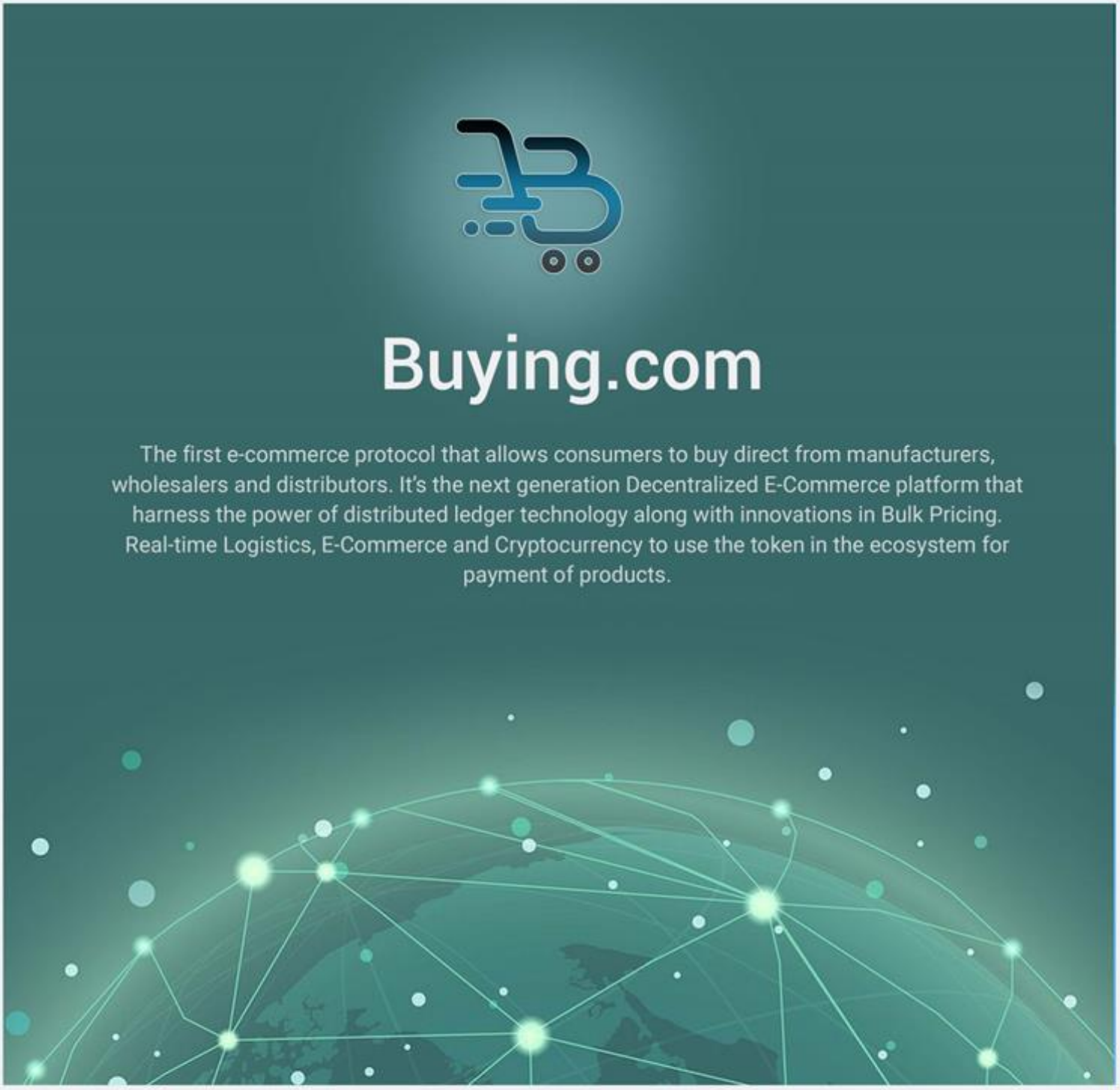

Ecommerce
Fulfillment network

WHITEPAPER
version 3.0

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Whitepaper

Abstract

The Next Revolution in E-Commerce Fulfillment

Online stores and restaurant chains get a cheaper and guaranteed delivery with our blockchain-powered decentralized micro-distribution system.

We are one human generation into the internet age and e-commerce has become part and parcel of modern life. This impact has been felt through the unprecedented growth in online shopping and the move away from retail. This transition has been made possible by better technology, creative distribution methods, improved scale of operations, and a change in shopping habits. As we enter the second generation of the Internet age, this process of disruption will continue. Consumer behavior has evolved in a way that convenience has become the utmost priority, while also expecting “shopping experiences” from brick and mortar stores. This has led to a new hybrid system where maintaining online presence has become critical for traditionally offline businesses.

Buying.com is a company that aims to reshape the landscape of E- Commerce the same way the last generation of companies did.
We believe that there are new business models, innovative ways of distribution, effective methods of leveraging purchasing power, and improvements for efficient logistics and back-office integration that can be at the center of the next ripple of e-commerce solutions.
E-Commerce, in its current form, involves many moving parts including storefront creation, back-office operations, purchasing, fulfillment, distribution and more. This begs the question—is there a more vertically integrated, efficient solution that improves the economics of
E-Commerce. The answer is a vociferous—YES.

Our long term value proposition is:

MicroDistribution

Microdistribution channels powered by decentralized delivery networks and incentivization using distributed ledger technology.

Purchasing Power

Harness the advantage of wholesale pricing by offering Direct to Consumer pricing by peer to peer networks.

Storefront Creation

Provide a first of its kind e-commerce platform that enables e-tailers to plug seamlessly into the decentralized network.

Fragmentation:

Enable smaller retailers who do not have access to vertically integrated services to pose a serious threat to larger retailers such as Amazon and Walmart by offering fully integrated back-office operations coupled with our decentralized networks, microdistribution and peer to peer networks.

Manufacturer Benefits	Online Retailer Benefits	Consumer
Faster and more granular distribution	Unprecedented Microdistribution	Peer to Peer E-Commerce
Access to consumer markets	Lowest possible pricing	Lowest possible pricing
Drop-shipping capabilities	Ability to buy direct from manufacturers and wholesalers	Access to More Products
More Customers, Bigger Numbers	No need to maintain a large inventory	Ease of Transactions
Expanding Global Reach	Ease of setting up store	Expanded Purchasing Power

Initially the focus of Buying.com will be to transform the way e-commerce's last mile business is fulfilled and help new businesses to maintain an online presence. Current e-commerce businesses face many challenges in doing hyper-local deliveries across varying geographies and demographics. Each store or company is trying to build its own delivery network which lacks optimization. The special characteristic of the hyperlocal delivery model is that the entire delivery network is located close to the buyers as well as sellers. Aggregation of decentralized delivery systems will open up new capabilities for small and large businesses alike by improving the last mile solutions for their e-commerce.

Current MicroDistribution Loci:

Hyper-Local Delivery

Decentralized network of freelance drivers for food delivery, enabling more restaurants/businesses to come online.

POS Machines

Provide vertically integrated logistics and delivery solution with the aid of an easy to operate POS machine, which will show them the current orders and allow the business to choose to fulfil the order themselves, all in a few taps.

Guaranteed Delivery

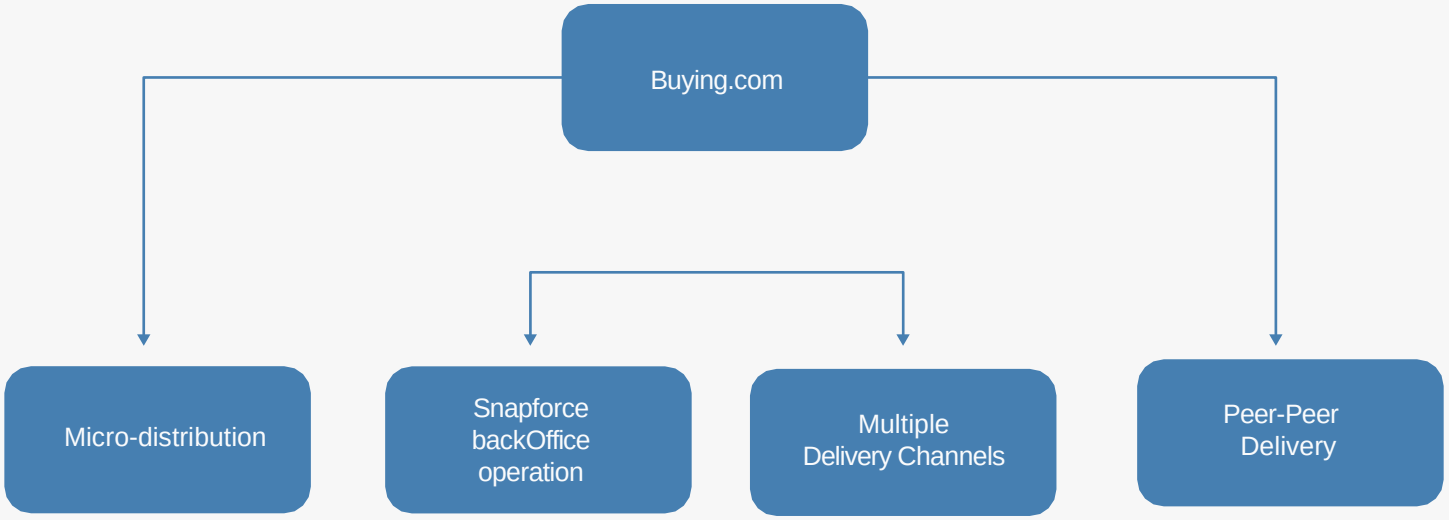
With multiple delivery channels and failure monitoring, any retailer or restaurant gets a top class delivery service.

Huge Savings and Increased Reach

Our solution offers the most competitive delivery system which can result in 10-30% compared to current expenses. Our solution will also expand the businesses geographical reach and will help in increasing revenue.

Executive Summary

Buying.com is a next-generation e-commerce platform with innovations in bulk pricing, real-time logistics and a highly decentralised hyper local delivery network that utilizes distributed ledger technology for incentivisation of repeat business.



Top 10 Reasons How Buying.com is changing the face of E-Commerce

1. World's first vertically integrated e-commerce platform.
2. Decentralized multi-channel delivery to compete with Amazon and Walmart's reach.
3. Built-in BUY Tokens Cryptocurrency with incentive schemes for stores and users.
4. Delivery network to match local delivery at the last mile with Uber-like capabilities for anyone to deliver goods.
5. Businesses and consumers will have seamless access to real-time delivery data for tracking purposes.
6. We utilize blockchain technology to offer customers a digital ledger that offers a fraud-proof solution and auto-verifies transactions for a tamper-proof, secure, immutable audit trail.
7. Integrated back-office e-commerce processing technology comparable to Salesforce.com.
8. Peer-to-peer pick and drop service which has guaranteed delivery with tracking.
9. Finds the cheapest available delivery mode on every transaction.
10. The range of the distribution network at the local level is more robust than any existing solutions.

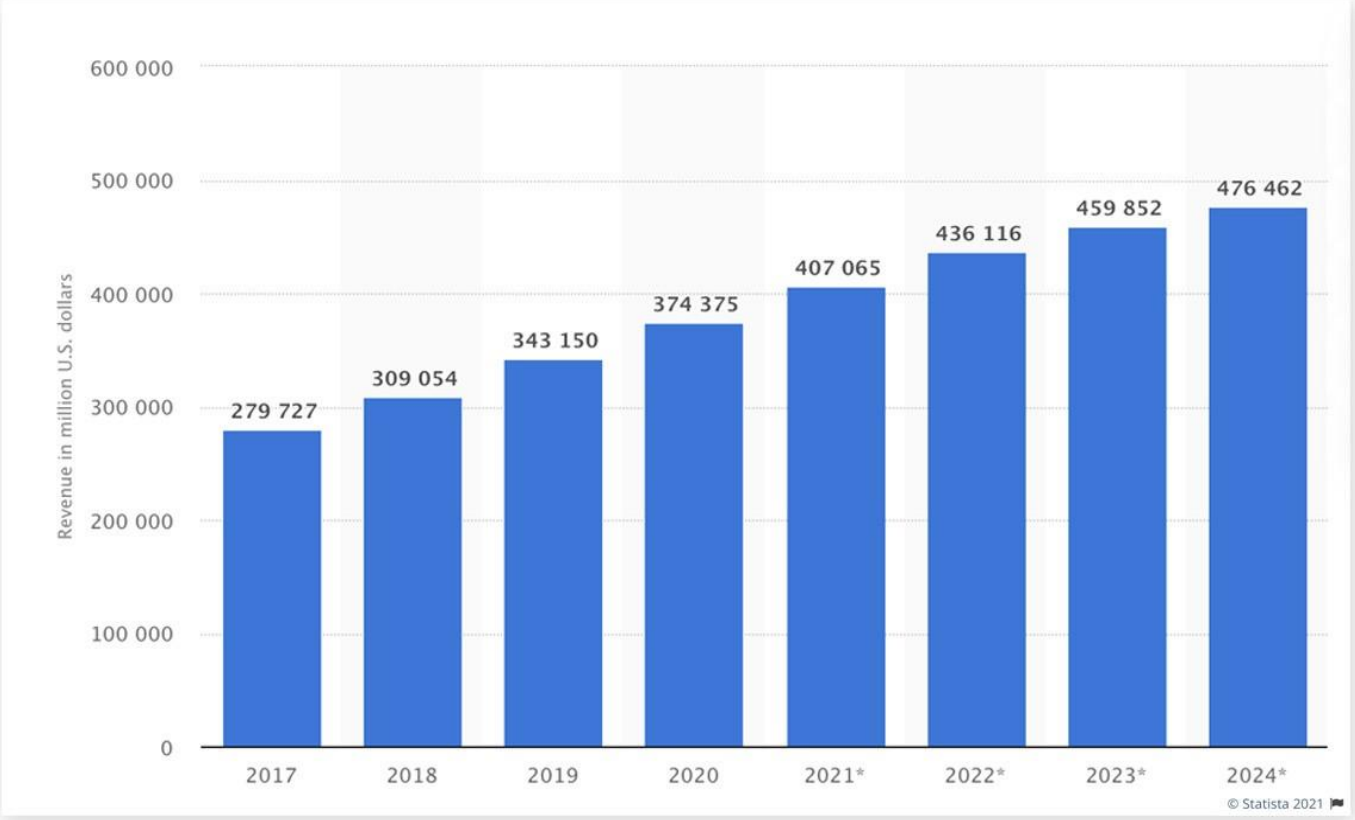
2. Market Overview

Rise of e-commerce

In July 1995, Amazon.com opened its doors to the world, offering internet users the ability to buy books in its online store. Just four years after its launch, Amazon.com reached $1 billion in sales — an astonishing feat that took Macy's 134 years to achieve. Today, Amazon is an e-commerce juggernaut with $386.06 billion in 2020 net sales. Forrester Research projects that U.S. e-commerce sales will account for 17% of retail sales by 2022, up from 13% in 2017. If current trends persist, the more time that goes by, the more purchases will take place digitally. Forecasts for global e-commerce sales are significantly higher.

Retail e-Commerce sales in United States from 2017 to 2024

(in million U.S. dollars)



E-commerce Overview

Statista reports that the global e-commerce market was worth $2.7 trillion in 2017. The opportunity to convert more global businesses into new age e-merchants is substantial. There are some 1.3 million e-commerce companies in the U.S. Worldwide, that figure rises to 2-3 million e-commerce companies, excluding China. The latter figure is roughly equivalent to 1% of D&B's global commercial database, which contains some 285 million business records worldwide. Shopify claims that 600,000 companies use its e-commerce platform. BuiltWith, which offers a development tool that detects the presence of code snippets, reports that 500,000 sites use the Magento e-commerce platform. The next generation of e-commerce tools will help global markets move to the forefront of electronic retailing — enabling both businesses and consumers to buy anything, anytime, and get it delivered just about anywhere. While some would say that vision is already possible today, it remains surprisingly difficult to execute in today's largely insular world. A 2014 report by the management consulting firm of McKinsey & Company predicts that the global flow of goods, services, and finance will more than double from $26 trillion in 2012 to between $54 trillion and $85 trillion by 2025. McKinsey attributes rising prosperity and greater participation by the emerging world as major growth drivers behind the doubling of global flows — a perfect backdrop for a blockchain-driven e-commerce tools startup.

Sectors within e-commerce are growing in popularity as well alongside the industry as it scales. The acceleration of e-commerce is fueled by new business models and different categories of new businesses coming online. From 3D printer market-places to farm-to-table solutions, e-commerce has expanded to accommodate market places for all categories of businesses. The digitization of the modern service industry has extended itself to the restaurant industry, and food delivery has carved out a niche for itself in this large e-commerce blue ocean. All around the world, people are visiting restaurant websites, food ordering platforms, and delivery apps to get their favorite meals delivered right to their doorstep. This growing hunger for convenient alternatives to home-cooking and restaurant dining has caused global revenue in the online food delivery segment to almost double since 2017. This figure is expected to reach almost 97 billion U.S. dollars worldwide by 2024. In the United States, the second-largest online food delivery market worldwide, busy lifestyles and a new wave of platforms and technologies have been driving demand for mail-order meal solutions for many years.

Once people had a taste of the convenience of on-demand food-delivery, a market for delivering 'anything and everything' started taking shape. This led to the creation of a market for hyper-local delivery. Globally, the hyperlocal service market size was valued at $1,324.2 billion in 2019, and is estimated to reach $3,634.3 billion by 2027, registering a CAGR of 17.9% from 2021 to 2027.

Buying.com will be adopting a step-by-step approach to address this dynamic market. Initial focus will be solely on the food-delivery market. At a later point we will make our move into the broader hyper-local delivery market and later expand our way into offering "Anything delivered Anywhere".

3. Problem Description

E-commerce Landscape

The current ecosystem for e-commerce has evolved rapidly from it’s first avatar in the 90’s, with most brands and businesses establishing mobile and web presence and cementing their positions in the e-commerce landscape. Retail merchants rely on listings in these major e-commerce marketplaces to sell their products. These companies have invested heavily to streamline their logistics and fulfillment. Businesses far away from these centralized fulfilment centers or warehouses cannot utilize these delivery channels due to high costs and businesses associated with perishables that need to be consumed immediately, like restaurants, have a different set of requirements which is out of scope for these fulfillment channels.

Current state of E-commerce

If one were to deconstruct the e-commerce ecosystem, it would involve several moving parts (and dominant players in the segment in parentheses):

Storefronts - Shopify.com

Payment Processing - PayPal, Stripe

Shipping and Fulfillment - FedEx, UPS

Backoffice processing - Salesforce.com

As more consumers go online to buy products each day, the demand for e-commerce continues to grow. However, inefficiencies persist in this segment, which includes:

Labor Expenses

Huge money is spent on payroll, taxes, insurance, and other liabilities over every labor in an organization.

Fragmentation

Smaller retailers do not have the access to a vertically integrated service platform to pose a serious threat to larger retailers such as Amazon. This results in them having to use a fragmented set of services as shown above.

Delay in Delivery

As a seller has to rely upon a single service provider, a delay occurs in the delivery time during peak hours and bulk orders. Failing in fulfilling the customer requirement and bringing a negative impression to the company.

Cost of Operation

The cost businesses spend on the operation part of the delivery partners eats into their profits.

Since our focus will initially be on the food delivery market, let’s try to understand the problems faced within the food delivery vertical.

Current state of Online Food Delivery

Online food aggregators like UberEats, GrubHub, Door Dash, Postmates came in to fill a gap in the market for hyper-local food delivery. These competing aggregators have to set up and main- tain their own delivery fleets for fulfillment, and also develop, market and update their application to enable restaurant discovery and food ordering. Fleet maintenance for fulfillment is a resource intensive aspect of their businesses.

If one were to break down the online food-delivery ecosystem, we can see that it involves 3 components mainly

Restaurant discovery platform — Uber Eats, GrubHub etc.

Fulfillment — Same platforms.

Food preparation — Restaurants

The demand for the convenience that doorstep food-delivery offers, continues to grow as more customers are going online. Like other segments in the larger e-commerce space, food delivery space is also plagued with inefficiencies.

Labor Expenses for aggregators

Huge money is spent on maintaining the delivery fleet's payroll, taxes, insurance, and other liabili- ties. This capital can be utilized for improving their restaurant discovery solution and improving the food ordering experience of the user.

Lack of leverage for restaurants

Since restaurants are heavily dependent on these aggregating platforms for delivery, they have to agree to the prices set by these platforms, which eats into their profitability.

Increased Complexity for restaurants

Most restaurants find it complex to keep a track on different orders from different platforms.

4. Our Solution

Buying.com is poised to be a major player in the E-Commerce space by disrupting the status quo, bringing about efficiencies in the ecosystem benefiting both the supply and demand sides of the equation. By utilizing decentralized delivery networks and utilizing distributed ledger technology for incentivization, Buying.com is bringing to market a solution with asymmetric advantages over the incumbents. Market efficiencies, unavailable to earlier generation platforms, will be achieved.

We plan to do this through the following groundbreaking innovations:

Consolidated Admin Panel

We offer a consolidated admin panel to manage orders placed via different platforms and they could all be managed under the same roof effectively.

Micro distribution

We offer decentralization of E-commerce by turning every driver into a delivery guy. In addition to distribution centers run by Buying.com, now anyone can become a node on the Buying.com network. This solves the last mile logistics issue that has plagued e-commerce for the longest time. It is similar to how Airbnb that turns every spare room in a home into a hotel room, or how Uber leverages excess driving capacity to turn every automobile into a taxi.

Real-Time Tracking

By providing real-time tracking data and by providing transparent smart contract enforced audit trails, PROXEUS integration and user's data protection by encryption to keep information secure, we will be pioneers in the e-commerce space. Manufacturers, businesses, and consumers will have seamless access to real-time tracking data to optimize dropshipping costs.

Cryptocurrency

Utilizes Algorand blockchain to launch BUY tokens as incentives for repeat business.

Transparent and Auditable

We utilize blockchain technology to offer customers a digital ledger that offers fraud-proof solutions and auto-verifies transactions leaving behind a transparent, immutable audit trail.

In Food-Delivery Sector

Buying.com is aiming to be a major player in the food-delivery order fulfillment space and larger hyper-local delivery space initially by creating a system that benefits online food aggregators, restaurants/businesses and indirectly, end users.

We will offer an intuitive and user friendly, consolidated admin panel to manage orders placed via different platforms without having to keep separate devices for each food-aggregator.
We offer a decentralized delivery network by turning every available driver in an area into food-delivery personnel. We also plan on providing real-time tracking for restaurants to ensure timely delivery. We will utilize the Algorand blockchain to launch BUY tokens as incentives for repeat business. We have combined blockchain and decentralized data storage to offer restaurants a fraud-proof solution with a transparent, immutable audit trail of successful transactions.

Our system will allow any local restaurant to be independent from profit-sharing with the food-aggregation platforms, and open own mobile, web storefronts. The food-aggregator platform is granted the ability to focus their resources towards the discovery and ordering experience, instead of running a complex logistics operation.

5. Competitive Landscape

Major Industry Players

The E-commerce space is fragmented but the industry incumbents are well-heeled and significant. Listed below are the main players that would compete in various segments that Buying.com will be playing in, although several of them will not have the vertical integration or technically interlocking capabilities we offer.
Listed below are the main players that would compete in the segment that Buying.com will be engaged in.

Amazon.com

Amazon.com, Inc. is American electronic commerce and cloud computing company based in Seattle, Washington. The tech giant is the largest Internet retailer in the world - as measured by revenue and market capitalization, and second largest after Alibaba Group in terms of total sales.

Walmart.com

Based in San Francisco, California, Walmart's Global eCommerce division provides online retailing for Walmart, Sam's Club, Asda, and all other international brands.
There are several locations in the United States in California and Oregon: San Bruno, Sunnyvale, Brisbane, and Portland. Locations outside of the United States include Shanghai (China), Leeds (United Kingdom), and Bangalore (India).

Volusion

Volusion is also based in Austin, TX., and claims to have 30,000 merchants. It has $28 billion dollars' worth of transactions placed in the company's history Volusion pricing starts at $15/mo. for a "Mini" plan, which is limited to 100 products.

BigCommerce

The Australian founded BigCommerce, which is now headquartered in Austin, TX, raised $84 million in April 2018 ahead of U.S. IPO. The company now has "more than 55,000 online merchants." A "Standard" online store with unlimited products, file storage, and bandwidth costs $29.95/mo. Although it doesn't release financial documents, it exceeded the $100 million dollar revenue milestone in mid-2017.

Shopify

A "Basic Shopify" store starts at $29 monthly for unlimited products. Currently valued at over $15 billion, Ottawa,

Canada-based Shopify has over 377,000 users. In Q1 2018, Shopify claims to have 600,000 businesses in

approximately 175 countries. Total revenue for the full year 2017 was $673.3 million, a 73% increase over 2016.

Magento

A recently-acquired $8 billion dollar open-source platform written in PHP, Magento was launched in 2008 with the assistance of volunteers. The company's recent acquisition by Adobe will result in an intensified pressure on commerce incubators to compete within the space.

BlueOcean in ECommerce

There is an open space in the market for an e-commerce ecosystem that has low transaction costs, enhanced shipping models, community-driven, and a fast platform with a quick response time. By capitalizing on barriers that our competitors lack- the speed, the pricing, the quick response time- the Buying.com business model will capitalize on an exploding global e-commerce market by enhancing a preexisting platform with ground- breaking blockchain technology. Although there is an opportunity for direct competition to emerge, Buying.com's unique combination of proven traction, unique domain name branding, early embracement of blockchain, and group-sourced pricing practices will make the Buying.com business model hard to replicate by competitors. Clearly Amazon.com is well-positioned to further invade the blockchain-based e-commerce industry. Yet, blockchain as it's currently defined cannot scale up to Amazon's millions of transactions-per-hour needs, nor have other e-commerce companies leveraged the technology to its fullest capacity. Scalable blockchain solution is set to be part of Buying.com's defensible IP. Our ecosystem will provide features such as automated verification, shipping cost optimization, security enhancement, smart contracts, and a superior pricing model. Buying.com will be entering this BlueOcean in e-commerce from the fulfillment end and later integrate other sections to the vertical.

Barriers to Entry

While a number of e-commerce companies are capable of fielding an engineering model similar to Buying.com, most existing players are held back by the tyranny of the installed base. For example, while both Amazon.com and eBay are acutely aware that their user interfaces could be improved substantially to raise conversion, their complex system architectures prevent them from making major changes, an issue recently explored by analysts in the San Jose Mercury News. Shopify Another major player in the e-commerce space, Shopify, also has several problems with its current model. Several key issues include limitations with the Product and Search Filter, the Point of Sales system, shipping models, discount models, and high transaction costs. Magento, a major competitor, is also limited in the e-commerce space for similar problems as the one's already listed, including expensive licensing fees (up to $18,000 USD), long delays for site load time, and issues with their promotions system. As previously mentioned, Magento began as a community of volunteers who built the platform. Since then, it was acquired twice, the first time by eBay, the second time by Adobe. However, since the acquisitions, the company has shapeshifted into a corporation unrecognizable by it’s early supporters and has lost the community support it once had. Similarly, Shopify’s business model doesn’t allow it to maintain a community backing the project up.

6. Value Proposition

There are four distinct prongs in the Buying.com business model. These are:

1. **The Core E-Commerce Model**
2. **The Microdistribution Model**
3. **Direct to Consumer Pricing**
4. **SnapForce Backoffice Operations**

We describe all of these distinct elements in detail as each contributes a significant dimension to the Buying.com value proposition.

Core E-Commerce Model

Our dropshipping ecosystem serves as both an e-commerce incubator as well as a platform that fuses businesses and consumers purchasing power together to achieve bulk prices. Building on top of our core preexisting business structure, Buying.com acts as an incubator for e-commerce stores while addressing a major pain point for e-merchants: sourcing products at the best prices. E- commerce retailers and retail customers alike want access to products directly from the source: manufacturers, wholesalers or liquidators. We deliver source-point pricing; we provide the platform for direct interaction between these parties.

Manufacturers, however, prefer to deal in large order sizes, shutting off supply to all but the largest merchants. With hundreds of suppliers already in place and a rapidly growing catalog of over 2 million wholesale products, Buying.com presents an unbeatable value proposition to disrupt the $9 trillion B2B e-commerce marketplace, while latching onto the B2C space as well.

Benefits of on-boarding with buying.com includes:

Low start-up cost

E-merchants can start selling without much upfront investment because merchants do not have to purchase their inventory at wholesale levels, or cover the cost of manufacturing their own products.

New market expansion

Sometimes obtaining products across international borders can be costly and challenging, but merchants who partner with strategically located suppliers, can often access the same or similar product offerings, shipped quickly. This allows merchants to test the market and validate if a given product is worth importing.

The Buying.com model offers retailers several advantages:

Cash Flow increase

Since e-merchants do not have to stock inventory, no payment is due until products are sold.

Scalability

Products can be consumer tested, or new ones added quickly, without the burden of having to order in bulk, while avoiding slow-moving inventory, which ties up valuable time and capital. In a retail industry survey by supply-chain software vendor SPS Commerce, 40% of respondents said they expect more drop-ship vendors in 2017.

Lifetime customer value

Buying.com gives manufacturers the ability to consistently expand product selection, keep existing customers engaged, and invite customers to return to explore new merchandise.

Cost reduction

Each time a product moves through the supply chain, there are associated costs. Ocean freight services, port operations, LTL and FTL services, and warehouse employees all get added to the cost of goods sold. Some product offerings would deliver a higher profit margin if they were drop-shipped.

Virtually unlimited inventory

One key reason for the existence of the dropshipping industry is to help retailers and suppliers combat inventory inefficiency: the $800 billion challenge of overstock clearances juxtaposed with out-of-stock shelves. By tapping into the supply chain further up the line, e-merchants can theoretically gain access to virtually limitless inventory.

MicroDistribution Model

For e-commerce businesses on the rise, decentralized inventory may be a worthwhile investment. With smaller, regional facilities, they can get products into customers' hands, sooner. Additionally, depending on the location of warehouses, these locations may be able to serve as a pickup spot for customers as well, an option growing-in-demand by the day.

Buying.com Model Advantage

1. **Reduce shipping/delivery costs**

   When you rely on a single or centralized delivery partner, the cost of operations goes higher. Depending on the strategic location of your warehouses, you may be able to seriously cut down on transit times and shipping costs thanks to closer proximity to more customers. When warehouses are located closer to delivery locations, shipping costs go down. For on-demand food delivery companies to maintain a fleet of delivery-personnel, they need to sustain their employees, provide all the benefits required by law and pay for maintenance of the vehicles. This makes their deliveries more expensive than what Buying.com can provide. This will give us an advantage over incumbents and a foot in the door in e-commerce fulfillment space.

2. **Reach a wider customer base**

   Much like the benefits you get from reduced shipping costs, having more delivery guys can increase your reach to customers spread across a larger area. A customer interested in a pair of shoes from our trusty shoe retailer is much more likely to order if their purchase will be delivered in just a few days. If that retailer had service in just one location, shipping might take a few weeks, giving customers a reason to shop elsewhere. The shoe retailer could now advertise online, to a wider base, further away from his/her shop, due to their new ability to deliver to customers further away. Expanding your footprint will expand your potential customer base, earning you more business.

3. Manage warehouse risk

Remember the analogy about putting all our eggs in one basket? Managing risk is the central reason for that egg distribution. One example that illustrates this in action is the case of two banana suppliers that were hit hard by Hurricane Mitch in the 90s. With more than 80% of the region's banana crop washed away, both companies faced major obstacles with the distribution. Dole lost 70% of its crop, ultimately reducing revenue by 4% overall. Chiquita, its competitor, held inventory and had relationships with multiple suppliers. Thanks to this preparation, the company increased its revenue by 4%. While this is a somewhat dramatic display of the difference in strategies, it's a lesson to apply to businesses everywhere, that putting all our eggs – or bananas – in one basket is risky.

4. Faster local deliveries.

Especially in the age of curbside pickup and same-day delivery, having multiple delivery guys increases a local customer's ability to pick up orders themselves, or give them access to same-day delivery. With these options in place, customers can potentially buy and receive items on the same day.

Last Mile Advantage

With micro-distribution into every neighborhood, we now unlock the solution to one of the most expensive and difficult problems facing e-commerce. Inexpensive last-mile delivery. Amazon due to scale gives away free shipping by mandating an annual signup fee to Amazon Prime to underwrite the program. This is similar to Costco's annual subscription fee. We don't need to resort to such fees because we have the last mile covered at a more granular and inexpensive level. To businesses we are able to offer these for the last mile.

1. Streamlined Shipping & Delivery Process

We automate the time-consuming and repetitive tasks in the delivery process, saving a lot of time, resources, and money for your business. Manual methods of tracking such as waybills and handwritten-receipts or notes without barcodes are not only time consuming but also lead to human error. With a modern last-mile delivery solution, such systems become entirely automated, eliminating verification issues and ensuring accurate and efficient load planning. Buying.com empowers your business with predictive insights, auto-allocating resources like transport, drivers, and even your inventory.

2. Route Optimization

No entry windows, lousy weather, peak traffic hours, and sudden route disruptions can slow down your deliveries considerably. We will provide a route optimization mechanism which will use a dynamic delivery route optimization software, to calculate and assign the most efficient routes for all deliveries. Buying.com will also be equipped to crunch real-time data to alert last-mile delivery agents about any upcoming traffic jams or bad weather and send them an alternative route that would be most efficient in the given circumstances.

3. Flexible Deliveries

Buyers are often looking for flexible delivery options, which adds to the convenience of online shopping. For example, if an urgently-required medicine is ordered but the buyer might miss the parcel that's scheduled for delivery at the home address, can be updated on the retailer's site and edit their delivery time or address to either receive the parcel at a later time or have it delivered at an alternate address.

Buying.com makes this possible through real-time updates, allowing customers to change the time or location of deliveries with a tap, while also making it easier to handle cancellations and returns using the same system.

4. Improved Order Management

Despite the best systems in place, delays do happen, and sometimes there isn't much you can do to inform the customers regarding anticipated delays to manage their expectations better. Think about it – isn't it better to proactively inform customers about delays instead of waiting for them to get frustrated and call. We can help by alerting you and your customers of any potential delays, leading to better expectation management and trust. Automatic delivery updates also keep customers updated on exact delivery times, ensuring their availability to accept the order and increasing the customer satisfaction.

5. Adding Smiles To The Last Mile

Many customers across the globe are not comfortable using their cards or banking details online. Pay-on-delivery is the most viable option for such users, and the pandemic has further increased the demand for contactless payments at the doorstep. Buying.com makes it easier for customers to pay for their orders by integrating multiple payment options in the delivery app. Some software also gives end-users the option to rate and review the service they've received, which can help improve businesses to meet customer expectations better.

Effective Delivery Management Advantage

As the volume of packages continues to increase, so does the chance of lost or misdelivered items. That begs a thorny question: who's at fault if an employee's purchases are lost after they've been delivered to the office?

1. Automation circumvents human error

If the front desk or mailroom staff receives package deliveries manually, a simple spelling mistake or incorrect digit can send a package into metaphorical oblivion. A shipment can sit on the loading dock or clutter up the lobby if the recipient doesn't even know the box is there. But notifying individuals about delivery arrivals can be tedious and time-consuming, and it's way too easy to forget one or two. As soon as a label is photographed, it's also in the record as received.

2. Package tracking after delivery

What's going on with the delivery? Should employees pick up your package at the front desk, the mailroom, the shipping department, or will someone bring it to them directly? We keep employees updated about the location of the package after it's been received and recorded. This workplace technology helps employees keep track of their deliveries for more than just the last mile—it tracks it right into their hands.

3. Free up time for other tasks

Automation of repetitive and time-consuming jobs has provided opportunities for employees to take on more challenging and meaningful work. That's not to say that these professionals are being replaced by software—in this case, it's quite the opposite. Front-desk personnel has new responsibilities to improve the workplace experience—everything from enhanced visitor and employee hospitality and services, lobby management, event planning, and more.

On-Demand Delivery System Advantage

One can schedule a driver, track their orders, and deliver orders to their business with ease. In addition to 24/7 live support, our platform provides complete tracking and monitoring of drivers with live feeds and three-way communication for every order. This all-in-one order management platform handles external orders -- including UberEats, GrubHub, DoorDash, Slice, and Postmates -- as well as internal orders. Every order gets tracked instantly as a customer begins to place an order all the way through the delivery stage.

1. Faster and cheaper

We provide customers to book the service or order their favorite item fast by tapping a button. On-demand delivery service is comparatively cheaper and the customer can choose the service that fits in with their budget. With the customer loyalty program such as offers and discounts, customers can offer a service or order an item at a cheaper rate.

With an on-demand model, business owners can save a lot of money which they are currently spending for their deliveries.

2. Convenient

Buying.com offers great convenience to the customers as it helps them with great features and functionality like search, real-time tracking, multiple payment options, and home delivery.

3. Transparent

With the feedback system, the on-demand delivery application provides transparency of the service. The service providers can improve their service by analyzing the feedback from the customers.

Direct to Consumer Pricing

Many of us have experienced the benefits of group buying and wholesale pricing from Sam's Club, Costco or even Alibaba. After years of development, Buying.com has created a powerful e-commerce app — called DPA or Direct Product App. This is the heart of our Tipping Point Technology. It allows any deal placed through the company's platform to meet what is called the Minimum Order Quantity, the amount necessary to obtain the best possible pricing direct from manufacturers, wholesalers, or exclusive distributors.

The company has developed a working MVP that will allow e- commerce businesses to work together to achieve the MOQ and unlock bulk pricing that would not otherwise be available. If the B2B businesses do not meet the MOQ, then Consumers will be able to use the DPA App to access the best pricing, helping businesses meet their minimum order.
This will not take away from businesses, but rather enhance them by further enabling activation of the best prices for everyone. The app will be available on both Android and iOS mobile platforms.

Benefits for E-Commerce Stores

DPA will level the playing field for e-commerce stores, putting them on equal footing with large retailers.

- It also allows consumers to benefit from lower bulk pricing by harnessing the combined purchasing power of millions.
- Manufacturers will now deal directly with consumers without limiting their market reach due to minimum order quantity requirements. DPA showcase technology lets them offer special product deals or liquidate overruns without being subject to the whim of volume or channel buyers because they can reach out directly to consumers.
- Our DPA app's mobile B2B and B2C platform lets e-commerce sellers and individuals purchase products directly from manufacturers using a simple iOS or Android mobile app. For the first time, small sellers and individuals will be able to buy at prices that before were only available to big-box retailers.
- The DPA harnesses the buying power of the masses to offer direct product pricing on millions of items worldwide. Manufacturers will have access to a platform that connects them directly to end-users while still meeting their required MOQ.

Benefits for Retail Market

The DPA platform addresses two basic retail market challenges:

- Customers would like to buy products at wholesale prices but can't fulfill the minimum order quantity.
- Wholesalers want to increase sales by reaching retail customers but that would require additional processes, logistics, etc., and result in higher costs.

Features of DPA Technology

1. Tipping

Buying.com will utilize the concept of 'tipping', which requires a certain number of buyers to unlock one or a series of dis- counts for the entire group. By sourcing through the 1.5M product (and growing) available through DropShipper, the B2C strategy is uniquely positioned to offer discounts on a range of products that is not readily available elsewhere.

2. Scarcity

Buying.com will utilize inventory limits (real and perceived) to drive demand and response. By running only a limited number of deals per day or structuring deals in a way to build demand (think Yeezy by Kanye). Buying.com will create demand through promoting great deals with very limited (real and perceived) quantities.

3. Time Constraints

Buying.com will utilize proven techniques to leverage limited- time deals to drive demand and response. Delivering highly targeted messages via e-mail and push notifications to communicate time constraints such as one hour deals, 15 minutes left, and time constraints helps to move limited inventory and build allure to products with deeper inventories.

4. Social Sharing

Buying.com will leverage the innovative system of incentivized social sharing pioneered by Refer-Local. Deals are shared and available for purchase by connected friends, exponentially increasing exposure through social channels and driving even greater demand for products. This opportunity provides Buying.com with an army of free marketers all pushing product through their own social networks.

SnapForce Backoffice Operations

Snapforce, a service of Buying.com, is a leading SaaS Customer Relationship Management (CRM) and Cloud Phone System. Snapforce has a broad range of back-office features, ranging from Sales Automation, Marketing Automation, Customer Service, Billing and Payments, Reporting and Analytics, Call Center, and much more. Some of the more advanced features that you will not see at other CRM's can be seen in the timeline below:

The comprehensive platform integrates all channels of communication including Telephony, Email, Fax, and SMS. Snapforce is in a unique position to garner all layers of customer communication, something Salesforce.com has been trying to do with AI, can be accomplished much faster for Snapforce.

Snapforce provides e-commerce vendors essential tools such as CRM, Phone Service, Business Phone System, Company Voicemail. Coupled with Buying.com’s Dropshipper service, the synergies between the two make a powerful duo.

7. Case Studies

In this section, we illustrate how the Buying.com system process works

Case Study #1

You are a restaurant manager and you accept orders from Uber Eats, GrubHub, DoorDash, Postmates, etc. These different providers would have their own dedicated devices given to you for operation. Our system will combine all the software you're currently using into one central control center. The Buying.com On-Demand Delivery System tracks and monitors drivers providing two-way communication with the driver and offers SMS communication for the customer from the driver. We have live admins monitoring every delivery 24 hours a day, 7 days a week.

Case Study #2

The tech giant HP is about to launch the next generation model of a new desktop printer. The new launch will devalue the prior generation's model. As a way to liquidate some of these items before the price goes down upon the product launch, HP contacts a distributor who will then contact Buying.com to host a large-scale promotion on the item through our DPA App.

Case Study #3

Sanyo places a special deal for 55-inch televisions via our DPA app with a minimum order quantity of 100 units. The DPA app launches the deal. Few small retailers are capable of buying 100 of these televisions. Once the minimum order level is reached, the Buying.com platform springs into action.

8. Product and Technology

In this section, we describe the main concepts behind the Product and Technology.

Actors & Objects

In any system, there are various actors and roles that the system is meant for. In that vein, we will describe the major actors in the Buying.com system. We also describe objects in the system and these refer to major constructs that underpin the system.

Retailer

This is the entity that wishes to set up a storefront and conduct business online using the tools and services offered by Buying.com.

Product

These are goods and services that are sold by a retailer and produced by a manufacturer.

Storefront

These are the storefronts through which a Retailer conducts business. One retailer can have one or more Storefronts. Each Storefront will have a Catalog consisting of one or more Products.

Catalog

Every store has a Product catalog which is made up of multiple products and services.

Manufacturer

These refer to producers of goods and services which are listed in the Buying.com catalogs. Retailers can select Products from various Manufacturers to place in their Catalog.

Consumer

A consumer is a user of the Buying.com system who purchases goods and services by placing Orders online.

Order

An order is a list of products and services purchased by a Consumer. Each item in an order may be produced by various Manufacturers.

Minimum Order Quantity (MOQ)

Manufacturers of goods often require a minimum size of orders to be placed. This is due to the fact that operating a manufacturing cycle costs a lot and a manufacturer can only recover such costs by operating at scale.

Drop Shipment

This is a shipment from a manufacturer to a consumer bypassing an intermediary storage point (i.e. wholesaler, distributor, retailer).

Distribution Center

A distribution center is a warehouse to store products prior to delivery.

Delivery Company

A delivery company picks products up from a distribution center for delivery to an endpoint e.g. retailer, consumer etc. In our case, this will be between a distribution center and a consumer.

MOQ Group

This refers to a group of consumers who each have a need for a product from a manufacturer but each one by themselves does not represent a demand quotient large enough to meet the MOQ of the Manufacturer. In this case, they form an MOQ Group to create a collective order large enough to meet the MOQ of the Manufacturer and to benefit from the economies of scale.

Microdistributor

This is an entity that wishes to participate in the Buying.com network as a distribution center. This distributor acts as a node on the network by acting as a distribution center to create density of distribution centers in the system.

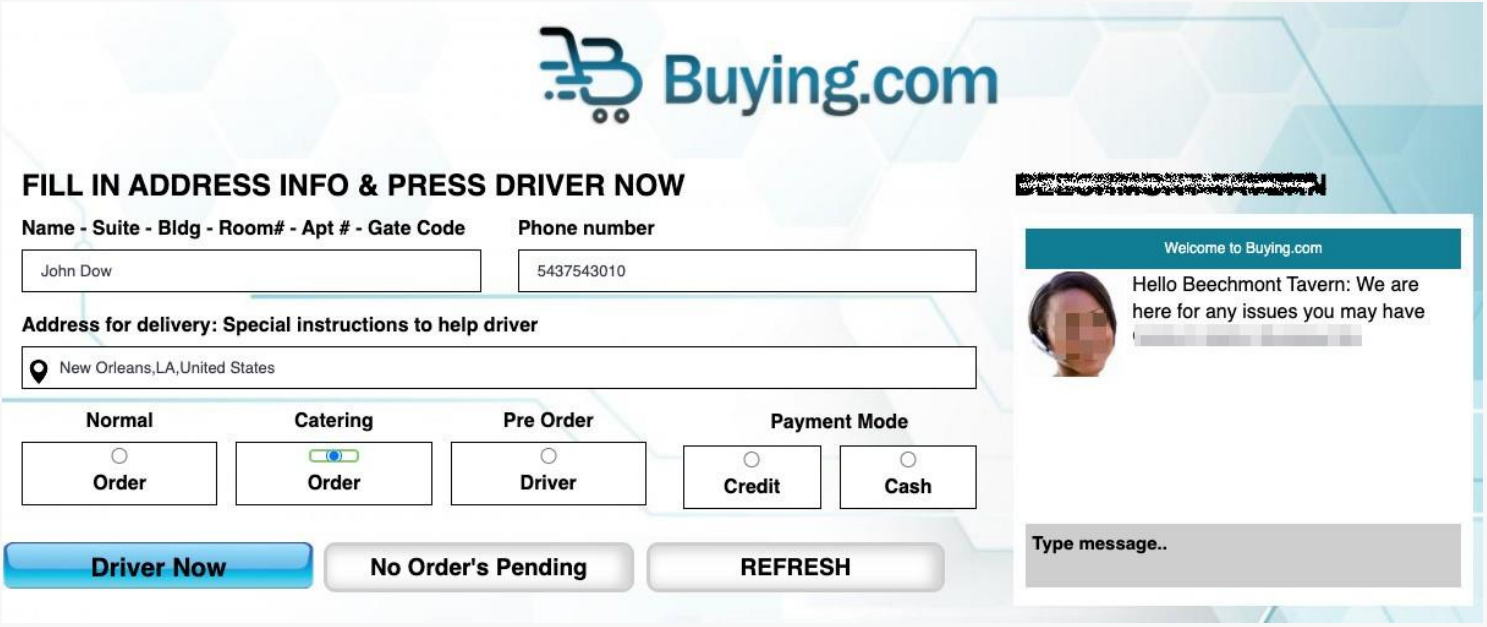
Microdelivery

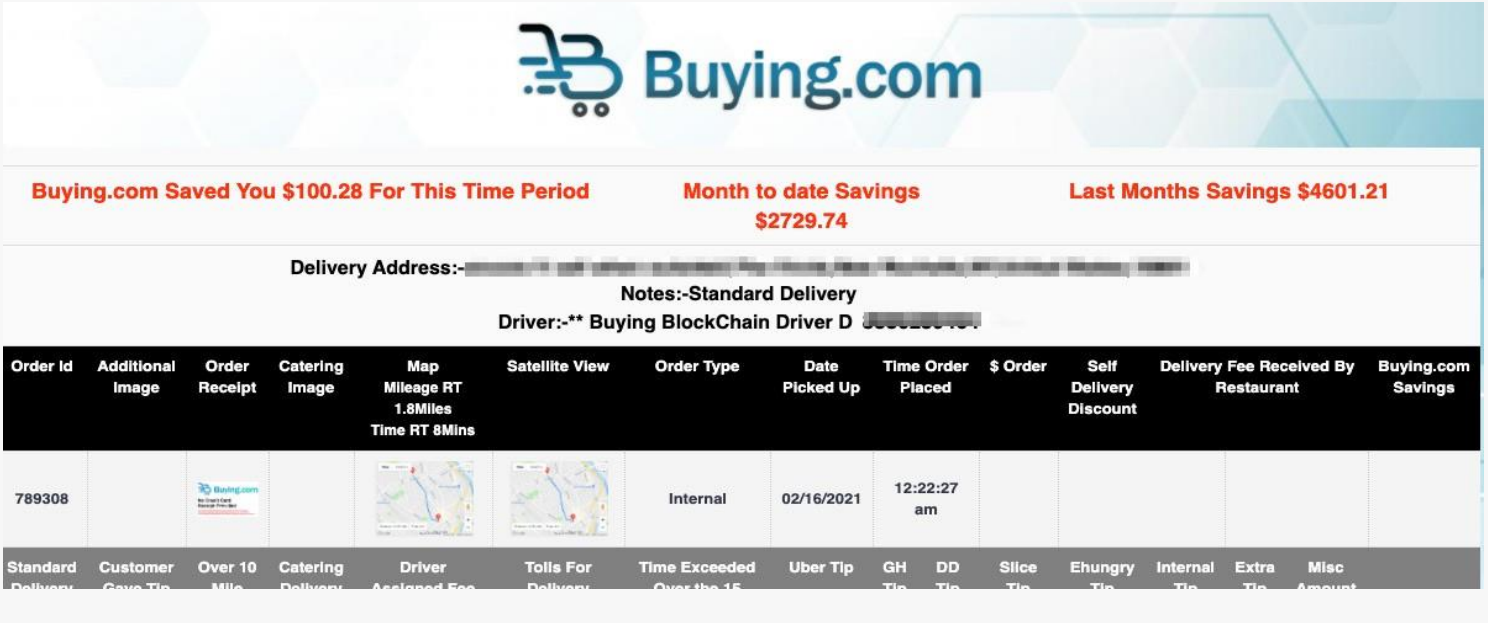
This is an entity that wishes to participate in the Buying.com network as a delivery partner. This delivery partner acts as a light node on the network thereby providing scalability for the network while acting as a delivery partner to improve last-mile delivery in the network.

Product Description

The initial rollout of the buying.com product focuses entirely on the hyper-local food delivery sector of the larger e-commerce spectrum. Buying.com will equip any and every restaurant with a Point of Sale (PoS) machine, which will allow them to accept orders from food aggregators such as Grub-Hub, UberEats, Postmates, DoorDash, instead of keeping separate devices for each aggregator. Normally, these aggregators will procure and fulfill the order from the end consumer, charging both the consumer and the restaurant for the fulfillment (pick-up and delivery). Buying.com will give the restaurant owners more degree of control over the fulfillment expenses by giving them a robust delivery service.

On Buying.com's PoS device, restaurant owners will have an option to choose "Self-Delivery". Selecting this option will disable fulfillment commitments by the food aggregator and route it to Buying.com's micro distribution service. Buying.com will calculate the most feasible solutions out of selecting a hyper-local delivery service or Buying.com's own maintained hyper-local delivery fleet or choose a freelancing runner, registered and available on the service. Based on the suggestion from the feasibility calculation algorithms, Buying.com will fulfill the final food delivery on behalf of the restaurant. The restaurants are rewarded with BUY tokens, which are discussed in detail next, for utilizing our services.





Buying.com

Order Id	Order Type	Date Placed	Time Placed	Customers Name	View Orders	Net Transfer Due
789265	Buying.com	02-15-2021	10:40:05 pm	[redacted]	Confirmed View Order	$34.25
Current Week Net Transfer (Transfer Date Tuesday)						**$34.25**
788931	Buying.com	14-02-2021	10:53:04 pm	[redacted]	Confirmed View Order	$42.02
788747	Buying.com	14-02-2021	05:44:05 pm	[redacted]	Confirmed View Order	$31.17
788187	Buying.com	12-02-2021	08:56:06 pm	[redacted]	Confirmed View Order	$25.79
787654	Buying.com	11-02-2021	11:31:06 am	[redacted]	Confirmed View Order	$21.85
787355	Buying.com	09-02-2021	11:53:04 pm	[redacted]	Confirmed View Order	$33.51
787105	Buying.com	08-02-2021	11:03:04 pm	[redacted]	Confirmed View Order	$18.73
787104	Buying.com	08-02-2021	11:02:05 pm	[redacted]	Confirmed View Order	$21.85

This potent set-up allows food aggregators such as Grub-Hub, UberEats, Postmates, DoorDash to focus their resources more on their consumer-facing ordering services, granting them the freedom to offer their services even in areas with low order volume, where it's unprofitable for them to maintain a fleet. On the other end, this set-up allows restaurants to expand their reach, have more control, and have more leverage while negotiating with food aggregators for their charges.

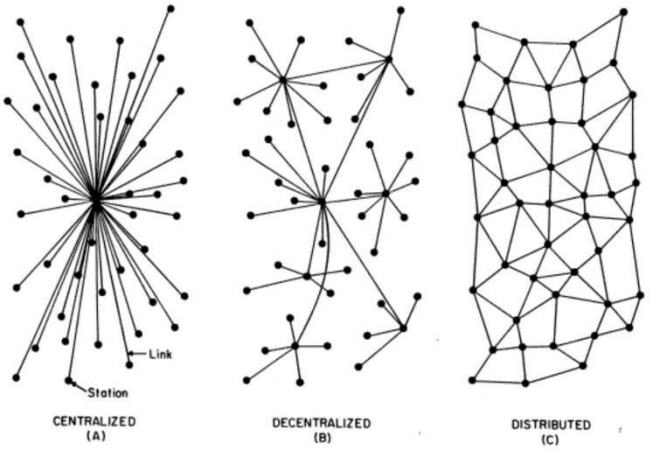
GRUBHUB DOORDASH Uber Eats

*Other logos, products, and company names mentioned herein may be the trademarks of their respective owners.

Technology Overview

Decentralization

The predominant architecture currently employed by most systems across multiple industry domains is Client-Server technology (see Centralized systems in the diagram below). This is being disrupted and replaced rapidly by decentralized computing wherein ecosystems of organizations and individuals participate and share data. The silos of data are thing of the past in decentralized computing and this is made possible through the use of Distributed Ledgers (see Decentralized systems in the diagram below)



Source: Paul Baran, "On Distributed Communications Networks" originally published in 1964:

Key Concepts

- A distributed ledger is a database that is consensually shared and synchronized across networks spread across multiple sites, institutions, or geographies. It allows transactions to have public "witnesses," thereby making a cyberattack more difficult.
- A smart contract is a computer protocol intended to facilitate, validate, or enforce the negotiation or performance of a contract.

Distributed Ledger Technology

Distributed Ledgers can be developed using a number of different technologies including the blockchain (e.g. Ethereum Hyperledger) and direct acyclic graphs (e.g. Hashgraph, Fantom) and there can be both permissioned and public distributed ledgers. Layered on top of distributed ledgers, depending on the application at hand, is the concept of cryptocurrency. This is particularly applicable in public distributed ledgers such as Ethereum, Bitcoin, and others. Another useful concept in decentralized computing is that of smart contracts A smart contract can be thought of as code that acts upon data stored in a distributed ledger, very similar to how stored procedures and triggers in traditional database technology operate on data stored in tables. So, taken in aggregate, a decentralized network could be thought of as a combination of network, logic, and data.

Technology Implementation

In this section, we discuss the technical implementation of the decentralized application. For zooming into technical details, refer to the appendix (page 47).

Blockchain Consensus

Key Algorand Features

ASC1

Trustless programs that execute on-chain, where users can be confident that the program was run without error and the results were not tampered with. They are integrated into Algorand's Layer-1, inheriting the same powerful speed, scale, finality, and security as the Algorand platform itself, and are cost-effective and error-free. ASC1s have the ability to automatically enforce custom rules and logic, from simply defining how assets can be transferred to complex application logic and flow.

Algorand Standard Assets (ASA)

Standardized, Layer-1 mechanism to represent any type of asset on the Algorand blockchain. ASAs are low cost to execute, due to Algorand's minuscule transaction fees. Role-Based Asset Control allows optional and flexible asset controls for issuers and managers for business, compliance, and regulatory requirements. Before a new asset can be transferred to a specific account the receiver must opt-in to receive the asset, preventing asset spam of unknown assets that may have tax, legal, or reputational risk.

Atomic Swap

Atomic Transfers offer a secure way to simultaneously transfer a number of assets among a number of parties. Specifically, many transactions are grouped together and either all transactions are executed or none of them are executed.

Algorand Rekeying

Algorand Rekeying in Layer-1 solves these operational inefficiencies by allowing users to change their Private Spending key without the need to change their Public Address. Rekeying enables more flexibility, continuity, and less overhead with any changes of the Private Spending key.

Current Implementation & Token Issuance and Redemption

Buying.com will utilize Algorand's ASC1 to keep track of order details. How we achieve this, is by storing all order details of a day, made to Buying.com, stored into one IPFS file. The hash of the IPFS file is stored in another IPFS file. The second IPFS file acts as an index file for finding the order details of a particular day. This second IPFS file has the first one's hashes, mapped based on dates. Every time there's an update to the second IPFS file, i.e., end of each day, when the entire order details of a new day are added to one IPFS file and its hash generated and stored in the second file, the hash of the second IPFS file changes. Each of the changed hashes is stored inside our ASC1, as a global variable. This system of storage allows us to query the order details of any particular day, upon need.

Buying.com will utilize the Algorand Standard Assets protocol to launch BUY tokens on Algorand. ASA requires to set a few immutable asset parameters during the creation of a new asset.

1. Creator - buying.com (current address of the ASA creator on Algorand mainnet)
2. Asset Name - BUY TOKEN
3. Unit Name - BUY
4. Total -1 BILLION (maximum supply)
5. Decimals - 6 (divisible up to 6 decimal places, 0.000001 being the smallest unit of BUY)
6. Default Frozen - 0 (initially unavailable asset quantity)

There are four parameters in ASA that correspond to addresses that can authorize specific functionality for an asset. These addresses must be specified on creation but they can also be modified after creation. Here are the four address types to be specified while creating a token. For our purposes, we've kept the addresses the same as the creator's address.

Manager Address: The manager account is the only account that can authorize transactions to re-configure or destroy an asset. This account address should not be set to empty if we want to be able to re-configure or destroy the asset. The manager of an asset is the only Algorand account that can destroy an asset and is the only account that can reconfigure the other admin roles of an asset. In order to trigger a destroyed asset transaction, the original creator of the asset must be in possession (must have in its balance record) of all units of the asset.

Reserve Address: Specifying a reserve account signifies that non-minted asset will reside in that account instead of the default creator account. Assets transferred from this account are "minted" units of the asset. Currently, there are no tokens in the reserved address.

Freeze Address: The freeze account is allowed to freeze or unfreeze the asset holdings for a specific account. When an account is frozen it cannot send or receive the frozen asset. If the Default Frozen state is set to True, we can use the unfreeze action to authorize certain accounts to trade the asset (such as after passing KYC/AML checks).

Clawback Address: The clawback address represents an account that is allowed to transfer assets from and to any asset holder (assuming they have opted-in). This is used when we need the option to revoke assets from an account (like if they breach certain contractual obligations tied to holding the asset).

Token Issuance Logic

A business that has utilized the services of Buying.com's micro-distribution service repeatedly in a day, will be rewarded with 1 BUY token for repeat business. To describe what constitutes an order, let's consider an example of a hyper-local food delivery service requesting a local restaurant to fulfill a customer's order. The restaurant requests Buying.com's service for delivering the prepared food. The end consumer's order details are inconsequential to the Buying.com platform and hence, restaurant rewards aren't based on end consumer order values. Instead, the number of rides requested by the restaurant in a day is taken into account.

Token Issuance

10% of the total token supply is set aside for the rewards program, which accounts to about 100 million tokens out of the total 1 billion token supply. If any business orders for 10 rides in a day, they're awarded 1 BUY token. All order details are stored on the Buying.com platform and a final reward calculation is carried out at the end of the day, based on the number of orders. If the business has been billed for, say, 44 rides, the business will be awarded 4 BUY tokens and the extra 4 rides will be carried forward to the next day's tally.

Token Redemption Mechanism

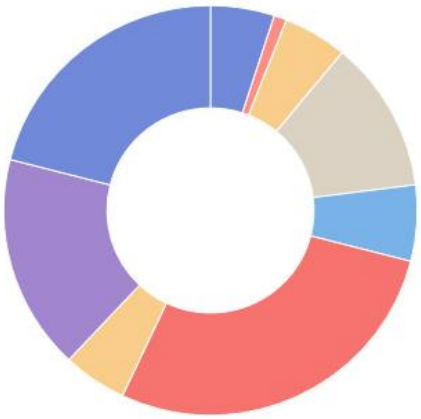
At the end of a month, when the final settlement between the business and Buying.com takes place, the business can redeem the BUY token for bill adjustments. The adjustments will be made based on the average market price of BUY tokens on the many listed exchanges. For example, if the outstanding bill at the end of the month, of the previously considered restaurant, which fulfilled 100 orders through Buying.com, at a cost of $7USD per order for simplicity's sake, totaling to $700 USD, can redeem the 10 BUY tokens it earned and pay a settlement of $693, assuming that the USD/BUY exchange rate is at $1. This could lead to interesting marketing techniques being deployed by these restaurants, like announcing free deliveries for high value, but slow-moving products.

Tokenomics

Total Supply
1,000,000,000

Initial Market Cap
$618,000.00

Token Distribution



- Admin 5% 50,000,000
- Legal 1% 10,000,000
- Liquidity 5% 50,000,000
- Advisor / Partners 12% 120,000,000
- Marketing 6% 60,000,000
- Token Sale 28% 280,000,000
- Strategic Acquisitions 5% 50,000,000
- R&D 17% 170,000,000
- Ecosystem 21% 210,000,000

Total Fund	Initial Supply	Tokens Sold
5,025,000	31,400,000	28%

Token Fundraiser

Round	Seed	Private	Public	Total
Sale%	62.5%	16%	21.5%	100%
Tokens	175,000,000	45,000,000	60,000,000	280,000,000
Price	.015	.020	.025	
USD Raised	2,625,000	900,000	1,500,000	5,025,000
Initial Release	14,000,000	5,400,000	12,000,000	31,400,000

Future Implementations

BUY tokens will be used to converge all verticals of our business. We will be utilizing the BUY token to seamlessly move through all verticals and be used for settlements across the verticals. We intend on implementing this in 4 stages:

Stage 1

We will be integrating the BUY token to our DPA app to incentivize completion of MOQ's by consumers and retailers alike.

Stage 2

Integrate the BUY token into the Snapforce back-office operations for settlements between e-tailers, manufacturers and consumers.

Stage 3

Integrate a tipping mechanism to delivery-personnel by customers and retailers alike. Integrate an incentive mechanism for delivery personnel using BUY token.

Stage 4

PRIME Protocol is developed which incorporates puts all of the different pieces in the Buying.com ecosystem together. BUY token will be made universally acceptable through PRIME protocol. All payments and settlements done on the Buying.com network through our apps by e-tailers, consumers, manufacturers, is all completed using BUY tokens.

1. Customers will be able to buy products from e-tailers or manufacturers using BUY token.
2. E-tailers can settle with manufacturers using BUY tokens
3. Micro-Distribution centers will get payments in BUY tokens
4. Delivery personnel will have the option to accept their payments in BUY tokens.

9. Roadmap

2019

July

Development of the buying.com last mile delivery platform begins.

2020

Aug

Buying releases mobile app for drivers nationally.

Sep

Buying.com launches

Oct

Buy token development starts

Nov

The Buying.com software and hardware is dispursed to business throughout the country

2021

Jan

Buy token integration with Buying.com tests successfully.

Feb

Revenue increasing with market share.

Mar

Buying launches the Buy token on Algorand

April

Buying chooses Mt Arlington NJ as their East Coast Center.

May

Buy Builds command center capable of 100% success rate of last mile deliveries

June

Buying completes triple Redundancy at main headquarters

July

Mount Arlington Command Center Processing 24/7

Aug

All 3rd party platform completed for integration

Dec

All 3rd party platform completed for integration

2022

June

Buying token integration into DIrect Product App (DPA) to Group Buying

Aug

Integration of Buying.com infrastructure into Snapforce CRM for Sales Automation, Marketing Automation, Customer Service, Billing and Payments, Reporting and Analytics, and Call Center

Sep

PRIME Protocol development with BUY token commences to enable Purchases settlements, Micro-Distribution Payments, Delivery Payments

2023

Jan

Rollout of PRIME Protocol Delivery Payments POC using BUY Token

Aug

All 3rd party platform completed for integration

10. Scaling

In this section, we will cover aspects of how Buying.com will scale its operations. As alluded to in the previous section, Buying.com is a decentralized e-commerce network that brings together various ecosystem players including retailers, consumers, freelance drivers, and delivery partners under one umbrella.

The scaling of this ecosystem has many facets and let us examine each one.

Consumer Scaling

In order to achieve a critical mass of consumer adoption, Buying.com will leverage a few tools in its arsenal:

Incentivization Tokens

Of the token pool, a significant percentage has been allocated for incentivization of the value chain. Restaurants play a paramount role in this value chain and tokens can be leveraged for this purpose. In order to get restaurants to join the network, Buying.com will issue BUY tokens. Restaurants can use these tokens and convert them to fiat through the BUYING.com network or via listed cryptocurrency exchanges. The purpose of these BUY Tokens is to identify and incentivize repeated business. It is the customer acquisition cost for the BUYING.com network.

Distribution Center Scaling

The hyperlocal microdistribution model is a linchpin in the Buying.com decentralized e-commerce network. Hence, scaling the number of nodes improves the efficiency of the entire network. In order to scale the number of distribution centers, we have planned a multi-prong strategy:

Homeowners

Latent capacity in garages offers an inexpensive and tantalizing use case of share economy concepts for Buying.com. Some certification will be implemented to prevent spoilage or damage to goods. Many homeowners would welcome the opportunity to participate, in our estimation, to better monetize the space they have to help defray everyday living expenses.

Retailers

Retailers can play a dual role as not only suppliers of product but also as storage facilities. Because of Buying.com’s ability to source products at lower costs through dynamic group purchases, our costs for many items may end up being lower than that of retailers. However, retailers can still play a valuable role in the following ways:

Hard to find items

There may be items that a retailer carries that is outside of the product mix offered by Buying.com suppliers

Shortened Delivery Window

In some cases, the time it takes to dropship a product may not fit within the time window set by the customer in which case a retailer may be able to fulfill the order faster albeit at a higher price.

Storage

Retailers often have some storage space and retailers can monetize that space by opening it up to Buying.com's inventory for distribution to local customers within a hyperlocal region.

Storage Centers

There are many storage centers nationwide with capacity to spare. These operators can become distribution centers for Buying.com by opening up their capacity to our network. This will maximize their utilization while improving our network's location density. In addition, storage centers have high security, in many cases have storage-controlled rooms needed for certain types of goods. They are desirable to have as part of the Buying distribution network.

Delivery Scaling

Delivery is vital to the Buying.com model. With this in mind, we plan to scale this dimension by the following methods:

- Drivers already driving for ride-sharing companies such as Uber or Lyft could leverage their trunk capacity for the delivery of goods and maximize their earning potential.
- New methods of delivery: As the world adopts new methods of delivery such as drones, Buying.com will be at the forefront of such technology offering operators of drone fleets the opportunity to earn more income through the delivery of orders.
- Part-time drivers who are not part of any network can join the system to take deliveries whenever they are available and earn money.

11. Our Team

Jean Gabriel

Founder & CEO

Jean Marie Gabriel, designer with a great vision, is the Founder & CEO of Buying.com. Packed full of passion and a zeal to do something different, Jean came up with the idea of the Buying.com platform for its affiliated company named Dropshippers.com. Under her leadership, Buying is passing through a stunning transformation from a start-up to a major profitable venture. With lots of successful and groundbreaking business ventures Jean has demonstrated an unmatched mindset and foresight that would take Buying.com to its apex. With her direction the company has grown throughout the United States offering their delivery platforms for all businesses which is Phase 1 of the Buying journey. Jean is pushing to complete Phase 2 on schedule for the Buying.com decentralizing and fulfillment operations for e-commerce.

Utkarsh Khare

CTO

Utkarsh Khare, the Chief Technology Officer, has currently been leading Buying.com's architecture, development, and operation of the company's IT infrastructure, technology platforms, services, and applications for the last few years.

Through his innovative initiatives, he, in collaboration with the business leaders across the organization, adds value to existing and upcoming Buying.com products, focusing on their upgradation and performance improvement constantly. The CTO explores the emerging technologies and adopts the best ones to increase products' efficiency and user-friendliness for the on-demand e-commerce community. Khare possesses extensive experience of 15 years in the Information and Technology industry with many successful prototypes, concepts, and solutions to his credit. He has extensively been involved in overseeing all technology functions, including product development, product architecture, professional services, VC funding, domains, and e-commerce management, blockchain, and crowdfunding.

Raghu Bala

Lead Block Chain Designer

Lead Block Chain Designer for Buying.com. Mr. Raghu Bala CEO of Netobjex.com was previously an executive with Yahoo, Infospace, PwC, and with 3 successful startups. He also teaches MIT Sloan School of Business/Computer Science and AI Laboratory's course on the Implications of Artificial Intelligence on Business, as well is a Tutor for MIT's Blockchain course. Mr. Bala was winner of 2016 Best Abstract in Best Wearable Medical Device category at the AI in Medicine conference, and in 1993 winner of the Best Thesis Award on Temporal Databases at the Hartford Graduate Center Conference. He holds an MBA in Finance from Wharton MBA, an MS in Computer Science from RPI, has been a Columbia University Adjunct Lecturer, published author (Microsoft Press, Macmillan) and speaker at several major conferences including IoT Congress and Google IO.

Vince Tullo

Senior Advisor - Stephens Institute

- 47+ years of experience in fintech services and consulting.
- VP of Global Sales for Lighthouse Instruments, a reputed and global leader in pharmaceutical laser testing technologies.

Abhinav Sinha

Product Head (Mobile Apps, AWS & Scripts)

- 10+ years of experience in product vision, strategy, and execution of mobile apps, AWS, and script development
- Award-winning professional and a member of many reputed associations in the IT sector.

Bhupinder Singh

Technical Lead
(Web & APIs)

10+ years of dynamic experience and unmatched skills in contemporary web-site and application development.

Has been a part of various mainstream organizations where he led front-end development as well as assisted the back-end programming.

Shikha Mahaldawan

Project Coordinator
& Quality Lead

- Worked with various mainstream enterprises.
- Excels in the development and reporting of management processes, corporate standards, and management assessments, and customer feedback mechanisms.

Diksha Dekate

Sr. Software Developer
(Web)

- Years of experience in CI, Yii2, Opencart, and Laravel.
- High-level expertise in Payment Gateway: Stripe, TapPayment, Authorize.Net, Tranferwise, 2checkout, and flutterwave.

Vinay Khare

Senior Consultant

- 35+ years of experience in the fintech industry associating with various banks, financial and IT firms.
- Managed and advised hundreds of diverse portfolios previously single-handed- ly as a financial consultant.

Experienced at Designing the software products Layout, Web and Mobile application UX / UI Design, newsletter for Product promotion, Social Media Post Design, Design the banners and Mailers etc.

- Hands-on various tools like Adobe Photoshop, Illustrator, Adobe XD, Axure.

Seema Sherry

Art & Creative Director

Joe Rivello

Chief Operating Officer

Dali Durdevic

Head of Social Media and Marketing

Lauren Soto

East Coast Director of Driver Administration

Ericka Guilbe

West Coast Director of Driver Administration

Evelyn Garcia

National Director of Operations

Robert V. Cornish Jr.

Of Counsel - Wilson Elser

Von E Sanborn

Senior Legal Counsel - Day Pitney

Joseph Doren

Senior Accountant

Roger Gottilla

Senior Legal Counsel - Wilson Elser

12. Appendix

Decentralized e-Commerce Network

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Buying.com is a decentralized, e-Commerce Network with cybermediation platform features, allowing businesses and individuals access to products at wholesale prices. Furthermore, Buying.com leverages existing distributors along with its own microdistribution network in order to achieve two-hour threshold delivery time for fast-moving consumer goods. The current paper gives an overview of the Buying.com and its unique value proposition and expounds on the technical aspects behind the platform. Specifically, it covers the Algorand blockchain technology used by Buying.com and its Pure Proof of Stake consensus. It provides a solution to the problem of multi-objective optimization of last-mile logistics and discusses several aspects of platform governance as well as the crypto economics of the ecosystem.

Introduction

E-commerce sales in the past few years has accelerated tremendously with reports that the global B2B e-commerce market was worth $7.7 trillion in 2017 (1). There are some 1.3 million
e-commerce companies in the U.S. alone. Worldwide, that figure rises to 2-3 million e-commerce companies, excluding China. The opportunity to convert more global businesses into new age
e-merchants is substantial.
The current ecosystem for e-commerce has evolved from the mid-90s during the first wave of internet technologies, with most major brands and retailers maintaining a web and mobile
e commerce presence. Several dominant players such as Amazon.com, Walmart.com and others have emerged for mass market retailing of a wide variety of products. If one were to deconstruct the current state of the e-commerce ecosystem, it would involve several operational components: Storefronts (Shopify), Payment Processing (PayPal, Stripe), Shipping and Fulfillment (FedEx, UPS), Back Office processing (Salesforce).

Despite the history and the growth of this industry, inefficiencies persist

throughout the ecosystem:

- **Last Mile Distribution**: This is a problem not only for small retailers but big retailers as well. Amazon has recently purchased Toys R Us and Whole Foods to some extent to expand their distribution channels. The recent introduction of Amazon Flex (2) where people can sign up to deliver goods for Amazon aims to address this but even then last mile peer-to-peer microdistribution is not yet a reality.
- **Purchasing Power**: While more consumers go online to purchase goods and services, there is noefficient mechanism to consolidate their purchases to derive wholesale pricing.
- **Fragmentation**: Smaller retailers do not have access to a vertically integrated service platform topose a serious threat to larger retailers such as Amazon. This results in their having to use a fragmented set of operational components.

2. Buying.com: The Solution to e-commerce Inefficiencies

Buying.com is a company that aims to reshape the landscape of e-commerce by providing solutions to the inefficiencies of the ecosystem thus benefiting both the supply and demand sides of the equation. *Distributed ledger technology* (blockchain) provides Buying.com with new asymmetric advantages that enables it to apply solutions which were not available in earlier-generation platforms. The *unique value proposition* of the platform comprises several innovative solutions.

- **Microdistribution**: With Buying.com e-commerce becomes fully decentralized by turning every garage into a distribution center. In addition to distribution centers run byBuying.com, now anyone can become a node on the Buying.com network by staking tokens (buy-in) and leveraging existing yet *latent storage capacity* in their garage to be-come a microdistribution center. This solves the last mile logistics issue that has plaguede-commerce for the longest time. It is similar to how Airbnb turns every spare room in ahome to a hotel room, or how Uber leverages excess driving capacity to turn every auto-mobile into a taxi. *Fast moving consumer goods* (FMCG)

ordered on the Buying.com appcan be delivered to consumers within two hours. This empowers all e-commerce and retailplayers to not only compete, but in many cases outperform established giants in the industry that have distinct advantages at the moment. A fully decentralized solution addressingdelivery inefficiencies will be disruptive and transformative for the e-commerce sector.

- Bulk Pricing: Consumers and businesses would like to enjoy largepurchase pricing discounts but that is not always possible because minimum order quantities (MOQ) needed for bulk pricing are not achievable. The Buying.com protocol leverages the purchasing power of mil- lions of consumers and small businesses to reach MOQ levels. This enables online stores and consumers to receive direct from manufacturer pricing through bulk order quotes with best possible pricing on products.
- Real-Time Logistics: Leverages blockchain solutions to deliver real-time logistics data, provides transparent, smart-contract enforced audit trails, and protects users with data encryption. Manufacturers, businesses and consumers will all have seamless access to real time shipping data to optimize dropship- ping costs provided by a permissionless, public blockchain.

- BUY token: The Buying.com protocol utilizes its own cryptocurrency, namedBUY, for transactions on the Buying.com platform.

- Transaction Payments: Buying.com's protocol transactions will escrow payments until the customer receives the ordered goods and is satisfied. Once thedelivery is cleared, funds are released. This will significantly reduce charge-backs, a commercial problem costing retailers billions every year.

- Transparent and Auditable: Blockchain technology offers customers a

fraud-proof digital ledger of verifiable transactions and hence a transparent, immutable audit trail.

The current paper focuses on the technical aspects of the Buying.com platform and how these affect the overall ecosystem. Section 3 covers the blockchain technology used by Buying.com, namely, the Algorand platform. The next section (Section 4) gives a detailed analysis and proposed solutions to the problem of multi-objective optimization of last-mile logistics. Section 5 deals with the platform governance (i.e., consensus algorithm, Ricardian contracts, proof-of-delivery mechanisms) while the subsequent section discusses network scalability and attendant effects (Section 6). The paper concludes with a presentation of the crypto economics of the ecosystem.

3. The Buying.com Platform and Protocol

1. Decentralized Network Architectures

Traditional Client-Server architectures are currently being supplanted by decentralized computing platforms wherein ecosystems of organizations and individuals participate and share data. A decentralized network consists of peers that can run independently of each other. The power to transmit information is distributed among a network of servers, instead of being driven from one primary source. For this reason, data silos are a thing of the past in decentralized computing, and this is made possible through the use of Distributed Ledgers.

2. Distributed Ledger Technology

Distributed Ledgers can be developed using a number of different technologies including blockchain (e.g., Ethereum Hyperledger) and directed acyclic graphs (e.g. IPFS, IOTA), and there can be both permissioned and public distributed ledgers. Layered on top of distributed ledgers, depending on the application at

hand, is the concept of cryptocurrency. This is particularly applicable in public distributed ledgers such as Ethereum, Bitcoin, IOTA, and others. A distributed ledger is a database that is consensually shared and synchronized across the network and spread across multiple sites, institutions or geographies. It allows transactions to be immutable and publicly variable thereby making a cyberattack more difficult.

Another useful concept in decentralized computing is that of smart contracts. A smart contract can be thought of as code that acts upon data stored in a distributed ledger, very similar to how stored procedures and triggers in traditional database technology operate on data stored in tables. So, taken in aggregate, a decentralized network could be thought of as a combination of network, logic, and data.

ALGORAND vs ETHEREUM

	ALGORAND	ETHEREUM
AVERAGE VERIFICATION TIME	5 SECONDS	3.5 MINUTES
COST OF TRANSACTION	0.001 ALGOS Roughly 0.0015$	Depends on the complexity of thetransaction and required transaction speed. Simplest Ethereum transactionscost 3-6 in 2021
FEATURES	Atomic Swaps Rekeying Instant Finality Capable of 1000 TPS	Turing Complete Language
SECURITY	Pure Proof of Stake consensus solves the blockchain trilemma by ensuring decentralization, security, and scalability.	Work for switching from Proof of Work to Proof of Stake is undergoing, will have to observe it's ramifications.

Table 1: Comparison of Algorand to Ethereum

3. Algorand Network

A public blockchain infrastructure provides an ideal solution to address the problems outlined in the previous section and implement the unique value proposition of Buying.com in a trustless environment. The Buying.com Protocol is based on the Algorand blockchain network (3).

The Algorand decentralized ledger records a list of all the balances and transactions belonging to every single account on the network. A complete copy of the global Algorand ledger is hosted on each server that runs the Algorand software. Any entity can run an Algorand server. Table 1 compares Algorand to Ethereum in terms of average verification time, price per transaction, features, and security.

The Algorand servers communicate and sync with each other to ensure that transactions are valid and get applied successfully to the global ledger. This entire process of coming to consensus on the Algorand network occurs approximately every 2-5 seconds and uses the Pure Proof of Stake Consensus Protocol.

4. Node Operation

The Algorand network consists of two distinct types of nodes, relay nodes, and non-relay nodes. Relay nodes are primarily used for communication routing to a set of connected non-relay nodes. Relay nodes communicate with other relay nodes and route blocks to all connected non-relay nodes. Non-relay nodes only connect to relay nodes and can also participate in consensus. Non-relay nodes may connect to several relay nodes but never connect to another non-relay node.

In addition to the two node types, nodes can be configured to be archival and indexed. Archival nodes store the entire ledger and if the indexer is turned on, the search range via the API REST endpoint is increased. These additional configuration options are described below.

Both node types use the same install procedure. To setup a node for a specific type, requires a few configuration parameter changes as described below. The default install will set the node up as a non-relay node in non-archival and non-indexed mode.

Participation Node

Classifying a node as a participation node is not a configuration parameter but a dynamic operation where the node is hosting participation keys for one or more online accounts. This process is described in Participate in Consensus. Technically both non-relay and relay nodes can participate in consensus, but Algorand recommends only non-relay nodes participate in consensus.

Non-relays nodes do not have to participate in consensus. They still have access to the ledger and can be used with applications that need to connect to the network to submit transactions and read block data.

Archival Mode

By default non-relay nodes only store a limited number of blocks (approximately up to the last 1000 blocks) locally. Older blocks are dropped from the local copy of the ledger. This reduces the disk space requirement of the node. These nodes can still participate in consensus and applications can connect to these nodes for transaction submission and reading block data. The primary drawback for this type of operation is that older block data will not be available.

The archival property must be set to true to run in archival mode, which will then set the node to store the entire ledger. Relay nodes are always set to Archival mode. Non-relay nodes have the option to run in either configuration.

Relay Node

A relay node uses the same software install as a non-relay node and only requires setting a few additional configuration parameters.

A node is a valid relay node if two things are true:

1. The node is configured to accept incoming connections on apublicly-accessible port (4161 by convention).
2. The node's public IP address (or a valid DNS name) and assignedport are registered in Algorand's SRV records for a specific network (Main-Net/TestNet).

Relay nodes are where other nodes connect. Therefore, a relay node must be able to support a large number of connections and handle the processing load associated with all the data flowing to and from these connections. Thus, relay nodes require significantly more power than non-relay nodes. Relay nodes are always configured in archival mode.

It is recommended that all microdistribution nodes, delivery drivers, suppliers, dropshippers and third-party retailers participate in the network as non-relay nodes in order to increase network resiliency. Consumers can use the Algorand Network without any need for running any nodes.

5 Delivery Optimization

When a customer places an order through Buying.com, the order is assigned to a distribution center where the order will be delivered from, according to the procedure and rules described in the following subsection. When time comes to schedule the delivery from that particular distribution center, and given the set of customers waiting to be served, the driver will be selected and the optimal route will be constructed. In general, deliveries are scheduled at the end of the day for next-day delivery, or every 2 hours for 2-hour delivery. Subsections 4.1,
4.2 and 4.3 describe how the distribution center, the driver and the optimal route are selected, respectively. Finally, subsection 4.4 describes how to dynamically update existing routes when new order requests arrive, by inserting customers in already planned routes in an optimal way, when this is possible.

Customers that place an order for FMCG will have the option to request either a 24-hour delivery or a 2-hour delivery. Obviously, a 2-hour delivery will come with a higher delivery price. Under the 2-hour delivery guarantee, in the worst case, a driver will be selected to pick up the products from the distribution center and ensure delivery to the customer within 2 hours from the time when the order was placed, without combining any other orders. It is very important that such orders arrive on time, otherwise the reputation of the driver will be negatively impacted. Of course, in case where such a delay occurs but it is the distribution center's fault, then the reputation of the distribution center will be negatively impacted instead. While on a

two-hour delivery duty, the driver's route and schedule will not be modified dynamically. The normal mode of delivery will be the 24-hour delivery guarantee. This applies to all items 1 that do not fall under the FMCG category, as well as to FMCG for which the customer did not choose the 2-hour delivery option. At the end of each day (or more frequently, if appropriate), for each distribution center, the routes for the following 24 hours are scheduled in an optimal way.
These routes can later be modified dynamically during execution, upon new customer requests.

4.1 Delivery Optimization Part I: Distribution Center Node Selection

Let K be the set of all customers. Suppose that customer $k \in K$ has just placed an order through the Buying.com platform for items $1, 2, ..., n$ with associated quantities $q_1, q_2, ..., q_n$. We need to decide which distribution center will be selected as the pickup node for the order, among all available distribution centers in the region that have stock of the requested quantities of all the items ordered.

Let $J = \{1, 2, ..., |J|\}$ be the set of all nodes that represent distribution centers. Let $J^* \subseteq J$ be the subset of distribution centers that: (a) are located within a radius R from customer k, (b) have stock of the necessary quantities for all the items ordered, and (c) are open and available at the date and time of interest. We restrict our choice of the distribution center within the set J^*. Specifically, for each distribution center $j \in J^*$, we evaluate:

1. The distance $d_{j,k}$ from the distribution center j to the location of customer k who placed the order. In general, we would prefer $d_{j,k}$ to be as small as possible. Note that $d_{j,k}$ is bounded by R (i.e. $0 \leq d_{j,k} \leq R$). We wish to minimize $\frac{d(j,k)}{R}$, which is a real number in the interval $[0, 1]$.

2. The *distribution center's reputation score* R_j, which is a real number in the interval $[0, 1]$. The value 0 represents the worst reputation score of 0%, whereas the value 1 represents the best reputation score of 100%. Please refer to Section 5.4 for more details on how R_j is constructed. In general, we would prefer a distribution center with a higher rating. Therefore, we wish to maximize R_j, or equivalently to minimize $-R_j$.

3. The time ψ_j that has elapsed since the last time an order was fulfilled by distribution center j, where $\psi_j \geq 0$ for all $j \in J^*$. In general, a distribution center with a higher value of ψ_j will be preferred. Incorporating ψ_j in the objective function will give a degree of fairness in the process of selecting the distribution center. Specifically, distribution centers that haven't been selected as pickup nodes recently, will be favored. This metric will help to avoid ending up with a few centers that managed to get high ratings initially, getting most of the orders all the time, while all other centers get very few orders and eventually opt-out of the agreement. In order to normalize the respective component objective, we need to define $\psi_{max} = \max\{\psi_j | j \in J^*\}$. We wish to maximize $\frac{\psi_j}{\psi_{max}}$, where $0 \leq \frac{\psi_j}{\psi_{max}} \leq 1$, or equivalently to minimize $-\frac{\psi_j}{\psi_{max}}$.

4. Assume that for each item i that is sold through the Buying.com platform and has an expiration deadline, we have identified a threshold date, after which the item is considered to *expire soon*. Let $q_{i,j}^E$ be the number of pieces of item i in distribution center j that expire soon. Then, $min\{q_{i,j}^E, q_i\}$ is the number of pieces of item i in distribution center j that expire soon and will be included in the order, in case the order will be fulfilled by distribution center j. In general, we would prefer selecting distribution center j_1 over distribution center j_2, if the first one has more items that expire soon, compared to the second one. Therefore, we wish to select the distribution center j which minimizes the term $-\frac{\sum_{i=1}^n min\{q_{i,j}^E, q_i\}}{\sum_{i=1}^n q_i}$, which is equivalent to maximizing the term $\frac{\sum_{i=1}^n min\{q_{i,j}^E, q_i\}}{\sum_{i=1}^n q_i}$. The latter is a real number in the interval $[0, 1]$ and denotes the proportion of the number of items in the order which expire soon, if the order is fulfilled by the distribution center j. It is a measure of urgency to deliver from distribution center j, due to potential expiration of its stock that is related to the order. Note that, since $0 \leq min\{q_{i,j}^E, q_i\} \leq q_i$, we will always have $0 \leq \sum_{i=1}^n min\{q_{i,j}^E, q_i\} \leq \sum_{i=1}^n q_i$, which leads us to the inequality $0 \leq \frac{\sum_{i=1}^n min\{q_{i,j}^E, q_i\}}{\sum_{i=1}^n q_i} \leq 1$.

5. Let M_{total} be the order's total worth, in tokens. Define M_j as the number of tokens missing from the distribution center j to cover the order's total worth M_{total}, if the number of tokens that it holds is less than M_{total}; or 0 otherwise (i.e. $M_j = 0$ if the distribution center j holds at least as many tokens as M_{total}). We wish to minimize $\frac{M_j}{M_{total}}$. Note that since $0 \leq M_j \leq M_{total}$, we get $0 \leq \frac{M_j}{M_{total}} \leq 1$. By incorporating the term $\frac{M_j}{M_{total}}$ in the objective, we allow the possibility of selecting a distribution center that owns fewer tokens than the amount of tokens equivalent to the value of the stock. However, in such a case, the greater the deficiency in tokens, the less likely it is for a distribution center to be selected. On the other hand, if we wish to restrict our choice of the distribution center among the ones which hold at least as many tokens as the order's total worth, then we can consider only the distribution centers with $M_j = 0$, and ignore the last component of the objective function (or equivalently, set $p_5 = 0$, where p_5 is defined below).

Combining all the factors mentioned above, we can calculate the *distribution center's objective function* $F(j)$ separately for each $j \in J^*$, in order to find the distribution center which minimizes $F(j)$, as defined below:

$$\min_{j \in J^*} \; F(j) := p_1 \frac{d_{j,k}}{R} - p_2 R_j - p_3 \frac{\psi_j}{\psi_{max}} - p_4 \frac{\sum_{i=1}^{n} \min\{q_{i,j}^E, q_i\}}{\sum_{i=1}^{n} q_i} + p_5 \frac{M_j}{M_{total}} \qquad (1)$$

with weights $p_\nu \in [0, 1]$ for $\nu = 1, 2, ..., 5$ such that $\sum_{\nu=1}^{5} p_\nu = 1$. The importance of each component objective can be captured by assigning appropriate values to the weights p_ν. For example, if the first component objective is more important than the fourth one, then we can assign a higher value to p_1 than to p_4.

The objective function for the optimal selection of distribution center presented above, is the weighted sum of five component objectives, that seeks to find the distribution center j which simultaneously: (i) minimizes the distance of the distribution center from customer k who placed the order, (ii) maximizes the reputation of center j, (iii) maximizes the elapsed time since the last time an order was fulfilled by distribution center j, (iv) maximizes the measure of urgency

to deliver from distribution center j due to expiration of the stock of distribution center j which is related to the order, and (v) minimizes the missing tokens from distribution center j. Additionally, each one of the five component objectives is normalized.

For each order placed through the platform, we calculate the above objective function separately for each distribution center j in the area which has the goods in stock, and the single distribution center j^* which yields the minimum value of the above function is selected.

4.2 Delivery Optimization Part II: Driver Node Selection

After an order has been placed and the distribution center has been selected as the pickup node, we need to select the driver that will pick up the order from the distribution center and carry out the delivery. In short, for the driver selection, we consider all available drivers within a radius r from the distribution center, and for each one of them, we calculate the driver's objective function, which is based on three factors: (i) the distance between the current location of the driver and the distribution center, (ii) the reputation of the driver, and (iii) the last time the driver was chosen for a delivery. The top x drivers with respect to the objective function are notified, and the first one to respond gets the order. If multiple responses come within a narrow window of y seconds, preference is shown to the one with the best value of the objective function.

More specifically, let $L = \{1, 2, ..., |L|\}$ be the set of all nodes that represent drivers. We assume that each driver $l \in L$ comes with a specific vehicle of known capacity C_l. The value C_l is by default the total capacity of vehicle l, unless the vehicle is partially loaded, in which case it is the driver's responsibility to update his vehicle's capacity, so that the updated C_l value now reflects the available or remaining capacity. Note that, in the extreme case when a driver accepts an order while his vehicle is partially loaded and, upon arrival at the pickup location, the order does not fit in the vehicle because the driver failed to report the true available capacity of his vehicle, this is considered to be a violation of the agreement between the driver and the company, by the former party. In this case, the driver will be penalized and his reputation will

be negatively affected.

Let $L^* \subseteq L$ be the subset of the drivers that: (a) are within a radius r from the distribution center at the particular time, (b) are available for work at the time, (c) have vehicles with enough capacity that can accommodate the order and (d) have vehicles with the necessary equipment needed to load and unload the orders (in case where such an equipment is needed). For each one of those drivers $l \in L^*$, we calculate the following:

1. The distance $d(l, j)$ from current location of driver l to the distribution center j where the order will be picked-up from. In general, we prefer $d(l, j)$ to be as small as possible. Therefore, we wish to minimize $d(l, j)$, or equivalently to minimize $\frac{d(l,j)}{r}$, where $0 \leq \frac{d(l,j)}{r} \leq 1$.

2. The *reputation* r_l *of driver* l, which is a real number in the interval $[0, 1]$. The value 0 represents the worst reputation score of 0%, whereas the value 1 represents the best reputation score of 100%. Please refer to Section 5.4 for more details on how r_l is constructed. In general, we would prefer a driver with a higher rating. Therefore, we wish to maximize r_l, or equivalently to minimize $-r_l$.

3. The time $t_l \geq 0$ that has elapsed since the last time an order was fulfilled by driver l (counting from the time that the previous route of driver l finished). In general, a driver with a higher t_l will be preferred. Let $t_{max} = \max\{t_l | l \in L^*\}$. We wish to maximize $\frac{t_l}{t_{max}}$, where $0 \leq \frac{t_l}{t_{max}} \leq 1$, or equivalently to minimize $-\frac{t_l}{t_{max}}$. Incorporating this factor in the objective function will give a degree of fairness to the selection of drivers, in a sense that it will tend to favor drivers that haven't been selected recently for delivery. The reason for using this metric is to avoid the scenario where the few selected drivers who get the best ratings in their first few orders, end up with being assigned almost all of the deliveries later on, while the remaining drivers 'starve' and eventually opt-out of the agreement.

Taking into account the above factors, the driver's objective function is calculated separately for each driver $l \in L^*$. Specifically, the objective at the driver selection stage is to find $l \in L^*$ that minimizes the *driver's objective function*, $f(l)$, which is defined as follows:

$$\min_{l \in L^*} f(l) := \rho_1 \cdot \frac{d(l,j)}{r} - \rho_2 r_l - \rho_3 \frac{t_l}{t_{max}} \tag{2}$$

where $\sum_{i=1}^{3} \rho_i = 1$ and $\rho_i \in [0,1], \forall\, i = 1,2,3$.

The above objective function is the weighted sum of three normalized component objectives, with weights ρ_i, $i = 1,2,3$, that essentially seeks to find the driver l which simultaneously: (i) minimizes the distance from the distribution center to the driver, (ii) maximizes the driver's score and (iii) maximizes the time that has elapsed since the last time an order was fulfilled by driver l.

Instead of simply selecting the single driver with the minimum value of the objective function $f(l)$, the drivers with the x best (lowest) values of the objective $f(l)$ are notified, and the first one to respond gets the order. However, if multiple responses come within a narrow window of y time units, preference is shown to the one with the best (lowest) value of $f(l)$.

Note that the following information needs to be communicated to the drivers, before they accept a route: time of start of the route, estimated duration of the route (or upper bound), and reward or payment for the driver.

4.3 Delivery Optimization Part III: Route Selection

In this subsection we present a mathematical model for selecting the optimal delivery route, once the distribution center, the customers waiting to be served from the particular distribution center, and the driver have all been selected. Specifically, we present a variation of the Traveling Salesman Problem with Time Windows (TSPTW) formulation, which we have adapted in order to solve the problem of determining the optimal route to be traversed by a specific driver and the schedule of visits to the customers, once the driver has been selected and the customers that

will be served in the respective route have been specified.

In general, the TSPTW is the problem of determining a minimum cost tour in which a set of nodes are visited exactly once within their requested time windows. More specifically, in the *adapted TSPTW* that we propose, we have a set of customers waiting to be served and a single vehicle (traveling salesman) that must depart from a specific starting point, it will then directly visit the distribution center to load the orders, it will visit each of the customers exactly once and finish at a specific end-point. Each customer i is associated with a service time s_i, i.e. the amount of time that the vehicle needs to spend at the customer once the service starts; and a time window $[a_i, b_i]$ defined by its ready time a_i and due date b_i. The time of start of service of any customer must lie within the respective time windows. This means that the time when the service finishes may actually be later than the due date. Furthermore, if the vehicle arrives at a customer earlier than their ready time, it must wait until the ready time. The objective is to minimize the total travel time.

We formulate the *adapted TSPTW* on a graph $G = (I, A)$, where $I = \{0, 1, 2, \ldots, n+2\}$ is the set of nodes and A is the set of arcs, defined below. Node $n+1$ represents the starting point and node 0 represents the end-point. Node $n+2$ represents the distribution center. Any two or even all three of the nodes 0, $n+1$ and $n+2$ may coincide, in case they correspond to the same geographical location. For instance, in the special case when the distribution center uses its own vehicle and driver, the starting point node $n+1$, the end-point node 0, and the distribution center node $n+2$ will all coincide. Let $I_1 = \{1, 2, \ldots, n\}$ be the set of customers. The set of arcs $A \subseteq I \times I$ is defined as $A = \{(n+1, n+2)\} \bigcup \{(n+2, j) : j \in I_1 \cup \{0\}\} \bigcup \{(i, j) : i \in I_1,\ j \in I_1 \cup \{0\}, i \neq j\}$. Also, for each $i \in I$, define $\Delta^+(i) = \{j \in I : (i, j) \in A\}$, and $\Delta^-(i) = \{j \in I : (j, i) \in A\}$.

Let $t_{ij} \geq 0$ be the travel time from node i to node j, for all $(i, j) \in A$. Let $[a_i, b_i]$ and s_i be the time window and service time associated with node i respectively, for all $i \in I$. For the starting point $n+1$ and end-point 0, we have $s_{n+1} = 0$ and $s_0 = 0$. Note that s_{n+2} represents

the amount of time needed from the time when the driver arrives at the distribution center $n+2$, until the time he or she departs from it, which includes the time needed to load the goods.

Let x_{ij} be the number of times that arc (i,j) is traversed, for all $(i,j) \in A$. Let w_i be the time of start of service of customer i, for all $i \in I_1 \bigcup \{n+2\}$. Let w_{n+1} be the time of departure from node $n+1$, and let w_0 be the time of arrival at node 0. Let M be large positive integer (say, $M = 10^{10}$). The quantities n, M, t_{ij}'s, s_i's, a_i's and b_i's are known parameters, whereas x_{ij}'s and w_i's are the decision variables.

The vehicle must start from node $n+1$, which denotes the vehicle's starting position at time 0, and then go directly to the distribution center, which is represented by node $n+2$. The vehicle must then visit all customer nodes in the set I_1, and finish at node 0, which denotes the vehicle's end-point.

The problem is formulated as a mixed-integer linear program (MILP) as follows:

$$\text{minimize} \quad \sum_{(i,j)\in A} t_{ij} x_{ij} \tag{3}$$

subject to:

$$w_{n+1} = 0 \tag{4}$$

$$x_{n+1,n+2} = 1 \tag{5}$$

$$\sum_{j \in \Delta^+(i)} x_{ij} = 1 \qquad \forall\, i \in I \setminus \{0\} \tag{6}$$

$$\sum_{i \in \Delta^-(j)} x_{ij} = 1 \qquad \forall\, j \in I \setminus \{n+1\} \tag{7}$$

$$w_i + s_i + t_{ij} - w_j \leq (1 - x_{ij})M \qquad \forall\ (i,j) \in A \tag{8}$$

$$a_i \leq w_i \leq b_i \qquad \forall\ i \in I \setminus \{n+1\} \tag{9}$$

$$x_{ij} \in \{0,1\} \qquad \forall\ (i,j) \in A \tag{10}$$

$$w_i \geq 0 \qquad \forall\, i \in I \tag{11}$$

The objective (3) is to minimize the total travel time. Equation (4) states that the vehicle must depart from the starting point $n+1$ at zero time. Equation (5) states that it must then visit node $n+2$, which is the distribution center (in order to load the goods to be delivered). Equation (6) ensures that the vehicle leaves each node exactly once, apart from the endpoint node 0. Similarly, equation (7) ensures that the vehicle enters each node exactly once, apart from the starting node $n+1$. Constraints (8)-(9) guarantee the feasibility of the schedule, with respect to time considerations.

Note that there is no check for the capacity constraint in this model. We assume that this happened in a previous stage, and specifically that the total demand of all the customers in the set I_1 does not exceed the vehicle's capacity.

The MILP presented above can be implemented using a mathematical programming solver like CPlex and it can be used to find the exact optimal solution for small instances. However, the TSP and its variants, including the adapted TSPTW presented here, are NP-hard. Therefore, for large instances, appropriate heuristics may need to be developed.

Note: The adapted TSPTW can easily be extended for the case of more than one vehicles, into the *adapted Vehicle Routing Problem with Time Windows (adapted VRPTW)*. A comprehensive study of the Vehicle Routing Problem and its variants, including the classical VRPTW, can be found in Toth & Vigo (2014) (4).

4.4 Delivery Optimization Part IV: Dynamically updating current routes, upon new order requests.

Scheduled routes may be modified dynamically upon new order requests, with the exception of 2-hour delivery routes which are not allowed to be altered once the driver has accepted the original order. In this subsection we will discuss how to dynamically insert a customer in an already scheduled route in an optimal way, for the cases where it is allowed to dynamically alter the routes.

When a request for a new order comes in, the distribution center (DC) where the relevant order will be picked up from will first be selected, according to the rules described in subsection 4.1. The new customer who placed the order may be inserted dynamically in a route which is currently being executed, incorporated in an already scheduled route whose execution has not started yet, or a new route may have to be created for that particular customer. Consider the following scenarios:

1. Suppose that there is already a scheduled route that involves pickup of items from the particular DC, but either the execution of this route has not started yet, or it has started but the vehicle has not left the DC yet. Then, if by adding the customer to that route the total load will exceed the capacity of the vehicle, we need to construct another route for that customer and either use another vehicle, or wait until the first vehicle finishes its route to be used again. In this case, depending on the time windows, we may wait until more orders arrive before we select another driver and schedule a new route, according to the rules of subsections 4.2 and 4.3.

   If on the other hand, by adding the new customer to an already scheduled route whose execution has not started (or it has started but the vehicle has not left the DC yet), the total load does not exceed the capacity of the vehicle, then we add the new customer to the existing set of customers I_1 that were to be served by the particular vehicle, and we re-optimize, by solving the MILP described in section 4.3 with the new set of customers.

In this case, depending on the geographic location of the nodes, the travel times, service times and time windows, the order in which customers are visited in the new route may differ from the original one, but the new route will be optimal with respect to minimizing the total travel time, and it will include the new customer (not necessarily at the end of the route). Of course, it is possible that due to the time windows, the new problem is infeasible; in which case, we need to create another route, as described in the previous paragraph.

2. Suppose that there is no route scheduled for the specific DC. Then obviously we need to select an available driver and construct a new route for that customer. As before, depending on the time windows of that customer, we may or may not be able to wait until more orders arrive before we select a driver and create a new route, as described in subsections 4.2 and 4.3.
3. Suppose that there is at least one scheduled route that involves pickup of items from the selected DC, whose execution has already started and whose respective vehicle has already left the DC. Let $K = \{1, 2, ..., |K|\}$ be the set of all such $|K|$ routes (where $|K| \geq 1$). We wish to select the single route $k^* \in K$ to insert the new customer, and the right position within that route, so that all customers are served within their requested time windows, the capacity constraint is always satisfied and the increase in the total travel time after including the new customer is minimized. In general, the sequence in which customers are visited may completely change after rescheduling.

    - **Strategy A (re-optimize):** For each $k \in K$ separately, we perform the following:

      We add the new customer to the set of customers, remove the served ones, update n as the number of the remaining customers of the route, and relabel the remaining customers as nodes $1, 2, ..., n$, as well as the nodes $n + 1$ and $n + 2$ as the current position of the vehicle and the DC node, respectively. We then solve again the

adapted TSPTW using the model of subsection 4.3, and we get the total travel time $T_1(k) := \sum_{(i,j)\in A} t_{ij}x_{ij}$ of vehicle k, concerning the remaining customers and including the new customer.

We then repeat the process described in the previous paragraph, but without including the new customer. We then get the total travel time $T_0(k) := \sum_{(i,j)\in A} t_{ij}x_{ij}$ of vehicle k, concerning the remaining customers and excluding the new customer.

We then select the single vehicle k^* for which $T_1(k^*) - T_0(k^*) = \min\{T_1(k) - T_0(k) | k \in K\}$, i.e. the one which gives the minimum increase in the travel time after including the extra customer.

- **Strategy B:** For each $k \in K$ separately, we perform the following:

  Find the point on the remaining part of the scheduled route k that is the closest to the DC. Suppose that originally, vehicle k was supposed to pass from this point at time $\theta(k)$. Let n be the number of the remaining customers that were scheduled to be served after $\theta(k)$, increased by one (for the new customer). Denote by $n+2$ the position on the remaining part of the scheduled route k that is the closest to the DC. Then, with $n+2$ as the new starting position and relabeling as $\{1, 2, ..., n\}$ the set of the customers that were scheduled to be served after time $\theta(k)$ extended by including the new customer, solve again the adapted TSPTW of subsection 4.3, to re-optimize the part of the route after time $\theta(k)$, and get the total travel time $T_3(k) := \sum_{(i,j)\in A} t_{ij}x_{ij}$ of vehicle k after time $\theta(k)$, including the new customer.
  Using the same starting node and starting time $\theta(k)$, we repeat the process described in the previous paragraph, but without including the new customer. We then get the

total travel time $T_2(k) := \sum_{(i,j)\in A} t_{ij}x_{ij}$ of vehicle k after time $\theta(k)$, excluding the new customer.

We then select the single vehicle k^* for which $T_3(k^*) - T_2(k^*) = \min\{T_3(k) - T_2(k) | k \in K\}$, i.e. the one which gives the minimum increase in the travel time after including the new customer.

Therefore, by using either strategy A or strategy B, we can select the single route $k^* \in K$ in which the new customer must be inserted. The process described above also provides the way to construct the updated route k^*.

Note that in scenario 3, the proposed strategies are both heuristic ones and may give optimal or sub-optimal solutions. Also, for both strategies A and B, we assume that at the time when re-optimizing starts, the sum of the total load of each vehicle and the demand of the new customer, does not exceed the capacity of the vehicle. Strategy A may work well in cases where the time windows are tight and dramatically affect the routes. For instance, it may be preferred when there is urgency to serve the new customer early. Strategy B may be more appropriate in cases where there is flexibility at the time when the new customer may be served.

5. Platform Governance

In this section issues pertaining to governance, consensus and settlement are covered.

5.1. Self-Governance

Members of the Buying.com platform are integral to the governance and operations of the network. A participant can be considered a member of the network if they have a Buying.com account. Such an account can be set up using the Buying.com application. The app and associated account are the same for all members be they consumers, microdistribution node operators or delivery drivers.

All members form the core governing community of the platform. The platform has no default voting processes, campaigns, or constitution. The governing community decides on an ad hoc basis to give consensus (proved against the network) on road mapped platform functionality. Such functionality may include:

- New delivery areas to cover by the microdistribution network.
- Modification to existing services (pricing, dropshipping, chargeback options etc.)
- New services offered by the network (drone delivery, assembly services)
- New rewards and partner integrations.

Participation in the decision making of the Buying.com platform is voluntary. A member with the Buying.com app will be prompted to choose between two or more choices. These choices will allow for the platform to aggregate and deduce the most demanded functionality. With this method, the platform is able to govern itself in terms of core product, focusing exclusively on demanded functionality first, with minimal time/energy debt to the member.

5.2. Ricardian Contracts

The digital issuance of instruments can be viewed as the issuance of contracts. A Ricardian contract is the issue (6). Such smart contracts not only consist of code but additionally are allowed to contain legal prose. The rationale behind this is to give the code legitimacy that is rooted in the associated legal prose (7). Buying.com uses Ricardian contracts as a way to attach terms and conditions on a per-transaction basis.

5.3. Microdistribution and Delivery Driver Reputation System

A reputation system will be developed to assess microdistributor nodes as well as delivery drivers. This will be helpful in determining staking amounts, inventory allocation and dynamic pricing. The reputation system that Buying.com will implement will be based on the well-documented Eigen Trust algorithm for reputation management in P2P networks (8).

5.4. Real-Time Reconciliation

The Buying.com platform will provide an API to supplier partners or other third-party retailers that would allow them to monitor payment authorizations,
dates and cash flows. This will be immensely helpful to such partners because it can achieve real-time reconciliation and automate many back-office procedures.

5.5. Proof of Delivery

During deliveries, drivers are responsible to keep Proof of Delivery. When at the time of delivery the customer is present their signature will be required or some other biometric form of id (on the Buying.com app). This along with the date, time, and proof of arrival at the designated delivery location (GPS coordinates) will be recorded. If, on the other hand, the customer is not present at the delivery location (house) then the date of delivery, the time of delivery and proof of arrival at the designated (location coordinates GPS) will be recorded, along with a photograph of the place. Proof of Delivery will be achieved using a multi-signature scheme between the delivery driver, the consumer and the microdistribution node.

5.6. Settlement and Escrow Mechanism

An optional smart contract-based escrow mechanism will be used to settle delivery payments of orders of high-enough value. This escrow mechanism will be available to customers for a nominal fee. The customer will pay tokens into the escrow, then the vendor will release the goods which are delivered to the customer via a microdistribution node. Proof of delivery as described in Section 5.5, will be employed by this escrow mechanism to ascertain delivery and partially establish initial customer satisfaction before releasing funds to the vendor.

The Buying.com platform has also provisioned for a returns processing mechanism. If a customer files an intent to return the delivered goods, then a smart contract allocates the released funds from the vendor to the escrow. Once the customer ships the returned items and the vendor accepts the return- ascertained by Proof of Acceptance, akin to Proof of Delivery-then the smart contract releases tokens to the customer.

5.7. Chargeback Minimization

A chargeback is the return of funds to a consumer, initiated by the issuing bank of the instrument used by a consumer to settle a debt. Even though chargebacks were created as a form of consumer protection, dated industry regulations have allowed chargebacks to pose a threat to retailers. Consumers can use chargebacks for a number of wrong reasons, like avoiding restocking fees on order returns, “buyer’s remorse,” not acting promptly resulting in time limit expiration and so on (9). Chargebacks can incur transaction fees for the retailer or even fines, and thus have a serious adverse impact on business sustainability. Minimizing chargebacks has been a challenge due to the number of parties involved and the complexity of their interactions. The escrow mechanism utilized by the Buying.com platform for returns processing constitutes an innovative way to minimize chargebacks.

5.8. Third-Party Retailer Integration

The Buying.com platform needs to bring in other retailers, manufacturers, wholesalers for drop shipping to work. The Genesis feature will allow all retailers, e-commerce players, distributors, wholesalers, even peer-to-peer network participants to upload their inventory. Genesis will know where and what is located in every neighborhood on every street across the United States of America. The asking price, condition, description of every item in Genesis will be known.

This information will be geo-fenced unique to each user's location. To achieve real-time knowledge of existing inventory would require third parties to expose their inventory to the buying.com platform. However, such third parties might be reluctant to share inventory information publicly. This relates to inventory disclosure under regulatory reporting. Reporting Inventory balances of a company's operating segment (financial, manufacturing, raw materials, work-in-progress) can disclose previously hidden risks and thus affect valuation negatively (10, 11).

In order to void the above complication Buying.com third-parties will be required to disclose only necessary inventory. Since IPFS is already used for record keeping of KYC/AML it can also store inventory in order avoid posing unnecessary burden to the blockchain. In addition to keeping the inventory it can keep a user-defined threshold for each inventory item so that as soon as inventory numbers drop below the threshold a re-order is triggered automatically.

6. Network Scalability and Effects

Network effects are crucial for a company like Buying.com because such effects are the most important means to build defensibility fora tech company. The Buying.com ecosystem exhibits several network effects.

- General Direct Network Effects: The increased usage of the Buying.com service eitheras it applies to the microdistribution network or to MOQ ordering will lead to a direct increase in the value of the service and its users. Moreover, because of the topology of the network, certain subgraphs corresponding to the regional delivery networks will be densely connected. Such densely connected subgraphs cement people's commitment to the network and according to Reed's Law (12) the true value of such a network increases *exponentially* with respect to the number of nodes.

- Protocol Network Effects: Such effects arise when a computational standardis used by all participating nodes in the network and new potential users can join the network by employing said protocol. This is potentially a very strongnetwork effect because once the protocol has been adopted it is extremely difficult to replace. In the case of Buying.com one of the more well-known blockchain protocols, namely the Algorand protocol, will be leveraged to expedite the Buying.com protocol establishment and its ubiquitous adoption.
- Personal Utility Network Effects: Buying.com will have the users' personal identity tied to the network. This makes the daily usage of the network essential to the personal and professional lives of all users. This applies to several categories of users on the Buy ing.com: network suppliers, consumers,users responsible for order fulfilment, owners of microdistributor nodes some of which have a reputation score assigned to them (e.g., delivery driver and microdistribution nodes). For people not being on the Buying.com network this will present significant impediments in the personal and professional since they cannot take advantage of the unique value Buying.comhas to offer.
- Direct Market Network Effects: Buying.com enhance already existing offlineprofessional distribution networks between suppliers, brick and mortar stores and fulfillments centers. It will achieve this by moving the entire integrated network online and by introducing to the network a finer localization granularity for delivery.
- N-Sided Marketplace and Platform Effects: There are several sides to the Buying.com network but they can be roughly distinguished between to buyersand sellers and distributors. A network like Buying.com's is hard to disrupt because it offers a better value proposition to all three sides simultaneously. Consumers get faster delivery times at cheaper prices. Distribution and order fulfilment is decentralized allowing people to enter the gig economy with insignificant entry cost, and sellers can optimize last mile delivery costs.

7. Cryptoeconomics – Tokenomics

The following subsections cover aspects of the token economy of the Buying.com network such as staking, pricing, and incentivization and rewards schemes.

7.1. Staking Mechanism

A crucial aspect of accepting new microdistributor nodes to the existing Buying.com ecosystem is staking. During the onboarding process, prospective microdistributor nodes need to stake, i.e., deposit with the Buying.com platform a specified amount of BUY tokens. This staking of tokens has a dual function.
First, it functions as an investment into the ecosystem and as a mechanism to encourage network growth in terms of size and consequently in terms of token value. Secondly, these tokens function as collateral to the value of the inventory held by a microdistributor. In fact, a microdistributor cannot hold inventory valued at more than the amount staked.

The staked amount is flat for all new microdistributor nodes and can be periodically revised depending on the rating of the node provided by the network's reputation system. The reputation system is described in Section 5.3.

7.2. Dynamic Delivery Pricing

The Buying.com platform will leverage algorithms for optimized order delivery (vid. Section 4) to also dynamically determine pricing. Other factors that will be taken into consideration when determining the price include but are not limited to the type of goods delivered (FMCG or not), the delivery time requested by the consumer, demand forecasting, MOQ level and the driver/microdistribution node reputation score.

7.3. Incentivization and Reward Schemes

The Buying.com platform will offer several ways to incentives engagement and

behavior beneficial to the network for both micro-distributors and consumers. These incentives will take the form of rewards. More specifically:

- Holding Costs: These are associated with costs of storing inventory that remains un-sold. Such costs include insurance, security, obsolescence, and rent where applicable. Micro-distributor nodes need to be incentivized to store goods that are not as fast moving as others. This incentivization can be achieved rewarding nodes with a higher percentage of the delivery cost.

- Delivery Options: Consumers placing an order using a the Buying.com will be given several delivery options.

    1. Door-to-door home delivery within 24 hours is the standard option.
    2. Door-to-door home delivery within 2-hours is only applicable to FMCG.
    3. Option to pick-up from a local micro-distribution node (e.g., walk three doors down to the neighbors garage to pick up your order).

    The reasons for the pick-up option being more attractive to certain consumers becomes clear when one considers issues of security and convenience. This option caters to people with busy schedules who might not be present at home during delivery times. Hence, any parcel left outside the house becomes liable to theft. Such consumers might prefer to pick up their order at their convenience. For this reason no discount will be offered for the pick-up option. This reflect a growing trend among established industry players like Amazon of making delivery more *customer-centric*. The delivery destination is no longer tied to a particular place (e.g., home) but is customer location-aware.

- **Subscription Plan:** When ordering FMCG on the Buying.com app, the system will theconsumer the option to an option to switch to a subscription plan. Pushing consumers towards recurrent orders helps with better demand forecasting and inventory optimization for the micro-distribution nodes. Switching to a subscription plan will be incentivized by offering additional price reductions.

- **Recommender System:** A product recommendation system alerts consumers to furtherprice reductions opportunities. Buying.com has the ability to detect ordering patterns (e.g., locality and seasonality) by using AI and machine learning techniques and recommend to the consumer to join a particular order pool. This has the effect of maximizingthe probability of achieving MOQ levels and thus wholesale pricing.

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