck accepts the deal, the property is bought – nowhere in this process did Alan have to fill out dozens of forms, sign many more documents. It was a single page contract, a handshake, a payment, and Alan now has an additional 100 acres.

"Betty and the baby ..."

Betty, the facilitator and major player in the "chicken and egg" blockchain tokens, is pregnant – and there is no available obstetrician in her area. She creates a Meet-Up group (meetup.com) and decides to hold an informal focus group on the subject of prenatal and other forms of childcare and healthcare. In attendance were 120 women, 30 men, all of whom are interested in fixing this issue. Most of them had suffered under an imploding healthcare system, and were looking for some way out.

After the first meeting, Betty gets enough feedback to formulate a plan - "we're going to do more than just get an obstetrician to our county, we're going to re-invent healthcare delivery, or, rather, rediscover it ...".

Betty figures out that several of the women, and some of the men, in attendance, were healthcare professionals - "why not form our own co-op clinic and issue a healthcare token?". She puts together a white paper describing how she will use the "Liberty Clinic Health Token" to allow members of her community to invest, by respecting the value of the token, accepting it as fair payment for goods and services. Now, they hold these tokens – and for the most part, they never get traded on the crypto-exchanges. The *LCHT*, or *Liberty Clinic Health Token*, is the means by which families, in her county, begin to get access to medical care, treatments, and required remedies (pharmaceuticals).

We walk you through these user-stories or use-cases for resource token commerce to explain, in basic terms, that this is not "rocket science". The most complicated part of Riegel's approach is the valuation of 2 or more resource tokens vis-a-vis each other – but this is also very simple. The free market determines the value of the "chicken token" just as easily as it determines the value of the "healthcare token" - and in some cases, like a local clinic, it might never be necessary for most of these tokens to touch a trading exchange … but what if they did? What if one or more LCHT(s) were traded on a crypto market exchange? - would there be value in amassing these tokens, if you're "Mark" and you work as an entrepreneur in the area of "travel and leisure"? Mark might trade for Betty's local clinic token, along with clinic tokens all over the United States – as more and more local hospitals and clinics distance themselves from a collapsing and crony healthcare system? Perhaps Mark works in healthcare, and simply wants to create a general agora or market for healthcare services, providing an arbitrage mechanism.

The point is simple – in the Riegel model, if there is a need for a token it will be invented. How many of each token is mined or sold is a function of supply and demand, nothing more. Since people tend to be risk averse when it comes to healthcare, especially when this concerns their families, children, it is very likely that the "healthcare tokens" become part of a general, voluntary, catallaxy resulting in communities taking full ownership of their wellbeing.

One of the questions that inevitably arises is this: how many cryptos or tokens can the human ecosystem support?

This question doesn't have a simple answer. It's like asking "how many tractors do we need to build next year?" - the only logical answer is "we'll know next year, based upon the demands of the marketplace". So, there is very little value in these kinds of predictions or estimates, beyond the academic fun of making guesses. So let's go down that road a bit, have some fun with 'conjectures' …

Assumptions:

(1) The world GDP (measure of production) was $78 trillion, in nominal terms, according to the CIA Fact Book (2014).

(2) The current daily blockchain transactions average about US$3 billion per day. If you extrapolate this out as a low-end estimate, you could suppose an economy of about a trillion dollars in annual cash flow.

(3) The fraction of blockchain transactions out of the world economy is 1.28% roughly – could be higher, probably not lower.

(4) Let's assume, that the amount of "world economy" represented by the crypto economy is closer to 10%. That would imply, using this math, that 90% of the space is still open to other tokens, resource-tokens, like the "poultry farmer" scenario described.

The above "napkin analysis" is very limited, but here is our conjecture: There will be major cryptos, like Bitcoin, that will continue to exist and provide a role – a space better fitted to Bitcoin, Ethereum, and the other meta-tokens. As meta-tokens, they are instruments of investment, savings, large scale balance of payment transactions, shipping, etc – but meta-tokens would be ill suited to the world of "chicken farmers", software engineers selling services, or, frankly, those who mine physical gold and silver or sell oil and petroleum products. It makes sense that various companies, farm co-ops, mining companies, oil companies, would consider issuing their own tokens – which would allow them to capitalize and invest outside the world of crony financial economics and broken markets.

4. Architectural Vision and Catallaxy

Under normal circumstances – those situations not impacted by government or state involvement – markets arise as needed. Sometimes markets are very simple – involving no more than 2 people participating in simple bartering or horse trading. The markets required by our more advanced societies do not function well using simple barter. In the case of our more complex society, there are many kinds of markets – and because of the amount of state intervention, none of these is really a "pure" free market.

For purposes of this discussion, we are assuming facilitative markets, or agoras, to enable the efficient exchange and balancing of necessary resources at all levels, both material and token trading based – all of which is unplanned.

For our "Riegel Way" vision, we desire certain entities and expect them to arise, but we also note that this is an issue of education and training.

Participating entities:

(1) *Buyers, sellers, resource providers, professionals, farmers, etc:* these are the human agent participants. At some point, in the future, this might include artificial intelligence – but for now assume people, either singly or as members of a block or co-op.

(2) *Private, resource based, token mining nodes:* these are token mining networks, not unlike the mining and transactional networks for Bitcoin and Ethereum. These nodes might be fully managed by a particular seller or, more likely, managed in blocks. Like the scenario mentioned above with "Alan" and the "chicken and egg co-op" – a group of chicken farmers, maybe hundreds, could get together and issue their own tokens – and select people to operate mining nodes. Miners seek opportunities to generate wealth, and will likely become enablers, voluntarily and emergently.

(3) *Resource-tokens:* an artifact, that can simply be electronic, that represents some amount of product, service, raw material, or any other item that could conceivably be bought or sold. The key here is "real and tangible" - which means it is implied that any given resource-token can be used to purchase directly from the provider of the underlying resource. So, if you had a "chicken token" good for 3 whole chickens, you would expect to redeem this token, with the farmer, and receive 3 whole chickens. Otherwise, you would take these tokens to a marketplace or store and use them to buy something else.

(4) *Meta-tokens:* these are tokens, Bitcoin being the best example, that facilitate large transactions and resource trading scenarios involving many products, where the buyers/seller need to conduct business at a high level. Meta-tokens are best used to facilitate business creation, fund major projects, exchange resource-tokens for other specie in the outer-community.

(5) *Token Trading Markets, and exchange nodes:* these nodes, some of which are already being built (see ***http://www.silentvault.com/***), allow for the large scale valuation, clearing price discovery, and healthy market trading of all tokens, including meta-tokens, in relationship to each other. This is where the price-discovery happens, and the determination of the relationship between "chickens and software engineering consulting" occurs. It is via computer based token trading markets that the "problem of barter" is resolved and E. C. Riegel's vision is attained. Practically speaking, this the mechanism by which someone who "holds too many chicken-tokens" can exchange them for other kinds of tokens. This is also an enabling factor for stores, markets, super-markets, malls, any and all agora where a seller must take their various tokens and transfer them into usable wealth for future investment, savings, and other business opportunities.

(6) *Token Issuance Auditing Nodes:* these nodes would be created by participants who have the "information sharing" role. These nodes would download various (or all) resource blockchain tokens and monitor these for irregularities, and provide data for forecasting and analysis. One could say there is a "business journalism" angle to this, and that would be an appropriate perspective, but the key is to ensure that if 10,000 chicken tokens are issued, there are, given the contracts involved, enough chickens to cover these. This is not governance, nor a replacement for the normal operations of a free-market. This is, rather, a proposed scheme that is already taking hold with the major crypto-tokens, like Bitcoin.

(7) *Generalized Token Bag (meta-wallet):* there are many companies working on meta-wallets for meta-tokens, like Bitcoin, Ethereum, Monero, Dash, Dogecoin, etc. The Riegel Way token-bag will be designed to allow a user to carry with them, safely, securely, a generalized wallet – and the ability to print physical copies, as tokens, to trade without the use of a computer. The

physical version of crypto would need to have safety features, and operate similarly to travelers checks or a printed ticket, with authenticating data as part of the paper. The idea is to allow the buyer/trader/seller to carry as many tokens as they need.

(8) *Agoras – both physical, virtual, to include stall-based open markets:* we call out "agoras" because they are so critical – not simply to the Riegel Way, but more importantly for how this paper envisions this catallaxy unfolding.

Diagram, shown below, illustrates an incomplete version of this emergent catallaxy:
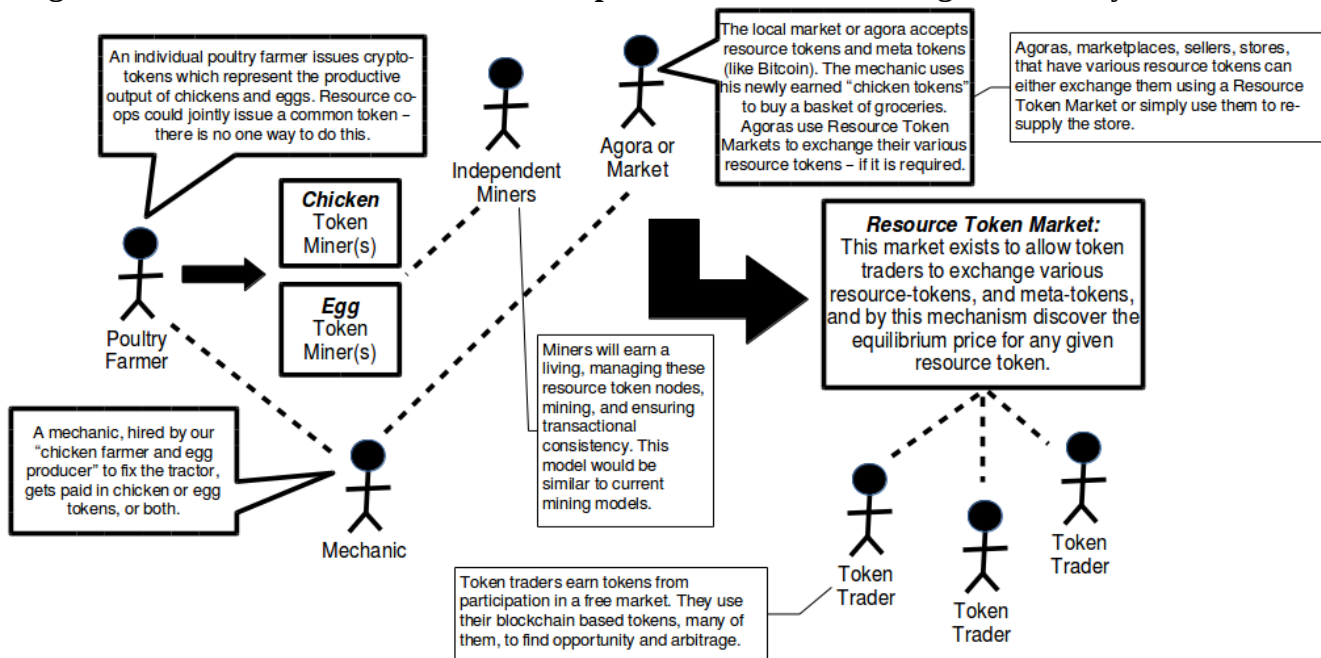
5. Road Map

The way-token has a road map of where we want to be with our main mission: to learn, invent, develop, create liberty-based communities – and, most importantly, to share what we've learned along *open-source* principles.

Phases:

(1) *Token Presale:* we want to make available, on our agora or marketplace, the "Way Token". The "WAY", for short, is a token that can be bought and then used on our marketplace for purchases, including and not limited to the presale of leases (per our philosophy) to create some of our first resilient-communities.

(2) *Ethereum Smart Contract:* following the token presale, we expect to deploy an Ethereum smart contract that would allow us to use the Ethereum ecosystem to support, facilitate, our foundation and goals. This would be an ERC-20 standard smart-contract, and would allow the "WAY" token to become virtual and still integrated into our eCommerce platform.

(3) *Branching of Bitcoin to support generic features as a resource-token:* in accordance with proper standards within the open-source community, we intend to branch and modify, openly, the Bitcoin model. Not in a fundamental sense in terms of core behavior, unless that is justified – but rather to support a generalized, customizable, blockchain technology that any resource provider, service provider, professional, farmer, etc, could use to issue their own tokens backed by their work, production. We want to investigate improvements to the hashing process and the way transactions are verified. But, as stated, not a radical reinvention as much as a templating of this blockchain tech. Additionally, we need to develop: a) a meta-wallet, b) a trading-exchange (this might be mediated by the existence of at least one exchange that we could simply partner with, like SilentVault), c) a toolkit and educational materials on how to "spin up" a resource token, mine them, and make them available.

(4) *A different approach to blockchain generation:* this is our ambitious phase – we believe, and could be wrong, that the Bitcoin protocol and system can be improved upon. Or, rather, that the blockchain will evolve. One potential source of "evolution" is to substitute the work of recursive hashing (Merkle Tree generation) with a pure number theory approach. In many ways, the blockchain is already, in the big-sense, a non-deterministic number series that 2 or more programs can synchronize off of in a race to discover the next useful number in the series. More on this below.

"The future of the blockchain ..."

With crypto-economics, our main focus is the open-source expansion of free, dignified, human scale living arrangements – or communities. A question we are asked is "why get into cryptos", and although we will reprise this in the concluding section, it is worth considering what you've read so far – about E.C. Riegel's ideas and how this relates to a resilient and healthy community.

The blockchain will evolve – this is not a radical statement. The evolution of the blockchain will not be linear, but it will be faster than most appreciate.

The blockchain currently ascribes value to complex calculations, or hashes, that match rules of sequential completion – i.e., to mine a new token on any blockchain, you must incorporate features of the sequence itself, Merkle Trees, and then find the next hash that makes for a valid sequence, and in this process of "massively parallel hashing", new tokens are discovered. This "work" is valuable, but it is primarily valued for the private, consistent, shared network sequence it allows, whereby the entire network, based upon voting rules, adjudicates transactions.

You can imagine the blockchain like a group of weavers, separated by thousands of miles, all trying to "create the next section of cloth" - knowing it must be based on the same common pattern of fabric (blockchain) that already exists. This process of "weaving" to come up with the next swatch is akin to mining.

The analogy between "mining the blockchain" and "cross-country synchronized cloth weaving" breaks down, however.

The Sullivan Conjecture

Phase 4, described in summary above, is the most ambitious of our proposals – but we believe it is a reachable goal. Here is the summary of our conjecture, call it "conjecture part A":

(1) The blockchain, as it currently functions using Merkle Trees, can also be viewed as a non-deterministic and synchronizable (across peers in a network) numeric sequence where the cost of lengthening the sequence is non-linear.
(2) Merkle tree generation, as part of the way the blockchain functions is powerful, inventive. But, there are likely many ways to generate non-deterministic, difficult to discover (mining process) in terms of non-linear costs, and capable of being synchronized across many peers in a network.
(3) Mining, from a certain perspective, is similar to mathematical induction – in the sense that miners are, via brute force, discovering the next hash, allowing the blockchain to grow (adding coins) and doing so consistently across a decentralized network of mining computers.
(4) Focusing on the "number theory" feature of virtual, safe, peer-to-peer, token generation opens up certain possibilities, including the customization of code-lines, like Bitcoin, via branching from the source, where the functor [F], for determining the next valid sub-sequence for extending the sequences, would be a virtual function – overridable by extension and sub-classing, in an object oriented language, like C++, using virtual methods. This is a continuation of the work of innovators, like Vitalik Buterin (Ethereum), in proposing that not simply the blockchain itself can be extended, but the means of generating the blockchain can be extended, customizable, and allow for the template'd design of a generalized blockchain API that can be applied to a myriad of resource-token scenarios (like the "chicken token").

One of the first projects on our Phase 4 "road map", assuming we achieve our funding goals, will be to develop a test network, using as many Linux based PCs as we can affordably deploy (virtual servers are a good option for this experiment) to create a simulation I call "The Sequence Game".

"The Sequence Game"
The Sequence Game is a proposed sub-project and *gedanken-experiment*, as part of our Phase 4, to create generalized software agents, operating in Linux OS environments, where each agent participates in a peer-to-peer numerical sequence generation competition – each agent starts with the "seed" sequence (similar to the "genesis coin" idea with the current blockchain).

The Game:

(1) There are (n) players, where n > 1. In the simple case, 2 computers, running their own agent software, competing to extend a synchronized non-deterministic numeric sequence where the cost of extending the network is a customizable non-linear cost. Customized non-linear costs are similar to the way the block-size, and other features of the blockchain, are mutable based upon the value of the blockchain token.
(2) The players "compete" to extend the sequence (analog to the blockchain).
(3) The players incorporate "special quasi-random strings" to represent transactional payloads or blocks.

There is a great deal more work that needs to be done, but the first step is to write the software that allows this "synchronized non-deterministic sequence generation".

Before closing this section, we propose a thought: *would it not be useful to substitute brute-force hashing with some equivalent and costly, but useful, calculation?*

There are problems in math and science that involve numbers that do not have shortcuts – like prime numbers.

Assume the following prime numbers:

{ 2, 3, 5, 7, 11, 13, 17, 19 … }

It turns out, other than "*brute force*", there is no *constant time* way of verifying if some number is prime – it is polynomial time, best case. In fact it falls into the class of problems, in number theory, that have *heuristic* and combinatoric strategies but no "fast means" of determination. This is also why, as (n) increases, (n) being the value of the prime or its ordered position in the sequence, becomes more difficult to verify. The process of "verifying a prime" is, in many ways, not that dissimilar from determining if "some new hash" that your mining rig has found meets the conditions of the current blockchain being extended.

Discovering "new primes" is likely not a great use of the blockchain, but what about something like "SETI at Home"?

In the early 2000's, "SETI at Home" was a distributed client application, you could run on your computer, that would download signals from the Allen Radio Telescope Array Observatory, and each app, running on a publisher-subscriber network (not peer-to-peer) would process the signals and assist, in a distributed way, in the search for extra-terrestrial intelligence.

We provide the SETI@HOME example to propose a further, but weaker, conjecture – call it "conjecture part B" - that there might be a way to incorporate other "work" into the mining process that might (might) add additional value to the mining process. In some ways, V. Buterin's Ethereum is already equipped to do this, but via the smart-contract. We propose, knowing this is a difficult task, that we could implement, via the [F] functor for blockchain generation and membership, a mining process that provides this other value while at the same time the miners are extending a useful token blockchain for an entity, like farmer "Alan". Part B conjecture requires much more research.

6. Conclusions

In the annals of human history there is one common story – when the state is least intrusive, the people prosper. It is NOT our intention, in this paper, to promote "separatism" or crude "autarky" or any closed-world approach to human society. Rather, we are promoting a strategy of human progress – beyond simple human survival. As part of this, we cannot dismiss the necessity of safe, reliable, ethical means of human commerce and exchange.

Walk the grocery store aisles – observe the kiosks containing prepaid gift cards, from Amazon, Home Depot, Olive Garden, Best Buy, etc. Are these cards, these tokens, securities? Are they currency? Are they anything more than a promise that IF you purchase the Amazon gift card, THEN Amazon promises to provide products, services, etc, in the denominated amount?

Gift cards from Amazon are a perfect example.

Amazon claims to be an "everything store", so if they are allowed to do this, why wouldn't anyone, even a local physician, be ethically justified in doing the same?

How different is the Amazon gift card from Alan's "chicken token"?

Amazon promises to redeem …

"Alan" promises to redeem.

If either hypothetical "Alan" or Amazon failed to redeem the card, what would be the meaning of this?

These questions are posed, not because there is a simple answer but because we believe there is no ethical, legal, or functional difference between a prepaid gift card and a crypto-token tied to a resource – no legitimate difference, that is.

"The Riegel Way"
Riegel's proposal, from decades ago, is rather simple:

(1) Human society serves as the only "government" required – the "natural governance" as Riegel would say, and it is the only bulwark against fraud. No amount of legal or police or bureaucratic control can replace the power of decent, intelligent, and FREE people making decisions in the marketplace.
(2) The only morally justifiable representation of work that one could reasonably use for trade, via a proxy, like a crypto-token or gift card, *must be directly connected to some underlying resource.* In the case of Bitcoin, the underlying resource is the network, the brand, the cachet, and the thousands, millions, of participants and miners. Meta-tokens, like Bitcoin, will never cease to have value as bulk representations of work, in a private, stable, consistent blockchain. But most of the tokens issued, in a world of liberty, would be like Alan's "chicken" or "egg" token – a prepaid artifact representing concrete production. In many ways, meta-tokens, like Bitcoin or Ethereum are the EXACT EQUIVALENT to an Amazon gift card – tell me, what restrictions are there, on you, when using the card? You can buy any item at their "universal store" - and, as such, it becomes a "durable and convertible" instrument. Unlike the gift card, however, it is not limited to just Amazon. Bitcoin can be used all around the world – at any store that will accept it. Bitcoin makes the world "Amazon", and Amazon seeks to make the world of commerce its own (topic for another paper).

There is nothing that prevents us from achieving Riegel's ideas – except for cowardice before petulant and conniving officials and crony institutions.

"The Way Token" will be in line with Riegel's admonitions.

We will not issue more than we can support. We currently propose to release 100,000 Way tokens at US$1 each with that price good through the end of December 2017. Thereafter, we propose to release a further 600,000 tokens at US$2 each. No additional tokens will be released by us for a further 18 months.

We will not issue more than can be redeemed for value, and we will stand by our products, services, foundation AND mission because this is what men and women of principle do.

We understand that liberty and responsibility are inextricably linked, and that's what makes this resilient and anti-fragile.

The Riegel path is restricted only by the limits of human work and imagination …

The central bank path has failed and has produced a dystopia – stale, dead, dehumanizing.

Another "way" is needed – a means of human commerce leading, inextricably, to the stars.

Be resilient!

Please join us on this journey!

Glossary of Terms

A-financial: means, in the context of this paper, "non-financial, not under the jurisdiction of financial regulation or using corrupt financial schemes as a source of funding or trade". It means AVOIDING those institutions, structures, systems that support and enable the crony economics of our central bank planned world.

Agorism (sometimes called voluntaryism): a philosophy, developed by Samuel Edward Konkin III in the early 1970's, that proposes only voluntary relationships among people. Therefore, taxation, regulation, and any form of bullying, would be anathema to an agoristic or voluntaryist approach to business, life, society. Many anarchists call themselves agorists, but agorism is fundamentally in the constellation of anarchist values. It is connected to the non-aggression principle.

Algorithm: a formal solution to some problem that can be described in purely mathematical terms. A true algorithm contains no heuristics, no shortcuts, and is often accompanied by a formal proof using mathematical induction, showing the boundary conditions of the solution and why the solution is consistent. Additionally, Big-O analysis (complexity analysis), is included as part of this process.

"Big-O" analysis or complexity: in the mathematical sense, complexity is the functional approximation of the number of steps required to solve some problem – like sorting a list of random numbers. The "bubble sort" is $O(n) = n^2$, so for a list of 10 numbers, randomly sorted, we would expect 100 steps to be required. The "quick sort" will sort a list with a complexity of $O(n) = n*LOG(n)$ – much better performance than the "bubble sort".

Browser: a client application, run from a computer or other device, that allows a user to navigate HTML documents and, by extension, the WWW (world wide web).

"Brute force": refers to a basic strategy, in computer science, where you have no elegant proof-based shortcut to solving some problem – like the "Traveling Salesman Problem", which has an assumed n-factorial cost but is non-deterministic - and are left with performing heavy calculations in order to find a solution. The process of mining tokens in the blockchain involves brute-force hashing and enables one way the blockchain does not suffer the effects of manipulation – one of many protections.

Catallaxy: an alternative to the word "economy" preferred by those who promote counter-economics. Catallaxy implies the spontaneous emergence of systems, relationships, that enable commerce between free people. It is the emergence of these features of a free economy and their ability to approximate solutions without government involvement that we call catallaxy and not an economy. Catallaxy is only possible in a free market.

"Constant time": refers to algorithm analysis and a specific level of complexity. This is the case that, for any problem that can be measured by steps (n), the "cost" is always the same – though, in the real world, this often ignores the actual "costs" within a standard (Von Neumann Architecture) computer. Hashing, in the simple case, is a constant time operation – it can be expensive in terms of RAM, Processor, but it is $O(c) \rightarrow$ "BIG-O notation". Problems like "sorting a list" have trivial polynomial time solutions (bubble sort) with $O(n) = n^2$. But, there are much better solutions, like the Quick Sort, with $n*LOG(n)$ behavior – quite good compared to polynomial time. Some problems are much harder

than polynomial time, like the "Traveling Salesman Problem" - and therefore are described as NP complete (or non-deterministic polynomial time).

Counter-economics: those voluntary strategies for commerce between 2 or more people that do not involve the threat of force. This means that there are no government courts, no cops, no regulators, no agencies, no "thug armies or gangs", between these 2 or more people. All that exists is voluntary and peaceful exchange of work – or its token representation.

Crypto-miner: or "miner" is someone that runs one or more (usually specially designed) computers for the purpose of discovering new "coins" and in support of crypto-transactions. Miners earn wealth off of the new tokens they mine, and they also earn by acting as part of a network-based clearing house for business transactions on the blockchain.

DAO (Decentralized Autonomous Organization): a strategy of using Ethereum's smart-contract model to create investment fund type organizations outside the context of "normal" fund raising or capital investment.

Digital money: a monetary system where the specie itself is virtual, electronic, and managed by often complex and highly centralized client-server architectures.

Ecmascript: this can be thought of as "generalized Javascript". It is a standard, managed to create a general "Javascript Standard" that many implementers can support. "Solidity", Ethereum's "Javascript like" language, is a loosely based ECMASCRIPT language.

eCommerce: refers to business and trade that occurs on the WWW – AMAZON being a good example of this on a large scale.

Encryption: the process by which ordinary information or "text" (often referred to as plain text) is modified to make the information unreadable by anyone but the intended recipient.

Equilibrium pricing: this is based upon the supply/demand model. The equilibrium price for any good and service, in a free market, is quickly reached and in balance with supply. A truly free market is sensitive to changes in supply and demand – ergo, the "price" can never be fixed or set. The price is based upon a balance or "equilibrium" between the supply of some item and the general desire for that item on the part of a set of customers.

Gedanken-experiment (thought experiment): a thought experiment is a conceptual model of a problem, considered in dynamic rather than static terms. It's not an actual experiment, but a process of considering a problem that can, sometimes, lead to an insight – that might require, at some point, a real experimental model and scientific exploration. Thought experiments are also used in philosophy to discuss complex problems, where the process itself is like disciplined brain storming. A "conjecture" (or educated opinion) is often linked to a thought experiment.

Heuristic: a rule that is assumed to be true. Often times in computer science and software engineering heuristics or "rules" are incorporated into the system – this is because "calling a rule" is $O(c)$ complexity (constant time) and therefore very efficient from a performance perspective. However,

heuristics are not equal to mathematical algorithms which have corresponding proofs – because of this, heuristics are often considered "second class citizens" to algorithmic solutions.

HTML: hyper-text markup language. This is the language, invented at CERN in the early 1990's, that allows anyone to mark-up their data such that a standard browser can read the data. The original language was relatively simple, supporting basic formatting and the useful innovation of hyperlinks. Hyperlinks being a marked up chunk of text, that when clicked on from inside a browser, directs the user to another page, file, or other source of information.

HTTP: hyper-text transfer protocol is the simple client-server language that allows a browser to request web pages, post data, upload files, and navigate using HTML.

Meta-token: a meta-token is a representation of value for purposes of moving, saving, exchanging, baskets of other value – in the context of this paper, "other value" implies resource based tokens. Bitcoin, Ethereum, and many of the current crop of crypto-tokens are meta-tokens in this sense and are critical for any number of reasons – not the least of which is their power to allow large-value grouping and exchange of work-value between communities and organizations, at a scale that fits both their feature set and scalability.

Open-source: refers to a movement, that began at Berkeley in the 1970's, that promoted the free dissemination of software, under different kinds of licenses that supported users, programmers, and allowed for the free-software marketplace. Often connected to the LINUX movement.
Additional information: https://en.wikipedia.org/wiki/Open_source

Outer-community: the outer-communities are those regions, towns, nearby places, that are not part of a intentional community. These are often counties, cities, and other groupings, run by a government.

Perverse incentive: any payout or reward that reinforces bad behaviors, and distorts standard models for risk. For example: if a banking system fails, and you use stolen or printed money to pay off the bad debt, or forgive it altogether using the state, this creates an impression that "someone always has my back". This "someone always has my back" feeling will lead the bankers to taking the same or greater risks that led them to crisis in the first place. These kinds of incentives are completely in the scope of state action – no state, no perverse incentives.

State: the state is any association of people who feel that, by some magical authority, to include "democracy" and "social contract", they have the right to control the lives of others. Any bully, acting alone, is a kind of proto-state. "State" can be used interchangeably with the word "government". The state operates on the basis of illegitimate authority, fear and violence.

Token-system: a resource or product of work based token-system, in contrast to a monetary-system, is honest, value based, transparent, and easily observed by all market participants. Monetary-systems are opaque, dark, hidden, nested with lies and rackets, and very few if anyone understands the "M1, M2, Quantitative Easing ..." garbage language designed to obscure the essence of it – central banking is a fraud, a criminal enterprise, protected by the force of the state.

Turing-complete: for any computation that can be performed by a theoretical Turing-machine, the language described can do the same. An easier description: a fully functional programming language,

that can, with the right APIs involved, do almost anything – but, like all smart contracts, what it "does" is based upon how much "gas" you have and want to expend. "Gas" being the measure of processing resources required to execute the smart contract.

Use-token: a token that is exactly like a pre-paid gift card, like those pre-paid cards you would find at the grocery store in kiosks. The generally accepted accounting term is "customer advance payment." Additional information:
a) https://en.wikipedia.org/wiki/Advance_payment
b) https://www.accountingtools.com/articles/how-to-account-for-customer-advance-payments.html

Venture-humanism: the philosophy that proposes "people are more important than things", and that, in our daily practices, we should think of investment, not as a "resource extraction scheme", but rather true investment is about making practical wagers on people, their ideas, their lives. It is not in opposition to venture-capitalism, but a different angle on the idea of being an entrepreneur. We wager not simply for a "pay off" in financial terms, but instead for the deeper, more long-lasting, pay off in terms of our lives, neighborhoods, families, and future.

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