



# DROPCHAIN

## Incentivizing Transparency and Traceability in Global Food Supply through Gamification

White Paper (v 10.5)

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# 1 ABSTRACT

Blockchain innovations are transforming the world as we know it. Global supply chain and logistics is one area where this technology may have the most profound impact in the years to come.

In this paper, we present a vision for applying Blockchain technology to modernize and drive transparency in supply chains supporting a \$1.5T global food trade.<sup>1</sup> The world's population continues to grow and is expected to reach 10 billion by 2050,<sup>2</sup> which will require our food supply chain to evolve and become more efficient, transparent and reliable.

At the same time, consumer trust has been eroded over the years due to numerous food scandals around the world. PricewaterhouseCoopers estimates food fraud is a \$40 billion global problem.<sup>3</sup> As a result, consumers have demonstrated an increasing demand for safe and healthy foods that they can trust. We believe consumer trust can be rebuilt through a more transparent and accountable food supply network.

Global supply chain solutions based on Blockchain technology already exist. However, many of them are centralized solutions that seem to focus on distributing tokens to data centers, and not to those operating within the supply chain. Thus, they tend to fail to address the human element and are not aligned with incentivizing individuals.

DropChain's technology aims to solve three core problems in foodstuff distribution:

1. **Data fragmentation in supply chains**, by developing an open-standard, low-cost, and easy to adopt solution for all supply chain stakeholders;

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<sup>1</sup> WTO International Trade Statistics, 2015

<sup>2</sup> <https://foodsafetytech.com/column/blockchain-improves-visibility-food-supply-chain/>

<sup>3</sup> <https://press.pwc.com/News-releases/fighting-40bn-food-fraud-to-protect-food-supply/s/44fd6210-10f7-46c7-8431-e55983286e22>



2. Supply chain transparency and data integrity, by creating an innovative gamified cryptoeconomic incentive program rewarding each physical distribution channel for their participation;
3. Lack of ground-level consumer data for brands, by providing granular consumer and small business data to brands through a global dashboard, enabling them to track the distribution of their brands down to street level.

To address these problems, DropChain proposes to create a decentralized, layered Blockchain-based protocol stack servicing food and beverage distribution, called the **DropChain Network (DCN)**. This project is a strategic combination of ground-level partnerships with key brands and distribution partners throughout China and Southeast Asia, with a custom-built ecosystem utilizing the latest in Blockchain, mobile technology, and global supply chain standards, anchored by an existing business and digital platform.

DropChain intends to form strategic partnerships together with entities which have an established market base in China and existing goods distribution platforms (for example, Foowala, which has **managed hundreds of unique brands and over 1000 SKU's, selling goods to SME and corporate customers since 2015**). DropChain will seek to leverage on their years of hyper-local experience in the marketplace, their relationships with countless brands and distribution channels, and their strong technical team. We envision that this project will change the face of food and beverage distribution for years to come.

DropChain's protocol stack is composed of five layers for (1) liquidity, (2) binding, (3) tracking, (4) incentive, and (5) application.

This paper first delivers an introduction on issues that currently surround supply chains in the food and beverage distribution industry, followed by a high-level overview of DropChain's vision and proposed solution. Next, we break down the 5 layers of our protocol stack, followed by an in-depth discussion on ensuring supply chain data integrity and the gamification of token economics. We conclude with the structure of our token offering that will help fund this project and jumpstart DropChain's ecosystem.



Blockchain technology has the potential to decentralize supply chains, drive transparency and traceability, and address the food safety issues surrounding the authenticity of what we eat, modernizing a \$1.5T industry. DropChain possesses the rare combination of hyper-localized distribution experience along with the technical knowledge of how to address this industry's problems.



## 2 INTRODUCTION

As supply chains go global, the journey from farm to fork and grape to glass has become increasingly complex. Your meal has most likely traversed multiple countries and came into contact with countless parties before ending up on your dinner table. However, while the complexity of supply chains has increased, in most cases, their transparency and traceability has declined.

Supply chain data has become unevenly distributed amongst key stakeholders across the supply chain due to a multitude of systems and standards. As a result, stakeholders have little reason to share their data with external parties and are stuck within their narrow data siloes. Consequently, end-buyers have no way of tracing or authenticating the goods they purchased.

Furthermore, although billions of dollars have been spent developing complex global supply chain solutions, none of them can consistently deliver full transparency and trace a bottle of wine from grape to glass. Technology companies appear to have forgotten that, ultimately, human beings are involved at every point in a supply chain, and many may simply have no incentive to participate in the system.

This system of misaligned incentives and incomplete supply chain data has spawned entire industries dedicated to the counterfeiting of food products, from olive oil and milk to high-end whiskeys and Cognac, with minimal risk of being caught.

Food fraud is a \$40 billion global problem.<sup>4</sup> Brown-Forman, the company behind Jack Daniel's, estimates 30% of all alcohol in China is fake.<sup>5</sup> Individual consumers face the greatest risk as the supply chain is least transparent to them.

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<sup>4</sup> <https://press.pwc.com/News-releases/fighting-40bn-food-fraud-to-protect-food-supply/s/44fd6210-10f7-46c7-8431-e55983286e22>

<sup>5</sup> <https://www.theguardian.com/sustainable-business/2015/sep/16/china-fake-alcohol-industry-counterfeit-bathtub-booze-whisky>



Food and beverage brands are also at risk as well. Their brand value is at stake if business owners unintentionally sell counterfeit products to their customers. Depending on the circumstances, this can be a significant problem. For example, an estimated 70% of all wine sold in China are fake.<sup>6</sup>

We've condensed the food and beverage distribution industry's present challenges into three key factors:

1. **Data fragmentation.** Data siloes exist across the food distribution supply chain. In order to tackle the current challenges that exist with supply chain transparency and product reliability, we must enable stakeholders across the supply chain to collaborate in a simple and transparent manner.
2. **Misaligned incentives.** Humans are still at the heart of supply chains instead of technology. Simply spending countless dollars on technological improvements will not yield favorable results if the real needs of stakeholders are not taken care of in a mutually beneficial manner.
3. **No decentralized solution for supply chain data.** Although Blockchain provides a decentralized solution to managing data, the technology is inherently difficult to scale up quickly and lacks relational data functionalities that the tracking of high volume, high transaction-rate goods like foodstuff requires.

## 2.1 DATA FRAGMENTATION

In its current form, foodstuff distribution data is segregated into silos across the supply chain, with individual database systems, ERP systems, and in-house solutions along the way. The challenge with this current environment is an inability for systems to communicate with one another and to pass on critical product and logistics data. The lack of a common technical language, data exchange standards and the perceived cost of implementing a unified logistics solution has hindered progress in this area.

These proprietary data silos have created a fragmented eco-system. Typically, only certain parts of a global supply chain get audited, with supply chain data only partially

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<sup>6</sup> <https://cpianalysis.org/2017/01/16/fake-wine-in-china/>

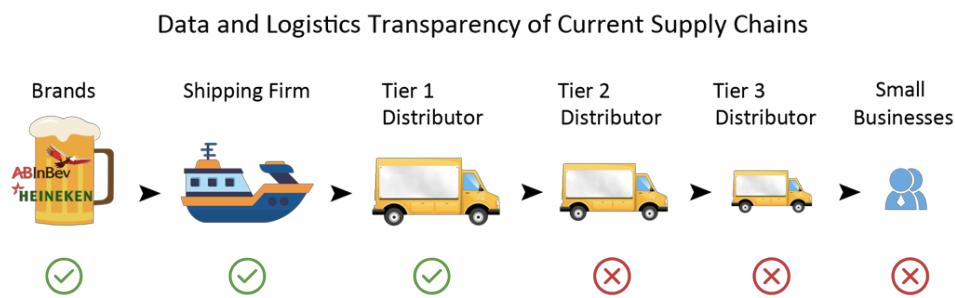


collected, and resulting in product and logistical data that is never truly complete or reliable.

## 2.2 MISALIGNED INCENTIVES

As we reach the tail end of the supply chain, where products end up in the hands of consumers (the “last mile” of food and beverage distribution), the data is obscure and often non-existent. Typically, once goods enter a country, it is passed off to Tier 1 distributors who own the distribution rights for a particular brand. This product is subsequently sold to Tier 2 distributors, who then resell it to Tier 3 distributors. Eventually, these goods will reach a consumer-facing business intermediary (e.g. restaurants, bar, or grocery store).

A problem with this supply chain is that data collection is not carried out beyond Tier 1 distribution because lower-Tier distributors often perceive it to be too costly and time consuming. Even if data is collected, product and logistics data is anecdotal at best and may be fabricated at worst. Without any way to reliably track a product’s logistics data from beginning to end, the true origins of a product, and the answer as to whether or not it is counterfeit, can never be truly ascertained.



Big brands are increasingly relying on big data to make better decisions on where to focus their marketing dollars and sales efforts. A large part of their strategy demands for a more holistic picture of how their products are disseminated to the end consumer. Even for some of the largest food and beverage companies in the world, decisions still rely heavily on conjecture and guesswork.



## 2.3 THE FLAWS OF MODERN SOLUTIONS

Blockchain technology presents itself as an opportunity to create a truly decentralized and open eco-system to overcome the data fragmentation challenges mentioned above. However, the technology in its current form also presents certain challenges. Although decentralized, the technology on its own lacks the necessary database functionalities inherent to supply chains. Ethereum, IOTA, Hyperledger Fabric and similar solutions are not designed for such data storage and manipulation. The cost of data storage and operations is also higher than traditional centralized database solutions, making a Blockchain-only solution economically and practically unviable.

While decentralized solutions such as IPFS and Storj can handle the storage of documents, they do not adequately address the complexities of handling global interconnected data while delivering advanced database search and operational capabilities found in professional database solutions.

On the other hand, traditional database solutions are capable of providing the advanced database functionalities necessary in a global supply chain system, but its centralized data storage does not address the key challenge of data fragmentation and the democratization of supply chain data. Centralized management also allows for the possibility of data tampering and stakeholder collusion, reducing the level of trust in the overall system.

Therefore, we think that the technologies that exist today are inadequate to single-handedly address the complex supply chain requirements of global food and beverage distribution. Due to the high-volume, frequent-transactional nature of foodstuff distribution, any open and decentralized solution would likely require high interconnectivity between all stakeholders, while remaining capable of delivering strong database operational performance and data delivery to end-users in a cost-effective manner.



## 3 VISION

DropChain seeks to be the first purpose-built decentralized supply chain ecosystem with a tokenized stakeholder incentive structure for the food and beverage industry. It will be developed as a complete solution that enables all stakeholders, from the brand owner to lower-tier distributors, to easily incorporate Blockchain-supported data tracking into their existing IT infrastructure, thereby promoting transparency and reliability of data throughout the overall supply chain with key emphases on:

- Aligning incentives for all stakeholders
- Low implementation and operational costs
- Ease of accessibility and applicability
- Empowering brands with big data

The objective is to create a self-sustaining logistics platform that is easy to integrate with while remaining cost-effective. Factoring in a unique tokenized rewards system that aims to incentivize participation in the DropChain ecosystem, we will be able to provide brands with the laser-focused hyper-detailed market data the likes of which they have never seen before. In doing so, we hope to tackle key barriers to adoption for stakeholders throughout the entire supply chain.

**Efficient, reliable, cost-effective, and  
fully transparent**



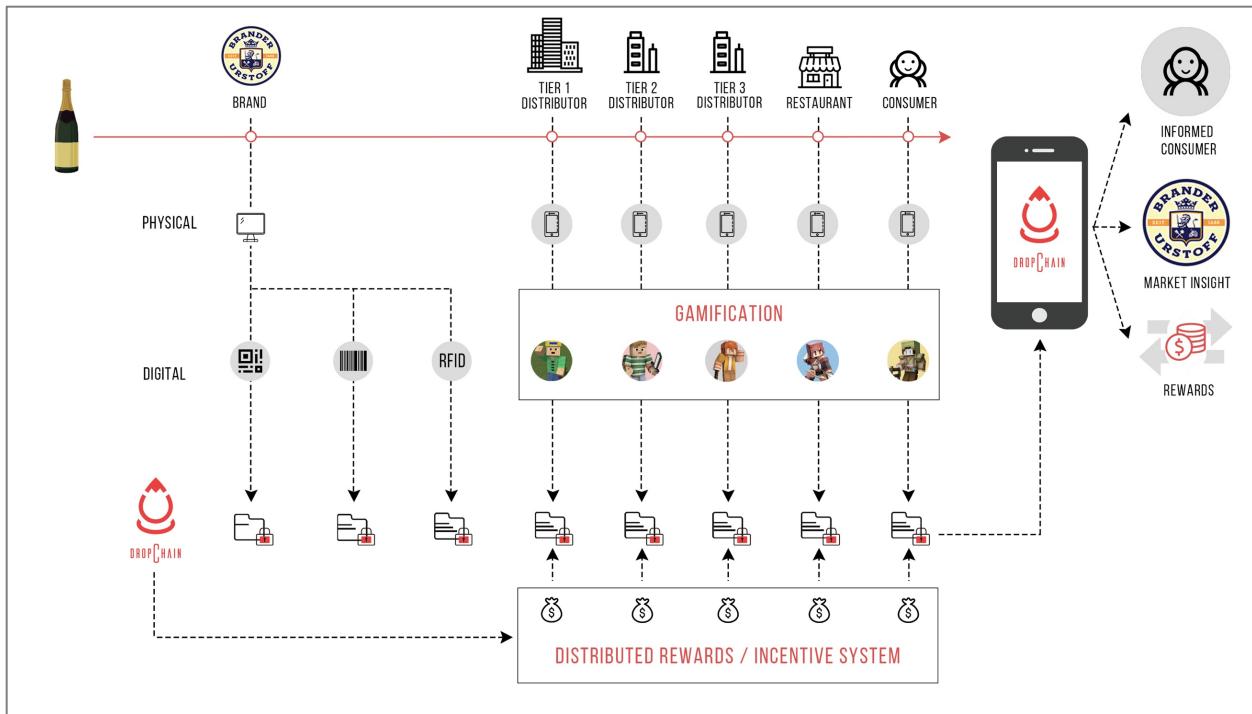
### 3.1 ALIGNING INCENTIVES

In its current climate, the food distribution supply chain is plagued with misaligned incentives. Brand owners and higher-tier distributors enjoy the most benefits from greater supply chain transparency, which allows them to make better decisions regarding which brands to import, the quantity to import, and which channels are most effective at distributing these brands. Lower-tier distributors, on the other hand, do not gain any benefit from supply chain transparency. Instead, greater transparency only translates into additional workload with no benefit or compensation. Due to this misalignment, brands lack the real data to plan their go-to-market strategy, which results in lower-tier distributors being saddled with excess stock they cannot sell. This in turn promotes questionable sales activities such as parallel (gray market) imports or intra-province distribution, all of which are invisible to the brand owner.

Through the implementation of a comprehensive incentive alignment strategy, DropChain's goal is to disrupt and modernize the food distribution industry's supply chain model. Tokenization enables us to potentially create clear monetary benefits for all stakeholders along the supply chain, driving participation and further growth of the DropChain ecosystem.

We aim to accelerate user participation by giving downstream players in the DropChain ecosystem the opportunity to earn tokens as compensation for their time and effort. Lower-tier distributors, and even restaurant or store owners, who "check-in" shipments of goods into DropChain's digital platform will be able to earn tokens that can be sold directly back to big brands, who will need the same tokens to purchase DropChain's supply chain services. This topic is further explored in [Section 8 \(BUZZ Token Economics\)](#).

*Tokenization and gamification of the supply chain may be able to create benefits for big brands, top-tier distributors and downstream players, thereby aligning user incentives with further growth of the DropChain ecosystem.*



### 3.2 LOWER ADOPTION COSTS

Centralized supply chain solutions are not only complex but are also expensive to implement. Hence, for big brands and top-tier distributors who already have an existing solution in place, encouraging adoption requires minimizing the entry cost, whether it's executing a full transition into DropChain's ecosystem or a data integration between DropChain and their existing system.

**Zero Fees.** To encourage adoption, DropChain proposes to charge zero fees for top-tier distributors and all downstream participants to use our platform to:

- Check-in shipments
- Earn and convert tokenized incentives
- Query and track the supply chain for any recorded shipment

**Pay to Play.** DropChain may take a tiny cost for "gas" (a few cents per transaction), in addition to a nominal commission to help cover server and operational costs related to



the ecosystem. This cost is directly borne by the brand owner and is calculated based on the volume of product the brand is interested in tracking the supply chain of. The cost is fully customizable so brands only track as much data as they want, making our ecosystem financially accessible to all brands, whether big or small. Furthermore, once a specific shipment is recorded in DropChain's system, all related downstream activities will possibly not incur further commission or fees.

*By attempting to minimize or eliminate the entry costs for all parties, we hope to actively promote the adoption of the overall platform across the entire supply chain. As the platform grows and the number of participants increase, our success will be derived from the volume of products being tracked via DropChain's ecosystem.*

### 3.3 EASE OF ACCESSIBILITY AND APPLICABILITY

The importance of usability cannot be understated. In order for any eco-system to thrive, it must be inherently easy for participants to access and use. To achieve this, DropChain's system will be largely open with a suite of API's to encourage development and integration. Furthermore, it will be free of mandatory hardware or proprietary labeling requirements that would otherwise deter both brands and supply chain nodes from participating.

**API - Friendly.** To further reduce development-related adoption costs, we propose to have a suite of free-to-use, secure API's will be available for existing supply chain solutions to build on. Utilizing XML, a widely adopted file format for data exchange, API's will enable big brands with existing solutions or smaller downstream players to easily and cost-effectively integrate with DropChain's ecosystem. Thus, a portion of our funds raised may be allocated towards:

- Fostering a development community dedicated to building API plugins and solutions for DropChain's ecosystem
- Building relationships with key industry players in shipping and logistics, and assisting with their software development and integration



Whether the supply chain participant is interested in integrating DropChain's supply chain data with their iOS application, corporate intranet, ERP, or even WeChat Mini Program, DropChain seeks to ensure there will be unified and automatic data interoperability between IT systems of various stakeholders in multi-organization supply chains, with mechanisms for ensuring data integrity.

**Label Agnostic.** Many higher-end brands already incorporate some form of unique labeling to deter counterfeiting. To encourage all brands to adopt our system, we will likely not require mandatory use of any special labeling or tracking mechanism. Brands are free to use their existing anti-counterfeiting technology in tandem with DropChain's system. Development funds may be set aside to assist brands initially with hardware integration.

Every unique tracking object generated by DropChain can be bound to a brand's unique labelling system. Brands will need to modify and incorporate a unique DropChain tracking URL onto the label that will allow downstream participants to easily track and scan that item throughout the supply chain. Whether brands already use RFID's, QR codes, or bar codes on their packaging, DropChain's system may be integrated seamlessly into their existing system.

**Bring Your Own Scanner.** DropChain will likely not require any proprietary scanning hardware. Supply chain participants that already have an existing scanning solution can potentially use it to scan and check-in shipments, subject to modifications to how the scanner unit handles the information.

In addition, DropChain may have standalone iOS and Android mobile applications and a WeChat Mini Program ready to launch, enabling lower-tier distributors and small businesses who do not have scanning hardware in place to easily track shipments that come in and earn tokens.

*We project that democratizing hardware requirements and opening up DropChain's ecosystem via a comprehensive API library and standalone mobile applications will allow us to drive platform adoption by both upstream and downstream supply chain*



*participants. Our aim is to ensure our platform can be accessed anywhere by anyone with almost any hardware.*

### 3.4 EMPOWERING BRANDS WITH BIG DATA

Knowing where a bottle of wine or case of beer ends up is critical for the survival of a brand. Understanding how their products are distributed at the lowest levels gives brands the data they need to make better business decisions such as the volume of goods distributed to a geographic area; who to target in country-wide marketing campaigns; or, which distribution channels are most effective in a given market.

In the past, big brands tend to have little visibility of lower-tier distribution channels. We endeavor to enable and incentivize these distribution channels to participate in the supply chain process by providing fair compensation for work performed.

The Application layer of DropChain's protocol stack seeks to provide the necessary data analytics platform for brands to gather, filter, and analyze the market data generated by each participant in their distribution supply chain, and will be completely free to use.

*This will enable big brands to have a level of transparency never witnessed before. Not only will brands understand how their goods are dispersed across a specific market, they will also have access to granular market data detailing which city, which district, which street, even which business establishment a specific product ends up at.*

Greater transparency and traceability in the food supply chain can only be achieved if a majority of players participate along the supply chain. This may require a gamified system specifically designed to incentivize all participants (via reward tokens); keep adoption costs at a bare minimum; and ensure it is easy to use and access for everybody. Once we are able to reduce these barriers to entry, DropChain is likely to have created a self-sustaining ecosystem whereby:

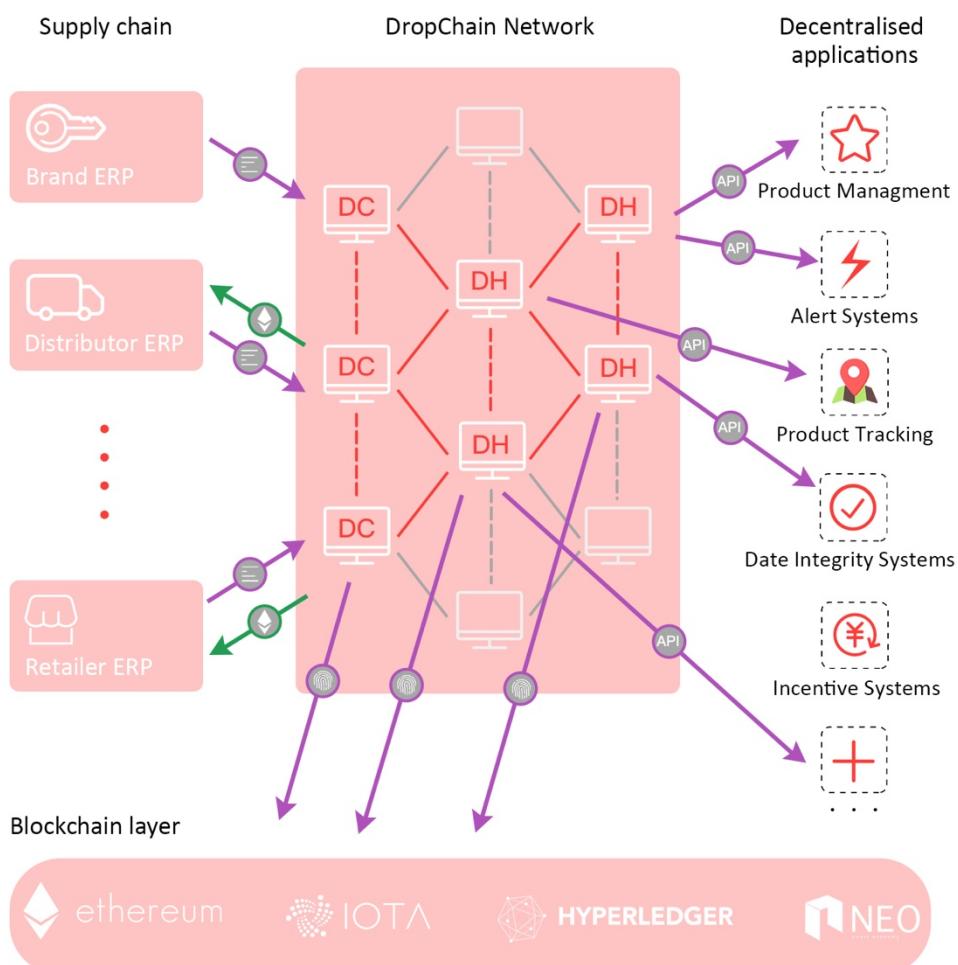
- Brands can quickly latch on to our infrastructure to track their global distribution supply chain using our tokens; and



- Supply chain nodes are rewarded for their participation through our native token that can be circulated back into DropChain's ecosystem and sold directly back to brands themselves

DropChain's protocol stack strives to preserve the industry's existing distribution structures while using Blockchain-based decentralized networks to create incentivized solutions that address the problems facing food and beverage supply chains and eliminate the core inefficiencies that currently hold back innovation and true market transparency.

### Decentralized Applications and Data Flow





# 4 PROTOCOL STACK

The following illustration and discussion will present an overview of the proposed **DropChain Network** (DCN) architecture in the form of a protocol stack.



## 4.1 LIQUIDITY PROTOCOL

Liquidity of digital currency will form the proposed base of DropChain's protocol stack because it allows demand-entities to pay for and utilize supply chain tracking and data analytics services. At the same time, it also enables supply-entities to liquidate digital incentives issued as reward for their participation in the supply chain.

Demand-entities such as brand owners may use tokens to access the DCN, so as to deploy smart contracts between both parties. This contract will allow demand-entities to generate unique tracking objects and write data on the DCN. Each instance of a tracking object will be allowed unlimited write privileges, facilitating more complex supply chains where numerous supply chain nodes are involved.



Concurrently, supply-entities such as distributors and business owners may be able to earn tokens in return for their contributions to the supply chain process. Smart contracts will keep track of the payment status as well as check-in history for the specific shipment. Once a check-in is authenticated and verified to be genuine, the liquidity protocol will dispense the in-progress compensation.

Smart contracts enable automated money supply management, implementation of specialized supply chain rules, and a variety of pre-programmed behaviors associated with other tokens. In DropChain's Liquidity Protocol, a mixture of strategies will be employed to incentivize every player to strive towards achieving 100% transparency in the supply chain.

## 4.2 BINDING PROTOCOL

The demand-side liquidity generated in the base layer of our protocol stack will be utilized by its second layer, the Binding Protocol.

The Binding Protocol defines all the ways in which demand-entities can generate unique tracking objects and bind them with a specific volume, measurement or shipment of goods. This is the primary service the DCN will provide to all brands to track their products across the supply chain. The number of tracking objects that will be generated by the DCN will be directly proportionate to the amount of tokens deposited by the demand-entity.

DropChain will adopt globally accepted GS1 standards for unique identifiers. GS1 identification standards define unique identification codes (called GS1 identification keys) which will be used within the DCN to reference real-world objects such as crates, unit loads on pallets, or individual cases. GS1 ID keys are globally unique and can be shared between multiple supply-entities, increasing supply chain visibility for participants. By adopting GS1 standards, we aim to create a common foundation for uniquely identifying products that enter the DCN.



## 4.3 TRACKING PROTOCOL

The Tracking Protocol is the third proposed layer of DropChain's protocol stack. This layer governs three aspects of the DCN:

- The mechanisms through which information is captured in the supply chain
- The methods used to manage that data within the DCN
- The algorithms for verifying the validity of new supply chain data

**Data Capture.** DropChain's ecosystem will adopt an open-standards methodology when referring to data capture methods. As stated earlier, a full suite of development API's will be made available, in addition to a fully agnostic approach when it comes to labelling or scanning technology employed to exchange data with the DCN.

However, global standards in data capture will still be followed to ensure all information will be accurately and consistently recorded. DropChain will aim to adhere to GS1 data capture standards, which currently includes definitions for bar code and radio-frequency identification (RFID) data carriers, allowing for GS1 ID Keys and supplementary data to be affixed directly to a physical object. GS1 standards also dictate a consistent interface for readers, printers, and other hardware and software components that connect to the DCN.

**Data Management.** Supply chains span the globe in today's economy, and the propensity for local standards to be used when sharing data can result in data corruption as it is disseminated across the supply chain. To mitigate this problem, we aim to employ global standards for electronic data management to facilitate the automation and ensure the consistency of data occurring across the supply chain.

Standardization of data within our ecosystem is critical for sustainable data integrity. Since XML is better adapted for information exchange using the internet-based technologies, it will likely be the lingua franca across the DCN. This standard will encompass most areas, including master data, logistical data, and incentive data.



To further strengthen data integrity and to ensure system-wide transparency and readability of supply chain data, the structure and content of the XML data will likely follow GS1 XML standards, which dictates a clear process flow with checks and balances to ensure the message sent is consistent with the message received.

**Data Verification.** All data received from supply chain nodes must be authenticated and verified before entering DropChain's data network. Numerous checks will be in place to ensure the integrity and consistency of information.

DropChain's analysis engine will play an instrumental role in driving supply chain data integrity. The Tracking Protocol will perform this verification in real-time and the backbone of its logic will determine trustworthiness through sophisticated rules-based analysis<sup>7</sup>, which will evaluate the event chains of each individual piece of data that passes through the DCN. Rules-based analysis is dependent on multiple algorithms being applied concurrently:

- Velocity consistency
- Dwell-time consistency
- Lifecycle consistency
- Pair-wise shipping/receiving confirmation

The protocol will model complex trust relationships and will simultaneously generate data used for accounting, risk-management, and preventative analysis. We call our system of fraud and counterfeit detection the **Integrity and Continuity Engine (ICE)** and its architecture will be discussed in detailed in [Section 5 \(Data Integrity\)](#).

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<sup>7</sup> Adapted from the EPCIS-based Supply Chain Visualization Tool by Alexander Ilic, Thomas Andersen, and Florian Michahelles, 2009



## 4.4 INCENTIVE PROTOCOL

The next layer of DropChain's proposed protocol stack is the Incentive Protocol. It defines and governs the incentive system that sits at the heart of the DropChain's ecosystem. The protocol is designed to provide transparency by ensuring supply chain node entities are dynamically compensated according to their contribution.

An inherent problem with current supply chain systems (whether or not they utilize Blockchain technology) is their inability to align the incentives of different key stakeholders. The old adage of "if you build it, they will come" does not hold true in the world of distribution.

Although demand-side entities (brands) and top-tier distribution nodes see the value of a fully-efficient and transparent supply chain, nodes further along the supply chain do not see any tangible benefits in their participation. Current solutions focus on rewarding the end-user to extract basic consumer data such as location, date, and brand; however, only having visibility at the beginning and the very end of the supply chain means companies have little knowledge of how that product arrived in the hands of the consumer. The product may have gone through multiple grey channels unknown to brand owners. Perhaps the product was already consumed but the bottle was refilled with fake content and resold to another customer in another city.

Without the prerequisite supply chain transparency, brands can find it difficult to optimize distribution channels, root out parallel imports and dissuade illegal activities such as inter-province sales or counterfeiting. Despite utilizing the latest technologies to build something truly transformational, most companies fail to address the simple question of: "what's in it for me?"

In DropChain's gamified incentive system, priority and focus will be placed on participants who matter most to supply chain transparency: logistics firms and distributors along the product's supply chain. These participants will receive the native currency of DropChain's economy as direct reward for their time spent checking in shipments into the DCN.



A Blockchain-based system has the advantage of distinguishing our incentive system through cryptoeconomics. Through automated smart contracts unique to a cryptocurrency economy, there will be no ambiguity or renegeing on services rendered. Dynamic incentives specific to each stage on the supply chain, governed in real-time based on the transactional velocity and market capitalization of the cryptocurrency, are immutably recorded and immediately transacted once participants complete their contribution. The simple, direct nature of transactions performed via smart contracts is one of the main reasons Blockchain is our technology of choice.

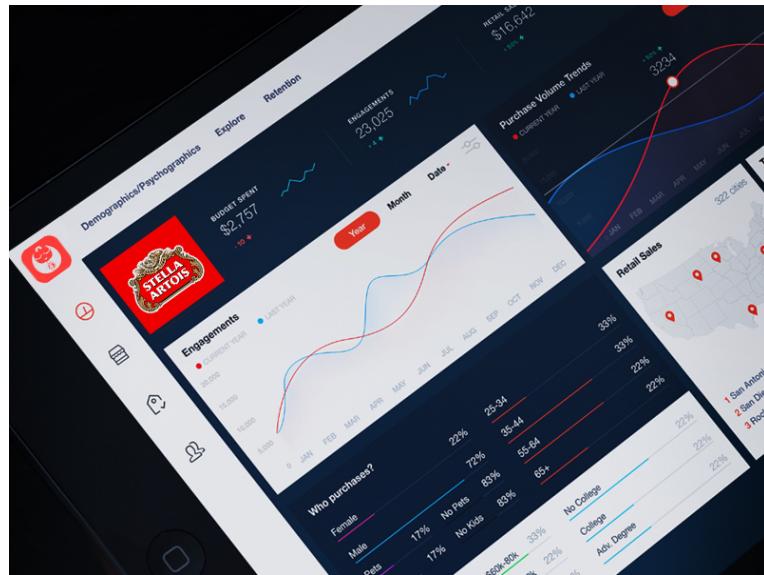
The exact value of the incentive depends on the stage in the supply chain process. Each value is also dynamic in nature and will fluctuate depending on a multitude of variables and will be actively managed by DropChain's treasury team:

Our approach aims to remove much of the friction inherent in traditional service-based relationships whereby one party promises to pay another upon completion of a particular task. Whether one party decides to fulfill their end of the agreement and make payment in a reasonable, timely manner is unknown. Smart contracts eliminate these headaches. An action performed will trigger a predefined reaction without any personal considerations.

## **4.5 APPLICATION PROTOCOL**

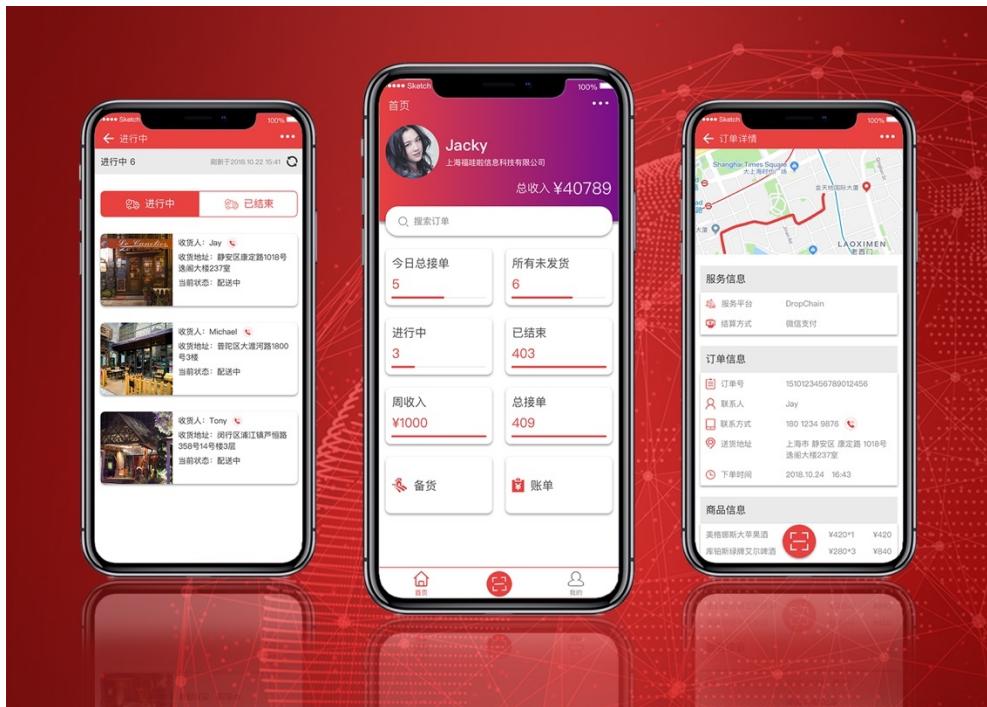
The Application Protocol is the final layer of the proposed DropChain protocol stack. This layer will define the global dashboards, tools, APIs, and data analytics standards that facilitate both demand and supply-entities accessing DropChain's supply chain network.

It is envisioned that brands who participate in the DCN will have access to a full range of tools and dashboards allowing them to easily track, aggregate, and analyze their product supply chain. Our mission is to drive full supply chain transparency, enabling brands to make smarter and more targeted business decisions. At the same time, this transparency is expected to improve overall supply chain integrity, and allow brands to better manage existing problems surrounding parallel imports and inter-provincial sales.



Furthermore, a fully transparent supply chain can help to decrease the overall counterfeit rate of a specific product, due to the increased difficulties involved with faking the unique identifiers on a specific case or shipment, ultimately improving food safety overall.

For a report on our application development, please refer to our latest Medium article:  
<https://medium.com/the-dropchain-project/dropchain-product-development-update-10523c6868c7>





# 5 DATA INTEGRITY

As supply chain data enters DropChain's data network via distribution nodes, a multitude of checks will be put in place to ensure data integrity, both in the authenticity of the data sender, as well as the data itself. Any discrepancies in data or participant will be flagged for review and the unique tracking object (GS1 ID) labelled as potentially compromised.

At the heart of DropChain's proposed data integrity system lies the [Integrity and Continuity Engine](#) (ICE), a complex series of algorithms designed to detect any anomalies in data across every product supply chain being stored on the DCN. The Tracking Protocol will perform this verification in real-time through rules-based analysis<sup>8</sup>, evaluating the event chains of each individual piece of data. The following are a few of the proposed core logic components that govern each data integrity check.

## 5.1 VELOCITY CONSISTENCY

Since the DCN handles real-world objects (food and beverages), certain speed constraints apply in the distribution process. Velocity consistency verifies that the velocity (calculated as a function of time and geographic location) is between a minimum velocity  $v_{min}$  and maximum velocity  $v_{max}$  defined via dynamic distance calculations based on readily available mapping API's.

The rationale is that goods cannot move faster than what the mode of transport allows. For example, if the data received states that a product was seen at 9 A.M. in Germany and an hour later in Japan, this rule would detect that the maximum threshold  $v_{max}$  is exceeded and the corresponding GS1 ID would be flagged as compromised.

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<sup>8</sup> Adapted from the EPCIS-based Supply Chain Visualization Tool by Alexander Ilic, Thomas Andersen, and Florian Michahelles, 2009



This inconsistency can be caused e.g. by a counterfeit tag (indicating a fake product). If the transportation method for a specific product is known (e.g. truck, ship, plane, etc.),  $v_{min}$  and  $v_{max}$  can be configured more accurately to reflect real-world constraints.

## 5.2 DWELL-TIME CONSISTENCY

All consumable items have a finite lifespan. In general, the goal is to move goods as quickly as possible across the supply chain to ensure shelf-life is minimized. Dwell-time consistency verifies that the length of time between location  $e_i$  and  $e_{i+1}$  is below a predefined threshold of  $t_{max}$ .

Quality degradation is a major issue for perishable food products. Tracking and predicting the quality of perishable food was a challenging and costly task prior to the introduction of modern sensor technologies, such as RFID tools and humidity-temperature sensors. Nowadays, with quality prediction models, brands can make a more accurate prediction about the remaining shelf life, which is the end consumer's main concern.

The quality degradation of perishable food is affected by multiple factors, such as storage time, temperature, and ambient conditions.<sup>9</sup> More specifically, the quality degradation can be expressed by the following equation:

$$(1) \quad k = k_0 e^{-(E_a / RT_0)}$$

where  $q$  is the quality of a perishable product,  $k$  is the rate of degradation, and  $n$  is the chemical order of the reaction. In the Equation 1,  $n$  could be equal 0 or 1, for the facilitation of two types of different degradation models. When  $n = 0$ , the quality decays at a constant rate. When  $n = 1$ , the quality decays exponentially. This setting appears to be more realistic and hence has been used widely in research relevant to perishable food items. For this reason, our research assumes  $n = 1$ . In Equation (1),  $k$  can be expressed as

$$(2) \quad \frac{dq}{dt} = -kq^n$$

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<sup>9</sup> Labuza, T.P. Shelf-Life Dating of Foods; Food and Nutrition Press: Westport, CT, USA, 1982.



where  $k_0$  is a constant,  $E_a$  is the activation energy, which can be estimated from empirical data,  $R$  is the gas constant, and  $T_0$  is the absolute temperature. According to Equations (1) and (2), the quality of perishable product at time  $t$  can be modelled by

$$(3) \quad q(t) = q_0 e^{-k_0 t e^{-(E_a/RT_0)}}$$

where  $q_0$  is the initial quality. In most retailers, the temperature and atmosphere condition are relatively stable. Therefore, we introduce  $\lambda$  as the deterioration rate to simplify the mathematical expression. Let

$$(4) \quad \lambda = k_0 e^{-(E_a/RT_0)}$$

Hence, the quality at time  $t$  becomes

$$(5) \quad q(t) = q_0 e^{-\lambda t}$$

Goods that sit idle too long at a specific distribution node will likely raise concerns within ICE. If the dwell-time is consistently long (or lasts forever) for multiple products passing through the same node, it may suggest the distributor is involved in exporting parallel goods, or they have inefficient stock rotation processes. Either way, the reputation of this distributor may be negatively affected, having a direct impact on their compensation model in the Incentive Protocol.

### 5.3 LIFECYCLE CONSISTENCY

Every unique tracking object generated on the DCN is represented with an activation date/time. Once the tracking object is judged to have reached its final destination (e.g. a small business), a deactivation date is also recorded. The lifecycle consistency rule ensures that there are no events before the original activation as well as after the deactivation. Any inconsistency would suggest the GS1 ID has been compromised or a counterfeit product has been introduced to the supply chain.



## 5.4 PAIR-WISE SHIPPING/RECEIVING CONFIRMATION

Traceability is a core requirement to ensure food safety, especially since according to PricewaterhouseCoopers, food fraud is estimated to be a \$40 billion a year problem.<sup>10</sup> The logic behind pair-wise shipping/receiving confirmation governs the chain of custody as a product passes through its supply chain. This rule seeks to ensure that for every distribution node value of  $e_{i+1}$  (receiving) there is a corresponding distribution node of  $e_i$  (shipping). Duplicate send/receive steps for the same GS1 ID would trigger alarms on inconsistency in the supply chain data, directly impacting the traceability of that shipment.

ICE will seek to model complex trust relationships and will simultaneously generate data used for supply chain node reputation scores. Distributors who consistently raise red flags within DropChain's ecosystem may be penalized with a reduced tokenized reward. Continued abuse will likely result in a permanent ban from DropChain's services. At the same time, distributors that routinely demonstrate a commitment to data integrity and supply chain efficiency may be rewarded with additional tokens.

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<sup>10</sup> <https://press.pwc.com/News-releases/fighting-40bn-food-fraud-to-protect-food-supply/s/44fd6210-10f7-46c7-8431-e55983286e22>



# 6 THE DROPCHAIN NETWORK

Blockchain is projected to create tremendous waves as it modernizes countless industries in the future to come. However, we think there are still inherent limitations to Blockchain technology. For example, the technology lacks the necessary database functionalities necessary for tracking multi-layered, data-intensive supply chains. Ethereum, IOTA and similar solutions are not designed for this type of data storage, nor can they provide complex data manipulation functionalities similar to SQL that would be core to a data analytics platform. The cost of data storage and operations is also higher than traditional centralized database solutions, making a Blockchain-only solution economically and practically unviable.

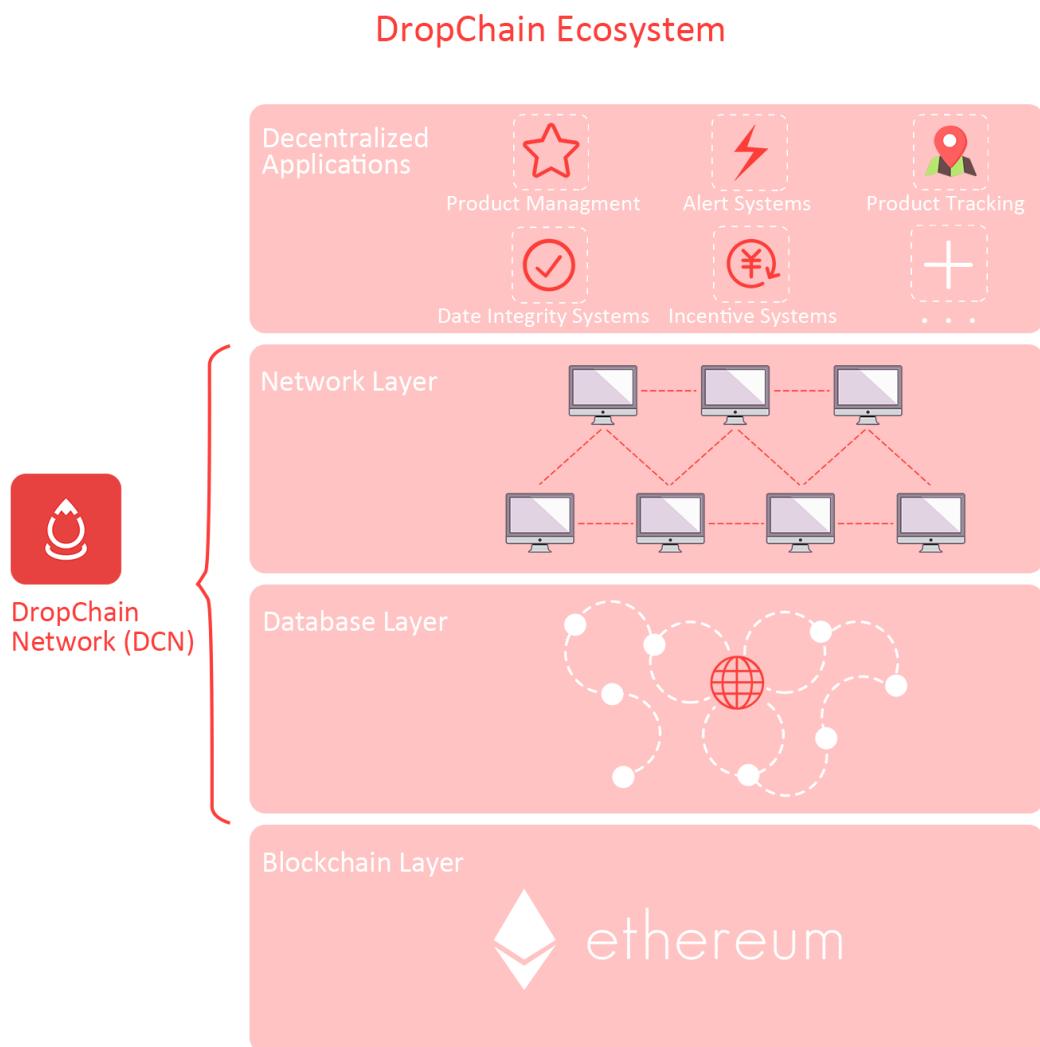
Decentralized solutions such as IPFS and Storj are capable of handling document storage but do not adequately address the complexities of global interconnected data while delivering advanced database search and operational capabilities found in professional database solutions. On the other hand, traditional database solutions are capable of providing the advanced database functionalities necessary in a global supply chain system, but its centralized data storage does not address the key challenges of data fragmentation and the decentralization of supply chain data. Centralized management is also inherently more susceptible to data tampering and stakeholder collusion versus a distributed data solution.

DropChain's ecosystem needs to be high-volume, high-frequency in nature due to the fact we are dealing with food and beverage distribution. The complexities of the industry's global supply chain also require a high level of interconnectivity between all stakeholders. While an open and decentralized solution is our mission, it must be balanced against the need to deliver world-class performance comparable to traditional database analytics to deliver quality data to end-users.



Therefore, the proposed optimal infrastructure for the **DropChain Network (DCN)** is a multi-layer, multi-tier decentralized network with an off-chain database layer to facilitate data storage and analytics.

The Network Layer would be responsible for demand and supply-entity-facing functionality such as negotiating services, processing and retrieving data, product tracking, verifying supply chain data integrity and managing incentive allocation. The Database Layer would handle the bulk of the data storage requirements. This is projected to increase overall Blockchain efficiency and lower operational costs.

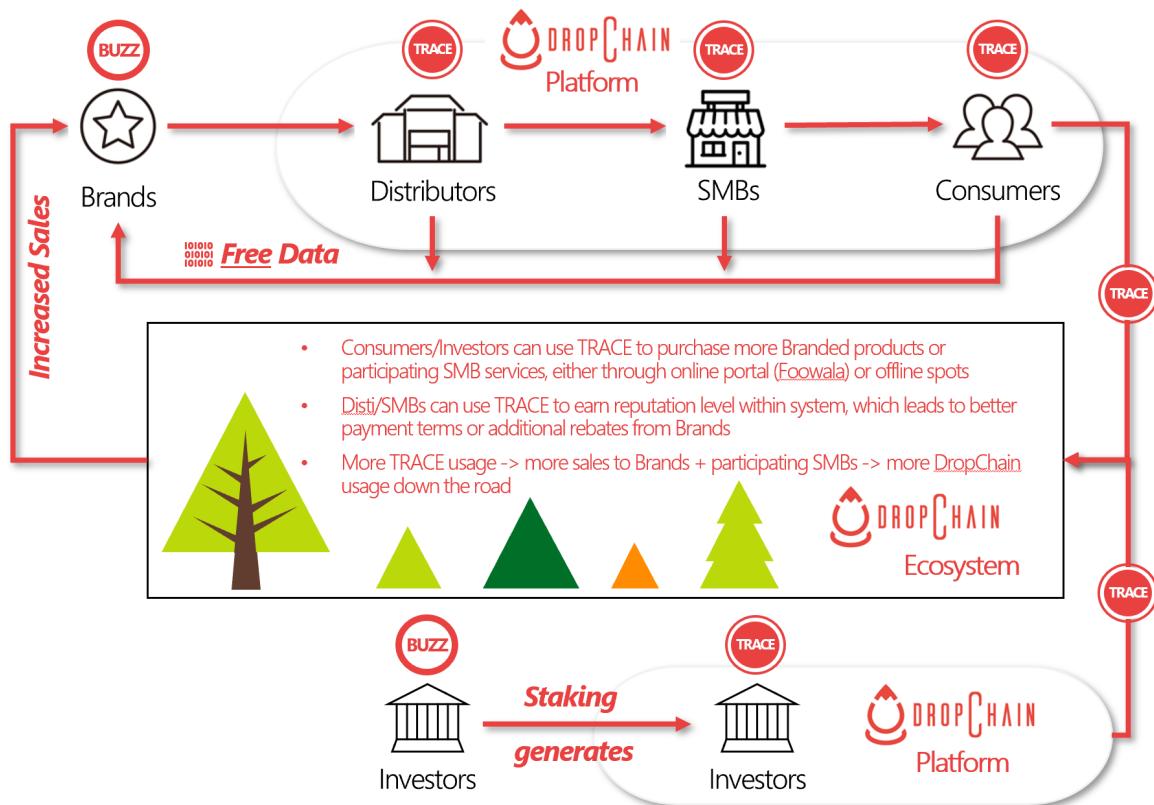




## 6.1 A DECENTRALIZED SUPPLY CHAIN ECOSYSTEM

In order to leverage blockchain's unique trustless nature, and to cultivate a self-sustained scalable ecosystem, DropChain will ultimately implement a fully decentralized business model, creating an autonomously governed ecosystem free of a central controlling authority. It will be a system that empowers supply chain participants with true ownership to their own data, allowing them to benefit from the distribution of that data to third-parties. Key concepts underpinning this decentralized ecosystem include:

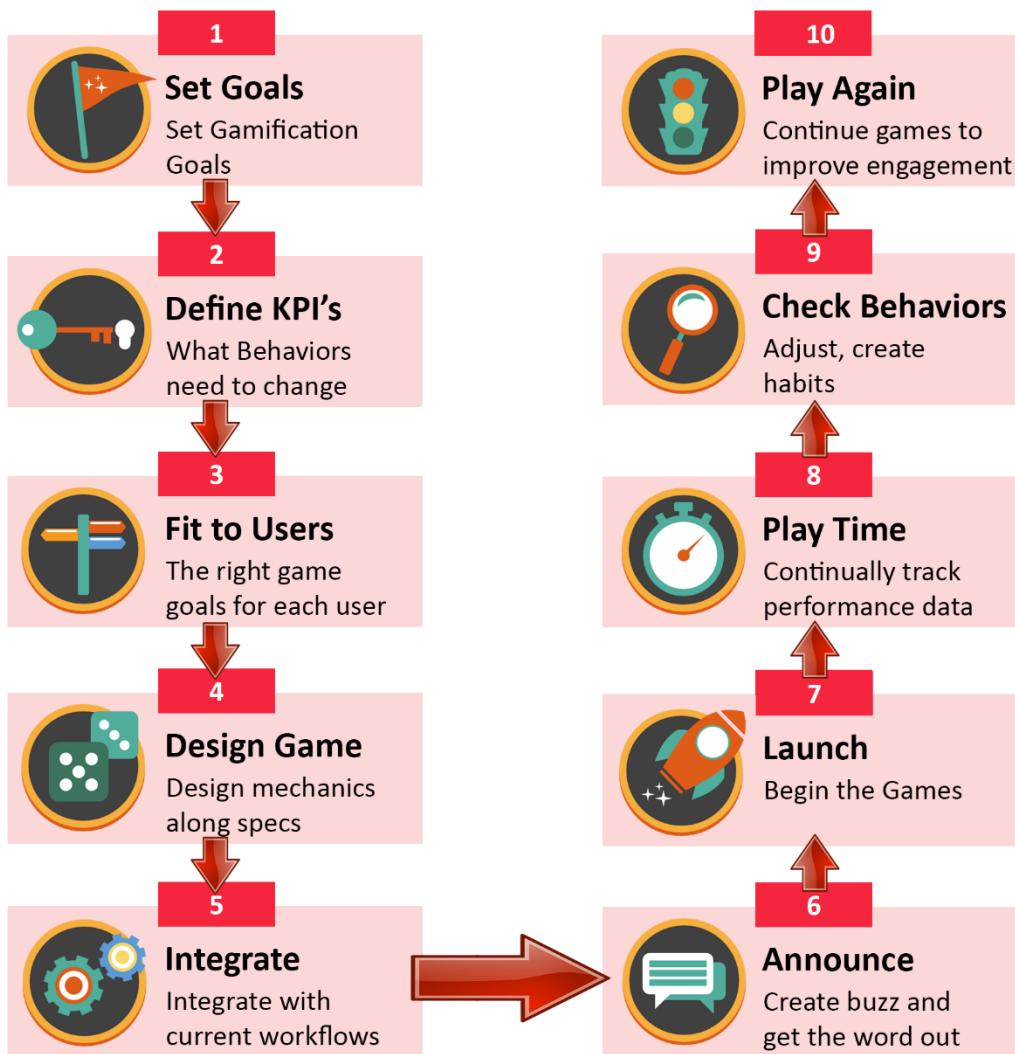
- **Token Economics:** To empower all participants and encourage them to contribute to the ecosystem, DropChain's business model must work to incentivize participants and ensure everyone benefits from the exchange of information. Token economics will dictate the way tokens flow in a circular fashion with adequate velocity and stable valuation within the ecosystem, with the value generated being re-invested back into the ecosystem. For more information regarding our token economics structure, refer to [Section 8 \(BUZZ Token Economics\)](#).
- **Smart Contracts:** A fully autonomous blockchain architecture will be complemented by a series of smart contracts to algorithmically govern the relationships between all parties and services. From contracts dictating the specific distribution of incentives along a supply chain, to contracts that govern the staking of BUZZ tokens, the power of blockchain lies in its ability to create working relationships free of a central authority overseeing the relationship. This will in turn reduce the cost to serve and coordinate distributed stakeholders, while mitigating counter-party risk.
- **Transparent Policies:** To have a self-sustained ecosystem, it must be regulated with not only relevant capital, but also transparent monetary and fiscal policies. However, the policy design must be robust enough to support random shocks from open market and discourage malicious attacks.
- **Consensus Mechanisms:** A decentralized decision-making process is necessary to remove the need for trust governance between non-trusting transacting parties. A consensus mechanism will be in place for group-level decision-making precisely because there is no one person or group of people that makes decisions within the blockchain.





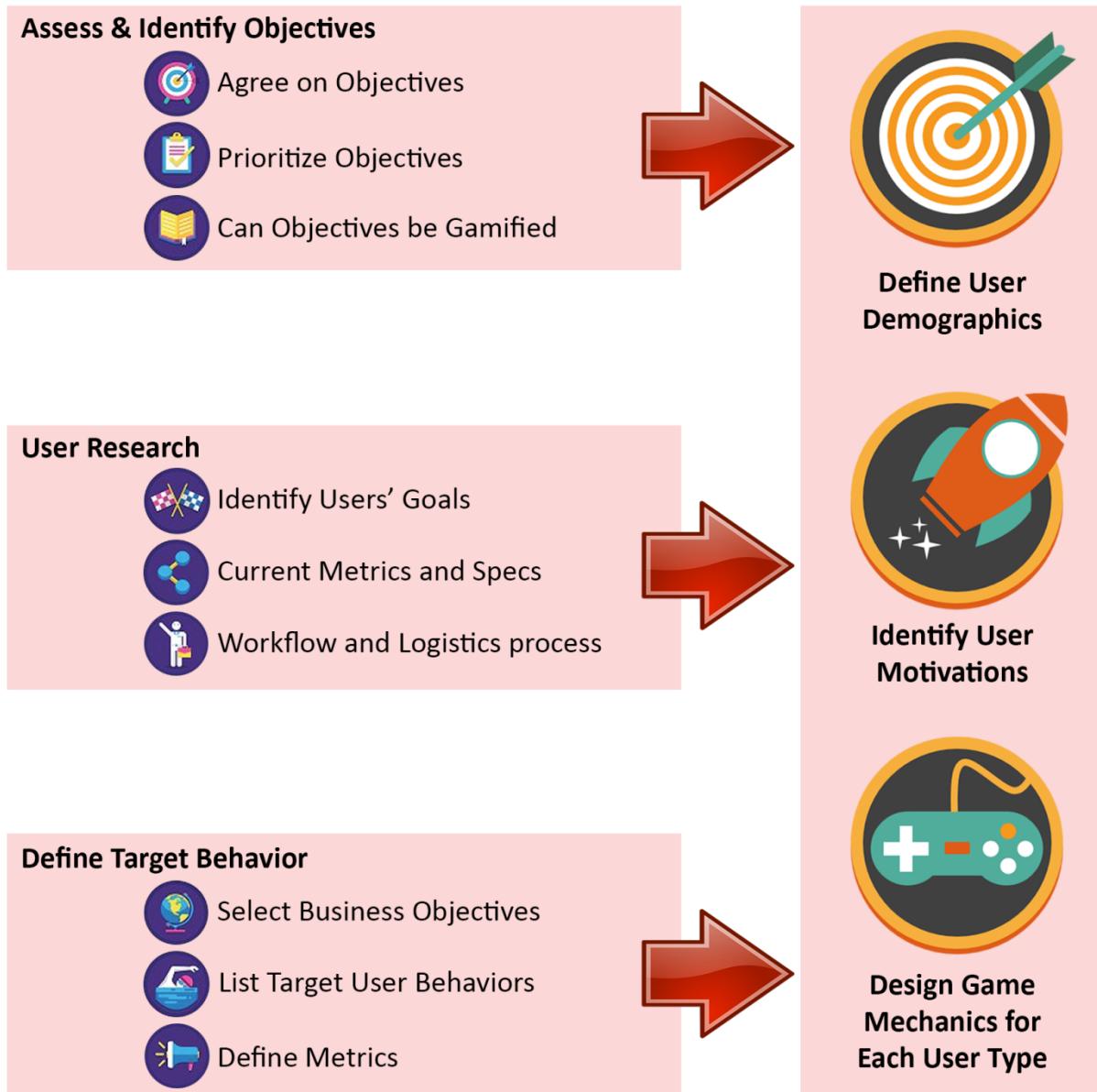
# 7 GAMIFICATION DESIGN

Gamification is the process of applying and integrating game mechanics into an existing system to improve and motivate participation, engagement, and loyalty. Gamification takes the data-driven techniques of game design and applies it to non-game experiences to motivate actions and create behaviors and habits that adds value to an existing ecosystem. Here is an example of how gamification may work:





To apply gamification techniques to the supply chain and to our users, and maximize their effectiveness, we aim to follow a strict process of identifying objectives, performing user research, and then defining relevant user behaviors. This process will help us identify, understand, and create an ecosystem where DropChain can seamlessly integrate itself with existing supply chain workflows and be the platform that empowers our users to be more informed, engaged, and incentivized.





DropChain aims to offer not only the next generation of supply chain tracking and transparency solution, but also a great experience and community for its users. By applying the principles of gamification (Incentivization, Engagement, and Retention) into the various features of the platform, DropChain's goal is to create unique mechanics and feedback loops that will encourage usage, engagement, participation by its users.

### Incentivization (Rewards):



DropChain can only be successful if its users contribute to the platform. To ensure and encourage participation, DropChain will rely on its token economy to reward the participants with the platform's tokens. Designing a user experience that gives clear steps on how to obtain a reward is paramount, and one of the keys in gamifying the experience. Examples of obtaining these rewards:

- Completion of Milestones (check-ins, delivery completions, shipping efficiency, average stock rotation period, etc...)
- Referrals (earn tokens for referring other similar businesses)
- Registration (platform registration, providing identification, business licenses, storefront address, etc...)

### Engagement (Making it fun):



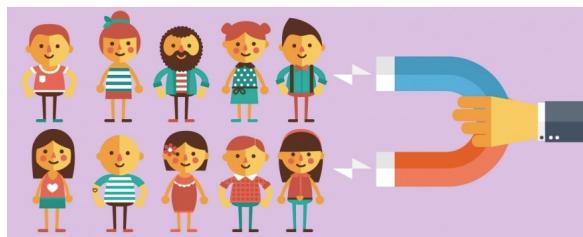
The design of features on the DropChain platform will be based on the core philosophy of making the platform easy and fun. DropChain wants to have its users participate and contribute not only in the data collection, but also in the fostering of social communities.



By offering tools and features that allow users to post and share their activities and events, as well as give the community opportunities to provide feedback, we can offer an engaging social system allows various user groups to connect with each other. Here are some examples that can help to promote such engagement:

- Proximity-based connecting (users to other users, locations of interest, etc.)
- Posting / Blogging opportunities (linked to future feature expansion plans)
- Like, Reward, Donation mechanics (feedback can be Likes, Comments, and even rewards)
- Brand Announcements

#### Retention (Encourage them to come back):



User Retention remains one of the biggest challenges of any app. By utilizing proven game designs from the game industry and providing incentives, user retention can be improved and maintained. The more times we can get users to use our app, the more ingrained our ecosystem will be in their daily lives. Here are some ways to increase user retention:

- Daily Login rewards (cumulative login rewards, consecutive login rewards, sponsored reward days, etc.)
- Tiered Gacha rewards (offer random special rewards; tokens, coupons, stickers, prizes, etc.)
- Timed Gacha rewards (open the box in 5 hours, open the box in 12 hours, open box in 24 hours, etc.)



- Task Completion Rewards (opening a marketplace store, placing an item on the marketplace, publishing your first post, referring your first 10 friends, etc.)

## 5 Common Gamification Mechanics

DropChain will employ the following 5 gamification mechanics, and many others, as ways to incentivize, engage, and retain our users and to drive participation, ultimately adding to the value of our platform.

- **Points** – measure a user's achievements in relation to others. These points can potentially be redeemable for prizes/cryptocurrency.
- **Badges** – reward achievements with visual badges and iconography.
- **Levels** – encourage users to progress and unlock new rewards and challenges that yield better rewards.
- **Leaderboards** – organize players/users by metrics and ranking through Global, Local, Company, and Friends-based leaderboard.
- **Challenges** – encourage engagement by offering specific tasks to complete

Gamifying the food supply network requires intimate knowledge and close relationships with key stakeholders along a given supply chain. Understanding their intrinsic motivations is critical to designing the gamification necessary to drive adoption and keep all users engaged.

DropChain will work with sales and business partners with strong experience in the food supply chain, and expertise at each level of distribution. We aim to collect a solid understanding of the needs of key stakeholders and how to translate them into real product functionality.



## 7.1 GAMIFICATION ENGINE AND PARAMETRIC ALGORITHMS

Currently, the gamification engine (GE) is proposed to be configured to group gamification objects (actions and milestones) in four broad thematic areas:

- **Shipment Scanning:** refers to actual number of shipments scanned as recorded by each distribution point
- **Shipment Scanning Insight:** refers to the understanding of how shipment scanning can be optimized.
- **Engagement:** refers to activity in the ecosystem and within the community.
- **Profiling:** refers to data input about the brand.

Across such areas, there are four major categories of actions:

- **Scanning actions:** these actions derive from distribution point scanning activities. When the scanning data is received by the **DropChain Network** (DCN), they are filtered through our data integrity engine (ICE) to monitor data quality and shipment integrity.
- **Ecosystem usage actions:** these actions are generated as consequences of the user activity by distribution points.
- **Gameplay actions:** these actions are produced by the GE.
- **External actions:** these actions are produced by external applications, e.g., the pre-existing ecosystem of each distribution point.

The algorithms for action recognition and token assignment differ according to the source of the action and the synchronicity of the rule engine computation. Scanning actions are evaluated synchronously for all users. The parametric algorithm for weekly scanning activities can be sketched abstractly as follows (the monthly version is similar):



```
1 For each user U_j in the set of distribution partners DP
2 If reading frequency >= day
3   Compute new weekly average NWA;
4   For all active weekly goals WG_k of user U_j
5     If NWA-Weeklybaseleine/Weeklybaseleine>= WG_k SatisfiedWeeklyGoals += WG_k;
6   End for;
7
8 AchievedWeeklyGoal = max (SatisfiedWeeklyGoals);
9 For all goals G_i in AchievedWeeklyGoals
10   Tokens_i = G_i.actionType.score;
11   SendGoalNotification(U_j, G_i);
12   U_j.profile.tokens+=Tokens_i;
13   IncrementTokensInArea(U_j, "scan", Tokens_i);
14   UpdateBadges(U_j);
15   UpdateRewards(U_j);
16 End for;
17
18 ResetGoals(U_j);
19 End for
```

The other categories of actions of the GE that do not depend on the asynchronous processing of scanning data are treated differently. They are triggered by individual users' events, which are managed by means of asynchronous calls to the GE:

```
1 Loop:
2 When Action A_j of User U_i is received at the GE
3 If (A_j.Active=true AND
4   (A_j.repeatable=true OR Count(U_i,A_j)=0) AND
5   (A_j.check_time_elapsed=false OR A_j.timestamp-A_j.lasttimestamp > A_j.time_elapsed))
6   Tokens = A_j.actionType.score;
7   U_j.profile.tokens+=Tokens;
8   IncrementTokensInArea(U_i, A_j.area, Tokens);
9   UpdateBadges(U_j);
10  UpdateRewards(U_j);
11 End loop.
```

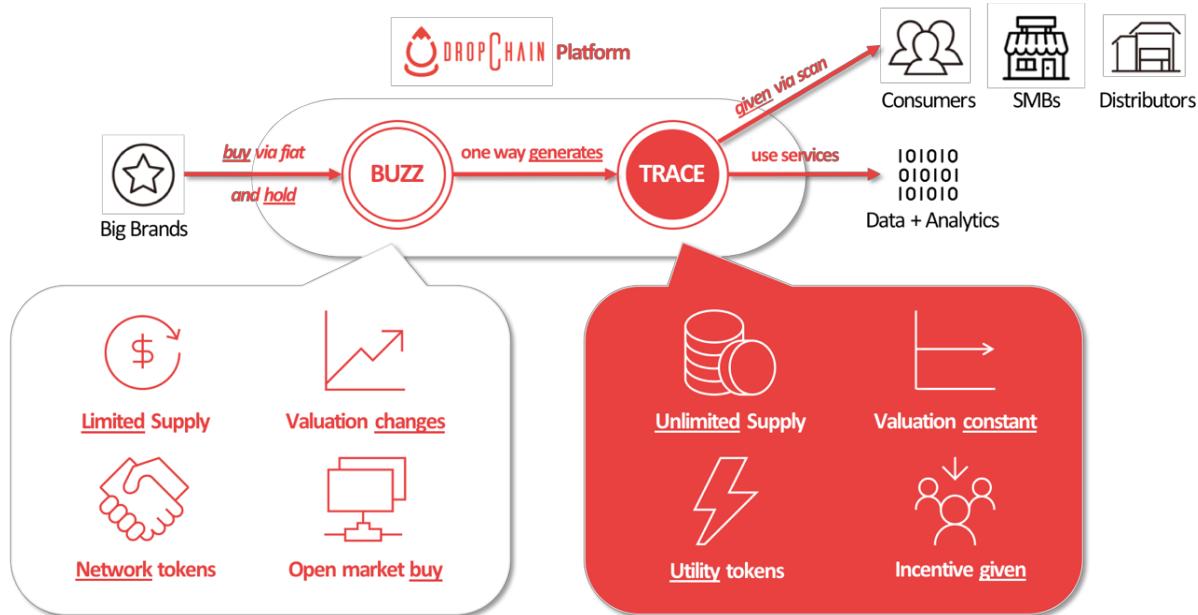


# 8 BUZZ TOKEN ECONOMICS

The DropChain Network (DCN) will be enabled by the tokenization of:

- Data tracking
- Consumer marketing
- Rewards exchange; and
- Supply chain contribution activities

We propose a dual-token economic structure with a network token (**BUZZ**) and a utility token (**TRACE**).



In the DropChain incentivized rewards program, participants can earn benefits in exchange for contributing data to the DCN. This benefit is in the form of a cryptocurrency specific to the DropChain economy and can be exchanged for goods and services within the DropChain ecosystem. This currency, **TRACE**, is designed to be an uncapped stable cryptocurrency. TRACE will serve as a means of transacting along the supply chain.



In addition to TRACE tokens, DropChain will issue a cryptographic network token called **BUZZ**. Key stakeholders can access DropChain's services by acquiring BUZZ tokens. For example, if a brand owner wishes to track a product shipment along its supply chain, they will need to obtain BUZZ to access DropChain's product traceability engine. BUZZ is a limited supply cryptocurrency and no additional BUZZ will be created after the initial token generation event.

To better understand the benefits behind a dual-token model and how the TRACE token will be utilized within the DropChain ecosystem, we need to first explore the various economic mechanisms available within the DropChain Network.

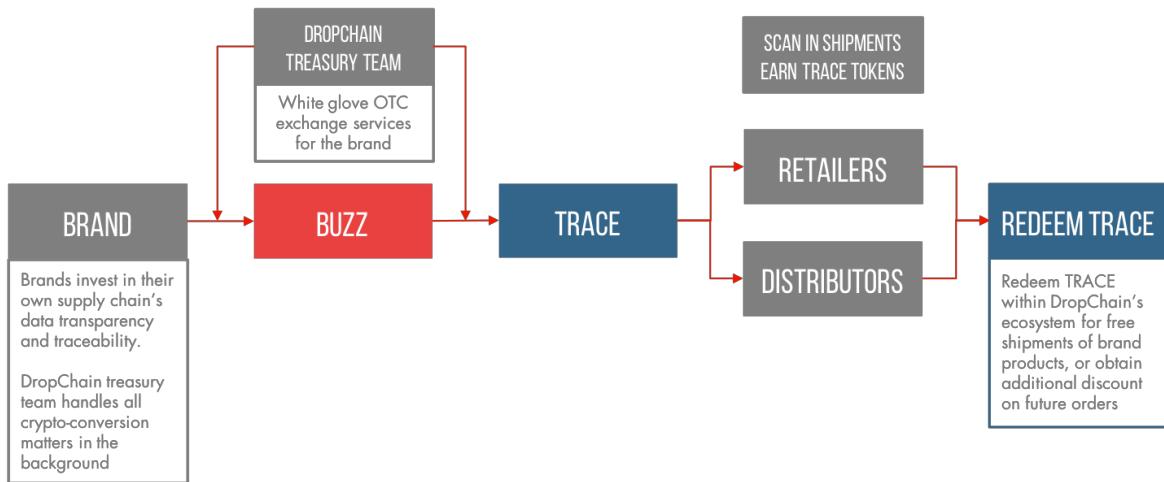
### **Proposed Token Economics Models**

Different token economic models will come into play at different stages in DropChain's life cycle. We are splitting our proposed token models into two phases. The first phase will be executed soon after the official product launch and revenue sources will come from a) product traceability and b) advertising campaigns. The second phase will begin once the DropChain Network gains a critical mass of participating consumers and end-retailers (earning tokens and exchanging them for rewards). Token economics in the second phase will focus on a) big data and b) a growing and self-sustaining ecosystem.

## **8.1 TOKEN ECONOMICS MODEL – PHASE 1**

### **1. Traceability**

Brands already invest significant amounts in pursuing supply chain traceability and transparency. Counterfeit, however, continues to be a global problem that damages brand reputation and consumer trust. The DropChain solution has been designed to overcome the flaws of modern systems and ensure product traceability on the blockchain is secured.



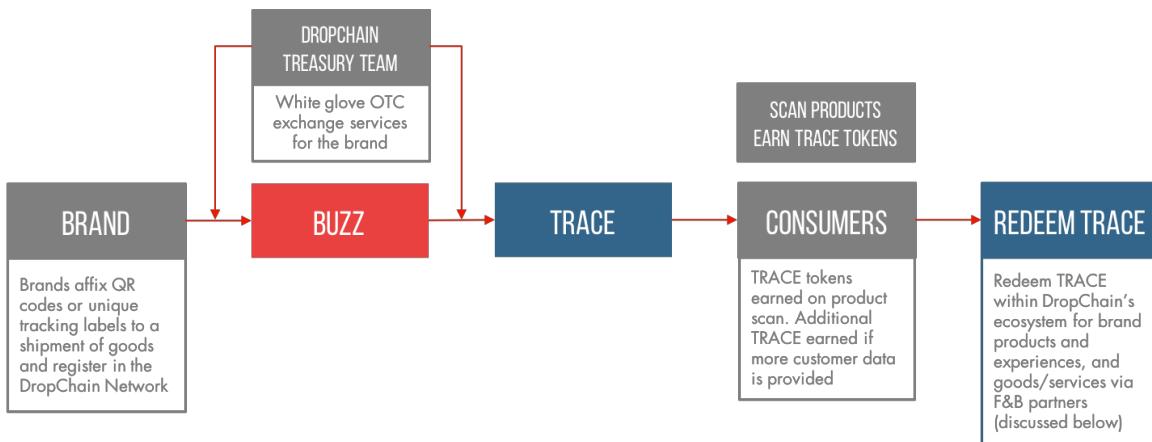
Once a brand determines its traceability budget, DropChain will levy a management surcharge (percentage of budget) for hosting and managing the execution of the campaign. The remainder of the brand's traceability budget remains with them. They stake these funds against the value of physical products or benefits that downstream distributors and end-retailers can exchange for once they begin earning rewards (TRACE tokens) for contributing supply chain data. The market value of the reward/incentive being offered during a campaign will be determined prior to its commencement. The total market value of the rewards/incentives being offered will not be higher than the budget surrounding the campaign.

DropChain will convert the value of the brand's traceability budget (minus DropChain's management surcharge) and generate equivalent quantity of TRACE tokens. The value of one TRACE token will be set and maintained by DropChain's Treasury Team (discussed below). These tokens are then distributed across the brand's supply chain, available to be earned by each distribution point (including end-retailers). TRACE tokens earned by these stakeholders can be exchanged for a predetermined set of benefits dictated by the brand themselves. For example, tokens can be exchanged for free cases of alcohol (for distributors to sell and earn additional revenue from) or additional discounts on products procured by this distributor.



## 2. Advertising & Marketing Campaigns

Brands can also launch marketing campaigns through DropChain's platform, targeting end-consumers. Brands are eager to better understand their customer demographic, and DropChain provides the most targeted solution to date.



DropChain will levy a management fee for handling the execution of the marketing campaign. This fee will be a percentage of the total campaign budget. The remainder of the marketing budget stays with them. They stake this remaining budget against the value of physical products or brand experiences for consumers to enjoy. The unit value of the reward is determined prior to the start of the marketing campaign, and the total market value of the rewards shall not exceed the marketing budget. Consumers can redeem these perks once they earn enough rewards (TRACE tokens) through DropChain's ecosystem.

DropChain will work together with brands to determine the execution strategy for each campaign. Unique scannable QR codes (or an equivalent) will be created, printed, and affixed to each product unit. In China, these labels can be scanned via WeChat using the built-in QR code scanner. Outside of China, we are looking at other platforms such as Facebook Messenger. By scanning this label, supply chain nodes and consumers will access a branded landing page from which they can immediately earn a set number of TRACE tokens. Should the consumer choose to answer a few basic demographics questions, DropChain can issue additional TRACE tokens. Consumers would be free to exchange these TRACE tokens for brand-related experiences or products. The cost of



these consumer rewards would come out of the brand's marketing budget.

## 8.2 TOKEN ECONOMICS MODEL – PHASE 2

### 3. Big Data

According to ESOMAR, the global market research industry is valued at over USD \$40 billion. Brands need to better understand not only their target markets (what is sold and where it's sold), but also their target demographic (who it's sold to). Due to the lack of transparency in modern supply chains, it's hard for brands to acquire this data directly from their top tier distribution partners since they themselves may not have that downstream visibility.

With DropChain's ability to collect retailer and consumer data through one end-to-end ecosystem, we drive tremendous value for brands when it comes to data intelligence. Based on the size of the market research industry, this is a lucrative space to be in. The number of brands seeking this type of data is staggering. For example, in Germany alone, there are over 3,500 individual craft beer brands, many eager to break into the China market but lacking the market insights to do so. DropChain can fill that knowledge gap and will leverage our unique ecosystem and ground-level data collection capabilities to provide two levels of data services: market surveys and refined market insights.

#### Market Surveys

DropChain will enable brands to help them better understand consumer preferences. We offer the ability to airdrop brand-traceable TRACE tokens to our existing consumer base in exchange for their time to fill out a survey or engage in brand-specific promotions. These TRACE tokens can then be exchanged for services and products within DropChain's ecosystem (free alcohol, dining at participating restaurant partners, brand merchandise, etc...)

Brands will be able to narrow down their target market and scope, from the type of consumers we send the survey to, to the city in which they live in. Since consumer



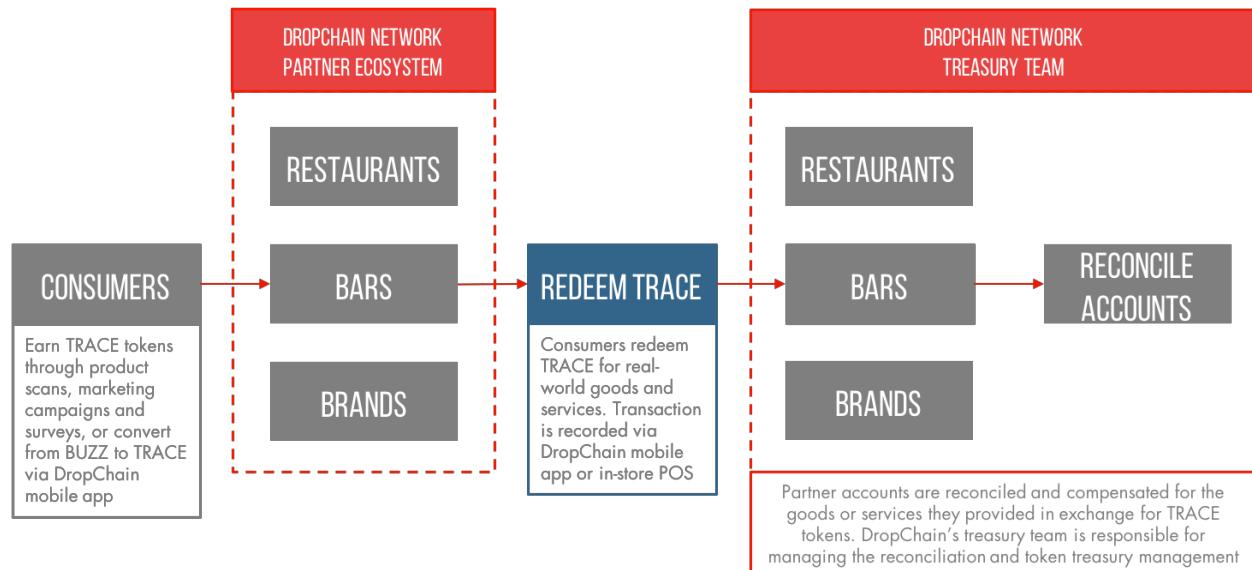
behavior and taste preferences change on a regular basis, brands will need to execute survey campaigns across various categories on a regular basis.

## Market Insights

Although brands will have access to their own supply chain data, DropChain has the ability to aggregate our data and deliver even stronger value to brands. DropChain will be able to provide market-level insights, providing laser-focused data on topics such as country-specific purchasing trends and consumer behavior. Market research firms and educational institutions will also have the opportunity to purchase access to this data.

## 4. Payment Ecosystem

DropChain will leverage its user base of both consumers and end-retailers to create an ecosystem where these stakeholders can exchange TRACE tokens for real-world goods and services. Through a combination of strong community building, brand marketing campaigns, and aggressive business development to bring end-retailers onto our platform, we will achieve and maintain a community sizable enough to create an effective & self-sustaining ecosystem.



As mentioned above, consumers can earn TRACE tokens by responding to brand marketing campaigns and market surveys. TRACE tokens cannot be converted to fiat, so



we must enable the necessary ecosystem for consumers to exchange DropChain's TRACE tokens for something of value.

Partnering with software startups developing POS (point of sale) systems for the F&B (food and beverage) industry, DropChain can quickly integrate its points system into their existing platforms. This will enable DropChain's TRACE token holders to seamlessly exchange their points for immediate rewards. Working with these startups would enable DropChain to quickly scale up and increase its coverage across a larger number of end-retailers.

We are also working directly with restaurant and brand partners to establish DropChain-specific rewards that consumers can exchange their TRACE tokens for. Consumers who would want access to these rewards but do not have the necessary balance of TRACE tokens can obtain more through DropChain's listed BUZZ tokens. BUZZ token holders will have the option of converting their BUZZ tokens into TRACE tokens via our mobile application.

DropChain will monetize this payment ecosystem by collecting a to-be-determined percentage of the sales amount. Restaurant and bar owners will provide a service to our TRACE token holders by allowing them to use these tokens at their establishment. DropChain, in turn, will need to compensate these businesses for the goods and services sold to the consumer. Prior to compensating business owners in fiat, DropChain will deduct a modest fee (less than what credit card companies would traditionally charge the same businesses for the same transaction).

### **8.3 TOKEN HOLDER INCENTIVES**

TRACE token has the following three proposed utility functions: payment, reward, and membership.

#### **Payment Utility**

TRACE token's main function is to be used as a payment token in exchange for services within our proposed ecosystem. Within the DCN:



- Consumers can exchange TRACE tokens for real-world goods and services offered by end-retailers (restaurants and bars) on DropChain's platform; and
- Retailers can exchange TRACE tokens for longer payment terms on a shipment of goods or a free shipment of additional product direct from the brands

### Reward Utility

TRACE tokens will be used as a reward for any work performed by distribution nodes, end retailers and consumers. There will be several ways to earn TRACE tokens on the DropChain Network, such as:

- Checking in product shipments by distribution nodes and end-retailers through the entry of logistics data in the DropChain Network;
- Scanning qualifying individual products by consumers;
- Completing brand marketing surveys or campaigns by consumers.

### Membership Utility

Retailers (restaurants, bars, cafes, etc.) and consumers who have met the minimum requirements for number of TRACE tokens held and holding time may enjoy additional discounts on services compared to regular participants. Additionally, they may gain access to premium or personalized services, such as extended payment terms from our distribution partners, free industry reports or data analytics. The goal is to reward the loyalty of TRACE token holders and ensure those who contribute heavily to the growth of our community are compensated fairly.

## 8.4 TOKEN CONVERSION

All key stakeholders must be able to transact with DropChain in a seamless manner. Although blockchain and cryptocurrency are the underlying infrastructure powering DropChain's economic structure, these elements must be invisible to the end user to facilitate a smooth, user-friendly experience.



## The DropChain Exchange (OTC Platform)

DropChain will have an in-house OTC platform and team to facilitate the conversion of fiat into BUZZ tokens, as well as the conversion of BUZZ tokens into TRACE tokens. This will be achieved by a combination of:

- Initially working with brands to handle the deposit of funds and conversion of tokens; and
- Mobile in-app token conversion for consumers which automatically converts funds into TRACE tokens for immediate utility.

A majority of real-world businesses will have no preconceptions or knowledge about how cryptocurrencies work (nor will they understand DropChain's complex dual-token structure). The necessary services must be in place to ensure that any cryptographic technology is seamlessly integrated into existing structures and understandable by non-technical users, such that:

- Fiat is converted into tokens in a simple one-click payment process
- Tokens are earned by consumers and each distribution node
- Tokens are redeemed by the end user

## Treasury Team

A strong treasury team is absolutely critical to balance the economics behind our token economics model. The treasury team exists initially to serve three primary functions, with their role evolving over time:

- Facilitate the conversion of fiat to BUZZ and TRACE tokens
- Facilitate the OTC conversion to compensate end-retailers for goods and services that consumers exchange TRACE tokens for
- Manage the balance of BUZZ tokens held by DropChain, buying back BUZZ tokens with a portion of the revenue we earn. As we are dealing with



consumable goods, DropChain must ensure we have the necessary resources to serve as insurance in case things go wrong.



# 9 THE COMPANY

## 9.1 THE TEAM

DropChain is a team of 8 and growing. Our primary hiring focus is on top-tier engineers with backgrounds in global supply chain, network security, Blockchain, and networking. Some of our current team members are:



**Billy Chan**  
CEO



**James Tsai**  
COO



**Louis Cronin**  
Head of Tech



**Crystal**  
Head of Marketing  
(China)



**James Wong**  
Business  
Development



**Vincent Nguyen**  
Gamification Expert



**Kay Neuenhofen**  
Blockchain Engineer

### **Billy Chan – Founder, CEO, and Head of Product**

Billy is a veteran of the IT industry, with over 15 years of software development, consulting, and sales experience in digital technology. Most recently he led the software antipiracy efforts for Microsoft in Eastern China. DropChain represents the culmination of his lifelong interests in technology, supply chain and good food. He has been passionate about Blockchain since 2015 and is excited about leveraging it to reinvent the food and beverage distribution industry.



### **James Tsai – COO**

James is a cross-industry Product and General Management expert. Having built his international career over the past 15 years with Deloitte, TNS, HSBC and most recently Microsoft, James went on to grow and develop China's Microsoft Surface product line, securing double digit % CAGR over past several years.

### **Louis Cronin – Head of Technology**

Full stack engineer with over 6 years of development experience, fully focused on Blockchain, AI, machine learning and the China market, with experience in high-load application development, product deployment, product development, and systems architecture.

### **Crystal – Head of Marketing (China)**

Crystal is an entrepreneur and marketing/PR specialist with over 8 years' experience working with high net worth individuals and Fortune 500 companies. As founder of consultancy firm TheGreatCrystal, she helps companies like Huawei embrace business process innovation. Crystal also founded e-commerce platform, EventDIY, and is a lifestyle blogger with 210,000+ followers worldwide.

### **James Wong – Business Development**

James has worked over 27 years in product, brand management, supply chain management, and retailing. A hands-on product merchandising, digital marketing and sales professional with successful business track record in licensing brands with Paul Frank, Minions, and adidasSwim sold in China and USA ecommerce platforms, wholesale, retail channels.

### **Vincent Nguyen – Gamification Expert**

Formerly a Producer at Tencent and Game Designer at Gameloft, Vince founded Faceroll Games Limited, a game development studio based in Shanghai, China.



Having experience in gamification, engineering, game design, platform design, digital arts, audio development, and production management, Vince provides the development teams with the vision, focus, management, and execution to ensure high quality output and efficiency during the production process.

Vince led the team in developing Activision's most profitable Call of Duty mobile game, Call of Duty: Heroes, which has amassed over 50 million downloads, over 2 million 4.5 star reviews avg., \$50+ million lifetime revenue, with nearly no UA spending.

### **Kay Neuenhofen – Blockchain Engineer**

Kay has proven experience in system and application development, product deployment and performance tuning. At Sun Microsystems, he contributed to the implementation of the Java Virtual Machine. At Netflix, Kay led the development of the Netflix iPad app which was ultimately demoed by Steve Jobs at WWDC. Most recently, Kay implemented parts of the Bitcoin protocol and developed several PlayStation apps for Major League Baseball, including ones for the WWE, MLB, and HBO. These apps are running on 100,000s of devices around the US, and were developed under very tight deadlines.



**Microsoft** **Tencent** 腾讯 **PRICEWATERHOUSECOOPERS**   **Shell**



## 9.2 ADVISORS

DropChain has put together a team of industry partners and seasoned advisors dedicated to guiding the growth of our business. In addition to technology advisors, we also placed heavy importance on supply chain and industry specialists.



**William Bao Bean**

General Partner  
SOSV Fund



**Aaron Choi**

CEO  
GJ Exchange



**Terence Wang**

Managing Partner  
AGA Capital



**Malcolm Tan**

CEO  
DXCEL



**Felix Wendlandt**

GM  
Brander Craft Beers



**Eugene Chew**

Regional Director  
Lion Global Markets



**Allen Fang**

Director  
Trade & Marketing  
Anheuser-Busch InBev



**Adrian Lam**

Blockchain Advisor



**Alvin Foo**

Blockchain Advisor

## 9.3 EARLY INVESTORS & STRATEGIC PARTNERS



**PRAGMATIC  
DLT**

**Taylor Vinters Via\***



**S T A T A**  
三 | 亚 | 加 | 速



**BLOCKWAY  
CAPITAL**

中国加速  
**CHINACCELERATOR**

**AngelVest**

上海科技

**ssba**  
Shanghai Singapore Business Association  
CONNECTING FUTURE



**BAIDE**  
WORLD LABEL SOLUTIONS™



**NOVELTEA**  
TEA. SPIRIT. EXPERIENCE.  
GREAT BRITAIN





# 10 STRATEGY, ROADMAP, & TOKEN SALE

## 10.1 GO-TO-MARKET STRATEGY

DropChain's ecosystem is applicable across many segments of the food and beverage industry. In the initial stages of DropChain's pilot project and MVP rollout, we will leverage on our existing online platform, industry expertise and supply chain knowledge to focus exclusively on alcohol and beverage distribution.

Why alcohol? Brown-Forman estimates 30% of all alcohol in China is fake,<sup>11</sup> with an estimated 70% of all wine sold being counterfeit as well. The counterfeit of alcohol results in an estimated \$1bn annual loss on revenues for the alcohol industry.<sup>12</sup> By narrowing our focus to alcohol distribution, we seek to exploit DropChain's existing technical and industry resources to speed up execution and product development. This systematic, targeted approach will better enable us to perfect our tokenized incentive program and cryptoeconomics of DropChain's ecosystem at an early stage.

Once the **DropChain Network** goes live, we will look to expand into other markets, both local and abroad. We will also begin expanding into foods that are most susceptible to counterfeiting and also suffer from a lack of transparency and traceability, such as:

- Olive oil (80 percent of Italian olive oil is fake)<sup>13</sup>
- Meat (the horsemeat scandal)<sup>14</sup>
- Milk
- Coffee

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<sup>11</sup> <https://www.theguardian.com/sustainable-business/2015/sep/16/china-fake-alcohol-industry-counterfeit-bathtub-booze-whisky>

<sup>12</sup> <http://www.incoproip.com/chinas-fake-booze-market/>

<sup>13</sup> <https://www.forbes.com/sites/ceciliarodriguez/2016/02/10/the-olive-oil-scam-if-80-is-fake-why-do-you-keep-buying-it/#7ee57b38639d>

<sup>14</sup> <http://www.thejournal.ie/horsemeat-scandal-explainer-3499580-Jul2017/>



## 10.2 PROPOSED TIMELINE

Below is our anticipated timeline for the development of the DropChain ecosystem, including key partnerships with brands and distribution channels, the **DropChain Network**, ICE data integrity protocols, and data analytics platform.

### Q1 2019

- Whitepaper release
- DropChain supply chain system architecture, UI/UX design and wireframing
- Mobile tools development for downstream supply chain points to check-in shipments through WeChat Mini Programs
- Data analytics platform development for brand owners to create, track, and manage individual shipments through a web-based portal
- Integration of QR code-based tagging technology into supply chain
- Gamification and dynamic incentivization engine development

### Q2 2019

- **DropChain Network MVP pilot phase begins with supply chain integration, tag-based tracking, and basic incentive program**
- Data analytics platform online, enabling brand owners to manage, track and analyze data for each tagged shipment
- Refinement of gamification and dynamic incentivization engine based on data and pilot phase partner feedback
- Partner with existing brands and distribution channels on infrastructure development and MVP testing
- Working Case Study in East China focusing on craft beers, boutique liquor brands and wine



### Q3 – Q4 2019

- DropChain Network officially goes live, with initial customer base, hardware partners, incentive system, and data analytics platform online
- Begin blockchain smart contract development and distribution
- Development of blockchain architecture and Mainnet ecosystem
- Further mobile tools development for international downstream supply chain points to check-in shipments through iOS and Android applications
- ICE data integrity protocols and algorithms development
- DropChain officially launches targeting brands operating in the Chinese market
- Begin international expansion of partnerships with brands and distributors

### Q1 2020

- Promote the growth of DCN ecosystem and assist brands and distribution partners globally with integrating DropChain into their supply chain
- DropChain MVP blockchain infrastructure integration complete
- Integrate with a third-party currency conversion protocols to enable payment and payout in TRACE points
- Integration of blockchain into existing infrastructure and business strategy
- Explore expansion of supply chain ecosystem into other verticals

Note: The above timeline is subject to change without notice.



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- (ii) any failure by the Company, or any of their its affiliate companies, partners, or third party contractors or licensors to deliver or realize all or any part of the project described in or envisaged in this Whitepaper;
- (iii) any information contained in or omitted from this Whitepaper;
- (iv) your use or inability to use at any time the services or products or Tokens offered by the Company,
- (v) mistakes or errors in code, text, or images involved in the Token sale or in this Whitepaper; or
- (vi) any expectation, promise, representation or warranty arising (or purportedly arising) from this Whitepaper;
- (vii) the purchase, use, sale, resale, redemption, or otherwise of the Tokens; or
- (viii) the volatility in pricing of tokens in any countries and/or on any exchange or market (regulated, unregulated, primary, secondary or otherwise);
- (ix) any security risk or security breach or security threat or security attack or any theft or loss of data including but not limited to hacker attacks, losses of password, losses of private keys, or anything similar; and
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