



Revolutionizing Supply Chain through IoT, AI and Blockchain

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PREFACE - ABOUT THE FOUNDERS

“Trust – At the heart of everything we do”

In a world of uncertainties, we find it of foremost importance to establish an atmosphere of trust and transparency. That’s why we’ve placed this section right at the beginning of our whitepaper document. We are aware of the many misgivings that players in the cryptocurrency ecosystem have about companies undertaking ICOs. These misgivings are not unfounded.

The Discovery Network is run by Copter Technologies, a company incorporated in India. It was founded by seasoned entrepreneurs with established credibility in the market:

Selvam VMS, Co-Founder & CEO

Selvam is a seasoned professional in the domain of Supply Chain Management and Marketing. He is the 3rd generation member of the founding family of Butterfly Kitchen Appliances (www.butterflyindia.com), a leader and a household brand name in the Indian market. Butterfly is a publicly listed & traded company on the Indian National Stock Exchange (NSE) (www.nseindia.com Symbol: Butterfly) and the Bombay Stock Exchange (BSE) (www.bseindia.com, Code: 517421), with a market capitalization of over INR 10 Billion (USD 150 million). He was actively involved in the operations of Butterfly before moving to entrepreneurial ventures.

Selvam is an Engineer with a Master’s in Business Administration (MBA) from Purdue University (www.purdue.edu). He specialized in Supply Chain Management and Marketing in his Master’s studies and worked with Dell in their SCM function before returning to India to handle his family business.

At Butterfly, Selvam headed the Marketing and SCM domains and has been credited with growing business revenues from less than INR 650million (USD 10 million) to over INR 5 Billion (USD 75 million) in less than 7 years. He was instrumental in turning the company around to profitability through various marketing and pricing initiatives. He was a key member of the team that successfully raised a Private Equity investment of INR 1 Billion (USD 15 Million) from a large Indian PE firm. The PE has since exited the company through a secondary sale, striking great returns in the process.

After a successful stint of 7 years with Butterfly, Selvam branched out to set his own SCM Company, H&S Supply Chain Services (www.hssupplychain.com). Within 3 years he has built an organization that now grosses over \$3million in revenues, working with some of the top



consumer product brands in India. He has a very sharp business acumen and strives to build win-win relationships with all stakeholders. This has helped H&S to deliver profitability levels of more than 20% in a highly competitive market, and handsome returns (34% ROI) to its investors.

Discovery was born out of the various problems that Selvam has directly encountered in Marketing and SCM, as a brand as well as a service provider. As Peter Thiel puts it, the best problems for a founder to work on are the ones she faces daily, not the ones she searches out. Selvam has a very deep understanding of the problems that Discovery sets out to solve. He understands the nuances of the problems and the value the solution adds to a client's decision making processes.

By virtue of his prior experience in working with investors across two very different industry segments, Selvam has a clear understanding of the expectations of the investor community. He holds their interest in high stead. He practices very high levels of transparency and ethics and is a firm believer in handling investor's trust and confidence with utmost care and respect.

Selvam can be reached through his LinkedIn profile [here](#).

Kumar T, Co-Founder & CTO

A techie at heart, Kumar is a technical entrepreneur who has demonstrated tremendous tenacity in building businesses. He runs the successful software development company iStudio Technologies (www.istudiotech.com), which he has built from scratch.

iStudio's client base includes some of the most reputed organizations in India, and this stands as testimony to the importance he places on customer satisfaction. He has enormous industry experience and specializes in the following areas:

- Artificial Intelligence, Machine Learning & Deep Learning
- P2P Algorithms & Blockchain
- Autonomous Drones
- Predictive & Precision Medicine
- IoT Hardware & Protocols, Miniaturization
- Cyborg Bugs

He has great passion for building products with innovative approaches. He is a strong advocate of challenging the status quo and is ever willing to take up challenges that are path-breaking. Kumar is an avid dreamer and strong believer in the potential of technology to change all facets of mankind in a positive and constructive manner. Kumar's LinkedIn



profile can be viewed [here](#).

Kumar and Selvam have known each other for more than 5 years, and have worked together on various projects during Selvam's stint with Butterfly as well as at H&S.

As a demonstration of their confidence, the founders have already invested more than USD 100,000 of their personal money into the business, in various forms. The ICO fundraising route is being explored to give wings to the idea, helping it chart the exponential growth trajectory that it deserves. Given that the underlying business is cryptocurrency driven, the founders have determined an ICO to be the most pertinent route for the fundraising, rather than the traditional VC/PE route.

Kumar & Selvam look forward to having you on board on Discovery's journey in the exciting space of IoT and Blockchain.



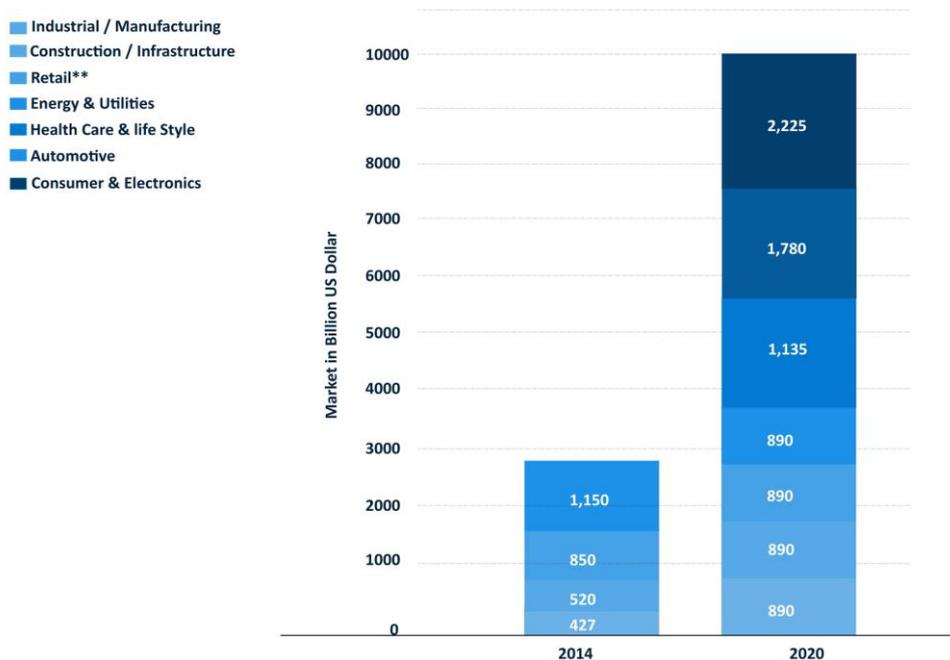
EXECUTIVE SUMMARY

“All world-changing products have one thing in common – they arise as a direct consequence of the convergence of multiple, individually revolutionary technologies

THE INTERNET OF THINGS

The internet permeates deep into our lives. Everything seems to be connected to the internet in some way or the other. Globally the IoT market is expected to reach \$9 Trillion by 2020 from \$3Trillion in 2014, growing at a staggering 20% CAGR.

Size of the IoT market worldwide in 2014 and 2020, by industry (in billion U.S. dollars)



For an increasing number of devices to connect to the internet, a reliable communications network is necessary. Not surprisingly, it is estimated that more than a fifth of the total IoT spend is on connectivity infrastructure.

Dubbed as part of the Industry 4.0, IoT is expected to bridge the gap between the physical



and the digital world, opening up a plethora of opportunities for the industry and consumers to benefit from. Applications of IoT are unlimited, and range from consumer electronics to life sciences, logistics to retail. Gartner estimates that there will be about 50 billion connected devices by 2020, with the spend on IoT services expected to cross \$7 Trillion.



Discovery

AN IOT NETWORK

Revolutionizing Supply Chain



Blockchain



IOT



Artificial
Intelligence



Edge
Computing

DISCOVERY

Discovery is a revolutionary solution that enables brands to track their products through their supply chains accurately and on a real-time basis.

The world believes in the potential of the **Internet-of-Things** (IoT). The impact of **mobile telecommunications** on the world is indisputable. Imagine the potential of a product that is born out of the convergence of these two technologies. We at Discovery believe in the phenomenal power of this convergence and are developing a product that will help harness the power of the IoT through the reach of mobile telephony. The level of visibility and control that this could potentially open up for enterprises across the world is path-breaking.

At its core, Discovery is an IoT led supply chain solution that is run through a network of Decentralized Nodes, residing on the smartphones phones of a community of users. What makes Discovery unique is that it blends together three layers into a one-stop solution: The hardware layer (Cliot), The distributed data harvesting layer (user community) and the Data Analytics/Artificial Intelligence layer. Discovery makes IoT an affordable solution for tracking daily products (and not just high-end luxury handbags) by disrupting the costs of the hardware and tracking simultaneously.

The various building blocks of the Discovery eco-system are explained in the following section.



THE DISCOVERY ECOSYSTEM

The Discovery Ecosystem has three main components/players:

ENTERPRISE CLIENTS

These are the paying customers or buyers of the Discovery Communications Network. Enterprises are typically brands that would like to track their products through their supply chain. For instance, Nestle – an Enterprise – could track their each and every unit of their chocolate bars throughout their supply chain – how many of each unit is lying at each warehouse, with each stockist, at each retail outlet and so on. We would be able to help Nestle handle this tracking solution and they would be paying for the service thus received.

THE IoT TAG- “CLIOT”

The **Clot** is a uniquely identifiable **self-charging printable tag** placed on the product to be tracked. We are developing it along the lines of a printable solution, where mass-production could take place through a decentralized infrastructure. Each enterprise user could print their own set of tags based on a pre-defined protocol built on the lines of EAN. Since data transfer from the tag is meant to be periodic (~100 times/day), and since the data blocks are very small (a few bytes to 1kb), battery life is expected to be long. Moreover, the device would be self-charging, drawing power from electromagnetic waves (cellular network / Wi-Fi waves). This would make the tag long-lasting, at very low cost (~\$0.05 - \$0.10 per tag). We believe this would help penetrate IoT to applications that were hitherto considered too cost conscious to warrant such application.

THE USER COMMUNITY

At the front end of the Discovery Network, a number of individual users would have the Discovery app installed on their mobile phones. These mobile phones would then serve as the nodes of the blockchain network. The Network harnesses the residual power and network capabilities that reside in the mobile phones of individual community members, thereby creating a global communications network.

These User Community would be compensated for lending their mobile phone’s data connectivity to the Discovery Network. The financial compensation to the user community would be commensurate to the data prices charged by the underlying telecom network, costs of which have been in free-fall mode over the past few years. The community member would be able to generate a handsome profit after netting off the data charges



that he would incur. More details on the economics for the user can be seen in the “Unit Economics” section of this paper. This would render possible delivery of the service to “Enterprises” at exceptionally low costs compared to the currently available solutions. Further, as the network is built on the base of the blockchain, the data generated by the system is not only accurate and timely, but also secure and reliable, which is very critical for enterprise customers.

The cornerstone of the Discovery Network is that it does not require any active effort from the User Community. It works on a passive mode, where the IoT device engages with the user’s mobile phone, through Wi-Fi and Bluetooth protocols, thereby connecting with the telecommunications network. The residual application on the mobile phone and the IoT device get paired through a smart contract, thereby enabling quick transmission of small “blocks” or packets of data to be transmitted over the cellular network.





The
Enterprise
solution



THE ENTERPRISE SOLUTION

THE PROBLEM STATEMENT

There are three fundamental problems Discovery sets out to solve:

1. Enterprises are unable to track products through their supply chain
2. Hardware costs of IoT products are prohibitive, restricting their penetration
3. IoT communications networks are unreliable, expensive and controlled by few companies

The Tracking Problem

Worldwide, companies suffer due to lack of visibility of their assets/products through their supply chain. Companies that sell through a long sales channel – importers, brand franchisees, wholesalers, super-stockists, distributors & retail outlets – in particular suffer from the opaqueness of data from the channel. Each player in the channel operates in a walled-silo of information, divulging only information that suits their requirements. Each one optimizes data flow to help their cause, thereby creating multiple local maxima, while the system operates at a fraction of the global maxima in terms of efficiency.

This leads to the following three problems:

Sub-optimal trade marketing spends

The term “Trade Marketing” refers to those activities that are undertaken **in-store**, in order to increase a brand’s market share. This could include activities like in-store promoters, slotting fees, display fees, discounts/schemes to trade, etc. Globally, consumer companies spend about 11% of their revenues on Trade Marketing. Ideally, these activities must be planned and budgeted, based on the stock level at the store, and sell-out from the outlet. However, because of lack of visibility of the store’s stock and sell-out levels, companies plan this budget based on past data, which leads to tremendous inefficiencies. For instance, despite a product having high consumer acceptance at a particular outlet (no effort required from the outlet to sell), brands may continue to be paying the outlet undeserved monies; while denying proportional money to a deserving outlet, where product acceptance is low (and thus, outlet’s effort required to sell the product is high). At 11% of revenues, Trade Marketing accounts for a global spend of \$3.3 Trillion per annum. An improvement in spending efficiency of 10% would add a **value of \$330 Billion** to the industry!

Loss of shelf space



In today's hyper-competitive world, retail shelf space is at a super-premium. Brands spend enormous amounts of money (part of the earlier explained Trade Marketing spends) to acquire shelf space for their products. Despite such premiums paid, often, due to the invisibility of sell-out data, companies fail to fill in the shelf with their products at the right time. Studies indicate that the global average stock-out level is 8.3%, or \$2.5 trillion. In most cases, stock-outs occur despite other players in the channel carrying stock of the same product. It is estimated that only about 27% of the stock-outs are unavoidable, that is, the channel completely drying out because of manufacturing/sales forecasting issues. This implies that 73% (or \$1.8 trillion) of the stock-outs occur due to mismatch of inventory in the channel. A reduction of stock-outs by 25% – by using our tracking solution – **would enhance brand sales (cumulatively) by \$450 billion.**

Stock Obsolescence

The opposite of the stock-out problem is the obsolescence problem. This is especially prevalent in the FMCG and Electronics industry, where products have limited shelf life and/or product lifecycles are increasingly short. Due to lack of visibility of channel stock information, often some layers of the channel end up carrying obsolete/old products. Retailers are estimated to suffer a revenue loss of 3.2% of topline, on account of stock obsolescence. A significant portion (75+%) is due to wrong decision making, which arises from lack of visibility of underlying reality (data). An improvement of 20% on this count would help **retailers and brands save \$190 Billion.**

PROBLEM HEAD	Problem Size	Addressability estimate	Total Addressable Market (TAM)
Suboptimal Trade Mktg Spend	\$ 3.3 Tn	10%	\$ 330 Bn
Loss of Shelf Space	\$ 1.8 Tn	25%	\$ 450 Bn
Stock Obsolescence	\$ 0.95 Tn	20%	\$ 190 Bn
TOTAL ADDRESSABLE MKT	\$ 6.1 Tn		\$ 970 Bn ~ \$ 1 Tn

The Hardware Problem

IoT has been the “next big thing” for a very long time now. Back in 2010, it was estimated that there would be 100 billion devices connected to the internet by 2016, but in reality, IoT



devices only numbered 10 billion in 2016. While there are projections that there would be 20 billion connected devices by 2020, pundits are sceptical about its achievability. Why?

One of the primary reasons for IoT not having taken off as projected is the cost of hardware. Presently, its cost has restricted its application to the “aspirational” products like Fitbit fitness trackers and Amazon Echo assistants. For IoT to realize its true potential, feasibility must be established in the daily use products. For instance, a tube of toothpaste carrying a sensor indicating the quantity left, where the brand can then reach out to the customer with unique offers to induce re-purchase. Or a product as mundane as a cereal pack carrying an indicator to tip the company off about a potential repurchase and help it plan its stock level at the local retailer accordingly. It is applications like these that would make IoT an everyday thing, from the “aspirational” stance it holds today.

In order for such deep penetration, the cost of the corresponding hardware needs to crash to a fraction of what it is today. A tube of toothpaste cannot afford a \$1 device, but can afford a \$0.05 IoT tag. It is at this price point that IoT would truly become an explosive technology that permeates our daily lives.

The Network Problem

The other challenge that is plaguing the IoT industry is the lack of a cost-effective communications network. Traditional GPS/Cellular Networks are prohibitively expensive, while Wi-Fi and other similar short-range protocols are, well, too short in range!

Today’s IoT devices depend mainly on the Wi-Fi network. Put in a different perspective, they are restricted to be placed inside homes, cafés and other indoor areas with Wi-Fi connectivity. Thus, while we have moved seamlessly into the era of the internet and wireless connectivity, our devices have been relegated to remain in the 20th century, in terms of technology.



CUSTOMER SEGMENTS

We plan to move our business cycle through two phases of operations.

- Phase 1: An IoT solutions provider backed by a blockchain enabled network
- Phase 2: A pure-play IoT communications network that any IoT device can be reached through

In phase 1, we would need to play the role of a complete solutions provider in the IoT space, giving our clients a hardware, network and analytics solution for their specific problems. This would be the phase where we would work towards familiarizing the industry with the disproportionate rewards that an investment in an IoT solution could bring to them. We would be working very closely with enterprises in select industries that have a deep requirement for such solutions, and would benefit the most from an IoT solution. This would also be the phase where we would work on building a threshold volume of community members to build the communications network.

Once a sizeable community is built, we would undergo a metamorphosis to become an industry-agnostic network provider. In this phase – phase 2 – we would turn into a global network that any IoT service provider can use for their communication purposes. We would be working on a usage fee model, at cost levels which make it worthwhile for users to use our products all around the world.

Phase 1 of the Business

In the early phase of adoption, Discovery would be a solution provider to companies that have a requirement for tracking of their products/assets through a channel, at various points in time.

Specifically, Discovery would target the following industries as the early adopters of the solution:

Consumer Durables

The consumer durables sector includes Automobiles, Parts, Home Furnishings, Tools, Appliances, Electronics and Hardware. The global market for this industry stands at \$13 trillion, growing at a healthy CAGR of 8%. This sector primarily relies on channel sales (warehouse – distributor – dealer – retailer) to reach the end consumer. This industry runs on very high channel inventory (average of 60 days inventory from parts manufacturer to store). The industry is also plagued by the inherent lack of data sharing and transparency through various layers of the channel. By virtue of the intensity of these factors, visibility of



stock levels would add tremendous value to brands/manufacturers. They would not only be able to plan their production and shipping better, but also give much better visibility to their component suppliers and vendors.

Fast Moving Consumer Goods

Products covered in this sector include Personal Care Products, Packaged Foods, Drinks, Cosmetics, etc. The global size of this market stands at a staggering \$8 trillion, with brands like Nestle, P&G, PepsiCo, Unilever and Coca-Cola capturing the highest market shares. Though the inventory levels in this industry are lower (15 days), this industry also sells through a long channel and thus suffers from the lack of data sharing across the channel. As these products have definite shelf lives (unlike consumer durables where the products do not “expire”), it becomes very critical for the retailer’s shelf to be stocked with the right product at the right time. While over-stocking would result in higher costs (arising from the expiry of unsold products, among other costs), under-stocking could lead to stock-outs resulting in loss of a brand’s market share. Thus, visibility of stocks at various levels of the channel is very crucial for brands operating in this space.

Fashion and Apparel

This industry has its own unique set of challenges. In addition to its global procurement norms, the industry suffers from a “season syndrome” – where products churn out of consumer acceptance every 2 to 3 months. By nature of the underlying consumer preference, brands would tremendously benefit from having visibility to channel stock and planning their further manufacturing accordingly. This industry is valued at \$1.7 Trillion and, on average, loses about \$350 billion on account of discounts offered on obsolete (out of season) products to consumers. As the industry runs on matching product design to consumer choice, some products (SKUs) perform well in some stores, while performing poorly on other outlets. With proper visibility of sell-out from retail shelves, a significant proportion of the \$350 billion loss can be avoided by redistributing stocks to the right outlets/regions.

There are other similar industries (pharmaceuticals, fresh produce etc.), that have a strong requirement for a low-cost product tracking solution. **We estimate a total global target industry size of about \$30 Trillion.**



Phase 2 of the Business

Discovery for everyone

In this phase of the business, we would be transitioning into an IoT communications network provider, and any IoT device would be able to use our network for communication. Since the network would be available at a very low cost (\$0.01 per day for 150 pings), this would exponentially increase the application scope for the network.

Some of the areas the network will be of tremendous value to include:

- Biotechnology
- Telecommunications
- Manufacturing
- Food & Beverages
- Education
- Advertising
- Financial Services
- Insurance
- Construction
- Energy

By using a real-time IoT solution in the above industries, enterprise clients will be able to gain the following benefits:

1. Improving the quality of service or product
2. Improving productivity of the workforce
3. Increasing reliability of operations
4. Increasing asset productivity
5. Reducing cost of materials or waste
6. Accessing new customers
7. Increasing customer satisfaction to reduce churn and support costs, gain revenue
8. Insight into new products
9. Reducing risk of theft and other loss
10. Transitioning to service offerings
11. Linking price to business outcomes
12. Tracking product
13. Tracking supply chain logistics
14. Tracking sales and retail off-take data



EXISTING IOT SOLUTIONS

Currently IoT solutions revolve around the concepts of RFID (Radio Frequency Identifiable Devices), telecom network or other specialized communication devices.

RFID Devices

Ever since their use in military applications in World War II, RFID devices had been pitted as a path-breaking technology to track and trace products through the supply chain. This technology requires an RFID tag to be installed on the device/product, which communicates with a Reader through radio-waves. Detection happens based on PRAT (Passive Reader, Active Tag), ARPT (Active Reader, Passive Tag), or ARAT (Active Reader, Active Tag) systems.

While RFID has been used as the primary tracking mechanism globally over the past 2 decades, it has some serious limitations. Though the tag cost has come down significantly to about \$0.15 per tag, the major drawbacks of using RFID for tracking are the communication range and the requirement of a reader.

Being a high-frequency radio wave based form of communication; the range of RFID (tag-reader) is notoriously low, ranging from a few centimetres to 200 metres. In other words, it would require a reader to be placed every 200m (highest range). This renders this technology non-viable as a solution for large-scale tracking/tracing of products over a large geographical area.

The underlying architecture of RFID requires a reader to recover data from a tag. This would exponentially increase the infrastructure cost for large scale applications.

These limitations have severely hampered the evolution of RFID, and have restricted its application for indoor tracking/counting like warehouses, retail stores etc.

Wi-Fi Network

The most popular communication mode for IoT device communication is through the Wi-Fi network. However, the inherent limitation of using this mode is that the IoT device must be within a Wi-Fi range, which limits the use of this methodology to indoor devices. Widespread use of this technology for tracking purposes has hence not happened so far.

Telecom network

The 2G/3G/4G telecom network can be used to transmit data from an IoT device to its central server. Given that mobile telecom network is widely available even in the remotest of areas, and is perpetually expanding even further, this solves the reach problem.



However, by definition, the telecom network is designed to carry large amounts of data through its network, and is not a cost-effective solution for most IoT devices where the data is transmitted in very small packet sizes (a few kb in size). Using the telecom network is thus a very expensive proposition for IoT device communication.

Specialized IoT communication networks

In the past year or so, new communication protocols specially designed for IoT devices have been developed. They have been especially built to carry small amounts of data that a typical IoT device will require. Sigfox and LoraWAN are two such networks that have gained some traction. However, these networks are also infrastructure based, that is, they require the installation of readers/towers at predefined distances (typically every 10Kms or so). Being a specialized application (IoT device communication), it would not be practically feasible to expand network coverage beyond large cities, thereby limiting the reach of these networks. Moreover, being highly centralized networks, they are prone to security issues from a data safety perspective, which is crucial for highly sensitive applications. Further, both Sigfox and LoraWAN suffer from issues of high pricing (\$0.10 per ping), limiting their application to high value tracking solutions only.

Thus, as we can see above, none of the currently available or developing solutions solve all the problems of reach, cost and scalability. Let's look at how Discovery solves all these problems concurrently, using the power of the blockchain.

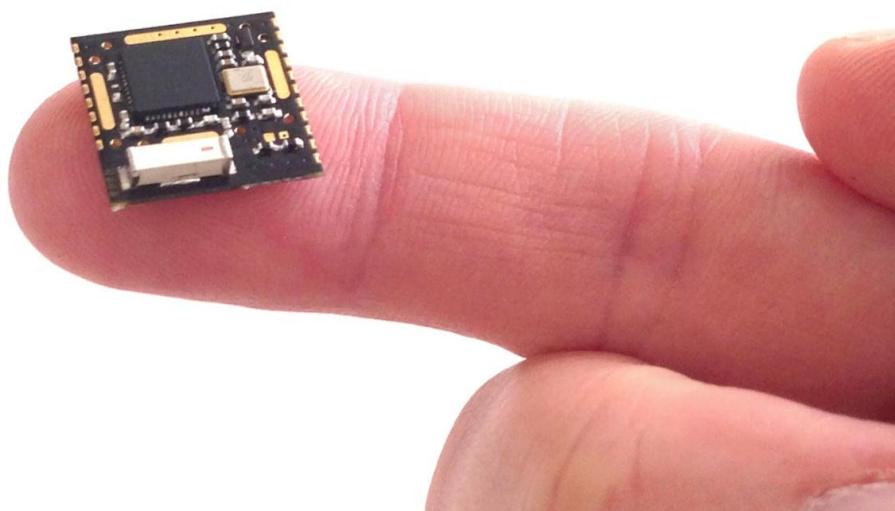


THE DISCOVERY SOLUTION

Discovery is a new breed of IoT device, coupled with a blockchain powered network that offers low cost, reliable and secure IoT communication, with the expansive reach of a telecommunications network.

CLIOT:

The Discovery Tag would be a revolutionary IoT device that puts IoT within the reach of all applications. Some of its features are listed below:



1. Low powered IOT device
2. Self-charging from external Radio/Wi-Fi frequencies
3. Max 30m Wi-Fi coverage
4. Waterproof IP6
5. Low cost: 5 – 10 US cents
6. Micro-sized: can be fixed in small products like cereal packs or toothpaste tubes
7. Can be integrated with other sensors like gyro sensor, heat sensor, temperature sensor, pressure sensor, a chemical sensor, IR sensor etc.
8. Works like a passive GPS – No live tracking, tracking can be done at a prescribed frequency



9. Customizable for individual industry requirements

Other Supporting sensors:

1. Accelerometer sensor
2. Light Sensor
3. Pressure sensor
4. Temperature sensor
5. Motion sensor
6. Vibration sensor
7. Parking sensor

Ambient Backscatter Technology

As the number of computing devices increases, along with the miniaturizing of sizes with technological features, sourcing power for these devices gets more complicated.

Traditional modes of powering these devices, viz., wired connection or batteries, have limitations. While the infrastructure cost of a wired connection is very high, a battery system requires a lot of maintenance and periodic replacement. The power source thus becomes a major limiting factor to scale.

Ambient Backscatter overcomes this issue by making things simpler i.e. it gathers the pre-existing signals out there in the air transmitted through surrounding radio wave and RF signals, and use it as a power source and also for data transmission.

The main components of an ambient backscatter circuit are a transmitter, a receiver, and a harvester to generate, send and receive the data through yielding power signals. Ambient Backscatter avoids energy usage on its own.

Clot Security - Algorithm Implementation

We are aware that Bluetooth devices have some security issues. Given that our application is enterprise based, data security is of paramount importance. A lot of research has gone into making the process security and privacy compliant.

We present a privacy-aware access-control system for enabling BLE-based IoT devices. Let the notation E/E_p denotes an elliptic curve E over a prime finite field E_p , defined by an equation:

$$y^2 = x^3 + ax + b,$$

where $a, b \in F_p$ are constants such that $\Delta = 4a^3 + 27b^2 \neq 0$.



All points $P_i = (x_i, y_i)$ on E and the infinity point O form a cyclic group G under the operation of point addition $R = P + Q$ defined based on the chord-and-tangent rule. In addition, we define $t \cdot P = P + P + \dots + P$ (t times) as scalar multiplication, where P is a generator of G with order n .

- **Smart contract Setup:** server X generates a group G of elliptic curve points with prime order n and determines a generator P of G . Then, X chooses a master key

$$s \in \mathbb{Z}_n^*$$
 and a secure hash function $H : \{0, 1\}^* \times G \rightarrow \mathbb{Z}_q^*$.

Next, X calculates a master public key $PK_X = s \cdot P$, and publishes system parameters, i.e., (G, P, PK_X, H) . On the other hand, given *parameters*, the smartphone S picks a random number $x_S \in \mathbb{Z}_n^*$ as its own secret value and computes $PK_S = x_S \cdot P$ as the corresponding public key. During system initialization, a set of system parameters, i.e., (G, P, PK_X, PK_S, H) , are installed into each IoT device associated with server X .

- **Verification:** Firstly, an authentication between smartphone S and node X is performed via smart-contract. After authenticating the user, the smart contract provides a pseudo-identity ID_S for the user.

Given parameter, s and the identity ID_S of smartphone S , node smart contract X generates a random number

$$r_X \in \mathbb{Z}_n^*,$$

and calculates

$$R_X = r_X \cdot P, h_X = H(R_X, PK_S, ID_S, PK_X) \text{ and } s_X = r_X \cdot ID_S + h_X \cdot s \text{ mod } n.$$

Then, the server X returns (ID_S, s_X, R_X) to the smartphone, S which soon forwards it to the device D . Then, device D checks the validity of (ID_S, s_X, R_X) via whether the equation $s_X \cdot P = R_X \cdot ID_S + h_X \cdot PK_X \text{ mod } n$ holds or not. The correctness of (ID_S, s_X, R_X) is presented as follows: $s_X \cdot P = (r_X \cdot ID_S + h_X \cdot s) \cdot P = r_X \cdot ID_S \cdot P + h_X \cdot s \cdot P = R_X \cdot ID_S + h_X \cdot PK_X$. If the validity of (ID_S, s_X, R_X) holds, device D can be operated and accessed by smartphone S (and node smart contract X) and sends a success command as a response to smartphone





The Discovery Community



THE USER COMMUNITY:

As stated earlier, Discovery is a user-powered IoT network where a community of individual users provides communication capability through their smartphones. The Discovery Application that resides on the mobile phones of the user community acts as the bridge between the Cliot tag and the telecom network connected to the mobile phone. Some features of the application are given herewith:

Discovery Community User Mobile App

Discovery works on connecting individual smartphones of the user community through a Blockless DAG IoT Network. Given the massive penetration of smartphones among the population, and given that smartphones support sophisticated communication protocols like WIFI, Bluetooth and NFC, a massive user community network is created.

The front end of the Discovery platform is a Distributed App (D-App). These D-Apps receive smart-contracts from the eco-system, containing a private/public key of specific IoT tags that need to be tracked. Based on the current location (fetched from the phone) of the user, “Discovery Zones” (explained in the next section) within a proximity/regular travel route of the user are flashed and shared with the user. Once the smartphone (with the D-App) is within the vicinity (Wi-Fi range) of any of the IoT tags, they enter into a handshake (smart contract executed), and a ping is recorded on the network, containing tag details. Based on the IoT tag ID all the data corresponding to the IoT device will store in the Discovery App. This detail is then pushed into the servers of the enterprise customers (client), as and when the user is online and connected to the internet.

Discovery Zones

The application on the community member’s phone gives a regular update to the user, on the locations within a specified proximity of the user, where IoT tags are “possibly” located. This is updated in real-time to the user, to enable them to support the system with a large number of pings, and get rewarded in return. Estimation of “possible” Discovery Zones is done through an AI/ML interface based on ping locations of the day from other community members, as well as from historical data. The Discovery Zone flash is also done based on other information like regular travel route taken by the user, frequently visited locations etc. This is being done to ensure that the community member is able to take advantage of the program in as much of a passive mode (without any active role requirement) as possible. A leader-board will also be created to create a motivation among community members.



Sharing / referring Discovery Zone & Spots

A member can be able to refer a discovery zone to a friend, to enable them to partake in the benefits of the program. As the same tag gets “discovered” multiple times (150 times) in a day, there is enough room for members to participate within the same Discovery Zone.

Invite a friend

A member can be able to invite a friend into the Discovery network as a member. This will serve as an additional layer of security for the network, as new members referred by existing members are more likely to be legitimate nodes. Further, the identity of each member is stored in geographically specific nodes that can work as a decentralised account backup. In the eventuality of a community member’s mobile phone crashing, the data and the token for the member will be automatically restored from the node, harnessing the power of the block-chain.

Automatic pairing and data share

Once enabled, the member app will monitor signals of all available Discovery tag and start automatic pairing as per the connection policies. The Discovery tag or IoT device data will be shared automatically mobile app and shared as per policies to the client server.

This data in Member app will be erased periodically as IoT data are highly confidential and it needs to be integrated in Client enterprise application for daily business analysis. This will also ensure that the community members’ phone memory is not clogged.

Data Limits Configuration

Each member, through his D-App setting, will be able to set up limits of mobile data consumption by the Discovery Network. This limit can be set up on a periodic basis (“Limit Consumption in the month to 1GB”) or daily basis (“Limit my consumption today to 10MB), or as a % of available data (“Use 30% of remaining available data as per my telecom package”). This will ensure that the users’ data limits as per their contracts with telecom operators, is not breached.

Token Payment

Reward earned by a community member would be directly proportional to the data shared with the network. This, in turn, is directly proportional to the number of pings. Based on the number of pings the tokens will be calculated and relayed to the contract on the network. Since our reward is fixed in local fiat (for instance \$0.05 per 1000 pings), the reward will be released in the form of DIS tokens, converted from local fiat, based on the



currently prevailing market price of the DIS token, on crypto-exchanges.

All the payments in Discovery network will be DIS token based. Tokens will be backed by ERC20 compatible smart contracts on the ethereum network. Payment will be in the form of micropayments, to facilitate instant gratification for the user.

Predictive Transactions

One of the key facets of the Discovery Network is that most transactions are predictable in nature. We will be taking significant advantage of this fact, in helping increase the transactional capability of the network. The Network uses high-powered Machine Learning techniques to predict the locations of the IoT tags, and therefore, regulate/direct nodal traffic accordingly. This enables the network to handle 1000x the traffic that would otherwise be possible.



DISCOVERY'S PROPOSITION

DiscoveryIoT provides an unparalleled, low-cost and scalable solution for product tracking through the clients' supply chains. Some of the key features of the Discovery network are as below:

1. **Low Cost Tracking:** With the DiscoveryIoT solution, brands can track their products at as low as \$0.04 per month per product.
2. **Real-Time Visibility:** By virtue of the real-time visibility that the DiscoveryIoT solution affords, brands will be able to take decisions quickly and promptly, thereby helping them avoid cases of stock-outs, over-stocks etc.
3. **Custom Reports:** The DiscoveryIoT data analytics layer enables brands to build reports customized for their individual requirements. We realize that each industry and company have their unique requirements for reporting and analysis, and the DiscoveryIoT solution provides this flexibility.
4. **Token Economy:** All transactions through the DiscoveryIoT solution are token-based. This would enable instant payments to the user community, as well as enable micro-payments on the platform instantly.
5. **Scalability:** Being a crowd-sourced network, DiscoveryIoT provides very high levels of scalability of its services. As there is no dependence on any physical infrastructure (towers, readers, scanners etc.), the solution is highly scalable geographically.
6. **Security & Reliability:** The DiscoveryIoT solution is built on a blockchain platform and driven through smart contracts, making it highly secure and reliable for enterprise applications.



HOW DISCOVERY COMPARES WITH THE OTHER SOLUTIONS

	RFID	WIFI	Telecom	Sigfox	LoraWAN	Discovery
Coverage	Very Low	Low	High	High	High	High
Infrastructure requirements	Reader Required	Wifi routers/modem	Already setup	Towers Required	Towers Required	None
Suitable for wide range applications?	No	No	Yes	Yes	Yes	Yes
Tracking costs	None	None	Very high	High	High	Very low
Reliability	High	Low	High	High	High	Very High
Data security	Low	Low	Low	High	High	Very High
Decentralized platform?	Yes	Partially	No	No	No	Yes
Scalability	Low	Low	Low	Low	Low	High



OUR BUSINESS MODEL: The DIS Token

Discovery's Business Model would revolve around its stated vision of making the IoT communications network affordable, to help it add value to our daily lives. Our guiding principle will remain to make IoT a daily use technology. The blockchain platform enables us to do that.

The Discovery Eco-system comprises the community of users and the enterprise customers. While the community of users "lend" their mobile network for the IoT devices to communicate, the enterprise customers benefit tremendously from the information thus gained. Thus, in a manner of speaking, the community of users represent the service providers to the Discovery ecosystem, while the enterprises represent the buyers in the platform.

For the community, the Discovery platform will be delivered through a mobile application interface. Users will be able to join the Discovery network at any time by toggling their application status. Being a passively enabled network (no direct action required by the user to transmit the data), it is very important for the users to be able to define usage limits. To this end, they will also be able to set limits and define the data consumption limit on daily/aggregate basis. For instance, a user can limit the data consumption by Discovery, say, 100MB per day. Once this limit is reached, the app would automatically deactivate any further communication on the Discovery platform for that day. Since the pay-out to the user would be on a per-MB basis, and since such per-MB pay-out would be higher than the amount charged by the telecommunications network, it would motivate users to "lend" more of their network bandwidth and data limit to the Discovery community.

For the enterprise customer, Discovery aims to provide IoT solutions at a fraction of the cost that would be otherwise available. The underlying data to be transmitted would be different for each enterprise customer. For instance, one company could require capturing only latitude-longitude data of their products (in which case the data would be a few bytes to 1kb in size), while some other enterprises may have heavier applications (upload recorded video on an IoT camera, for example), where the data would be much heavier (a few MB in size). Further, the charge to the customer would be on a cost-per-MB basis, with an index for the frequency of pings (number of pings per day).

Pricing Mechanism

Discovery intends to charge the enterprise \$0.04 per product per month @ 1 ping/day. Compared to other existing solutions, this represents a **60-100x savings** in cost for the client, making it truly affordable to the enterprise customer. The payment by the enterprise



would be in the form of local fiat, which will be converted through a smart contract into DIS Tokens. It must be noted that the price to the client would be fixed on local fiat, and that the number of tokens to be paid against the services availed will be calculated based on the conversion rate of DIS to the local fiat on that particular day.

The company would retain 15% of the receipts from clients towards management fees. This 15% would be reflected as “Revenues” in the company’s books. The balance 85% would be converted into DIS tokens, of which 80% of the total would be paid to the user community for the services provided, on a flow-through basis. The balance 5% would be permanently burnt on every transaction (more details [here](#)). The pay-out to the user community would also be in the form of DIS Tokens via the Discovery Wallet. Since the charges payable to the user community will also be fixed on the basis of local fiat, the number of DIS Tokens payable would be calculated based on the DIS – USD conversion rate prevailing on that particular day. The DIS Tokens would be available on multiple exchanges, and the network would be integrated with the exchanges to get a seamless pay-out experience for the community.

Of the company’s revenues (15% management fees retained) the business will generate a gross profit of 50% - 70% of revenues (50% - 70% of the 20% total collection from the clients). These profits would be used to create a further network of users/enterprises through attractive promotions and offers, especially in newer geographies.

The Network usage fee (fee per MB) is meant to be indexed to the local fiat currency, not to the DIS Tokens price. The transactions would happen in the form of DIS Tokens, converted at the daily prevailing price vis-à-vis the local fiat.

The DIS Tokens will also be made transferrable for using services across multiple other online and offline channels. We intend to establish partnerships where the user will be able to use their accrued DIS Tokens for purchases with attractive discounts. DIS Tokens can also be sold on the exchanges at prevailing prices. Though we anticipate a multi-fold increase in the adoption of the Discovery Network—given the tremendous value it creates for the entire ecosystem of community members and enterprise customers—the total number of DIS Tokens created is limited, thereby creating tremendous demand for DIS Tokens, enhancing value of the Tokens and creating further value to investors and users alike.

As a governing policy, we have decided to keep adequate Tokens in circulation to create a seamless global network, while at the same time restricting the total supply to maintain scarcity and increase investor wealth. Thus no DIS Tokens will ever be created post the ICO, and all unsold DIS Tokens from the ICO will be destroyed.



BLOCKCHAIN AND IoT

As an evolutionary form of technology IoT is considered to be the collective force of **mechanical, computational, and digital devices** that join hands together in order to avoid human-to-computer or human –to-human interference in any form.

Blockchain on the other hand is a distributed networking system which is created to strengthen the security of any data or records through deploying its encrypted functionality into the system. Combining these two major technologies together they deliver some astonishing results like unmatched security system, easy access towards devices and applications, and recording data through smart machines.

Need for combining blockchain and IoT

Combining blockchain and IoT will definitely yield several benefits to all the industries which will solve major real life threats according to current scenario. Some of the striking advantages of combining these two technologies are:

a) Transparency

Blockchain as a technology provides complete transparency to the authorized person in the network thereby creating an undisputed link that connects several blocks, in order to carry out various transactions that keep happening between organizations regularly. In addition to monetary transactions, it also allows to trace the activity of data, goods or any kind of information that is sent through the link in the supply chain. It functions as a complete process right from the beginning where it keeps monitoring the links, rectifies the vulnerable areas, and also protecting the network from unauthorized players by denying them access into the network.

b) Data Privacy

Data stored in the blockchain assures complete privacy where it involves encryption and distributed storage process. This eventually creates trust among the parties who are a part of the organization's supply chain. Machines carry out the process of recording the details in a secured way, which is then used for transactions between any two parties. Throughout this process, there is no need for any manual involvement. Without access to the private keys to unlock the link, it is highly impossible to extract any data from the blockchain.

c) Autonomous

Smart contracts provide another very useful layer to the blockchain environment. A smart



creates a digital agreement with stringent rules, and the agreement gets executed only if the requirements are met and tested at any point of time. This is particularly useful in case of monetary transactions where the complete authority to receive the payment is offered only if the required service is been properly catered.

d) Security

Blockchain as a technology provides an unbreakable shield of protection to the IoT environment due to its nature. Privacy and security are the two demanding factors keeps prevailing in any IoT based device which needs a solid support like blockchain. Let's take smart home devices for instance where they consist of all our personal information, which requires a fool-proof later of privacy and security to be maintained around it. Ultimately it requires the help of internet to transfer data between the devices but not at the cost of paving way to hacking. It is not just restricted with household based security deliverance but it also includes business organizations and governments getting into the field since they cannot afford theft of their highly sensitive data.

By adding a blockchain layer to the IoT technology, 100% security and privacy can be offered to the underlying data and players involved. By storing data in a distributed infrastructure, the system thwarts attempts even by the most seasoned and proficient hackers to steal data from it. This paves the way for high end enterprise adoption of IoT technology, which is otherwise prone to hacking and data theft.

The Discovery Blockchain

Blockchain Protocol

After thorough analysis of various protocols that are available in the market currently, we have selected Neurochain as our preferred Blockchain Protocol. All our nodes are intelligent & individually autonomous agents capable of handling smart contract and other required process. We utilize Neurochain's new PII consensus algorithm – Proof of Involvement and integrity & Proof of Workflow. All the nodes are light weight (smartphones) and they pair with the ClIoT via public key and private key authentication. One of the basic requirements that the DiscoveryIoT network places on the protocol is scalability, as IoT infrastructure requires millions of IoT devices that needs to be connected in a p2p distributed infrastructure. Our blockchain solution is designed in a manner to be offer high level of scalability, as the nodes are decision making systems. Based on geo-location, all the nodes (smartphones) receive smart contracts containing pairing credentials, pairing location rules and the set of functions that needs to be executed via edge computing. All the data are stored in block, once the required process completed, only the



hashed/processed data is pushed to the cloud server. All the data is pushed via node's WiFi or GSM connection. In case of connectivity issues, the processed actionable data gets stored in the block temporarily in the node itself, and pushed to the cloud whenever internet is available.

AI & Edge Computing Nodes

Discovery nodes are built with AI and Edge computing capabilities. AI is used to take smart autonomous decisions, and Edge Computing is used for Data Analytics. The two layers are tightly coupled with each other in order to process and execute data amongst them in a seamless manner. Discovery's Machine Learning algorithms help predict the traffic time in network and allocate the pairing schedule with the ClIoT automatically. Through this approach, Discovery minimizes network latency significantly. AI implementation helps us to take predictive measures in multiple ways like network traffic management, predictive payments and device security. Discovery AI engine provides complete security to the blockchain from the external oracles. Even in case of an attack on any of the nodes, the network remains unaffected, as the DiscoveryIoT is completely decentralized (unlike traditional centralized IoT networks). This decentralization effectively eliminates possibilities of any DDoS attacks on the DiscoveryIoT network. In contrast, existing IoT networks are completely vulnerable to DDoS attack, frequency of which has increased 100% y-o-y in 2018. Moreover, Discovery AI agents alert all the nodes in the network about any attack patterns, so that all remaining nodes will preventively and automatically protect themselves against similar attacks. Predictive security is one of our major key features of Discovery IoT that ensure data and device security.

Edge computing is the second layer where all data analytics functions happen. In the existing IoT infrastructure, all the processes occur in the cloud, consuming significant server resources and resulting in high network latency. These two issues (server cost and high network latency) have been major impediments to mainstream IoT adoption. The DiscoveryIoT network tackles these challenges in a very innovative way, using the decentralized architecture of edge computing. As data analytics functions are conducted by the node within the block, there is no possibility of data tampering. All the data analytics logics and rules are set by the enterprise client, and the data gets processed in the data analytics engine based on such logics. The Data Analytics engine is programmed and designed to handle logics and rules of varying degrees of complexity.

Mesh Network with SWARM Intelligence

As the DiscoveryIoT network runs on light nodes (smartphones), it is imperative for us to ensure that the Edge computing memory consumption remains within reasonable limits



(<10% of the smartphone's processor capability). While 10% is sufficient to process simple tasks, complex rules/logics will require a higher processing capability. This is accomplished by implementing a Mesh network, based on SWARM intelligence. Complex tasks are distributed amongst nearby nodes, wherein the task is completed efficiently while at the same time not consuming too much of the processing power of any single node. As the nodes are completely unstable by nature, AI is used to distribute the task and to predict the environment for the data analytics engine. Through this approach, the DiscoveryIoT network can handle complex calculations efficiently, and at a fraction of the costs that would otherwise be incurred in the current architecture.

Disconnected Architecture

One of the banes of the existing IoT infrastructure is that it is built on a completely connected architecture. In other words, the IoT device is connected to the cloud via internet, and uses direct internet to push the data. This is the major reason for DDoS attacks on the current infrastructure. On the contrary, the DiscoveryIoT architecture is disconnected architecture, where the IoT device (Cliot) is not connected with the cloud. Rather than connecting with the internet directly, the Cliot connects with the node (smartphone), which in turn, connects to the internet using the node's network connectivity. This ensures that the Cliot can never be hacked. This Disconnected Architecture offers unprecedented level of security to the DiscoveryIoT infrastructure.

Intelligent Contracts

As described earlier, Smart contracts provide a new and scalable approach to handling decentralized environments. However, there is an inherent limitation that smart contracts can only handle simple logics and not complex calculations. Moreover, smart contracts are static in nature not amenable to frequent changes.

Another major limitation of smart contracts is their washing off of old information upon upgrades. As quoted by IoT and Data Science expert Mr. Parishit Joshi,

“If you directly replace a smart contract with an upgraded one, you will lose all of your smart contract bound information from the blockchain”

In view of the above limitations of the smart contract system, DiscoveryIoT has built an advanced Intelligent contract system which has the capability to process complex calculations and integrate with external oracles in a seamless way. Moreover, editing or altering such intelligent contracts is also very easy through a simple drag-and-drop interface. Clients can modify any part of the Intelligent contract at any time, without any loss of prior history on the blockchain.



UNIT ECONOMICS

The unit economics of this business needs to be evaluated for the company as well as for the community member (user).

Community Member (User)

For every transaction (ping) undertaken by the user on the network, (s)he will be commensurately compensated by way of DIS tokens. The proposed pay-out to the user is \$400 per GB of data transferred through their smartphone. This would be adjusted for local telecom rates.

The economics from a user's perspective would be as below:

Revenue/GB = \$400

Cost/GB (Average Data Cost): \$25

Profit/GB: \$375

Profit as a % of revenue: 94%

Being a passive task (no active involvement needed from the user), the above economics represents a very attractive proposition for the users. In most cases, users would be "renting out" unutilized data from their monthly packages, thereby taking the marginal cost incurred to zero.

An attractive proposition as outlined above would attract a lot of users to join our network, thereby strengthening our tracking capabilities even further. This, in turn, would expand our network even further, thereby expanding the scope of our offering to the enterprise clients. This will make our proposition even more attractive to the clients, enabling us to add more clients. This, in turn, would increase the earning potential of the user community even further. Thus, a virtuous cycle of satisfied clients and more revenue to user community would be established.

Company

At a unit level, the company shall retain 20% of the inflows from the enterprise client as management fees. Since the network is blockchain powered there are no transactional costs involved for the company, thus rendering the unit economics tremendously positive. The fixed costs will be absorbed from the management fee thus generated.



GO TO MARKET STRATEGY

In order to build a vibrant ecosystem of community members and enterprise customers, it is very important for us to build both sides of the ecosystem in a systematic and scalable manner. The value of the network to one side of the ecosystem would be proportional to the density of members on the other side. For instance, the value of the network to users would be proportional to the number of IoT devices (which in turn would be proportional to the number of enterprise customers), and vice versa.

Broadly, in order to activate the user base, we would employ B2C (Business-to-Consumer) strategies. These would revolve around referrals, digital marketing and community building initiatives. The enterprise customer building process, on the other hand, would be predominantly a B2B (Business-to-Business) approach, and would involve feet-on-street combined with LinkedIn reach-out.



With a clear view to building a truly global network of users and enterprise customers, a sizeable portion of the planned fundraise is being allocated to marketing activities.



BUILDING OUT THE USER COMMUNITY

We realize that one of the critical success factors of our business model is building out the user community quickly and at scale. A sizeable and vibrant user community is critical to ensure sufficient data collection points for brands, thereby providing them with meaningful information.

We also understand that building our user community in an organic manner would consume significant amount of time and resources. Thus, in order to expedite this process in an efficient manner, we will be undertaking the following approaches to build out our user community (in addition to the organic approaches mentioned [above](#)):

Targeting employees of shopping malls/supermarkets

This is the real low hanging fruit that would enable us to quickly build out the user community at our significant points of interest (retail stores). We would be approaching employees working at malls and supermarkets to install our apps on their phones.

These employees, by virtue of their jobs, spend their working hours at retail stores anyway. With our app running on their phones, they can double up as data collection nodes for the Discovery ecosystem. This would present them with significant earning potential.

To put things in perspective, let us look at the economics of this operation from an employee's perspective. On average, in countries like India and China, the monthly salary of a retail front-end employee is about USD 200 per month. By having the Discovery app running on their phones, these employees can easily transfer 4GM-5GB of data a month, giving them an earning potential of USD 1500-2000 per month, which is a 7.5x-10x of their monthly salaries. This would significantly help them improve their lifestyles to a different level.

Further it is worth noting that such employees need not spend any of their active time on the Discovery app, as it runs in the background of their phones without any active involvement from the user directly.

Tapping other Third Party Apps through SDKs

Another unique approach to user community building that we are undertaking, is through partnering with third party apps (TPA) that already have a significant user install base. Of particular interest would be those apps that do not have direct revenue generated from the user, but rather rely on advertising to monetize their apps (example: games).



By integrating our software developer kits (SDKs) into their apps, all the users of the TPA would automatically become part of our user community, without having to download the Discovery application on their smartphones.

For such TPAs, the monetization opportunity is significant, to the tune of USD 100-400 per user per month, depending on the individual user's shopping behaviours.

This would help us to quickly build out a large enough user community within a quick period of time.



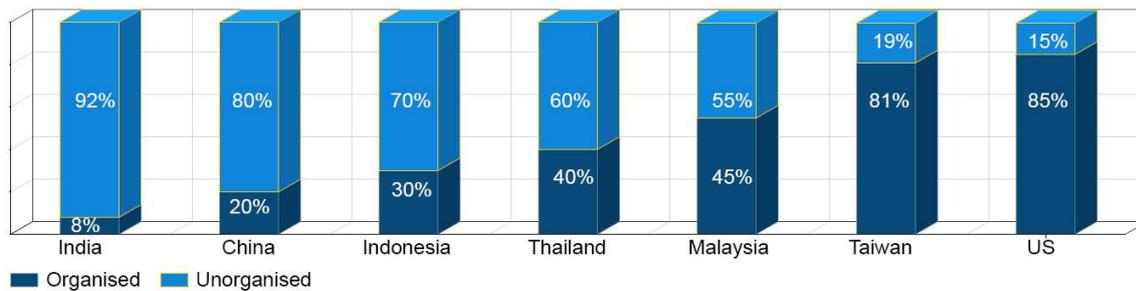
PHASED LAUNCH PLAN

The Discovery Network will be launched across geographies in a phased manner.

It is very clear that the value of the Discovery Network, for the Enterprises, would be highest in markets that are highly disorganized. The more organized a market is, the ability of the client to procure retail sales/offtake data would be much higher, given that fewer partnerships would need to be established with retail outlets. For instance, more than 80% of retail trade in the US is organized and controlled by a dozen retail chains.

Thus, for a company, it would suffice to establish data-sharing partnerships with these 12 chains to be able to gain access to the sales data. However, in the developing world, 90+% of

Organised Retail Penetration (%)



the retail sales happen through mom-and-pop outlets, where access to retail offtake data would be impossible for clients.



As one can see in the table above, countries like India, China, Indonesia, the whole of Africa (not shown in the chart above) have very low organized retail penetration, and hence are the ripe markets for Discovery to tackle in the early stages. It is in these markets, that brands find it impossible to collect retail sales data, thereby providing an avenue for highly profitable growth for the Discovery solution. Moreover, data costs are also very cheap in these countries (average cost per GB of mobile data < \$1), thereby enabling very low-cost solutions to clients.

As the solution matures, the Discovery Network will be expanded into the more organized markets like the US, Western Europe, Australia, etc.



ENTRY BARRIERS / DEFENSIBILITY

In order to create a sustainable business, it is essential for us to build certain strong defensible advantages in our business model. Peter Thiel summarizes Entry Barriers within four broad parameters:

Brand

Strong brand equity is probably the best defense strategy against a potential new competitor. This is especially applicable in the B2C setting, where brand loyalty runs deep. Since Discovery has a B2C side to the ecosystem (user community), we believe that the significant investment that we have planned towards marketing activities would help strengthen and entrench the brand among the network of users.

10x Superior Technology

For any technology to take-off with hockey-stick growth, its underlying technology must be 10x superior to the incumbents. Inherently, blockchain provides a platform that is 100x superior to the existing infrastructure-based networks. Further, even from a cost perspective, it is 60-100x cheaper than the current alternatives. We believe that with such superior features Discovery would enjoy significant technological advantages. This, in turn, would help us keep any potential new competitor at bay.

Network Effects

In a two-sided business, the value accrued by one side from the product is proportional to the number of players on the other side. The Discovery Network classically fits into this description. After the early push to create a threshold of users and enterprise customers, we would reach an “escape velocity” where the network would become self-sustaining, where one side would feed into the other side’s growth. This would make it tremendously difficult for any new competitor to replicate and fight.

Economies of Scale

This benefit accrues where the marginal cost of serving an additional customer reduces as the number of customers increase. Once Discovery establishes a base of enterprise customers and users, we expect a significant portion of new users/enterprises to come in from referrals, thereby reducing our cost of customer acquisition significantly. With such low customer acquisition costs, we would be able to strongly fend off any new competitor, who will need to outspend us significantly to gain a toehold in the marketplace.



FUNDRAISE DETAILS

The Discovery Fundraise process will be done in two phases – an initial pre-sale followed by a full-fledged ICO. To accommodate for the massive size of the industry, a total of 1000 Million DIS tokens will be created. Given the dynamic nature of the industry, and as we are creating a separate network protocol to handle our tokens, the company will keep 15% of the total Tokens (150 Million Tokens) in a liquidity reserve, which will be used if funds are required. .

Contributing to the Discovery fundraise can be done through the webpage (www.discoveryiot.com) or by sending ETH/BTC to the designated addresses.

As a motivation for the early participants, progressively decreasing bonuses are being announced throughout the campaign (pre-Sale and ICO).

TOKEN TICKER: **DIS**

TOKEN PRICE: **\$0.05 per DIS**

The Pre Sale Round

As a kickstart to the entire fundraise process, a total of 40 million tokens will be offered to select participants in the presale round. During this stage, a bonus of 40% of tokens will be available. We expect 5-6 participants in this round, which will last one month (July 1-31, 2018).

The Private Sale

During the private round, a total of 100 million DIS tokens will be made available for a limited period of time (26 days). A bonus of 30% of tokens would be available for participants in this round. The rounds and volume have been designed with diminishing bonus rates, thereby giving handsome returns to the early investors. The company reserves the right to issue special bonuses for large investments above \$100,000. Bonus tokens will be issued in 6 equal instalments, issued monthly (total issue period of 6 months). This is to avoid dumping of tokens at the time of listing on the exchanges.

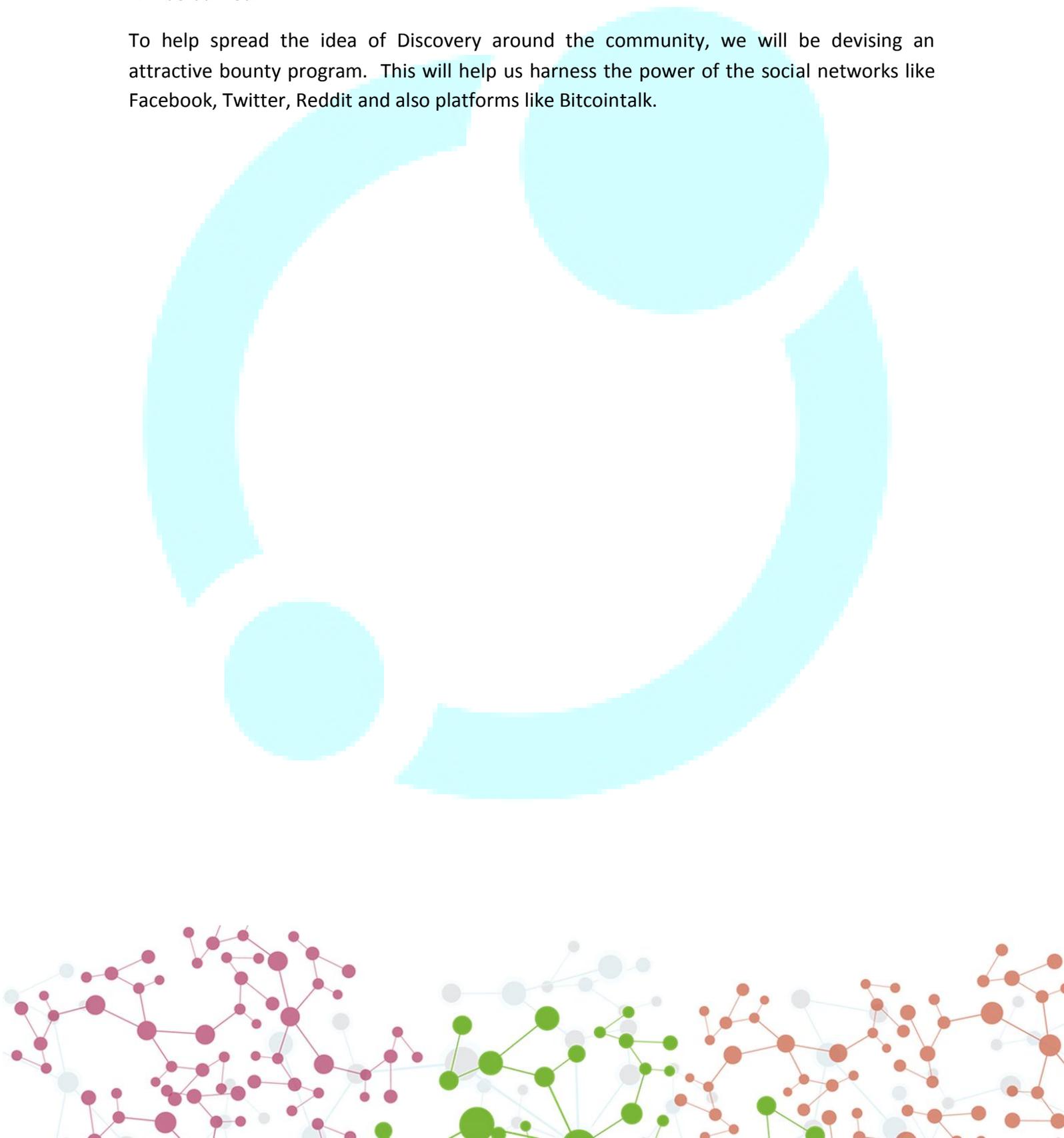
Funds raised in the pre-sale period will be used to build a strong advisory team, hire legal counsel for the ICO and for ICO Marketing.



ICO

The ICO will be rolled out over a total period of one month with two sub-rounds: first round over a 15 day period and the second round over another 15 day period, with varying bonus structures for each round (progressively declining bonuses). This will motivate more investors to participate in the earlier rounds of the ICO. New tokens above the 1000 million limit will NEVER be created, and any tokens remaining unsold at the end of the ICO period will be burned.

To help spread the idea of Discovery around the community, we will be devising an attractive bounty program. This will help us harness the power of the social networks like Facebook, Twitter, Reddit and also platforms like Bitcointalk.

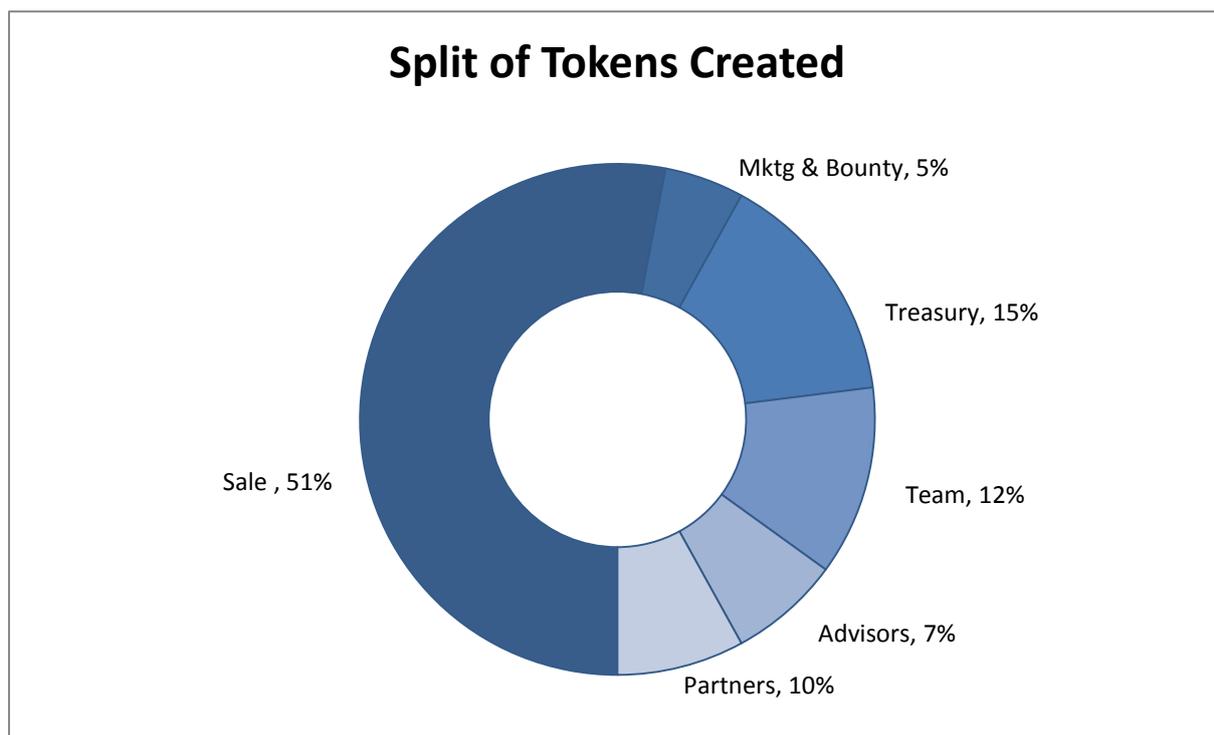


TOKEN STRUCTURE

TOKEN TICKER	DIS
TOKEN PRICE	\$0.05
TOTAL TOKENS CREATED	1000 MILLION (100%)
TOTAL TOKENS FOR ISSUE IN PRIVATE, PRE-SALE & ICO ROUNDS	510 MILLION (51%)
TOKENS FOR SALE	396 MILLION (39.6%)
TOKENS FOR BONUS ISSUE	114 MILLION (11.4%)
SOFT CAP (PRE-SALE + ICO)	100 MILLION DIS (US\$ 5m)
HARD CAP (PRE-SALE + ICO)	396 MILLION DIS (US\$ 19.6m)
TOKENS RESERVED (NOT FOR SALE)	490 MILLION (49%)
TOKENS KEPT IN TREASURY*	150 MILLION (15%)
TOKENS FOR FOUNDERS & TEAM	120 MILLION (12%)
VESTING PERIOD FOR FOUNDER TOKENS	QUARTERLY, OVER 24 MONTHS
TOKENS FOR MARKETING INCLUDING BOUNTY CAMPAIGN	50 MILLION (5%)
TOKENS FOR PARTNERSHIPS / CLIENT ACQUISITION	100 MILLION (10%)
TOKENS FOR ADVISORY BOARD	70 MILLION (7%)

*Tokens in the Treasury will only be liquidated if the company requires liquidity to fund its development activities





Founders/Team will have a 24 month vesting period where the tokens would be issued in 8 equal instalments, on quarterly basis.

Private, Pre-Sale & ICO Round Details:

ROUND	PERIOD OF SALE	# TOKENS AVAILABLE	BONUS ISSUED
PRIVATE & PRE-SALE		140 million DIS	
PRE SALE ROUND	Jul 1 - 31, 2018	40 million DIS	40%*
PVT SALE ROUND	Aug 1 - 31, 2018	100 million DIS	30%*
ICO		256 million DIS	
ICO ROUND 1	Sep 1 – 15, 2018	120 million DIS	20%
ICO ROUND 2	Sep 16 – 30, 2018	136 million DIS	0%
TOTAL		396 million DIS	

*The company reserves the right to issue higher bonus rates for large investments in these rounds.

The price of the DIS token will be pegged against the US Dollar (\$). Contributions during the pre-sale and the ICO rounds will be accepted in the form of \$US as well as popular alternate currencies (BTC, ETH). Other payment methods may also be accepted. As the price of BTC and ETH may fluctuate with respect to the \$US, we would be freezing the DIS/ETH and DIS/BTC conversion rates for each of the two ICO rounds, based on the USD/ETH and USD/BTC conversion rates of the first day of the round, at 00:00hrs UTC. It may be noted



that this pegging would be applicable only for the ICO rounds and not for the private & pre – sale rounds.

As an illustration, if the BTC price is \$7,500 on September 1, 2018 at 00:00hrs UTC, then the BTC/DIS price applicable for ICO Round 1 (that commences on September 1, 2018) would be 1 BTC = 150,000 DIS (20% bonus tokens additional).

Similarly, if the ETH price is \$500 on September 16, 2018 at 00:00hrs UTC, then the ETH/DIS price applicable on ICO Round 2 (that commences on September 16, 2018) would be 1 ETH = 10,000 DIS (no bonus).

In the event of the fundraise process failing to raise the stated soft-cap, all the funds raised through the public ICO rounds will be returned to the respective investors within a period of 3 days from the end of the ICO period, in the same form received (USD, ETH, BTC). Further, the token creation has a hard cap (as stated above) and the fundraising process will stop automatically as soon as the hard cap is achieved. In such an event, further contributions will not be accepted.

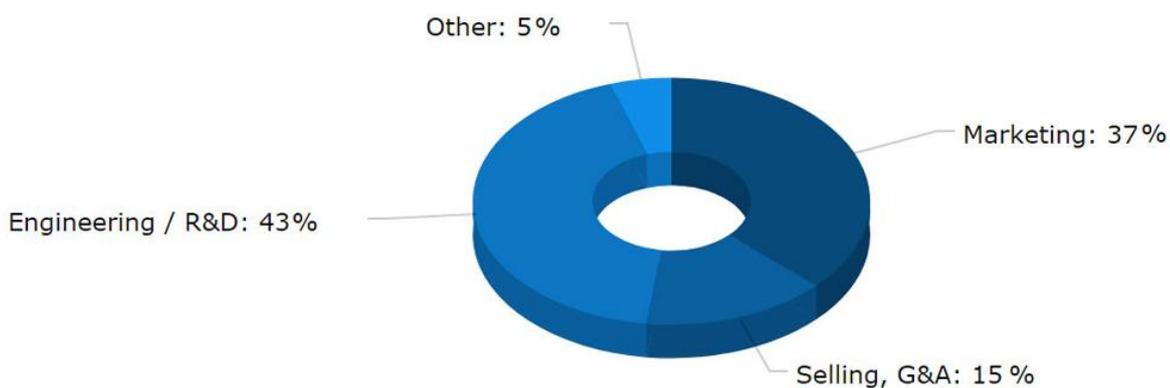
Any tokens that remain unsold at the end of a particular fundraise round will be added to the quota of the subsequent round, and all tokens that remain unsold at the end of the ICO period will be burned permanently.



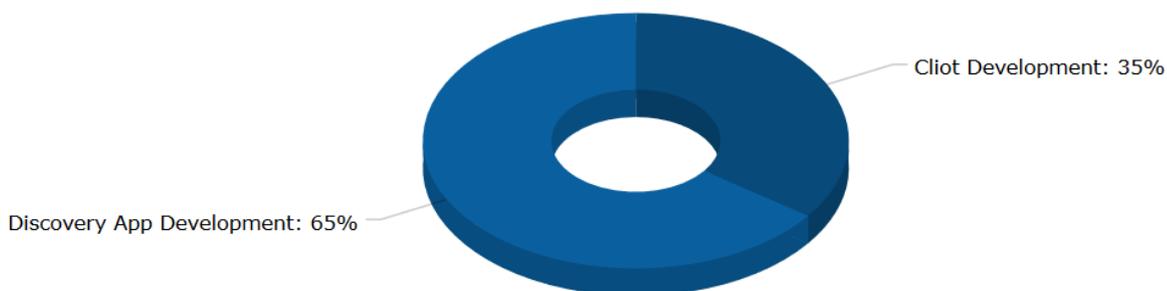
USE OF FUNDS

Funds raised through the pre-sale and ICO rounds will be used very judiciously and with utmost care. The broad areas of fund utilization is planned to be as follows. A further break-up into sub-sections is also given below.

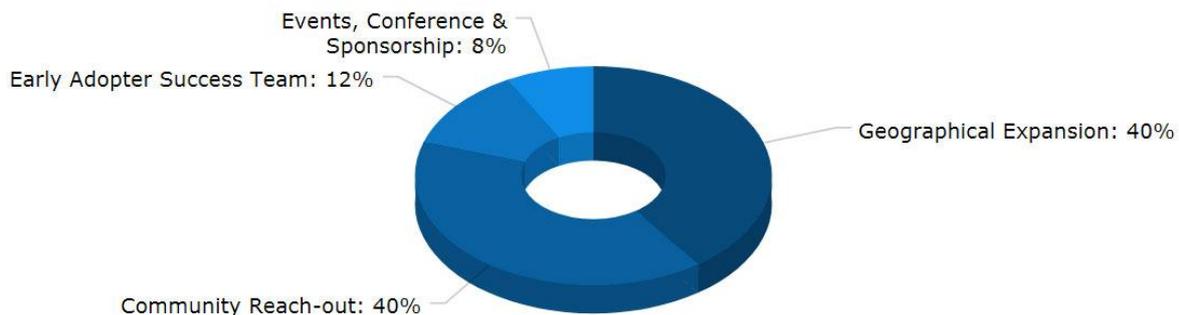
Use of Funds



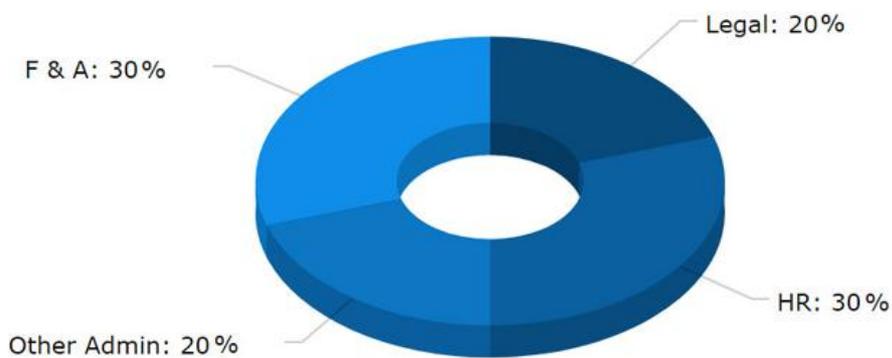
Engineering / R & D - Use of Funds



Marketing - Use of Funds



Selling, G & A - Use of Funds



DIS – CLEARLY A UTILITY TOKEN

Broadly, tokens can be classified into two types, viz., security token and utility tokens.

A very clear business use case of issuing a token would be established only if there is an underlying utility of the token on the blockchain network being created. Creation of a token without such utility, merely for the purposes of an ICO fundraiser, defeats the entire purpose of token creation, and is conceptually incorrect. While discerning the underlying value of tokens created in any blockchain, one must look for the underlying utility or the purpose solved by the token, among the players in the ecosystem.

As one can clearly ascertain from this document, DIS token has a very clear utility in the Discovery Network. In the Discovery Network Solution, the DIS token plays the role of a process enabler, that is, it is the medium of exchange of value between the buyer (enterprise clients) and the seller (the user community). The value of this token is thus directly proportional to the usability and the value generated in the network. In other words, the DIS token clearly represents a consumable resource (data transferred through the mobile phone's network), which is valuable from the buyer's perspective. Using local fiat for this purpose would not only be cumbersome (imagine transferring USD to millions of users on daily basis from/to bank accounts) and expensive (bank charges would represent a significant % of such low-value transfers), but also take a significant time (banks typically credit payments in 24-48 hrs). Moreover, using local fiat would route the system through a central processor (bank) which is contrary to the fundamentals of the blockchain technology.



Value for Investors

As mentioned in the earlier sections, DIS tokens have a very clear utility value in the underlying business. It enables customers (enterprise clients) to purchase a service (tracking service / IoT Network service) from a pool of community users, also serving as the currency of exchange on the platform. As per the principles of macroeconomics, there would be two determinant factors of the token price, viz., the demand for the token in the market, and supply of tokens in the market. Let us look closely at the various drivers that affect these two determinant factors:

Drivers affecting the demand for tokens

As enterprise adoption of the tracking solution increases, there would be an increased demand for the DIS tokens. However, supply of the tokens is capped (no tokens will ever be created beyond the limit stated [above](#), and all tokens that remain unsold at the end of the ICO period will be burned permanently. This would lead to a situation of increased demand for the DIS tokens, which, alongside the restricted supply of the tokens, could drive up the price of the token.

However, there would another interesting phenomenon that could potentially affect the price of the DIS token: the perceived token price change in the future by enterprises. A very interesting feature of the Discovery solution, unlike other plain-marketplace solutions, is that the price of the service (Tracking / Network services) is pegged against the local fiat (US\$ or similar). In other words, irrespective of the price of the DIS token, the cost of the underlying service does not change when calculated in local fiat. This has already been explained in the [pricing mechanism](#) section. Thus, if enterprises perceive that the price of the DIS token would increase in the foreseeable future (as a result of increased adoption amongst their peers), it would motivate them to stock up on the DIS tokens. This would be in the expectation of extracting more services from the same DIS tokens at a later date (as the DIS tokens would be worth more in the future, and thus get them more tracking services). On a cumulative basis this would increase demand for DIS tokens in the marketplace.

Drivers affecting the supply of tokens

An underlying supply constraint exists in the DIS token structure itself. As no tokens would ever be created beyond the limit stated [above](#), a natural supply constraint is created.

There is one other factor that would impact the supply of DIS tokens significantly: “**Part-Burn**” of tokens (Burning of part of the tokens being transferred). In other words, as tokens



are transferred from the buyer of the service (enterprise clients) to the user community (service providers), a portion of them would be burned. As an illustration let us consider the case below:

Let us assume that at a given point in the future, all 800 Million tokens are under circulation in the market. Further, let us assume that the price of the DIS token at that point is 1 DIS = US\$ 2. Let us also theoretically assume that this price remains stable for the entire month that is being illustrated here.

During a one-month period, let us say that \$100 Million worth of IoT tracking services is consumed by enterprise clients. Thus, clients would be buying $\$100 \text{ Million} / 2 = 50 \text{ Million}$ DIS tokens from the market (exchanges). As enterprises pay for the services with the 50 Million DIS tokens, we would be retaining 20% of the tokens ($50 \text{ Million} * 20\% = 10 \text{ Million}$ DIS tokens) as management fees (as illustrated [here](#)). The remaining 80% of the tokens (40 Million Tokens) will be paid to the user community for their services.

As a means to further induce scarcity of tokens, the company plans to burn a 25% of its retained tokens. In the example stated here, the company would be burning 25% of the 10 Million tokens ($10 \text{ Million} * 25\% = 2.5 \text{ Million Tokens}$), and use only the balance 7.5 Million tokens to meet its operational expenses.

As we can see from the example above, over the course of this “**Part-Burn**” activity, the overall supply of tokens has come down by 2.5 Million tokens, thereby bringing the total tokens in circulation from 800 Million (at the beginning of the month) to 797.5 Million (at the end of the month). One can easily understand the cumulative impact that such a move would have, over an extended period of time (few years).

This policy of the company (**Part-Burn**) would induce tremendous supply constraints over a period of time, thereby creating an upward pressure on the token price. A natural question at this point would be, why aren't other tokens following this model? This is a unique opportunity afforded to the Discovery solution, as the price of the token does not affect the cost of the service to clients.

Supply Scarcity would not affect the clients: In any platform, a scarcity of tokens would result in a price increase of the underlying service to the client. Thus, an increase of the token price above a certain level would render the underlying business unattractive to the buyer of the service. However, this is not true for the Discovery Network, because the price of the service (tracking / IoT network service) is fixed on the basis of local fiat. Thus, an increase of the token price would not affect the affordability of the service to the business client.



The cumulative effect of the demand drivers and supply drivers would create a virtuous loop of upward price pressure on the DIS token, significantly enhancing investor value.





Team



30 23 16 9 2
31 24 17 10 3
M T W T

INVOICE

Item	Quantity	Unit Price	Total
Product A	10	100.00	1000.00
Product B	5	200.00	1000.00
Product C	2	500.00	1000.00
Product D	1	1000.00	1000.00
Product E	1	1000.00	1000.00
Product F	1	1000.00	1000.00
Product G	1	1000.00	1000.00
Product H	1	1000.00	1000.00
Product I	1	1000.00	1000.00
Product J	1	1000.00	1000.00

The Team

DiscoveryIoT is run by a very strong team with a right blend of technical expertise and business knowledge. The team has tremendous domain knowledge.



SELVAM VMS
Co-Founder & CEO



KUMAR T
Co-Founder & CTO



PRABHAKARAN NAMBIAR
COO



MOHAMED FATHIMA
BLOCKCHAIN TEST ANALYST



ARUN V PRAKASH
BUSINESS DEV. MANAGER



ARJUN PARTH
IoT DEVELOPER



S BHUVANESH
BLOCKCHAIN DEVELOPER



MARGARET IGNATIUS
HR



PONNI SHANMUGASUNDARAM
IoT DEVELOPER



B KARTHIK
BLOCKCHAIN CONTENT CURATOR



PREETHA RAMESH
BLOCKCHAIN DEVELOPER



VIGNESH PS
DEVOPS



Our Experience

We are an existing business, providing Supply Chain services to some of India's leading consumer product brands. We have extensive experience in the Supply Chain tracking domain, and handle more than 150 million lbs of products through our supply chain infrastructure, on annual basis.

This experience has given us unique insights into the specific challenges that the supply chain industry faces, and enables us to design our solution inline with the requirements of the industry.

We have a demonstrated knowledge of the industry and the space we operate in. Unlike most blockchain projects, we are not building a solution in search of a problem. Over the course of our experience, we have identified a clear and pressing problem in the market, and have already built a working solution that addresses these problems. We are now moving it to the blockchain, to make it more scalable, reduce costs and improve transparency.



The Advisory Board

DiscoveryIoT is backed by a world-class advisory board with experts in crypto, IoT and blockchain coming together.



ALY MADHAVJI
SENIOR ADVISOR

Co-Founder of GlobalDCX |
INSEAD MBA | Award-Winning Author |
Angel Investor | Blockchain Entrepreneur



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SENIOR IOT ADVISOR

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& @Hurify | Influencer | Innovator |
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Director, Startup Grind, Shanghai Chapter





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Technology Enthusiast



SOUMYAKANT DWIVEDY
Senior SCM Advisor

Senior Supply Chain Professional | SCM Director of
Healthcare MNC | Significant FMCG and Consumer
Durables Experience | Logistics, Shipping &
Manufacturing Expert



PROJECT ROADMAP

As described earlier, the founders also run a supply chain company (H&S Supply Chain Services or “H&S”) that works with some of India’s leading FMCG brands. With over 3 years of experience in running H&S, the founders have clearly identified a very specific requirement for product tracking, a demand that has repeatedly been seen from various brands. Banking on Kumar’s extensive knowledge and expertise in the areas of P2P algorithms and IoT hardware, we have already built and deployed a semi-automatic tracking solution.



Please note: Periods up to June 2017 pertain to activities undertaken in the founders’ individual companies, but addressing the product tracking problem



MINIMUM VIABLE PRODUCT

The company launched a semi-automatic product tracking solution in March 2017, where the products are tracked on a manual basis and captured through a mobile application interface at the top distributor/retailer/wholesaler locations. Though this has improved product visibility tremendously for brands, it was not a real-time solution, and was prone to error as a manually run process. Moreover, with the involvement of a human effort, the solution was not cost-effective.

In September 2017 the founders started building out the technology stack for a fully automated, blockchain based tracking solution. The overall architecture has now been defined.

A working beta version (MVP) of the product has been successfully launched on June 15, 2018, a good 2 weeks earlier than the committed timeline of June-end. Two of our clients have deployed the MVP and it is current under active use in their warehouses. A video of an actual implementation can be found here:



The MVP consists of three parts:

1. The Cliot: We have been able to crash the cost of the IoT tag (from \$5 currently) to \$0.50 per unit. We have done so successfully by removing the GSM module connectivity from the hardware. Our next step is to integrate the backscatter protocol and removing the battery from the architecture. This will further bring the cost down to \$0.10 per unit.
2. The Mobile Application: A mobile application has been built to reach information from these Cliots and enable storing them in a decentralized architecture. This layer acts as a “scanner/reader” in the eco-system. The current application is enterprise-grade. The app is ready well before the plan, and can be downloaded from Google PlayStore here:

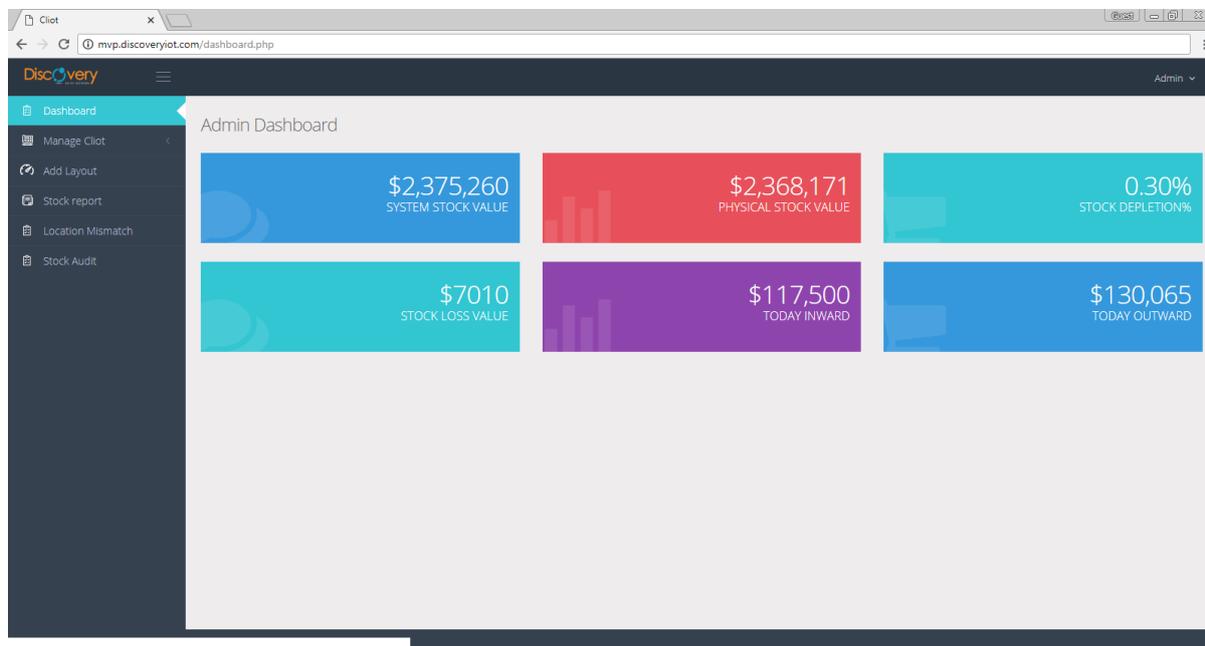
<https://play.google.com/store/apps/details?id=com.istudio.discoverysurvey>

3. The Enterprise Dashboard and UI: This is the layer that gives information to our enterprise clients on the happenings on a real-time basis. Our clients have real-time visibility of all product movements within the designated areas, on a micro-level. Further, they can also conduct stock audits in an automated manner with 100% accuracy. This dashboard can be accessed here: mvp.discoveryiot.com. As enterprise data is confidential, all the data that is populated on this site is dummy.



Enterprise Dashboard/UI (MVP)

Each user of the client is allocated unique credentials, and the data access is defined based on the privileges assigned to that user. Upon login, the dashboard for the client is as below:



Above data is dummy, in order to protect client information

This dashboard enables the user to understand all the key metrics of the warehouse operations in one shot. The user can infer the system stock (As per the books) vs. actual physical stock value (in reality), and thereby any depletion/loss in stocks. Further, current date's inward and outward stock data is also presented to them for ready reference.

From a warehouse manager's perspective, this dashboard has all the high level parameters that define the functioning of the warehouse. In the legacy systems, the accuracy of such data is highly suspect as the physical stock data is manually counted and captured. Moreover, the legacy systems also suffer from data latency, as physical stock counts are only undertaken once a month (or so) and any stock loss can only be realized after a long latency, giving very little room for course correction and recovery.

On the other hand, the DiscoveryIoT system enables a warehouse manager to understand the stock accuracy on real-time basis with 100% accuracy, as there is no manual intervention anywhere in the process. Any discrepancies can be identified in real-time and corrective action can be taken immediately to avoid any losses to the organization.



Clot Status

Through this report, the user can understand the status of each of the Cliots that have been given to the warehouse. Cliots status can be one of three: Free (the Clot has not been assigned to any product yet), Assigned (Assigned to a particular product), and Blocked (blocked from usage). A screenshot of a report on the Clot status is given here:

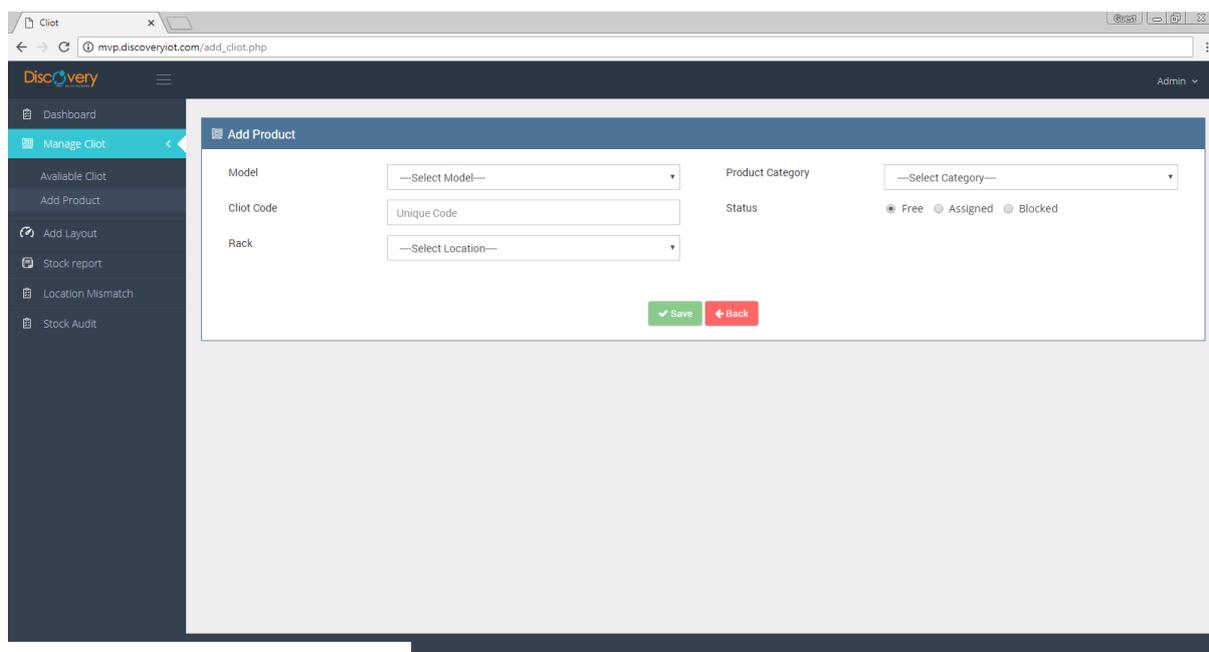
SI.NO	Clot Id	Status	Assigned Product Category	Assigned Model	State	Location	Last Update
1	00:A0:50:E6:C6:2D	Free	Deoderant	Classic	OUTWARD	Rack 3	25/06/2018 20:01
2	00:A0:50:E6:E6:C7	Free	Mixer Grinder	Jet	UNPROCESSED	Rack 1	
4	00:A0:50:P7:M1:OR	Blocked	Spice Container	Aesofotida	UNPROCESSED	Rack 6	
5	00:A0:50:N3:S8:XA	Free			UNPROCESSED		
6	00:A0:50:G9:A7:IH	Free			UNPROCESSED		
7	00:A0:50:I3:D9:ZR	Free			UNPROCESSED		
8	00:A0:50:G6:V7:BE	Assigned	Spice Container	Pepper	UNPROCESSED	Rack 4	
9	00:A0:50:D5:Z5:IP	Free			UNPROCESSED		
10	00:A0:50:E2:K3:KL	Assigned	Deoderant	Classic	UNPROCESSED	Rack 8	
11	00:A0:50:X1:R0:XL	Free			UNPROCESSED		
12	00:A0:50:N9:W5:NE	Assigned	Deoderant	Classic	UNPROCESSED	Rack 8	
13	00:A0:50:C0:B3:RZ	Assigned	Deoderant	Pink Passion	UNPROCESSED	Rack 8	
14	00:A0:50:B1:J5:OC	Free			UNPROCESSED		
15	00:A0:50:D9:E2:VU	Blocked	Mixer Grinder	Desire	UNPROCESSED	Rack 1	
16	00:A0:50:P0:Q3:YY	Assigned	Spice Container	Cinnamon	UNPROCESSED	Rack 4	

Above data is dummy, in order to protect client information



Affixation of the Cliot (Add Product)

Every product that is required to be tracked is affixed with the Bluetooth tag. In the current process, the tag is being affixed at the warehouse level, since our geographic presence is limited and because the tag needs to be reused after it reaches the retail level. This affixation is a manual process involved at the entry point of the warehouse. The interface to allocate the Cliot to a product is below:



The screenshot shows a web browser window displaying the 'Add Product' form in the Discovery IoT Network system. The browser address bar shows 'mvp.discoveryiot.com/add_cliot.php'. The interface includes a sidebar menu with options like 'Dashboard', 'Manage Cliot', 'Available Cliot', 'Add Product', 'Add Layout', 'Stock report', 'Location Mismatch', and 'Stock Audit'. The main form area contains the following fields and controls:

- Model:** A dropdown menu with the placeholder text '---Select Model---'.
- Product Category:** A dropdown menu with the placeholder text '---Select Category---'.
- Clot Code:** A text input field containing 'Unique Code'.
- Status:** Radio buttons for 'Free', 'Assigned', and 'Blocked', with 'Free' selected.
- Rack:** A dropdown menu with the placeholder text '---Select Location---'.
- Buttons:** A green 'Save' button and a red 'Back' button.

The Cliot code field is auto-populated based on the scanning of the Cliot from the user's mobile phone. Through this UI, the client can also assign the specific location within the warehouse (Rack) where the product is to be stored.

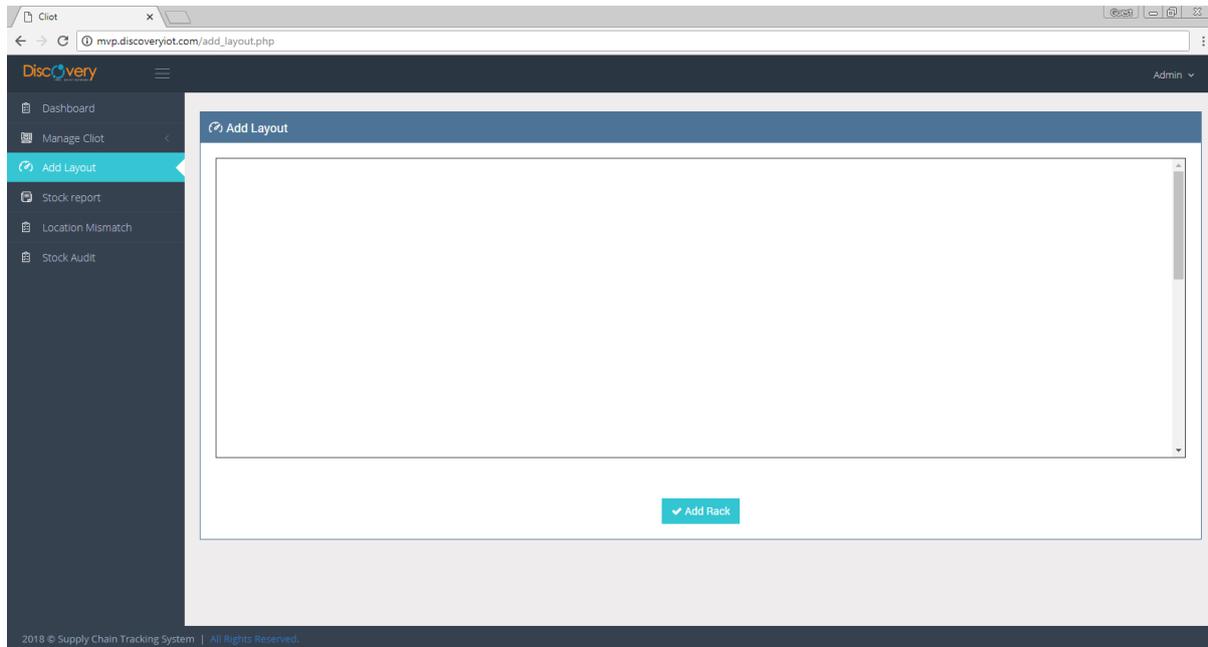
This provides enormous amount of visibility of the product to the warehouse manager, at a unit level, by each rack, which is otherwise not possible in a legacy system.



Layout Addition / Modification

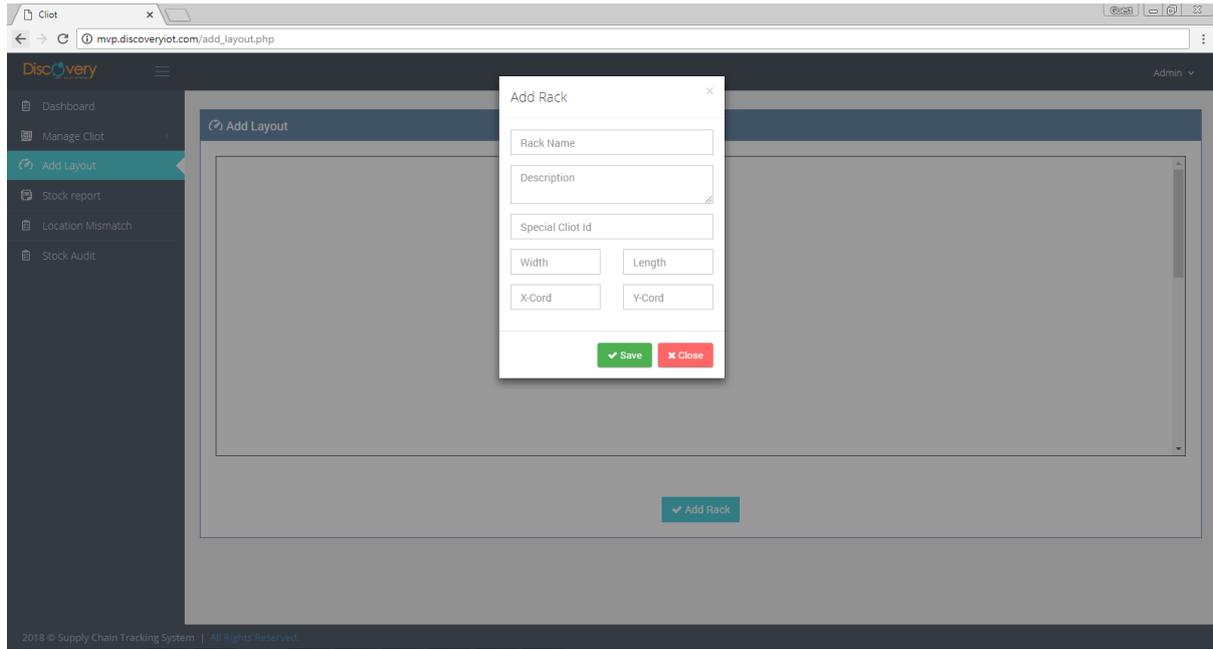
The warehouse manager can also define the specifics of their warehouse through our solution. As no two warehouses have the same layout/dimensions, our interface allows the user to define the specifications of his warehouse in a customized manner.

The UI for this process is as below:



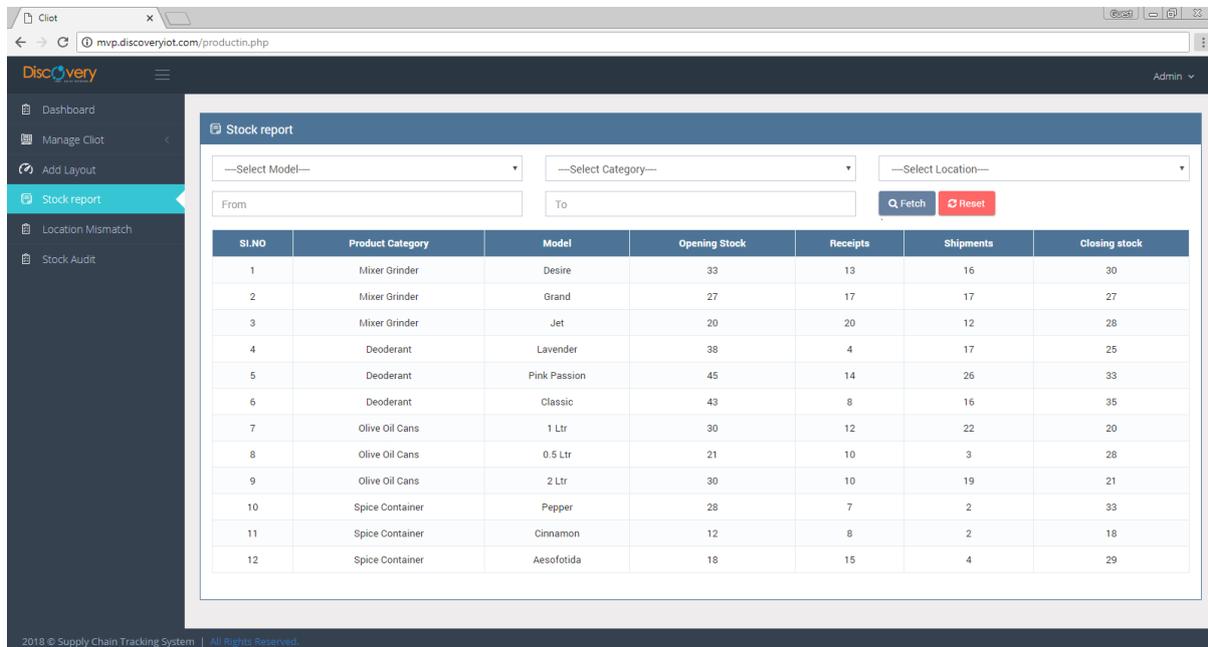
Upon clicking the “Add Rack” button, a separate dialog box opens up allowing the user to input the rack’s dimensions and location within the warehouse (X-Y coordinates):





Stock Report

This report enables the user to understand the stocks (as per the books) on any time, with a detailed blow-up account of opening stock, inwards, outwards and closing stock during any time period.



SI.NO	Product Category	Model	Opening Stock	Receipts	Shipments	Closing stock
1	Mixer Grinder	Desire	33	13	16	30
2	Mixer Grinder	Grand	27	17	17	27
3	Mixer Grinder	Jet	20	20	12	28
4	Deoderant	Lavender	38	4	17	25
5	Deoderant	Pink Passion	45	14	26	33
6	Deoderant	Classic	43	8	16	35
7	Olive Oil Cans	1 Ltr	30	12	22	20
8	Olive Oil Cans	0.5 Ltr	21	10	3	28
9	Olive Oil Cans	2 Ltr	30	10	19	21
10	Spice Container	Pepper	28	7	2	33
11	Spice Container	Cinnamon	12	8	2	18
12	Spice Container	Aesofotida	18	15	4	29

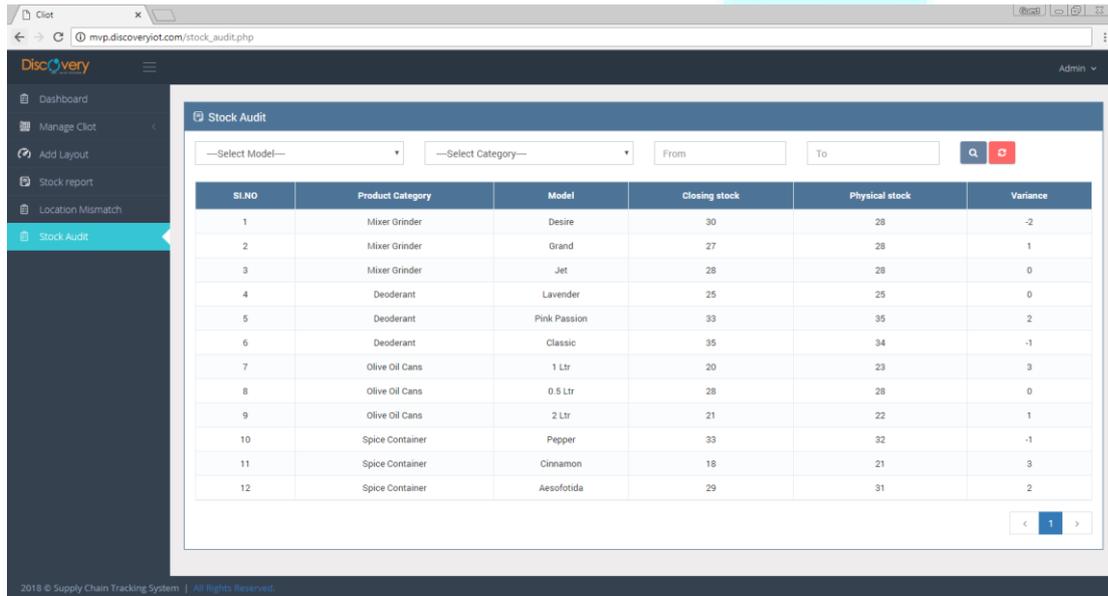
2018 © Supply Chain Tracking System | All Rights Reserved

The system allows the user to draw stock reports by product category/model, by location and over any specific time period. This feature allows the warehouse to conduct stock counts by each location (rack).



The Stock Counting Process

At every pre-defined time interval (say, once every 6 hours), a robot travels through the warehouse, mounted with a mobile phone, that hosts the reader app. The route of the robot within the warehouse is pre-defined through a series of infrared (IR) tags, which guide the robot along its route. As the robot moves slowly through the warehouse, the mobile app pairs with each individual Bluetooth tag and records their presence and exact location. The UI of the stock audit output is as below:



SLNO	Product Category	Model	Closing stock	Physical stock	Variance
1	Mixer Grinder	Desire	30	28	-2
2	Mixer Grinder	Grand	27	28	1
3	Mixer Grinder	Jet	28	28	0
4	Deoderant	Lavender	25	25	0
5	Deoderant	Pink Passion	33	35	2
6	Deoderant	Classic	35	34	-1
7	Olive Oil Cans	1 Ltr	20	23	3
8	Olive Oil Cans	0.5 Ltr	28	28	0
9	Olive Oil Cans	2 Ltr	21	22	1
10	Spice Container	Pepper	33	32	-1
11	Spice Container	Cinnamon	18	21	3
12	Spice Container	Aesofotida	29	31	2

A mobile phone is placed at each loading dock of the warehouse to serve as an exit recorder. That is, every product that is paired with this phone is considered to have “exited” from the warehouse, and the corresponding reduction is made in the inventory of that particular SKU. It is at this stage that the tag is removed from the product to facilitate its reuse.



Advantages to Enterprises

Throughout the process, the client will be able to track the inventory of each SKU within the warehouse with 100% accuracy. Through this interface, they will also be able to order stock audits in the warehouse in a single keystroke. This would order the robot in the warehouse to move along the pre-designated route in the warehouse and complete the stock audit process.

Advantages of this model vis-à-vis current model

This solution brings significant advantages to the client, some of which are listed below:

Accuracy

As the process is completely automated with minimal human intervention, the stock taken through this system is 100% accurate.

No VLOS

As the technology is Bluetooth based, there is no requirement of a visual line of sight (VLOS). This is much superior to the barcode system that most warehouses run on. As a direct consequence, it also enables a complete stock taking process without any requirement of moving the products physically in the warehouse to enable reading barcodes etc.

Reliable

Given that there is no human intervention in the process, the stock audits can be conducted at any time without any reliability issues. There would not be any requirement to pre-schedule audits with the warehouse team or the audit team.

Non interventionist

Through this process, the warehouse operations are not affected in any manner. Typically a traditional stock audit process lasts several hours and the warehouse operations come to a standstill during this time. This directly affects warehouse productivity and affects output. Using our technology, warehouse operations are not affected in any manner and operations continue undisturbed throughout the stock audit process.

Real-time

A traditional stock taking process happens at pre-defined frequencies (say once a month or so). To that extent, the data with managers is not real-time and any warehouse errors are



captured only during the next audit, with a lag of a month. As our technology is non-interventionist, the audit can be conducted very frequently (say once every 4 hours), thereby giving access to real-time information to managers.

Eliminates errors in loading process

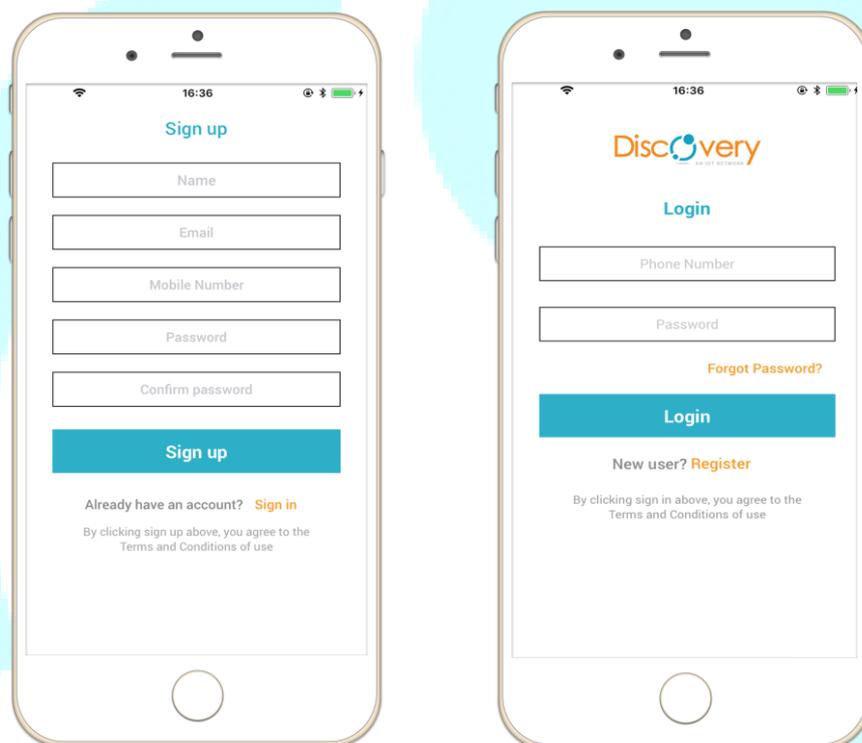
A traditional stock audit is passive, that is it captures information at one point of time. It does not eliminate the factors that lead to stock inaccuracies at the warehouse. As our technology is an active one, any error is captured in real-time and can thus be eliminated. For instance if 101 units of a particular SKU are being loaded against a plan of 100 units, the system immediately raises an alarm and alerts the team of the error, thereby eliminating the possibility of an error. Thus compared to a traditional stock audit process, this would not just report errors but actively work toward eliminating them.



The Mobile Application (MVP)

The consumer mobile application is also developed for Android and iStore deployment. The app has already been submitted to Android/iOS for approval, and is expected to happen over the next few days (status as of 20th July 2018).

The workflow and the screenshots of the application are as given below. Every user goes through a quick and easy sign-up process upon installation of the app. The registration process also validates the mobile number of the user, which serves as the “username” for the user. After registration, the user will be able to login to the app with their phone name and the password provided.



Immediately upon login, a dashboard with high level data (products pinged, Data consumption, Earnings, Amount Available for redemption etc.) are displayed to the user. All this data can be filtered by the user across any preferred date range. All earnings related information is presented in the local currency of the user.

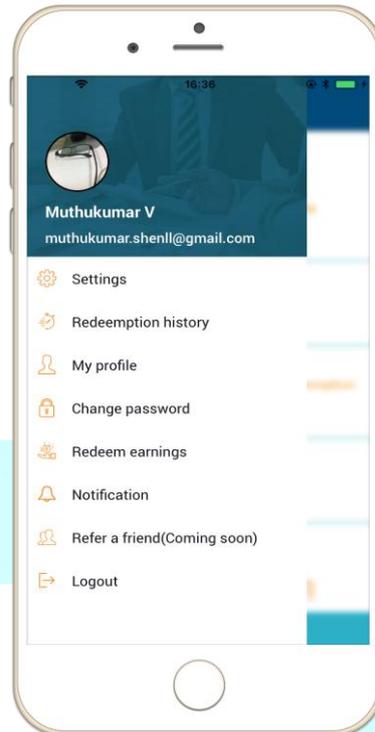




It is worth noting here that once the app is up and running, the “discovery” process of the Cliots happens automatically in the background, without any active involvement from the user. The smart contract that is pushed into the user’s smartphone (in the form of a block) already contains the credentials for such a pairing. Thus, the active can remain completely uninvolved in the entire process.

There are various menu options for the user to facilitate various functions. The screen for the same is as below:

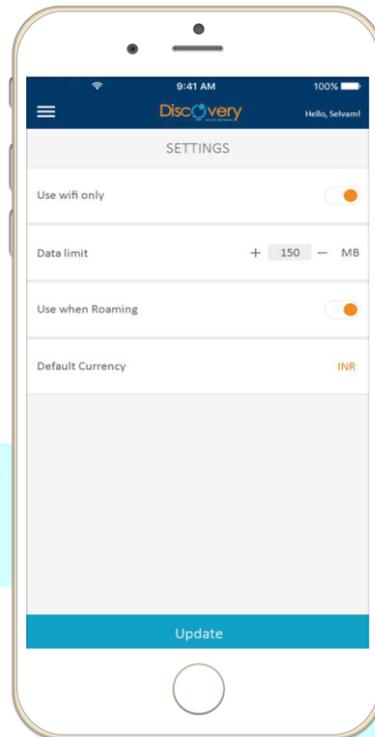




Each of the menu options are explained below:

Settings

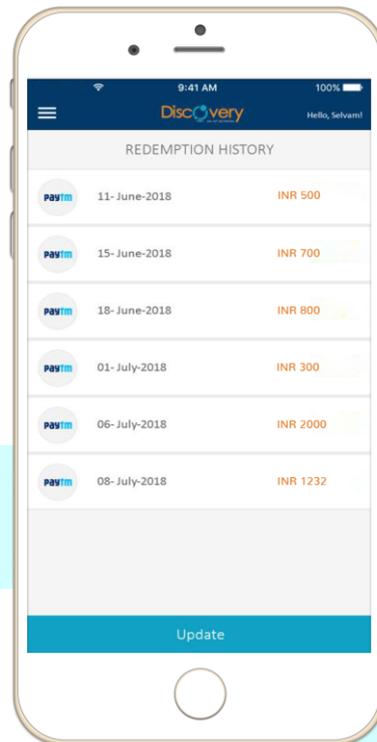
The settings menu enables the user to configure data usage as per their preferences. Through this option, the user can set limits on the data to be consumed by the app, during the ClIoT pairing and transmission process. Further, the user can also decide whether to allow the process of pairing and transmission to happen only on Wi-Fi, and also set roaming preferences.



Redemption History

This option displays all the historical redemptions that the user has undertaken, to redeem their earnings as local fiat into their preferred wallet.



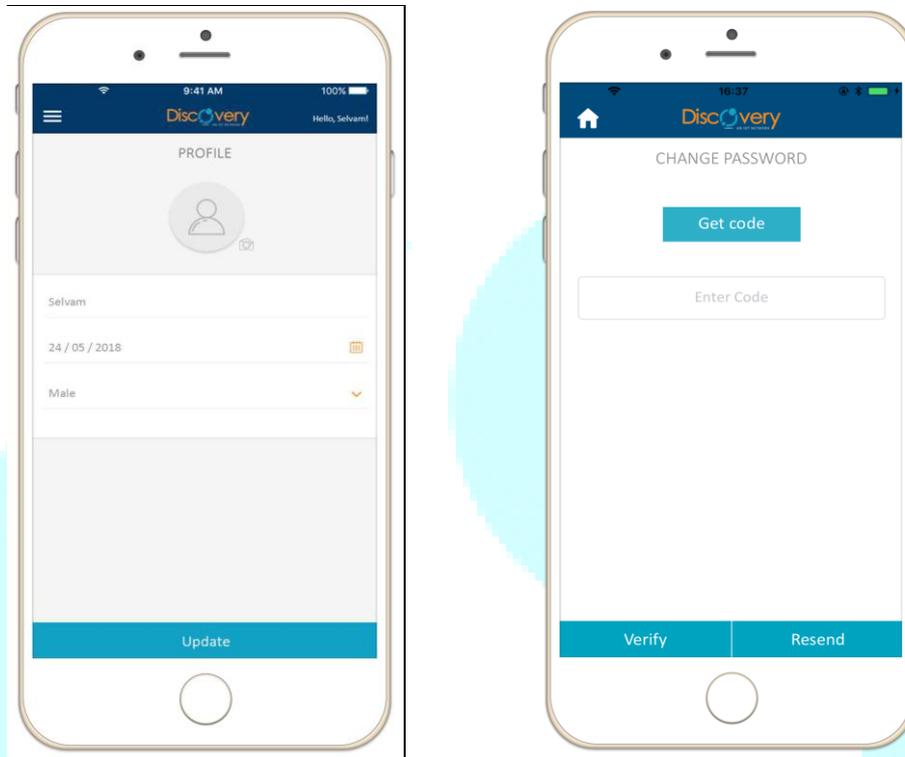


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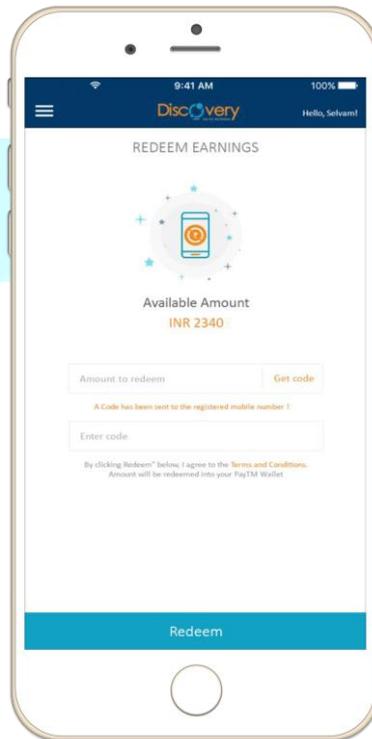
Profile & Change Password

These are Standard options for user to set his profile and change password. It is worth mentioning that the user will not be able to change their phone number once registered.



Redeem Earnings

This option enables the user to convert their token earnings into local fiat, into their preferred fiat wallet. As this is a financial transaction, one additional layer of authentication (by way of a authentication code) is required for the process to be completed.



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CLIOT (MVP)

We have developed the first version of the Cliot that has been deployed at our client's warehouse locations for product tracking.

As explained earlier in this document, the IoT tags that are available in the market today cost between \$5 - \$10 per unit, depending on their applications. We are developing the low-cost Cliot by bringing about two major changes vis-à-vis the current tags.

Step 1: Removal of the GSM/SIM unit from the IoT tag: Our architecture is disconnected in nature (Cliot is not directly connected to the internet, rather it utilizes the data connectivity of the mode (smartphone) that pairs with it, to transmit information into the blockchain. This makes the GSM/SIM module (that is present in most IoT tags) redundant. Thus, we have removed the GSM/SIM module and developed the version 1 of the Cliot. . Intensive research and efforts by our team and our partners' teams has enabled us to beat the committed deadline of the Cliot v1 launch by 2.5 months (committed deadline of October 2018).

This has brought down the cost of the tag by 10-fold (from \$5 to \$0.50 per unit) already. Real-life images of the Cliot (version 1) are shown below:



These are actual images of the Cliot, and deployed at our client locations



Step 2: Battery removal & Backscatter integration: The next step in Cliot miniaturization involves implementing backscatter protocol into the device and removing the battery from the architecture. We have partnered with several organizations including the University of Southern California's I3 consortium & IoTOne – a leading IoT research centre in Shanghai, for this integration. We are confident of meeting (and beating) our committed timeline of June 2019 for the launch of the next and final version of the Cliot.

This will bring down the cost of the Cliot to our target price of \$0.10 per unit, with a further reduction to \$0.05 per unit as volumes increase. The representative image of the final version of the Cliot is given below:



Representative (not actual) image to show the final version of the Cliot (under development)

Through implementation of the above three MVP layers (Clot, Enterprise Web UI, Consumer Mobile App), there has been a great learning experience, and all these learnings are being implemented in our future development processes.



The development process of the DiscoveryIoT technology is proceeding very aggressively and in a time-bound manner. Based on the experience of the rollout in the past few months and weeks, we are very confident of meeting the timelines as committed in the roadmap above.



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