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CrowdPoint Technologies | Official Whitepaper

Powering Open, Honest, Stable Markets

Sean Brehm, Nadab Akhtar, Eraj Akhtar,
Wolf Kohn, and Daniel Guinan

CrowdPoint Technologies¹
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Abstract

[TBD]

In 1889, Friedrich von Wieser asserted in his book "Natural Value" that utility is the highest principle of all economies. "The utility is imperfectly contained in value. The amount of utility contained is intimately associated with the idea of goods. Where value and utility come into conflict, utility must conquer; nothing in the nature of value could give it the ascendancy."²

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² Wieser, Friedrich von. 1893. *Natural Value*. London: Macmillan and Company.

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Introduction

CrowdPoint is pioneering the evolution of free markets by developing an ecosystem on the blockchain.

Blockchain ecosystems are networks of participants in a blockchain that share business objectives and processes. In today's market, the business ecosystems operated by large technology companies extract value exclusively for themselves. CrowdPoint is a blockchain ecosystem that ensures that all participants can extract value from its use.

The user is at the heart of the blockchain ecosystem. An individual's data constitutes a digital image of themselves and is the requisite foundation for measuring online e-commerce activities. In the blockchain ecosystem, a user claims a decentralized identity (DID), a new type of identifier with both bullion and numismatic value based on the user data's volume, velocity, variety, and veracity. The DID allows users to secure their privacy, protect their identity from theft, and improve their financial performance.

Problem

The information age made it easier to connect with friends and things you care about through the internet. What was supposedly a free market became monopolized by a few big corporations that crush innovation and promote surveillance capitalism.

We have a data-sharing problem.

- We need a better way to organize and connect
- Top-down control is no longer an effective solution
- Society is forming market networks to meet challenges

We need equal access to intelligence. However, to garner this, we must first answer: what is intelligence?

DATA (statistics on a subject) + VALUE (measure of economic activity) = INFORMATION (representation of even sequence)

INFORMATION x DISTRIBUTION (network to share information) = INTELLIGENCE (derived beneficial knowledge)

The key takeaway from the foregoing is that there is inherent value in everything. By encapsulating data and value into one transaction and sharing real-time intelligence, CrowdPoint aims to lower the friction of economic alignment of interest, across communities of interest.

Solution

crwd_family

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- **crwdid** – Returning value to users
- **crwdmarket** – Buy and sell everywhere
- **crwdcapital** – Spend smarter, live better
- **crwdfinance** – Build your future
- **crwdworld** – Create your world
- **crwdsystems** – Powering the digital realm

Unlike other platforms today, **CrowdPoint** helps users who want to unlock value by fixing the way we share data, building a better market, and empowering community

Introducing the world's first decentralized cryptographic cloud platform

Purpose built to be a fully integrated, end-to-end solution for the market. Boundless scale, fault-tolerant, and enterprise-grade database speeds to give the world truly secure computing.

- Microservices architecture allows installation of apps directly onto block like a container
- Deterministic concurrency runs three blocks at the same time for blazing fast speeds
- Group mitosis splits transactions and speeds up system to achieve infinite scale
- GraalVM multi-language support opens platform to a massive 35.9 million developers
- BLS 12-381 cryptography and chain key signatures provide secure, trustful environment
- Relational tables inside blocks permit API calls and eliminates need for middleware

Fintech marketplaces bring consumers closer to the transaction to improve experience

CrowdPoint allows marketplaces to cut intermediaries and embed fintech services directly into the platform for a better customer experience

- Inclusive payments capture demand by reducing friction
- Access to capital unlocks latent supply in market
- Real-time intelligence expands buyer-seller relationship
- Integrated systems subsidize product/market by bundling
- Regulated, open markets eliminate misaligned incentives

Blockchain Technologies

FinTech & Blockchain

Financial technology is one of the stand-out applications of blockchain technology and is especially suitable for industries as complex banking and securities. There are numerous upstream, midstream, and downstream suppliers, contractors, and shippers involved in the oil industry. The complexity of the financial services industry has historically created a high transactional cost due to administrative due diligence and regulation. By using blockchain

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technology to manage backend functions, financial institutions can reduce errors and costs simultaneously.

- **Reduced Risk of Fraud & Disputes:**
- Blockchain technology will enhance transparency, security, and efficiency in commercial and capital markets. Through sharing digital information on the blockchain, companies in a cooperative ecosystem could virtually eliminate the cost of intercompany reconciliations and third-party data hubs. Disputes between parties could reference the unified data on the blockchain to arbitrate any disagreement. By utilizing **crowdunits** as a settlement tool and smart contracts on an immutable blockchain ledger, disputed transactions could be significantly reduced.
- **Transaction Simplification and Speed:**
- Cryptocurrencies have the advantage of near-instantaneous transaction speed and low transaction cost. Companies operating in either commercial (e.g., e-commerce sites) or capital markets (e.g., securities, bonds, etc.) have a large volume of transactions. Utilizing blockchain payments could significantly reduce transaction costs. One element of this new technology that can bind skeptics and true believers is the potential of blockchain as a means of simplifying processes that can lead to enhanced efficiency and cost reductions. **Vogon can offer transactional verification instantly across a network, without relying on a central authority – potentially reducing operating costs, more securely storing and managing data, and improving the speed of transaction processing.**
- **Contracts and Agreements:**
- Utilizing blockchain, smart contracts can be coded in advance to any agreed-upon criteria, with the ability to self-execute should all the criteria be met. Such criteria could include triggers such as government approval, completion of payment, or title transfers. Joint ventures could even utilize smart contracts to fulfil audit clauses and to codify any issues related to the sharing of costs or revenues. By creating a single audit trail, joint ventures can drastically reduce their reporting burden to tax authorities and costs associated with legal disputes.

The potential use cases of blockchain technology are becoming more apparent as the technology becomes more prevalent throughout all industries. Those in the financial technology industry are facing the same question as leaders in many other industries. The disruptive potential of blockchain technology is high, but blockchain technology requires collaboration between companies in a vertical, supply chain, or industry niche (i.e., ecosystem). It is important for companies to form working groups and explore potential solutions with their existing business partners. The founder of Ethereum, Vitalik Buterin, underscored the utility of blockchain technology to ecosystems:

“Whereas most technologies tend to automate workers on the periphery doing menial tasks, blockchains automate away the center. Instead of putting the taxi driver out of a job, blockchain puts Uber out of a job and lets the taxi drivers work with the customer directly.”

Blockchain is a technology that can transform networks; this innovative tool can deliver efficiency, transparency, and liquidity to the companies and stakeholders that it connects. In recent times, some of the most successful companies have been networks such as AirBnB, Amazon, Google, Meta, and Uber. These companies provide a value proposition by centralizing and organizing market participants; they generate revenue by taking a percentage of the transactions that they facilitate.

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As Vitalik described in the quote above, blockchain ecosystems flip this model of centralization. In ecosystems, monetization is achieved through ownership of the network by its users. The networks of the past have a centralized model where the central entity earns the fees.

Indeed, there have been numerous blockchain communities formed since the first successful blockchain network, Bitcoin, and the subsequent success of Ethereum. These communities were scaled with a decentralized model in mind and became decentralized autonomous organizations (DAOs). DAOs may seem new to traditional markets, but they are in fact a combination of gig economies and (private and public) capital markets.

Liquidity & Blockchain

"One of the ironies of the stock market is the emphasis on activity. Brokers, using terms such as 'marketability' and 'liquidity,' sing the praises of companies with high share turnover...but investors should understand that what is good for the croupier is not good for the customer. A hyperactive stock market is the pick pocket of enterprise.

” – Warren Buffet

In the past, successful companies aimed to go public, as doing so would garner monetization events for shareholders, capital for growth, and prestige for the brand.

Deleted: :

As illustrated in Exhibit 1, the number of public companies in the United States has declined over the past 20 years. Fewer companies are going public, due largely to the myriad of challenges of being a public company. These challenges include market pressures (e.g., short-term thinking by investors impacts share price, stronger correlation to geopolitical events vs. private companies, etc.), regulatory constraints, diversified ownership, reporting costs, and more.

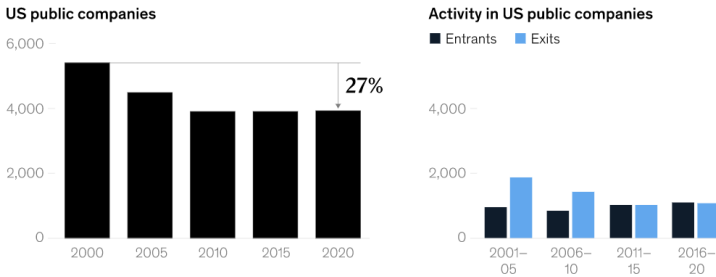
According to McKinsey & Company, “the number of public-company listings in the United States peaked in the mid-1990s, at nearly 6,000, but that number has fallen by about half over the past 20 years. The number of initial public offerings (IPOs) has also gone down sharply in this same period. [McKinsey’s] examination of close to 10,000 public-company listings and IPOs in the United States over the past two decades reveals that the drop-off in the number of listed public companies is primarily the result of changing dynamics in several key sectors: banking, industrials, and technology.”³

Exhibit 1

3 (Vartika Gupta, Tim Koller, and Peter Stumpner | McKinsey & Company 2021)

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The number of listed public companies in the United States has declined over the past 20 years, but activity has remained stable since 2010.



Source: S&P Global; Corporate Performance Analytics by McKinsey

Companies are staying private longer than in the past, all while there is a record amount of capital infused in public markets from pension and mega funds. This convergence of capital and public markets portends an opportunity for private companies that utilize blockchain technology to digitally transform themselves. Such companies can not only garner significant operational benefits, but they can also access open, honest, stable markets enabled by blockchain technology.

With respect to the foregoing, crypto companies – whether through security tokens or coins – have already blurred the lines between public and private markets. Crypto companies are liquid companies with virtually no barriers to participation for unaccredited investors.

Private Markets and the evolution of a DAO.

The original use of the Decentralized Autonomous Organization (DAO) on other Blockchains was designed to allow investors to send money from anywhere in the world anonymously. As part of this process the DAO would provide those owners tokens and voting rights, the projects varied and were not an efficient use of securitizing assets.

The fundamental driver behind liquidity in the DAOs were based on simple game theory and three possible actions:

Stake (Buy), Bond, and Sell.

Staking has the effect of pushing the price up +2

Bonding has no price effect but provides a discount of 1

Selling has the effect of pushing the price down -2

The most obvious benefit is if most of the participants of the DAO stake most of the team. The answer that *crwdworld* has garnered is inherent in *crwdunit* strategy. By classifying digital assets that track a GICs Subindustry that is tied to commerce, DAOs can be a repurposing of an ETN. These NexGen DAOs in *crwdworld* are not unsecured debt security, but the opposite as *crwdunits* securitize the underlying Industry focus by staking the silver. Now it becomes a new kind of index that tracks the underlying subindustry index tokens.

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DAOS at an industry group level can cross industry levels to fuse completely unrelated and non-tracking assets to securitize risk.

The key to each DAO's success is efficiently managing the stake, bond, and sell through incentives.

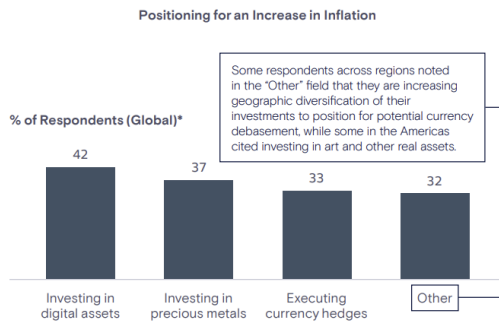
Benefits Realized by Investors from Regulated Digital Securities

Today, many investors (institutional and retail) have unprecedented levels of cash-on-hand, but they are limited in terms of avenues to deploy such funds. In the current climate, investors lose if they: hold onto cash (inflationary risk), invest it in public markets (recession risks), or invest in cryptocurrency (volatility risk, as exacerbated with the collapse of Terra and Luna). Where can investors pragmatically expect to find any yield? A logical answer is to invest in private companies focused on innovation, and more specifically, digital assets issued by private companies and traded on blockchain-enabled exchanges with liquidity.

Large institutional investors (e.g., pension funds) will soon have no choice but to embrace new asset classes as the float of debt shrinks along with developed-market demographics. If such funds start seeing declining levels of inflation-adjusted yield, these investors will inevitably be forced to seek other allocations for their capital.

Similarly, more family offices are considering investments in digital assets. According to a recent Goldman Sachs survey of 150 family offices, "some family offices are considering cryptocurrencies as a way to position for higher inflation, prolonged low rates, and other macroeconomic developments following a year of unprecedented global monetary and fiscal stimulus.... Of the approximately two-thirds of family offices that are actively thinking about an increase in inflation, digital assets emerged as one portfolio solution." The survey results indicate that 42% of respondents are investing in digital assets and 37% are investing in precious metals (see the chart below).⁴

Exhibit 2



Source: Goldman Sachs

⁴ (Goldman Sachs 2021)

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Family office industry analysts indicate that some offices are allocating 1% or more towards digital investments, but they generally do so with private banks that have advanced regulatory controls or that have built the capability for private clients to trade and custodize certain digital assets.

CrowdPoint's Blockchain-enabled Solutions for Investors

Indeed, a logical conclusion can be drawn that the potential yield investors can garner from digital assets looks attractive vs. traditional investment vehicles. In the case of pension funds, yield is necessary for the funds to offset their future liabilities. Shrinking yield in public securities and fully funded status will allow these funds to stomach greater risk. Further, family office interest in digital assets is likely to increase as secure platforms emerge and regulations become clearer.

CrowdPoint believes that evangelizing the utilization of registered digital assets backed by transactions and precious metals will deliver pension funds, family offices, broker dealers, registered investment advisors, among other investor types, avenues for realizing yield via innovative technologies such as blockchain.

The blockchain value proposition offered by CrowdPoint provides investors with unprecedented secondary markets. By bringing private companies into a blockchain ecosystem (both their securities and commerce), investors will be able to garner previously unrealized value. Further, these private companies will gain access to additional distribution channels to reach new customers and investors. CrowdPoint's technology offering allows small and medium-sized private companies to utilize its platform to gain operational and financial efficiencies, as well as compete on the same playing field as larger, publicly traded enterprises.

Recent examples of the Blockchain being used for the syndication of bonds with the European Investment Bank's first 100 million Euro digital bond on a public blockchain. However, there is a bigger opportunity for the use of our Vagon Blockchain: Private Debt. It won't be long that trade finance, direct lending, and peer-to-peer lending move into distressed, litigation financing, asset transfers, and specialty finance.

Secondary Markets: Liquidity Created via Blockchain-enabled Computational Trust

- Blockchain technology minimizes or eliminates third parties in transactions. In the case of securities transactions, the aforementioned disintermediation refines markets by speeding-up equity monetization events and removing non-essential parties
- Private markets present a challenge in terms of liquidity. Investors in private companies must wait for a monetization event or another exit strategy (e.g., company buy-back or OTC trade)
- Institutional investors in private markets (e.g., private equity firms, venture capital firms, family offices, or other), stand to benefit greatly from blockchain-enabled secondary markets
- Limited Partners or other investors in institutional funds would likely be more willing to make an investment into a fund if they know there is an avenue for them to withdraw their investment

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- Limited Partners or other investors in institutional funds would be able to trade digital assets / securities with other investors connected to the transfer agent or ATS
- Platforms trading private securities would garner the benefit of revenue from trading volume and related fees
- Institutional investors such as private equity firms or venture capital firms could fundamentally alter their investment strategies, related timelines and costs, and IRR performance metrics due to blockchain technology's ability to optimize the transaction process for shareholders

Blockchain Buttonwood Agreement

The Buttonwood Agreement of May 17, 1792, established the basis of the modern New York Stock Exchange. The brokers who wrote this agreement and signed it, created trust in the system by agreeing to the following key terms: (a) brokers would only deal with each other, eliminating auctioneers and speculators, and (b) commissions would be standardized at 0.25% of specie value.

In establishing a standardized closed, members-only financial exchange Trading Desk, the marketplace in the United States began to switch from Philadelphia to New York City. The shared trust between investors and brokers, investors, and businesses grew as investors knew valuations and other metrics were accurate and the traded currency was valid. In 1817 the number of brokers had grown, and they named their Trading Desk the New York Stock Exchange Board.

In the 1800s, a "Curb Exchange" began on Broad Street for the Exchange of stocks. This Exchange was created for those stocks that did not meet the requirements for the NYSE floor. This Curb Exchange grew into the American Stock Exchange when in 1921, it moved into actual "quarters" on Trinity. In 2008 the NYSE acquired the AMEX and Euronext exchanges. Today, the stocks traded on the AMEX are small-cap stocks.

In keeping with the Buttonwood Agreement, traders in Chicago organized a commodities exchange in 1848 to market agricultural products (corn, soybeans, grains). They then expanded to include options and futures on several other products (meat, gold, silver, US Treasury Bonds).

The economy of war had driven the world's economic growth from 1915 into the 1920s. In 1929 the stock market in the US crashed as speculation once again failed to deliver hoped-for returns on investments. In 1933, as part of Roosevelt's New Deal, the US Congress passed the Securities Act to create a uniform set of rules to protect investors against fraud. In 1934 Congress established the Securities and Exchange Commission (SEC) to oversee the implementation of the Securities Act.

Financial markets have continued to grow and expand since 1792 when 24 brokers came together to organize a marketplace for securities. Since then, the main ideas of the Buttonwood Agreement remained in place as the NYSE grew. Brokers traded only with other brokers. However, as the nineteenth century progressed, the Exchange sold seats within or "on" the Exchange to brokerage houses, and the number of brokerage houses grew and grew. According to the Financial Industry Regulatory Authority (FINRA), there are approximately 3,500 broker-dealers in the USA today.

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History shows us that technological growth as a result of World War II and the Cold War has changed the economies of all nations. What has once deemed science fiction [space travel, walking on the moon, watch phones, nuclear powered ocean-going ships/submarines] are now commonplace. Investment in this now present future is vital. The 24 brokers who signed the Buttonwood Agreement were focused on commodities and bonds.

However, is it a coincidence that the S&P 500 has modern trading desks that include 24 Industry Groups such as

This diversification calls for innovation in marketing and securities/stock exchanges. Each of the industry sectors listed above is part of the **CrowdPoint** Blockchain Ecosystem. **CrowdPoint's** Mission is to unite AI, Compaction, and Blockchain technologies to Democratize Big Data to Defend and Deliver dividends to YOU: the Human Identity. With CrowdPoint's Blockchain, the fear of speculators damaging market value as witnessed in the 19th century, the Great Depression, and the bursting dotcom and housing bubbles of the late 20th century is nullified. Investors will predict such events with greater accuracy and take measures to minimize the effects they could produce.

As of now, predictions of a market's future growth or change are based upon outdated data gathered from 8K and 10K quarterly and annual reports. The Blockchain allows each investor to create his/her Trading Desk using the **CrowdPoint** application. Any investor with "Company X" will be able to see all of the company's transactions in real-time, thereby creating real-time predictions necessary for buying and selling the stock. At the same time, the individual investor can use the crowd equity for growth without having to pay a commission for every transaction.

The Blockchain also reduces the effects of global events upon market economies. The recent pandemic affected global economies through vast amounts of monies spent on healthcare, unemployment payments, and economic stimulus packages. Of course, because of these conditions, market economies suffered. Nations had "locked down" businesses and social, face-to-face, interaction. Many small and medium businesses worldwide and famed restaurants were unable to withstand the forced closings and failed. With the Blockchain, investors can see the trends in financials before the effects are felt, thereby decreasing those effects in the marketplace. **CrowdPoint's** ecosystem brings the investor closer to the ground truth.

When the Brokers created the Buttonwood Agreement in 1792, they established an exchange system that they controlled. The exchanged stocks in commodities and government bonds resulted in exactly what the brokers wanted, trust in the Exchange. Since the industrial revolutions had not yet occurred, this system worked well. But time changes and world economies grow, sometimes at an exponential rate. With the rapid growth, new "exchanges" arose. The brokerage houses sold securities in many new industries. Still, the stocks themselves were difficult to come by as the titans of the American Industrial Revolution controlled industry and the trading desks and banks.

Imagine a multimillion-dollar exchange without a commission, saving the investor hundreds of thousands of dollars because he makes the Exchange through his/her Trading Desk with other investors in the chain. In the Blockchain app, the investor's identity is privatized. This entire process democratizes the trading process leading to a genuinely free-market economy controlled by the individual investor and not a brokerage house.

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To keep up with the rapidly growing economies and to democratize the Exchange itself, CrowdPoint offers the Buttonwood Blockchain Ecosystem to privatize identity and allow investors to monitor their current investments and diversified future investments on their trading desk. While the Buttonwood brokers established a neofeudalistic business, a society based on limited access to information and the stocks themselves, engaging with CrowdPoint's Platform is the new Blockchain Buttonwood Agreement allowing for transparency and safety in the exchange marketplace.

CrowdPoint aims to build an ecosystem of consumers, companies, investors, vendors, brokers, exchanges, and more, working together to create Open, Honest, and Stable markets. As Warren Buffet stated in the above referenced quote, "what is good for the croupier is not good for the customer" – CrowdPoint proposes a circular ecosystem that continuously organizes, builds, and stimulates both (a) commercial markets and (b) capital markets. These markets would be built upon the notion of shared common knowledge. Just as the original Buttonwood Agreement aimed to bring trust and standardization to markets, CrowdPoint intends to build an ecosystem that is grounded in transparency. Participants in the CrowdPoint blockchain ecosystem operate under a standard ruleset. Just as in public markets, securities in the CrowdPoint ecosystem would be subject to regulations set by the SEC, and, as a result, economic activity within the ecosystem would follow the same reporting taxonomy as public markets.

The blockchain enables Open, Honest, and Stable markets.

Technology Differentiator

Overview

At CrowdPoint, the underlying technology stack has a clear market differentiator. It redefines the typically separated applications of decentralized systems, distributed networks, microservices architecture, blockchain ledgers, and relational databases into one integrated platform. CrowdPoint built an entirely new approach to blockchain technology by creating a decentralized, distributed cryptographic cloud. This solution is called Vagon.

CrowdPoint's Vagon is a publicly available, open architecture, decentralized cloud service platform that includes a blockchain that offers guest programming languages that allow for more efficient and effective smart contracts. The Vagon decentralized, cryptographic cloud is the engine of CrowdPoint's blockchain ecosystem that supports a freely competitive market in which any buyer or seller may trade, and market forces determine prices.

Our blockchain ecosystem is an assembly of companies that derive exponential efficiencies through sharing a unified blockchain protocol. The ecosystem organizes transactions according to the Global Industry Classification Standard (GICS), an industry taxonomy

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developed in 1999 by MSCI and Standard & Poor's for use by the global financial community.⁵ “Companies are classified quantitatively and qualitatively. Each company is assigned a single GICS classification at the Sub-Industry level according to its principal business activity. MSCI and S&P Dow Jones Indices use revenues as a key factor in determining a firm's principal business activity. GICS is a common global classification standard used by thousands of market participants across all major groups involved in the investment process: asset managers, brokers (institutional and retail), custodians, consultants, research teams and stock exchanges.⁶” The GICS taxonomy is organized into 11 Market Sectors, 24 Industry Groups, 69 Industries, and 158 sub-industries.

CrowdPoint intends to organize companies and market activity at the sub-industry level. At this sub-industry level would be clearinghouses that would create digital assets correlating to market activity within the clearinghouse. These assets would provide investors with multiple investment opportunities, including direct investments in companies within the clearinghouse (e.g., security tokens) or investments at a wider, sub-industry level for all companies within the clearinghouse (e.g., index tokens). Further, the clearinghouses could issue its own regulated, crypto instrument for settlement within the sub-industry (e.g., merchant coins (explained in greater detail later in this paper)).

Introducing Vogon

“Vogons are described as officiously bureaucratic, a line of work at which they perform so well that the entire galactic bureaucracy is run by them.” – Douglas Adams, Hitchhiker's Guide to the Galaxy

- Vogons are real-time, high-performance decentralized crypto-cloud workhorses
- Vogons are infinitely scalable through consensus group mitosis (cell splitting)
- Vogons have blockchain installable microservices for the decentralized cloud
- Vogons do not perform useless work and consume energy normally
- Vogons use a new model for mediating byzantine fault tolerance
- Vogons are a fresh rethinking of decentralized consensus
- Vogons have solved current dApp update vulnerabilities
- Vogons are superscalar and extremely fast
- Vogons are written in Java
- Vogons enable relational database management system (RDBMS)-like functions for easy legacy integration

Blockchain Challenges

The many problems with the existing blockchains limit the widespread adoption and use of the technology in commercial applications. Currently available blockchains have limited use in enterprise settings because of inadequate processing capacity and speed, on-time of their high energy consumption.

⁵ (Wikipedia 2022)

⁶ (MSCI n.d.)

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Additionally, conventional wisdom will state that a blockchain is a kind of a database because it is a digital ledger that stores information in data structures called blocks. On the other hand, a traditional database is a data structure used for storing information. Many experts will stipulate that a blockchain is a very slow database, and developers of blockchains continually will boast speeds to refute that label.

In fact, blockchain claims of speed are everywhere. However, there is a simple way to apply a simple measuring stick for the credibility of the speed claims. Search around the internet for the performance of a database on single computers. You will get what amounts to the ceiling of data performance for a database on one piece of hardware.

It only requires basic math to figure out how much slower a blockchain solution will be: Merely take the number of cryptographic operations to calculate or verify a block. Then, using well-known performance metrics for those operations, you can calculate an upper bound on the number of blocks per second that a single machine can perform.

Blockchains will remain limited in speed until it is sharded into multiple blockchains, no singular blockchain solution will ever be that fast. When creating a single block on the blockchain, the crypto operations can be distributed to multiple machines. Still, some of the processes must be duplicated on those machines. However, performance in a group working on single blocks does not scale linearly with machinery. Additionally, the data must be shared between the machines that perform the work. That is why other blockchain speed claims are truthfully problematic.

When a blockchain company proclaims: We can do 100,000 transactions per second (TPS)...A simple back-of-the-napkin approach would have you calculate the need for X signature verifications and Y new signatures and Z hashing operations to perform one transaction. Another way to say it would be the performance of those algorithms is this, and therefore maximum throughput on a single machine is that. This simple mathematical process and logic challenge a blockchain owner's "problematically truthful" calculations.

Scalability, Speed, Sharding, Micro Services, and More

Scalability and speed make for a complex discussion when discussing CrowdPoint's Vagon Technology as there are two protocols, (a) Vagon 1.0 – which is currently developed in a lab environment (i.e., Vagon TestNet) – and (b) Vagon 2.0 – which is currently in development. With CrowdPoint, interacting with Vagons and reading from the blockchain is faster than competitors claim today. CrowdPoint delivers this value proposition with a rich set of APIs and microservices that expand using guest programming languages. This expanding nature enables Vagon to grow both in size and speed.

According to current TestNet analytics, Vagon 1.0 is capable of 10,000 TPS in a single consensus group. With many consensus groups working together in unison; it would not take long for 100 groups to reach radically fast TPS speeds. That means the more consensus groups, the faster Vagon becomes.

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Mind-boggling Fast

Vogon 2.0 will shard the blockchain into many smaller chains and route transactions through the network, and by doing so, it has no actual limit to the number of horizontal transactions that can be performed. No more than the limitations placed on a protocol like BitTorrent has for downloading.

The comparison to BitTorrent is only to visualize that the clients and nodes are entirely distributed, and there are no implicit choke points. Hence, as the network grows, the transactional capacity grows with it. This use of sharding in combination with microservices and many addresses distributed across many consensus groups effectively unbounded scalability and speed. Sharding is a method for distributing a single dataset across multiple databases, which can then be stored on multiple machines.

This allows for larger datasets to be split in smaller chunks and stored in multiple data nodes, increasing the total storage capacity of the system.

Vogon Power Requirements

The power requirements for running a Vogon are the same as that for running any standard piece of enterprise grade software. YES - the same as running software on AWS, Azure, and Google.

Vogon Security

Vogon use aggregate BLS 12-381 keys, a cryptographic signature scheme which allows a user to verify that a signer is authentic, are organized into a set of keychains to verify blocks on the Vogon blockchain. These keychains are subsets of their respective blockchains indicating consensus group membership.

A Safer, Better Internet

Vogon creates a safer internet where the playing field is leveled, and massive internet companies cannot monopolize the lives of everyone through tyrannical practices such as censorship and de-platforming.

A Decentralized Cloud

Towels: Vogon Microservices, Creating a Decentralized Cloud

The most significant difference between the Vogon Blockchain platform and other solutions is that Vogons host microservices natively. A microservice is a small highly specialized set of web services for achieving some goal. With Vogons, they come in three primary forms:

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- War files containing micro-site static assets for web browsers and/or other clients
- Web Service API code for the handling and execution of web service APIs on Vogons
- Transactional objects for manipulation of the blockchain

All of these microservice forms are installed onto the Vagon blockchain. Once installed, these microservices are immediately available for use on the internet. No other blockchain solution exists with these capabilities.

Development Example

As an example, a developer named Tony Stark may create a set of web service APIs to represent fractional ownership of his collectibles. Additionally, he may create some web pages to view those collectibles, APIs to show ownership or transactional objects that are used to change ownership or allow the collectibles to be bought and sold on open markets. When Tony deploys these individual modules, he is using what CrowdPoint calls "Towels."

Towels are the most useful items in the known universe in Hitchhiker's Guide to the Galaxy. Immediately, towels enable thousands of network nodes to light up and present the web site, accept API calls, and perform transactions with respect to Tony's collectibles. In conclusion, Tony has deployed his collectibles to the decentralized cloud.

Tony is able to leverage the decentralize cloud because of the architectural design of Vogons that enable him to build distributed applications using microservice containers that enable each function of the application to operate as an independent service.

This architecture allows for each service to scale or update without disrupting other services in the application. CrowdPoint chose to build these microservices on Java Virtual Machine (JVM).

JVM is the runtime engine of the Java Platform. Utilizing JVM, Tony is able to leverage any program written in Java or other languages compiled into Java bytecode to run on any computer that has a native JVM. Note that JVMs run in both clients and services, and web browsers can activate JVM when it encounters a Java applet.

Vagon Consensus: Block Graph at Scale

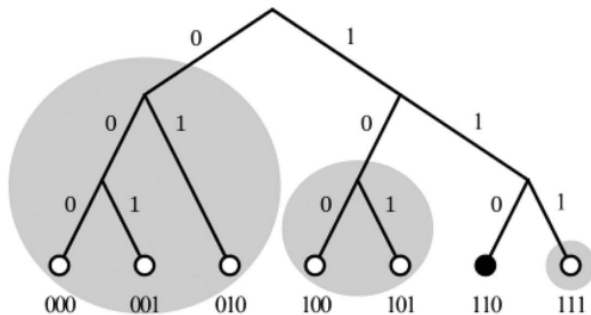
Vagon consensus is superscalar, with the ability to conduct a digital version of cellular mitosis where the first block is able to keep other blocks in-flight intended for addition into the blockchain in flight simultaneously. This is a high-performance design, intended to process many thousands of transactions per second.

As the number of Vagons grows past the optimal size for a consensus group, the consensus group splits into two consensus groups, each of them taking responsibility for half of the key space in the blockchain. The Vagons with keys starting with a binary 0 go to one group and those starting with a binary 1 go to the other group.

The blockchain becomes a block graph and we identify the new groups with the leading bits that were generated by the split. As this process continues, one group becomes two and are identified with one leading bit, two groups become four and are identified by two leading bits,

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four groups become eight and are identified by three leading bits, and so on. This can be visualized as shown below:



These leading bits that identify the consensus groups act to segment, or “shard” the keyspace.

Addresses will automatically route to the consensus group that is identified with the same leading binary digits as the address. This happens for wallet addresses in cryptocurrency, for developer scopes that identify where microservices are installed and so forth. Invocation of microservices and other operations are routed through this mechanism to the correct consensus group.

This type of routing is very similar to kademlia, which is a distributed hash table used by the most popular P2P protocols such as BitTorrent.

Here in this diagram, you can see the consensus groups are visualized as residing around a circle, sorted by their leading binary digits, and we can easily locate any consensus group through a kademlia “similar” routing protocol.

Searching on Vagon

With Vagon, the concept of “search” is not like Blockchain Explorer. Within Vagon, “search” means actually searching on automatically curated data from the blockchain itself. Every Vagon, by default, can search throughout the network. Currently, the type of search is a manifestation of relational tables and the blockchain microservices that are installed to service such tables.

These microservices are responsible for the transactions that create blockchain artifacts and the curation of blockchain data into the relational tables that those services can use to perform searches. It is also possible to weld in more advanced data services into the Vogons and make those services available for data curation and search (and other analytics) by exporting APIs to the microservices.

Each exporting API (or even web interfaces) and internal transactional objects can modify the blockchain under cryptographic scrutiny and data curation, including search or AI discovery.

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More exotic examples would be tamper-resistant voting modules or censor-resistant journalism modules. The easiest way to explain *Vogon's* approach is Proof-of-Stake.

Proof-of-Work requires adversaries to have 51% or more of the network's hash power to start rewriting the blockchain. Proof-of-Stake is "supposed" to replace hash power with investment, but many blockchains incorrectly reduce this to a social problem using voting or something equally ridiculous instead of crypto.

Vogons Defending the Human Identity

While very similar to kademlia, in that provides a way for millions of computers to self-organize into a network, communicate with other computers on the network, and share resources like files, and binary large objects between computers, all without a central registry or lookup run by a single person or company, *Vogon* is not exactly the same. *Vogon's* consensus groups contain up to hundreds of members and each is fully interconnected, which allows for the leaf nodes to act as a group, exhibiting a much more intelligent and faster-routing fabric than pure kademlia.

Some transactions must cross address boundaries between multiple consensus groups, such as a transaction to exchange one cryptographic asset for another, where their addresses have sharded them into different consensus groups. When this happens, *Vogons* perform "meta consensus" which is a two stage "atomic" operation that merges consensus decisions from two or more consensus groups.

The atomic transaction is simultaneously initiated on all concerned consensus groups and the results shared between them. The first step authorizes the transaction on the blockchain of all concerned consensus groups, and that authorization is committed when the results are mathematically combined together by each concerned consensus group.

Vogon Design and Engineering

Vogons were designed by world renowned accomplished computer scientists with experience ranging from cryptographic protocol implementations for securing credit cards on the Internet, at Javasoft / Sun Microsystems running the Java Commerce team and working on early cryptocurrencies and such technologies as Java Card.

CrowdPoint's data scientists are considered luminaries in both academic and business communities with published papers and multiple patents. *CrowdPoint's* data scientists are author or coauthor of hundreds of referred papers, books, and experts in distributed cooperative systems engineering.

Vogons were designed from the ground up with the discipline and experience that comes from such endeavors, it was designed to work at ad-scale and to potentially supplant or replace traditional PKI such as digital certificates. In fact, the vision is even larger.

The Human Identity is at the center of everything we do. While the technology world is engaged in a digital slave trade buying and selling human value by nefarious actors, our team has chartered treating the Human Identity as a new kind of currency that has precious metal bullion

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weight with real time fluctuations of the numismatic value expressed as non-fungible units for the benefit of mankind.

CrowdPoint Technologies and its blockchain ecosystem partners are proud to present this globally disruptive technology and business model implementation.

Vogons and Digital Transformation

Digital transformation traditionally has been the process of using digital technologies to create new – or modify existing – business processes, culture, and customer experiences to meet changing business and market requirements. In the world of Blockchain technology the concept of transformation is exponential as it requires a migration away from traditional Business Ecosystems where the Companies that used to excel did so by building a digital platform and then extracting the most value. In a Blockchain Ecosystem that value is shared by its participants.

For B2B and B2C businesses adopting the blockchain this kind of transformation creates trust and security for consumers, customers, trade, and business partners in the anonymous world of cross-border digital connectivity.

Additional Intellectual Property developed by CrowdPoint

Tokenomics

Context

- A utility token is a crypto token that serves some use case within a specific ecosystem. These tokens allow users to perform some action on a particular network. Utility tokens are not mineable cryptocurrencies. They are usually pre-mined, being created all at once and distributed in a manner chosen by the team behind the project.⁷
- Utility tokens do not represent any ownership stake in the project for which investment capital is raised. Instead, they allow the holder to buy or sell the underlying tokens preferentially. The value of utility tokens usually fluctuates depending on the demand for the project. It may generate profits for the token acquirer if the project reaches its intended purpose with reasonable success.⁸
- It is helpful to think of utility tokens as coupons or vouchers. The asset a utility token represents is a certain level of access to a product or service which the holder can gain by redeeming it.⁹
- Examples of Utility Tokens:
 - Filecoins holders can exchange Filecoins for access to Filecoin's decentralized digital storage capabilities
 - Ether holders can exchange Ether for access to dApps or execute smart contracts on the Ethereum blockchain

7 (Brian Nibley, SoFi Learn 2021)

8 (Murtuza Merchant, Cointelegraph 2022)

9 (METACO 2021)

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- Basic Attention Token (BATs) holders can earn BATs by viewing targeted ads; they can then exchange BATs for premium services on the Brave network
- A token, in data science, is a value – like a randomly-generated number – assigned to sensitive data to mask the original information. So, in a blockchain, a token is a number assigned to data stored within the blockchain.
- Transforming an asset into a token is called “tokenization.”

Introducing **crwdunits**

crwdunits are the main internal crypto-settlement tool of CrowdPoint and will be used to pay transaction fees.

- **crwdunits** will be a hybrid utility token and digital asset designed to function as a transaction processor for both API calls and financial settlements within the CrowdPoint ecosystem
- **crwdunits** will be commodity-backed (i.e., silver) tokens that have instant settlement time, custodianship in a U.S. chartered bank, and circulation via a Commodities & Futures Trade Commission (CFTC)-registered Central Counterparty Clearinghouse
- **crwdunits** will be collateralized by silver streamer agreements purchased from reputable silver mines
- **crwdunits** will be modeled as Forward Claims or Swap Contracts – and therefore subject to CFTC regulation as a Utility Token.

Investors will purchase **crwdunits** pegged to a specific price of silver per gram. Such investors will be entitled to coupons, future services, or cash flows. Investors will experience accretive benefits as more users adopt Vagon / CrowdPoint driven by speculation of the growth potential of **crwdunits** (additional detail below).

Further, **crwdunits** will be traded on multiple exchanges around the world, so holders will be entitled to benefits from secondary trading of **crwdunits**.

Adding Reality to the Ecosystem

CrowdPoint believes in digital assets with real, tangible value. It accomplishes the foregoing with **crwdunits** by utilizing silver as collateral to establish a floor price for each unit.

CrowdPoint's approach to tokenizing silver and using it to collateralize its **crwdunits** is to enter streaming agreements with silver mines. CrowdPoint would provide an upfront investment to a mine for silver-in-the-ground; such mine would in turn agree to mine and deliver silver in a certain period of time. Since CrowdPoint's paid for silver upfront, the silver would be at a discount to market prices. This streamer agreement would be fractionalized and spread across circulating **crwdunits** in order to collateralize them as a remittance tool and reserve asset.

For background, note that silver is tokenized by using a reference number against real-world ownership of a silver streamer agreement, and ownership is represented on an immutable ledger powered by Vagon. It is then given a second number that describes it as a fractionalized “child” to the overall holding. In short, **crwdunits** would reference the “child” relationship to the overall silver streamer agreement holding.

Commented [CM1]: Define “it”....assuming it is “The streamer agreement” or the ledger?

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With the aforementioned approach, **crwdunits** essentially become tradeable commodity-backed bonds. **crwdunits** offer “honest” stability to holders of these instruments, since they know (thanks to Vagon’s immutable blockchain ledger) that there is silver backing the instruments.

Commodity-backed investments have the added attraction as a speculative vehicle for investors who believe that the price of the underlying commodity will rise. The use of this type of instrument enables an exchange with a reasonable expectation of accretion (i.e., income). Additionally, commodity-backed investments are frequently used to hedge against inflation. This means that **crwdunits** could behave as a deflationary asset.

By combining silver with a digital token, crwdunit investors will maintain metal exposure in their portfolios. Silver is synonymous with money in many countries around the world. It has many uses in electronics, industry, and medicine, and it is a miracle metal for CrowdPoint’s blockchain ecosystem. At CrowdPoint silver is utilized as a monetary metal. **crwdunits** deliver the blended benefits of cryptocurrencies with silver.

Silver Mining / Why Silver?

Silver’s price is inelastic because production cannot be ramped up quickly when the price rises. It is inelastic because most silver is mined as a secondary metal (by-product) and usually represents only a fraction of a mine’s revenue.

The timing range for peak silver production is narrow, in 2027–2038, with the best estimate in 2034. By 2240, all silver mines will be nearly empty and exhausted. Today, from the current silver production alone, and this point forth, demand will outstrip production without exception. Silver is now rarer than gold and will be for all of eternity.

crwdunits Utility and Features

As CrowdPoint grows its ecosystem with newly developed products and services, or through acquisitions and partnerships, the utility of **crwdunits** will be expanded. Initially, the following are benefits garnered by holders of **crwdunits**.

- Accrual Benefits
 - **crwdunits** holders will benefit directly from any protocol revenues and fees generated from products built on Vagon. This includes on-chain revenue from **crwdunits** as well as potential off-chain revenue sources from **crwdunits** or CrowdPoint commerce products in the future.
- Development / Services Utilities
 - **crwdunits** will be used to pay for use of proprietary services and products offered by CrowdPoint, including development of Vagon and use of CrowdPoint’s identity database
- Staking Benefits
 - **crwdunits** will be used to stake clearinghouses that issue merchant coins and index coins. crwdunit holders will enjoy increased staking rewards for their locked crwdunit deposits.
- Redemption Benefits

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- **crwdunits** will be redeemable for cash from participating banks in the CrowdPoint ecosystem. The redemption would be at par value or other exchange rates as determined by the bank.
- Privileges, Experiences, Community Access, and Merchandise
 - **crwdunit** holders will be granted exclusive privileges, including curated experiences, merchandise, support, and more. Such benefits will be tiered so that holders with more benefits realize increased perks.

Summary: Open, Honest, Stable Markets

- Open: CrowdPoint's open public distributed cloud architecture includes a blockchain offering guest languages that allow for more efficient and effective smart contracts. It provides a freely competitive market where any buyer or seller may trade, and whereby competition determines prices.
- Honest: CrowdPoint's open public distributed cloud architecture includes a blockchain that offers transparency, speed, decentralization, and immutability.
- Stable: CrowdPoint's foundational element in its blockchain is the use of silver-backed **crwdunits**.

Illustrative Use Case

The following is a description of a use-case in which CrowdPoint would provide services to one of the 11 Industry Sectors per GICS®. This example will focus on the Utilities Sector.

CrowdPoint would utilize its suite of technology products and services to deliver incremental value to the Utilities Sector. This could be done by partnering with Utilities market participants such as renewable energy companies (e.g., a residential solar company), utilities company, battery manufacturer, commercial bank, and more.

A residential solar company, referred to as SolarRUs in this example, could be seeking to scale its operations and expand its market share. In order to do so, SolarRUs needs growth capital, so it engages CrowdPoint. Note that SolarRUs would pay for all CrowdPoint services with **crwdunits**.

CrowdPoint would provide the infrastructure and ecosystem participants needed for SolarRUs to raise capital through a Direct Public Offering (DPO). SolarRUs would utilize the Jumpstart Our Businesses Act (JOBS) Act to offer security tokens to both institutional and retail investors. "The JOBS Act allows companies to access funding in ways that were not allowed before due to [SEC] securities regulations. It reduced regulation, including oversight and reporting, removed certain barriers, and allowed for new ways of accessing capital. It makes it easier for entrepreneurs to start businesses or grow their current businesses.¹⁰ This service is delivered in the CrowdPoint ecosystem via **crwdcapital**.

¹⁰ (Gabe Alpert 2022)

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SolarRUs successfully raises growth capital through a Securities and Exchange Commission (SEC) regulated security token offering. It did so by leveraging CrowdPoint's database and other services to hyper-target investors interested in clean energy investments. Investors would learn of the security token offering through **crowdworld** or other communication mediums. SolarRUs wants to provide liquidity to its security token holders, so it lists them on exchanges under **crowdfinance**. SolarRUs has built its capital market.

Now, SolarRUs wants to build its commercial market. The company thinks that it can gain market share by having its own coin. The CrowdPoint ecosystem delivers this by helping SolarRUs create a merchant coin. These are digital securities associated with a special class of shares for the issuing entity. These securities behave as transaction processors exclusive to the issuing entity (i.e., the merchant coins are a proprietary payment rail for a company). Merchant coins are essentially "stablecoins" that are pegged to cash or a cash equivalent. Since merchant coins are powered by Vagon, they can be settled instantly and for minimal fees.

SolarRUs incentivizes customers and partner vendors to do business with SolarRUs through merchant coins, since doing so gains the customers / partners discounts, perks, and other benefits. SolarRUs can deliver these added benefits thanks for increased market share from customers who want the perks of paying in merchant coins.

SolarRUs further builds its commercial markets by building a blockchain-powered online marketplace via **crowdmarket**. The company uses **crowdunits** to not only pay for this platform, but also to leverage CrowdPoint's database to identify and hyper-target potential customers based on their interests as identified in their **crowdids**. Customers whose identities were used to drive commerce to SolarRUs will receive rewards when transactions are completed.

In addition, to merchant coins, SolarRUs could utilize CrowdPoint's technology services (**crowdisystems**) to issue other digital assets such as tokenized solar renewable energy certificates (SRECs). Similar to carbon credits, SRECs are a performance-based solar incentive that allow solar energy producers (e.g., solar homeowners) to earn additional income. SolarRUs could create tokenized SRECs for its customers and then list these instruments on exchanges within CrowdPoint. SolarRUs customers would capture additional income from the SRECs they trade, and SolarRUs would be able to differentiate itself from other solar companies and gain market share as a result.

Separately, a bank operating in the CrowdPoint ecosystem could purchase solar renewable energy certificates and bundle them to create green bonds. The bank would essentially purchase the rights to SRECs for some number of years in advance, and then guarantee a fixed return to its green bond purchasers. Leveraging artificial intelligence, intelligent microgrid management, and other intellectual property developed by CrowdPoint, the bank could reasonably mitigate its risk by bundling solar homes to create green bonds and offer higher yield to bond investors.

Beyond SolarRUs and a green bank, CrowdPoint will service other companies operating in the Utilities Sector (e.g., other residential solar companies, clean energy product retailers, battery manufacturers, etc.). The economic activity of the companies operating in the Utilities Sector, will be organized and reported as an industry index. Since CrowdPoint is tracking the industry on its own, it could create an Index Token that functions similar to an Exchange-traded Fund or Exchange-traded Note.

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In conclusion, the Utilities sector could have a number of digital assets available for trade, including security tokens, merchant coins, SRECs, green bonds, and index tokens.

crwdunit Value Propositions

Value-added Benefit to Crypto Exchanges

crwdunits are also addressing the current trend of reduced trading volume within the cryptocurrency market. Trading volume has declined by almost 75% across all exchanges as the market corrects itself. Lower trading volume translates to lower revenue for cryptocurrencies exchanges. Crypto exchanges provide the backbone for the crypto market as they provide the platform for valuation of projects. A reduction in revenues translates to less capital flow towards innovation and community building projects. This ultimately leads to the reduction of growth and progress of crypto as a whole.

crwdunits will provide crypto traders and fund managers with a tool to participate in commodities markets while remaining in crypto. In doing so, crwdunits will be introducing new trading volume to crypto exchanges that are not correlated to the crypto market. Vagon will continue to generate trading volume in a bear crypto market through traders engaging in speculative silver positions. This volume translates to a steady and diversified revenue source for crwdunit exchanges.

Value-added Benefit to Companies

Currently, there is a race for FinTech companies to innovate in the realm of instant settlement. In today's day and age of instant gratification with on-demand delivery apps and unlimited information and content available at any time, there is still substantial room for instant value transfer innovation.

The lag time in value transfer speeds is evident in areas from securities trading (i.e., T+2 transactions: trade date plus two days") to international bank transfers (3 to 5 business days). In either case, the lag time is too great in today's world. This is why companies need blockchain-enabled solutions for transaction settlement.

"Stablecoins have the potential to offer the same level of mass blockchain adoption that NFTs offered Web3, but instead of consumers on OpenSea and Rarible, these adopters will be institutions. Supply chains are increasingly global, and with the changing economic environment and rising interest rates, the world now more than ever needs cost-efficient means of settling instant B2B payments across borders – stablecoins can be a powerful solution."¹¹

¹¹ (Pat Rabitte | Blockworks 2022)

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crwdunits will serve as powerful, effectively instant settlement tools that will benefit retail and institutional players. All players who utilize crwdunits win when using a blockchain ledger-tracked settlement tool like a crwdunit since the transaction is fast, transparent, and, as a result, less risky.

CrowdPoint Roadmap

Stage 1: Friends and Family Round > Further develop TestNet

July 2022

\$5 million target raise @ \$0.001 per crwdunit (Simple Agreement for Future Token: SAFT)

Milestone: Further integration of CrowdPoint intellectual property on Vagon

Number of crwdunits: 5 billion

Restriction Period: 24 months

Stage 2: Pre-Sale Block One

Q3 2022

Number of crwdunits: 2.5 billion

Restriction Period: 12 months

Stage 3: Pre-Sale Block Two

Q4 2022

Number of crwdunits: 1 billion

Restriction Period: None

Stage 4: Pre-Sale Block Three

Q1 2023

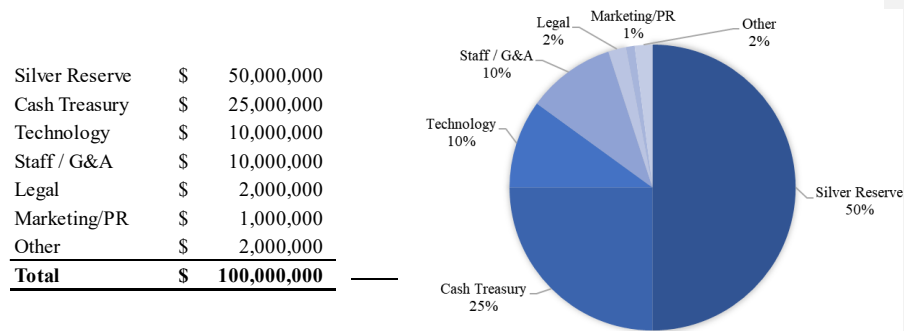
Number of crwdunits: 500 million

Restriction Period: None

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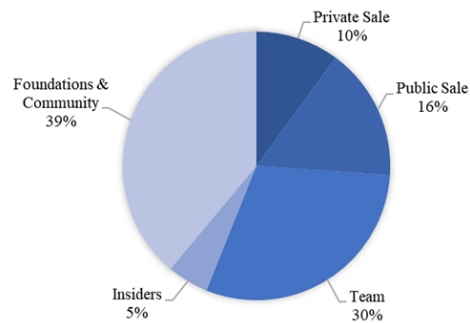
Allocation of Funds

The purpose of this paper is to set the foundation for CrowdPoint to raise the combination of required “Development” and “Growth” capital by the end of Q1 2023. The type, purpose and allocation of funds is as follows:



Allocation of Tokens

A total of 100 billion **crowdunits** has been divided into the following distinct categories:



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Leadership Team

Mr. Sean M. Brehm

Founder, Chairman and Chief Executive Officer – CrowdPoint Technologies

Mr. Sean Brehm enjoys 25+ years as an entrepreneur, corporate executive, military officer, and technologist. Mr. Brehm is a luminary in the technology industry, with particular expertise in big data, artificial intelligence, and cybersecurity. Mr. Brehm has received numerous industry awards and military citations.

Prior to founding CrowdPoint, Mr. Brehm founded and led Gradient Cyber (previously @Risk Technologies), a leading cybersecurity network operations management and managed detection and response (MDR) solutions provider. Under Mr. Brehm's leadership, Gradient's award-winning Quorum platform was developed in conjunction with the U.S. Department of Defense.

Previously, Mr. Brehm served as President of Information Systems at Atigeo Corporation, a big data analytics company focused on the healthcare, cyber, defense, energy, and financial services sectors. Mr. Brehm joined Atigeo when the Company acquired YaData Solutions, a company founded and led by Mr. Brehm. YaData's customer base included the Departments of the Air Force, Army, Navy and the United States Marine Corps, the Department of Defense and Intelligence Community. Notably, YaData delivered analytic platforms that leveraged IBM Technology with operational integration. Mr. Brehm's vision with YaData was to focus on analytics and transition defense customers to a big data platform as a service.

Mr. Brehm also worked for IBM where he sold cross-brand solutions to the U.S. Intelligence, Global Combatant Commands and the U.S. Special Operations Command. In this role, excelled at translating the complex domains of combat operations, intelligence and counter terrorism into actionable intelligence. While his peers in the commercial market were discussing the future of big data scalability, Mr. Brehm was designing, developing and deploying big data analytic platforms analyzing over eight petabytes of data while fusing social media, publicly available data and global cyber data into an exceptional user experience depicting user defined operational pictures that saved lives.

In the past, Mr. Brehm served in various capacities at Intel Corporation, including in operations and photolithography, as well as six sigma efficiency implementations in Santa Clara, Chandler and international locations. Mr. Brehm was recognized by various awards and led the Leadership for Manufacturing with SEMATECH, Stanford and other Universities worldwide.

In addition to the foregoing, Mr. Brehm's career includes professional science and technology consulting experience for global industries in Asia and Europe.

Mr. Brehm's professional career began in the US Army as an Airborne Ranger Infantry Officer with global combat operations while receiving assorted citations, qualifications, courses and

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training in support of global specialized operations. Mr. Brehm retired from the US Army as a Major Promotable.

Mr. Brehm is an Honor Graduate of the US Army Ranger School. Additionally, Mr. Brehm received a bachelor's degree from the University of Colorado where he was the ROTC George C. Marshall Distinguished Military Graduate.

Mr. Brehm currently holds an active DoD Top Secret/SSBI security clearance.

Mr. Nadab U. Akhtar

President and Chief Operating Officer – CrowdPoint Technologies

Mr. Nadab Akhtar enjoys 15+ years of experience as an entrepreneur and investment banker, including nearly a decade in corporate advisory and M&A transaction experience.

By way of background, Mr. Akhtar served as Chief Operating Officer of Nexus Health Capital, a leading boutique investment banking firm focused on middle-market companies. Nexus is responsible for several billion in aggregate transaction value since 2015.

Previously, Mr. Akhtar served as a Limited Partner and Advisor with Trinity Blockchain Management, a cryptocurrency-focused hedge fund. In addition to the foregoing, Mr. Akhtar is a Principal of Apollyon Group, a private investment firm with interests in the technology, government, retail, and real estate industries. Furthermore, Mr. Akhtar serves as an Advisory Board Member with Metropolitan Dream Center, a non-profit organization impacting the homeless and indigent population in Dallas, Texas.

Mr. Akhtar holds a BBA from Hankamer School of Business at Baylor University, where his studies focused on finance and chemistry.

Mr. Eraj U. Akhtar

Chief Futures Officer – CrowdPoint Technologies

Mr. Eraj Akhtar enjoys 15+ years of experience as an entrepreneur. A social scientist by training, Mr. Akhtar grasps the intricate overlapping worlds of human behavior and mathematics.

Mr. Akhtar has a keen business sense stemming from a deep operational background. In the past, he has had both Fortune 500 and startup experience in the consumer retail and enterprise technology spaces. In approaching the challenges of growth organizations, he employs First Principle TTPs to break down large-scale problems into manageable components resulting in deliverable solutions and commercial success.

After completing his undergraduate program, Mr. Akhtar spent several years founding and growing award-winning companies and has had multiple successful exits. During his time managing and growing his organizations, he saw a common theme arise – siloed data is the

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enemy of innovation and growth. He learned that identifying process efficiencies, targeting disparate audiences, and recognizing emerging trends is crucial to building an impactful, enterprise-grade company.

A core focus of Mr. Akhtar's professional and intellectual passions is furthering insights into the information humans produce during interactions with each other, their networks, and the world at large. A data-driven creative, he is acutely intrigued by constructs that build long-term, multi-dimensional social systems. Mr. Akhtar founded ApollyonX, a company that is advancing big data intelligence technology in support of the defense and national security apparatus of the United States. Mr. Akhtar leverages his policy and social sciences background to guide ApollyonX's development of sophisticated data and strategy models that conceptualize societies and stochastic processes. Mr. Akhtar's vision with ApollyonX is to utilize cognitive computing and social, and behavioral data to solve some of the World's most challenging problems.

Mr. Akhtar studied at the University of Texas at Dallas, earning his bachelor's in political science, where his core areas of study were law, national security strategy, and nation-building. He continued with graduate studies for his master's in artificial intelligence at Harvard University.

Additionally, Mr. Akhtar is a graduate of the Founder's Academy and The Leadership Institute. He is an active member and participant of the Capital Factory, World Affairs Councils of America, Harvard Club, and the National Defense Industrial Association. He volunteers with the Metropolitan Dream Center and the United Christian Church.

Dr. Wolf Kohn

Chief Scientist – CrowdPoint Technologies

Dr. Wolf Kohn leads research and innovation for CrowdPoint and the Blockchain Ecosystem's new digital economy through bleeding-edge fields of study in blockchain artificial intelligence ("AI").

Dr. Kohn holds 25 patents and has authored four books and over 300 papers in the areas of optimal hybrid control and quantum control, estimation and learning systems and architectures; he received M.Sc. and Ph.D. degrees in electrical engineering and computer science from Massachusetts Institute of Technology. He is the foremost thought leader in distributed, nonlinear dynamical systems and control theory.

A significant focus of Dr. Kohn's research and career has been in the energy management and battery optimization spaces. He brings this wealth of knowledge in these arenas and more to CrowdPoint where he is integrating his innovative research into the Company's proprietary blockchain.

Dr. Kohn joined CrowdPoint from Veritone, Inc. (NASDAQ: VERI), a leading provider of artificial intelligence (AI) technology and solutions, where he served as Chief Scientist. Dr. Kohn continues to serve Veritone as a member of its Technical Advisory Board. Prior to Veritone, Dr. Kohn served as Chief Scientist of Atigeo – the AI arm of Microsoft. Atigeo was acquired by Veritone in 2017. Previously, Dr. Kohn held numerous leadership positions with notable

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companies, including Lockheed Corporation, Citi Group, SEQA Capital Advisors, LP, Clearsight Systems, and Kohn-Nerode, Inc.

Dr. Kohn recently joined the faculty of Drexel University. Previously, Dr. Kohn served as a Professor with the University of Washington, Stanford University, and Rice University.

Mr. Daniel J. Guinan

Chief Technology Officer – CrowdPoint Technologies

Mr. Daniel Guinan enjoys 25+ years as an entrepreneur, corporate executive, and technologist. Mr. Guinan has designed and built, singularly, cryptocurrency systems, artificially intelligent robotic trading systems, application servers, database engines, ad-scale infrastructure, and highly complex self-organizing object-oriented frameworks.

Mr. Guinan has founded several successful technology companies, most recently Mr. Guinan founded Cebu Machine Intelligence Laboratories, Inc. which is a research lab and outsourced consultancy based in Cebu, Philippines. The company acquired Trust Labs, a privacy focused technology company, in 2011 which Mr. Guinan was integral in the acquisition's integration.

By way of background, Mr. Guinan began his career with Visa International where he was critical in the development of cryptographic commerce systems such as Secure Transaction Technology and Secure Electronic Transactions.

Following Visa, Mr. Guinan joined Sun Microsystems where he served as the Chief Architect and Engineer of Java Commerce. While at Sun Microsystems, he was instrumental in the development of the Java Commerce Framework, Java Wallet, Java Card, and Java Smartcard. Additionally, Mr. Guinan built one of the very first cryptocurrencies, Java Coin. Java Coin was never released to the public but was built and working ten years before Bitcoin with an almost identical transactional model.

Mr. Guinan then founded nanobiz, a company focused on cryptographic technologies in XML. Mr. Guinan successfully sold the company to Verisign in 2000. He then went on to serve as Director of XML Web Services at Verisign.

Mr. Guinan then founded RedShores, Inc. and GeneWaves. The companies focused on automated payment and access control for web services and automated trading technologies, respectively.

Mr. Guinan received his Master of Computer Science from the University of Nebraska – Lincoln, where he researched artificial intelligence, fuzzy logic, and fuzzy set theory.

Mr. Andrew (“Andy”) Barkett

Chief Architect Officer – CrowdPoint Technologies

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Mr. Andrew Barkett enjoys 20+ years of engineering and management experience. Mr. Barkett has particular expertise in software architecture, distributed systems, and hyperscale datacenters. He is an investor and advisor to numerous startups.

Mr. Barkett currently serves as Chief Technology Officer of Korbitt, an innovative company that is transforming education with AI-tutors.

By way of background, Mr. Barkett previously worked for both Google and Facebook. Mr. Barkett went to work for Google in 2006. While at Google, Mr. Barkett was a technical program manager for two years. During that same period, he co-founded Greenlight Apparel, a fair-trade, organic clothing company.

Barkett, meanwhile, earned a political economy degree from University of California, Berkeley, in 2002 and an MBA from UC, Davis, in 2009. He has worked for more than a decade at tech companies as an engineer. According to Barkett's Facebook page, from 2002 to 2006, he was a software engineering manager at OnWafer Technologies, which "manufactures lithography and plasma etch products to the semiconductor industry" and was acquired by KLA-Tencor Corp. in 2007, after Barkett's departure.

Barkett left Google in 2008. He was a senior IT management consultant at Taos Mountain Inc. for several months, then a senior director for engineering at Livescribe Inc. for almost two years. In January 2011, Facebook hired Barkett as an engineering manager

Barkett, 32, joined Facebook in January 2011 and managed engineering teams responsible for scaling the social network's mobile infrastructure, messaging, and News Feed products. Prior to Facebook, Barkett served as the senior director of engineering for Livescribe.