Nucleus.Vision

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CONTENTS

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2. EXECUTIVE SUMMARY

Founded in 2014 at Harvard University, Nucleus Vision is an end-to-end technology solution that captures and provides previously inaccessible customer data to retailers and other 'brick-and-mortar' businesses through its blockchain and real-time sensor technology. The solution that Nucleus Vision has built, which currently has 'ION sensors' deployed in 10 live retail establishments, will support a valuable data network for unique visitor IDs and corresponding user data. Our proprietary IoT sensor technology does not depend on any RFID, Wi-Fi, Bluetooth, or even facial recognition technologies to operate. Nucleus Vision sensors are able to detect mobile phones as they pass through storefronts and any other location where a sensor is set up, enabling our partners to detect visitor mobile phones using mobile ID over blockchain.

In the long term, our intention is to bridge between the online and offline retail wo venture is backed by several prominent i including Tim Draper and Reliance Telecommunication plays a vital role functioning of our technology, and v partnered with Vodafone, Communications and Idea Cellular to b platform to market.

The early focus of our adoption strategy around the retail sector. However, the Vision platform has applications in markets. We believe the following areas r promising markets where Nucleus Visior applied and add value.

Stage 1 (Present)
Retail Sector

We believe that the optimal model for today's successful retail venture is a physical s integrated digital retail channel that is able to execute a broad omnichannel retail For this sector, Nucleus Vision's IoT solution enables retail brands around the worl and execute a customer-focused shopping experience that leverages data fr in-person and online channels. The majority of this white paper will be dedicated deeper into Nucleus Vision's retail sector use-cases, and how Nucleus Vision shifts th of data control and monetization from big corporations to the customers the bringing forth the largest and widest application of decentralization and distributed

Stage 2
Physical Security

IoT solutions have already penetrated residential and industrial security systems, and their applications within this sector will grow substantially in the coming years. As it stands, the is severely lacking a comprehensive and intelligent solution that is also cognizant of pri believe that Nucleus Vision is primed to tackle this problem.

Nucleus Vision's smart IoT sensors can become an indispensable component of wider res commercial and industrial security systems by identifying potential threats and intrud securely transmitting this data to concerned authorities over blockchain network. This inf can be utilized both in real-time security, where premises can be monitored for unexpected as well as after an incident, where IoT sensors can be used to identify attackers.

Using secure blockchain-based identification system, any unwanted or dangerous individua around secure areas can be instantly flagged and brought to the attention of the security of any relevant preventive measures. For example, schools can deploy Nucleus Vision's p monitoring system and be automatically alerted when any known sexual predators ar around the school campus.

High value goods can be equipped with Nucleus Vision-powered sensors to detect unau removal or movement of items, any tampering with its sensors, and implement theft pr measures. Nucleus Vision can also replace complex employee and visitor tracking systems premises to auto-detect entries and exits and log them into a secure blockchain-based d Similarly, government offices or airports can amp up their security to track all visits and ent set up automatic alerts against any known criminals and threats, all using a simple Nucle identification, monitoring, and alerting system.

Nucleus Vision is also working towards integrating & partnering with the private and public databases of global agencies, and help them flag down any wanted criminals Micro-payments in the form of nCash tokens will enable this secure data transfer across our and various involved parties. Nucleus Vision will enable an ecosystem of secure, inco independent and permissionless exchange of data over blockchain.

Nucleus Vision doesn't claim to be a replacement for any existing security protocols, but means of augmenting and strengthening an existing security ecosystem, making the worl place for everyone. Nucleus Vision's security ecosystem includes perimeter monito protection, security system tamper protection, visitor and employee tracking, envirc sensors, secure intelligence tagging of company assets, and much more.

Stage 3
A Smart Nucleus Vision Powered Worl

After Nucleus Vision revolutionizes the retail and physical security industries, we have our on connecting the world through an ecosystem of interconnected IoT devices. Nucleus technology team has already begun assembling the frameworks for Nucleus Vision Home Vision Cars, Nucleus Vision Health, Nucleus Vision Agri, Nucleus Vision City and Nucleus Visi believe that the Nucleus Vision platform has massive applications for smart communiti cities, agriculture, transportation, healthcare, and home monitoring.

As new smart city technologies emerge, they too will need IoT-based solutions. Smart synonymous with IoT and will be a key driver of the technology's growth and adoption.

Nucleus Vision Home will bring an omnipresent sense of security to families and individ functionalities that range from identifying, securely logging and notifying home-owners c who visits to securing high-value goods kept in the home.

Using Nucleus Vision Air, airlines can instantly identify the devices of their business and f passengers and offer them services such as free in-flight Wi-Fi, pre-authorized in-flight value added services like premium audiovisual content, available upgrades, etc. Any user v Nucleus Vision ecosystem can also consume these value added services on flights usi tokens, which unlike traditional POS-based payment systems do not rely on telephonic conr function. This offers airlines a much safer and more secure payment mechanism, as well as t to offer a wider array of services enabled by the power of cryptocurrency-based microp using nCash tokens.

We have similar projects lined up across a variety of other sectors, and will be continuously e our offerings. We will also work closely with our strong community of users, using their feec ideas to help expand into sectors beyond our current vision, wherever Nucleus Vision's te can be a driving force of decentralization and disruption.

3. RETAIL INDUSTRY

3.1 Industry Overview

35   Global Retail Industry[1]
      Year 2013-2018

Whether for recreation or simply as a means to meet one's daily needs, consumer shopping is an integral part of the global economy. According to the Bureau of Economic Analysis, consumer spending in retail accounts for 70% of the United States GDP.[2] Many other countries have similar levels of consumer spending.

Year 2013-2018

Sales in trillion U.S. dollars

- 2013: 21.04
- 2014: 22.49
- 2015: 23.93
- 2016: 25.37
- 2017: 26.83

30
25
20
15
10
5
0

US Retail Market Size (in Billion US Dollars)[4]
Year 2013-2018

Sales in billion U.S. dollars

5500
4125
2750
1375
0

2013 2014 2015 2016 2017 2018

🟧 M-Commerce   🟦 E-Commerce   ⬜ Offline Retail
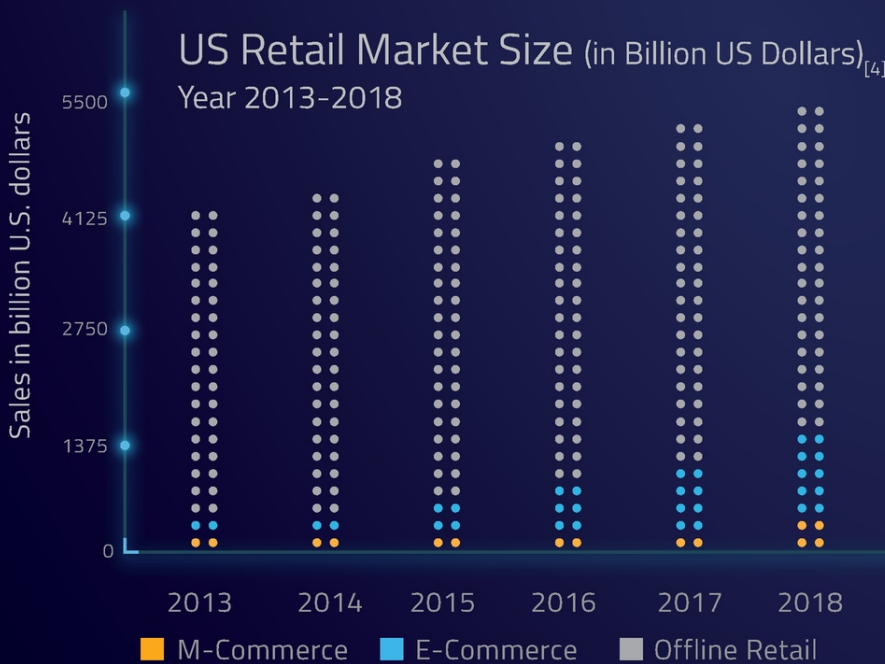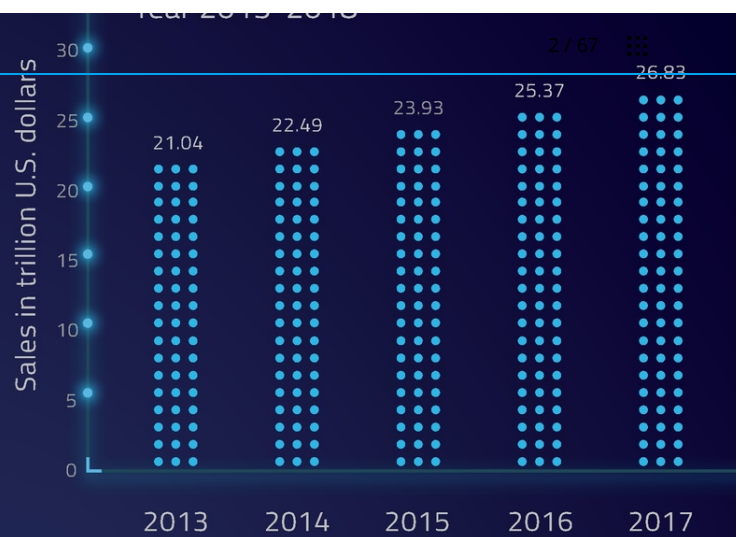
Report shows that the global retail se experienced an average annual growt 3.8% since 2008 and projects tha continue to rise to USD $28 trillion by The retail sector represents 31% o GDP and employs millions of peopl the globe.

Retail Distribution Between
E-commerce, M-commerce and
Offline Retail

M-commerce ←
E-commerce ←

90%
mark
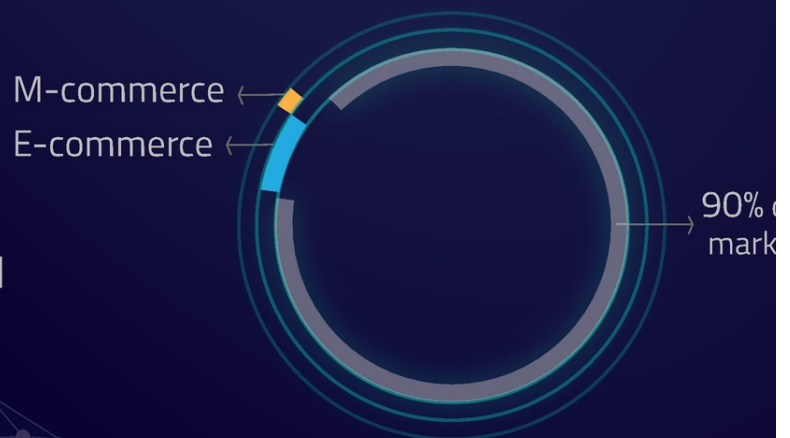
The majority of global consumer spending is transacted through offline, brick-and-mortar sales. While merce continues to grow in popularity, it is still dwarfed by the sheer volume of transactions occurring in retail stores. Despite the massive activity in brick-and-mortar retail, sales conversions on the flo decreased in recent years. As a result, merchants are investing in new ways to connect with their custom improve their in-store experience through technology.

BRICK AND MORTAR RETAIL

While 90% of retail sales still take place in-store, the new digital age is still changing the retail landscape. Retail brands that haven't yet learned how to cater to omnichannel customers have been shutting down unprofitable outlets in large numbers.

E-COMMERCE INDUSTRY

Despite its growing popularity, e-commerce represents only 5.8% of the entire retail market share. Small baskets, single channel customer options, ineffective delivery, and the inability to see, feel or try products prior to purchasing make it a difficult business model.

M-COMM INDUSTRY

Smartphones are great fo pers to research item engage, but sales rema low. The m-commerce market share is also co tively low at $42 billio approximately 1% of th retail market share. Desp rise of smartphones, abo of global transactions cash-based.[5]

In 2017, the expected sales volume from in-store retail sales is $26.83 trillion, which will be generated 15% to 20% walk-in sales conversions in the store. 2.6 trillion customers walk into 91 million retail stores the globe each year, and only 15-20% of those will convert with a purchase.

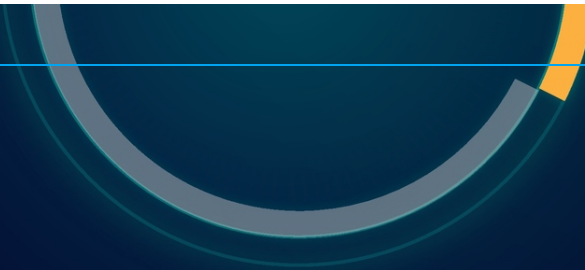## TOTAL WALKINS VS SALES TRANSACTIONS

85% Lost Opportunity

Only **15% ($26.3T)** of total footfalls make transactions in the store

■ Non-buying walkins   ■ Buying walk-ins

3.2 IoT in Retail

Internet of Things (IoT) is already present in retail stores, buildings, homes, cars, phones and wearable devices. In the process, it is bringing companies closer to their customers than ever before. According to the International Data Corporation, worldwide IoT market spend will grow from $591.7 billion in 2014 to $1.3 trillion in 2019 at an implied 17% compound annual growth rate. [6]

Furthermore, the installed base of IoT endpoints is expected to grow from 9.7 billion in 2014 to more than 25.6 billion by 2020. While there are several target areas for IoT technology adaptation, a key focus area within the industry is the retail sector - and for good reason.

With the expansion of e-commerce, brick-and-mor-tar retailers have experienced increasing pressure from online stores, which gather far more customer data and typically offer lower prices. IoT has the potential to help brick-and-mortar retailers regain an edge with regard to individual customer intelligence,

3.3 The Evolution of Retail

The retail industry has undergone four uni of consumer shopping behavior over th decades. These periods include:

SINGLE-CHANNEL SHOPPING
During this period, all consumers purchas brick-and-mortar retail stores.

MULTI-CHANNEL SHOPPING
During this period, consumers had multi shopping channels such as brick-and-m stores, websites and catalogs.

CROSS-CHANNEL SHOPPING
During this period, customers had access nected shopping channels, wherein a cust discover a product at a retail store and the it from the retailer's website.

OMNI-CHANNEL SHOPPING

which we believe will lead to increased sales.

> The full potential of connected
> devices is only achieved
> when they are tied to
> individual identities [7]
> Gartner

As a result of these anticipated benefits, retail chains are starting to pay attention to IoT. According to the Zebra 2017 Retail Vision report, nearly 70% of retail chain decision makers are ready to make the necessary adjustments to adopt IoT solutions by 2021. [8] Retailers are slowly moving from a fear of "showroom shoppers," who visit brick-and-mortar stores with their smartphones in hand but purchase online at lower prices, to exploring new ways to capitalize on the growing mobile market and connect with potential customers.

OMNI-CHANNEL SHOPPING

In this current period, retailers have begun ...ing a presence on multiple channels and pl... brick-and-mortar, mobile, online, catalo... enable customers to transact, interact a... seamlessly across these channels.

The evolution of retail industry has cr... opportunities and challenges for retailers... to The 19th Annual Third-Party Logistic... Capgemini, only 2% of all retailers are p... omnichannel retailing globally. [9] We belie... retail industry is only at the beginning of... channel shopping, prime for new technolo... tate market growth.

RETAIL INDUSTRY EVOLUTION
Customer - Retailer Touch Points

SINGLE CHANNEL

MULTI CHANNEL

CROSS CHANNEL

1995

2008

2011

FUTURE OF RETAIL

ION → Orbit

Retail Outlet

Loyalty Wallet

SIM Database

Neuron

Nucleus Vision Future

OMNI CHANNEL

(Connected Retail Channel)
2016+
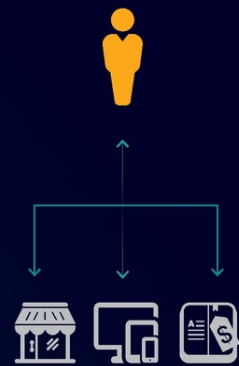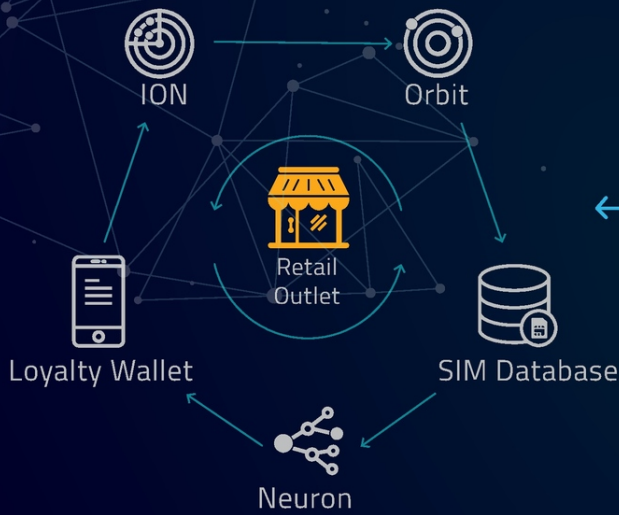
REASONS FOR CHOOSING TO SHOP AT STORES VS. ONLINE [10]

I want to see, touch, feel and try out items

I want to take items home immediately   4

I want to return items more easily   20%

I want to enjoy in-store experiences   18%

I want to pose questions to store associates   13%

I only shop online   7%
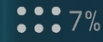
3.4 Role of Loyalty Programs

3.5 The Future of Retail with Nucleus Vision

Nucleus Vis
solution off
opportunitie

Nucleus Vision

Loyalty programs play a critical role for many retailers, helping to generate repeat business from known and active customers. These programs are generally supported by technology-based systems, which are able to track and leverage customer data to develop broad or personalized incentives to maximize revenue. While loyalty programs are widely used by retailers, they are still expensive to develop, implement and maintain. In 2014, companies spent $2 billion on loyalty programs in the United States alone. [11]

According to the 2016 Bond Loyalty Report, which queried 12,000 Americans and 7,000 Canadians about their opinions and behavior around 280 popular loyalty programs across industries, 50% of respondents reported that they were active members. Of that 50%, one-fifth had never redeemed their rewards. Furthermore, the loyalty program members who did not make redemptions were 2.7x times more likely to defect from one program and join another. [12]

"48 trillion reward points from brands worth close to $360 billion go unredeemed

We believe that a physical store with an integrated digital retail channel is the correct approach to enable the successful execution of an omnichannel retail strategy. An omnichannel retail customer experience provides many avenues through which a company can learn about individual customer preferences and provide visitors with personalized offers and experiences. Our platform serves this market with technology that enables omnichannel retail. In the process, we enhance the retail shopping experience in real-time.

To accomplish this ambitious goal, Nucleus Vision has built the first generation of its platform, which is currently deployed in 10 live retail stores. Our technology allows businesses, with customer consent, to obtain shopping preferences. Once activated and authorized by the customer, we are able to detect the customer's phone number, which the retailer can then use to find other customer data, such as past purchases, typical basket size, number of loyalty points, and loyalty redemption status in their CRM database or loyalty program database. Our platform continuously adds new information to the customer's profile as they have interactions within the store and/or on the store's website. Blockchain layer plays a critical role in secure data sharing with customer authorization.
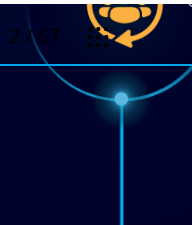
4. PRIVACY & COMPLIANCE

At Nucleus Vision, we believe that user privacy is key to our platform's success and adoption. Users ha
flexibility to give authorization or to revoke authorization for the service or for particular brand. As a p
our commitment to privacy and compliance, we adopted global best practices and used blockchain fe
to build a regulatory-compliant and transparent framework.

Nucleus Vision Privacy and Compliance Framework

| Compliance | → | Telecom compliant customer sign-up process | → | Smart Contract enabled business sign-up | |
| Privacy | → | **Security:** Encrypted by cryptography and auditable data storage | → | **Trust & Control**: Customer authorize data exchange | → | **Decentrali monetization**: C credit attributio exchang |
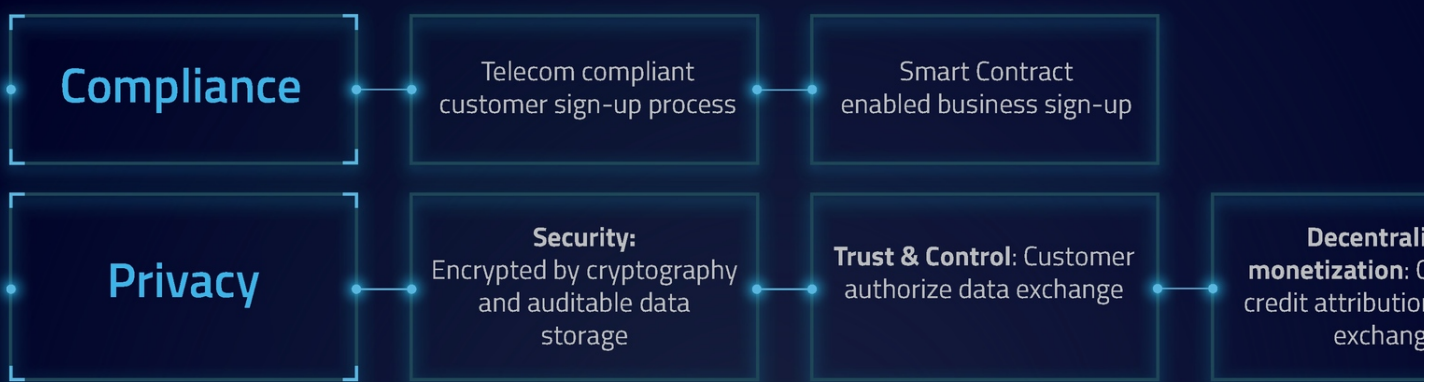
4.1 Compliance Framework
Telecom compliant customer signup process

As a first step to meet compliance requirements, we have adopted explicit, permission-based onboa
The Customer gives explicit consent to sign up using an activation channel provided by service provid
this case Nucleus Vision). For example, a customer can send his authorization over an SMS to their te
service provider or give consent via third party app or other existing service provider (such as a ba
accepting the T&C.

SMS/TSP Apps

Customer
email/sms

Third Party Apps

Other partner service providers E.g. Banks, Ecomm Portals

Retailer applications

Telecom Service Provider

Nucleus Vision Platform

Consent Replication

Nucleus Vis
Server

Telecom Se

Partner Se
consent fro
party)

Customer Sign-Up Flow
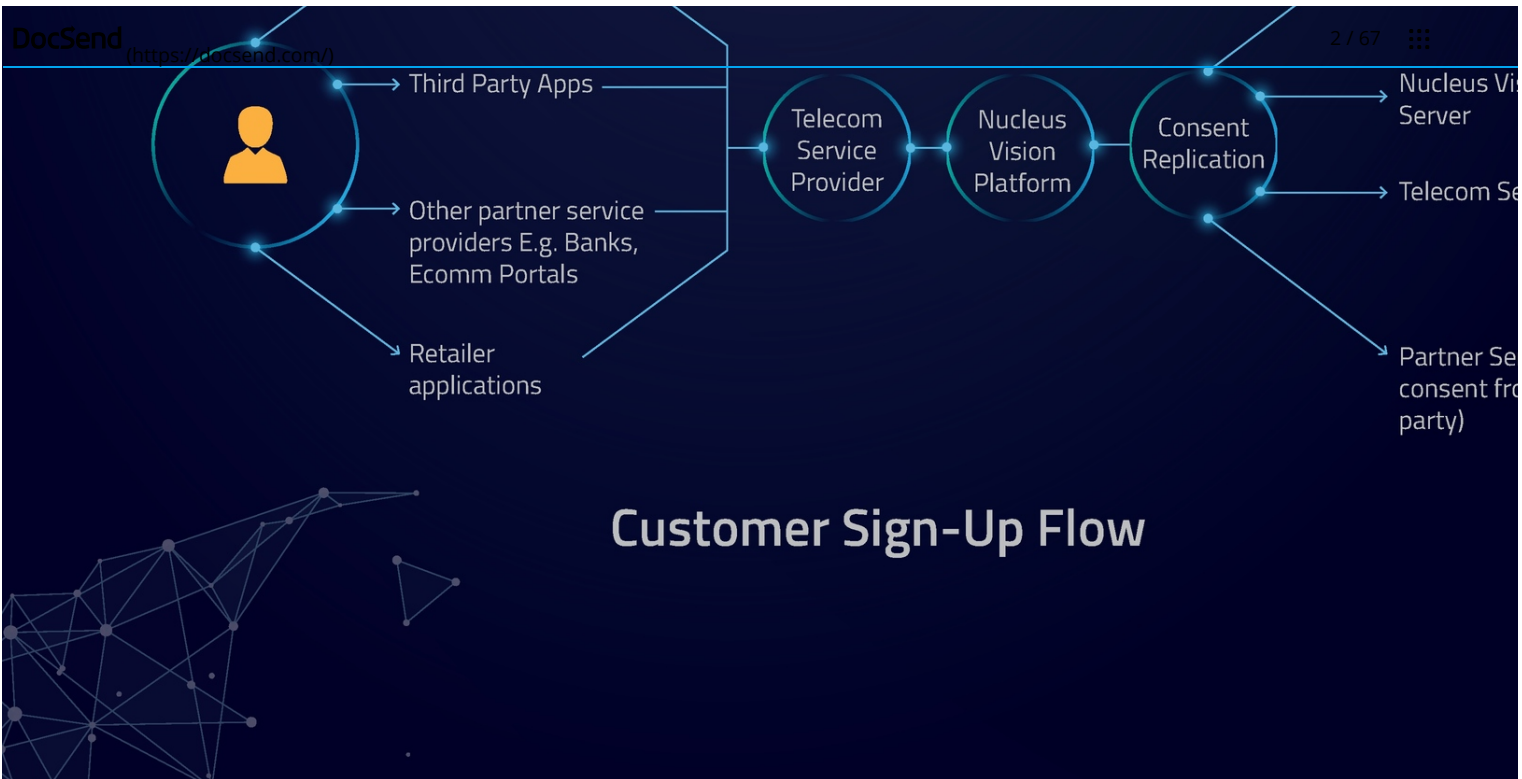
Nucleus Vision customer signup process complies with telecom regulatory guidelines

When a new customer authorizes Nucleus Vision, the telecom service provider receives a notificatio
the customer has signed up. The Nucleus Vision platform records this registration and securely logs
customer is requested to download the Nucleus Vision app, to fully control and view their data-trans
logs, as well as track all their nCash. All the customer data will then continue to reside in their cell-p
which becomes an edge computational node for Nucleus Vision. This way, every user's data is se
stored in their own hands at all times, and they and only they control Who can access their data, and
The Nucleus Vision platform records this registration and creates a transaction over blockchain. The co
is then replicated to four different places: the Nucleus Vision database and blockchain, the telecom s
provider database, a third party database and finally an email and SMS to the customer. These co
transactions are transparent to the entire ecosystem and stakeholders can check whether there is a
consent from the customer.

Smart contract enabled data transaction

Businesses become part of Nucleus Vision by signing up on the platform. The business first declar
variables which they own on behalf of customers. For instance, as a data provider, a bank may h
customer's first name, last name, residential address, government identity proof number, work
address, date of birth, credit score, and other data points.

The bank may elect to share only three variables about their customers within the Nucleus Vision ecosy Let's say they opt to share date of birth, credit score, and city of residence for their customers.

Any businesses that has signed up with Nucleus Vision can interchangeably play the role of data prov data user. For example, a lender may want to view a customer's credit score from the bank's unique I before issuing a microloan to the customer. The lender would request this data from the bank, ar customer would have the option to approve or reject the data transfer. If approved, the bank would tra the requested data to the lender. By structuring customer data and approval in this way, every player the ecosystem interacts only with explicit consent.

4.2 Privacy Framework

Privacy is one of the biggest challenge for traditional data sharing platforms. Blockchain technology pr the best solution to these privacy challenges. Nucleus Vision harnesses three main features of blockch optimize the platform. These are:

1. Security
2. Trust and Control
3. Decentralized Monetization

Security

Security is a crucial aspect of the data exchange process. The simplest and most common form of se breach is the unauthorized access of data. We see many instances of data hacking, and even the b banks in the world are not immune to security breach. Security becomes a major concern when data is at a centralized location, meaning that if the system is breached, all data is at risk.

Hashing and blockchain architecture provides inherent security to protect all identity and data protocol enced in the system.

Trust & Control

Smart contracts creates trust between IoT device owners, data providers and data buyers. No centra
stores the data and it is only accessed with the authorization of the customer. This system is automat
run on the blockchain to verify the authenticity of the parties involved in each transaction. This trust e
more IoT device owners to join the network, more data providers to share data freely and more data l
to spend with no conflict.

For example, customer may choose to share data with a specific brand and may refuse to share prefe
with other brands. Say an e-commerce player is willing to share few data variables with another non
peting business, but not with another e-commerce player. Once stakeholders set these rules of v
sharing, they will be applicable to the entire lifecycle of data and cannot be breached by any other pl
the ecosystem.

Decentralized Monetization

Today, Internet giants enjoy a monopoly on the monetization of customer information. To disrupt system, Nucleus Vision is creating a decentralized data exchange where every party gets True Credit Attribution. The term True Credit Attribution represents the distribution of economic benefit to all stakeholders playing a role in data exchange.

With every data transfer transaction, the system aggregates and builds a huge repository of customer behavioural information on the individual mobile device. The system curates the data over time through a 4-point triangulation system, by which data buyers must first reward customers before their data reaches 3rd party. Customer can also change data sharing settings.

Once again using our earlier bank example, a retailer may request a customer's credit score before offering him an EMI option on a high value product. The retailer sends the credit score access request to the customer, and the customer authorizes the request. The credit score variable is then declared by the bank, and upon customer authorization, the Nucleus Vision platform will send the credit score access request to the bank. The bank then verifies the customer authorization before sharing the credit score data. Customer is rewarded for authorizing the exchange. Hence the customer gets true credit attribution for the economic value generated for retailer.

This system offers full transparency to both data owners and data providers as to how data is being shared among entities, as well as how data consumption rules are validated. Any player in the ecosystem can request any data variable that has been declared by other players. Thus, data exchange is not restricted to any direct association between parties. This enables all players to freely make use of the Nucleus Vision decentralized data exchange platform.

5. NUCLEUS VISION PRODUCT

Nucleus Vision has built a technology solution for the   This helps create a personalized custom
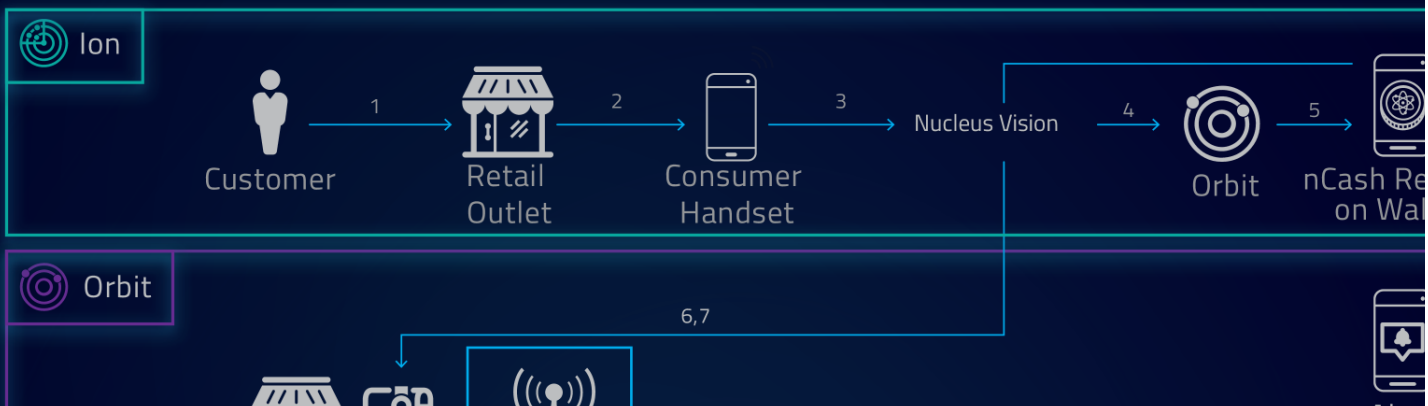
brick-and-mortar retail industry that enables retailers to collect customer data in real-time and provide relevant offers based on that data. Our platform uses blockchain, sensors and machine learning to create automated solutions that generate customer loyalty. For retailers, Nucleus Vision's IoT solution provides insights into customer behavior that were not previously possible, such as the ability to track customer visits, aisles browsed and paths taken in-store, favorite products and future customer behavior in-store.

ence that provides greater customer sa Nucleus Vision's sensor technology is uni ing seamless coverage of all walk-in custo retaining every collected data point of behaviour. This technology gives retailers to provide personalized offers and pron real-time, a service that 75% of shoppers would make them more likely to buy in-sto
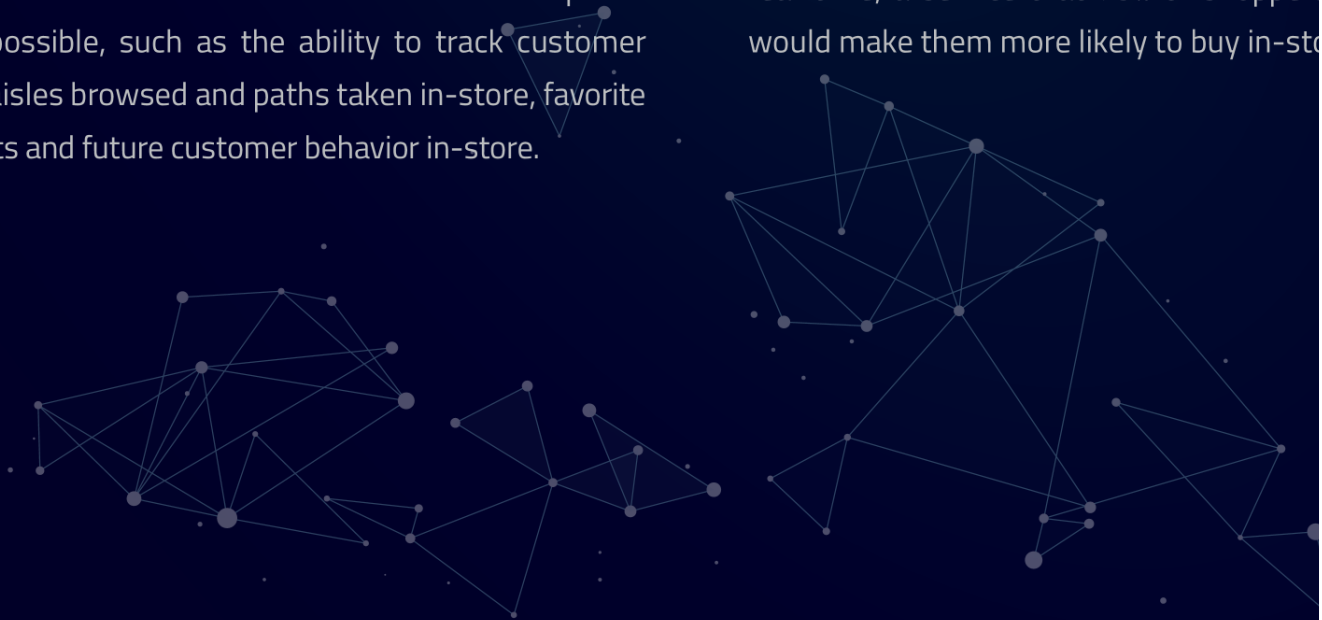
5.1 Solution Architecture

To better explain how Nucleus Vision's technology works in practice, we have broken down a recommen use scenario into steps. A detailed description of each step is as follows:

Ion

Customer → 1 → Retail Outlet → 2 → Consumer Handset → 3 → Nucleus Vision → 4 → Orbit → 5 → nCash Re on Wal

Orbit

6,7

Retailer
Attestation

Telecom

Orbit

Consumer

Aler

Recommer

Orbit

9

Bank

3rd Party

13

Authoriz

10

11

12

Neuron Campaign Management

14

15

In-store

Outside

Online

16a

16b

16c

Universal Reward
Exchange

Cross Brand Affiliation

Connected Exper

Universal Utility Programme

nCash Wallet

Transaction Summary/Analytics

Solution Architecture Overview

IoT Network   Deep L

Blockchain   UUP

Use Case Explanation Step-by-Step

1   Customer walks into a store

2 The customer's phone ID is recognized by an ION sensor

3 The ION sensor sends the customer's phone ID to Nucleus Vision

4 Nucleus Vision sends a text message (or push notification through a pre-install partner app) customer offering nCash [for opting into the store's reward program]

5 If the customer opts in, nCash is credited to his or her account (nCash can be moved to an ERC compliant wallet)

6 Nucleus Vision securely transfers this customer identification to the retailer over blockchain

7 Customer is mapped with retailer's core system through Nucleus Vision' blockchain network, u new data insights for the retailer

8 If the Retailer has no previous shopping history on this customer, the Retailer's system auto cally requests for data from Nucleus Vision's extended partner ecosystem, which is sent to c retailers and participants in the network. An incentive denominated in nCash is provided for network participant(s) that share information.

9 Network partners set pre-defined rules to share customer data amongst friendly, non-compet entities and share the requested customer data points, if approved

10 If the network partner accepts the request, they further request customer to authorize data exchange through blockchain before sharing actual data with retailer. Network partners atta some nCash as an incentive for the user to share data.

11 Customer receives the request for sharing their data across the retail partner network

12 Customer authorizes the request and receives nCash as incentive for authorizing, and will rec a portion of the nCash transferred each time their data is exchanged on the Nucleus Vision r network. The frequency of this authorization is controlled by customers.

13 If the customer authorizes the data sharing the blockchain enriches the respective parameter v retailer's smart Nucleus Vision intelligence system.

14 Based on the customer's data, a unique score is generated by Nucleus Vision' Neuron tec
This score represents the customer's value to the retailer based on his or her purchase
spending habits and other factors

15 The retailer may decide to offer nCash tokens to the customer based on his or her score. Retail
will be able to make decisions in real time within three different contexts:
a) Upon entering the store (to incentivize in store conversion)
b) Browsing around the store (to increase store visits)
c) At the time of checkout (to increase retention and loyalty)

16 The nCash tokens also act as a universal loyalty program, where customers can use nCash a
reward points across any retail partners on the Nucleus Vision network

5.2 Product Detail

Nucleus Vision is composed of several technology layers, which together enable the next gener
platform discussed in this white paper. A high level summary of the technology layers that make up Nu
Vision product can be described below

| Ion Sensor Network | Orbit Blockchain | Neuron Machine Learning | nCash Universal Utility Program |
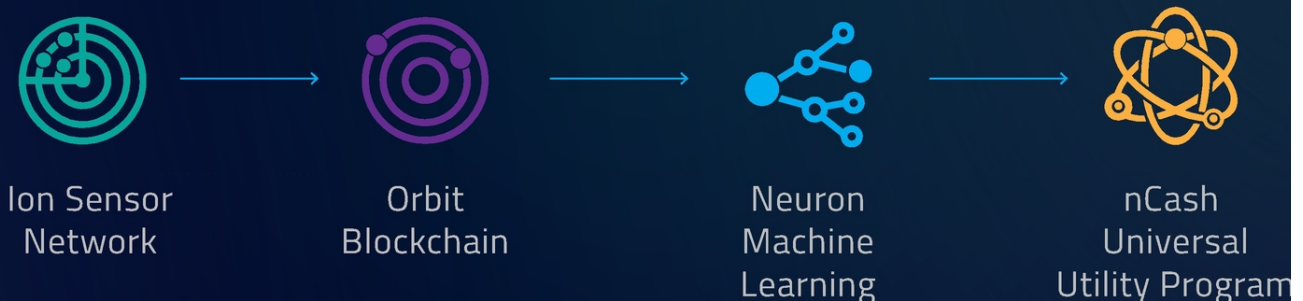
Each product component is discussed in detail in forthcoming sections.

5.3 ION Sensor: Proprietary Sensor Technology

ION sensors enable retailers to capture new data on brick-and-mortar customers. Nucleus Vision's p[...] etary sensor network, the ION Network, can uniquely identify and sense temperature, pressure, m[...] acceleration and sound within the vicinity of the sensor.

The ION platform is built in collaboration with industry leaders Intel, Alpha, and Radisys. It match[...] performance standards of the telecom industry as well as existing IoT platforms. The ION platform is c[...] of identifying 32 unique IDs per 612 microseconds and transmitting the data to Neuron platform in re[...]

The transmission radius of the Neuron platform can be adjusted based on the size of the store or inf[...] area to be created inside or around the store.

The ION network is a plug-and-play module for retailers, enabling them to instantly implement ION[...] store and start gaining intelligence about their customers. Furthermore, by activating ION in the store, [...] ers will become part of an extensive network of Nucleus Vision partners, customers and data ex[...] ecosystem.

As retailers become part of Nucleus Vision network they will be able to enjoy the benefit of network [...] and complement each other to improve customer stickiness.

and complement each other to improve customer stickiness.

ION can sense:

- Mobile Id
- Temperature
- Motion
- Pressure
- Acceleration
- Sound

Key features of ION

- Identifies 32 Ids in 612 micr
- 200 meter coverage
- Telco grade security

5.4 ORBIT Blockchain: Authorization and Data Transmission

Orbit ensures that information flows accurately and securely between all involved parties and sys Blockchain is the foundation of the Universal Loyalty Program and makes the flow of informatic rewards absolutely transparent for all stakeholders, no matter where they are across the globe.

Nucleus Vision is currently built with smart contracts on the Ethereum blockchain. With the inherent tion in transaction bandwidth with Ethereum blockchain, other prospective platforms and framewor

being evaluated. We are also considering designing and developing our own Nucleus Vision bloc[...] platform in the future.

We have derived an architecture for the NucleusVision ecosystem from the goal models, which resu[...] three coherent sets of distributed components:

- The data provider component consists of a Nucleus Vision profile manager that creat[...] maintains the data profile of the provider through external data sources and coordinat[...] profile encryption key generation.

- The data exchange component is comprised of a Nucleus Vision contract manager that c[...] nates the execution/blockchain interactions of data exchange contracts and release of [...] tokens to the data provider after successful data exchange.

- The data requester component centers around a Nucleus Vision request-manager that c[...] a new data request/profile creation, supports querying the status of existing requests, a[...] ing the resulting data and specifying the compensation(in nCash) for the data exchange.
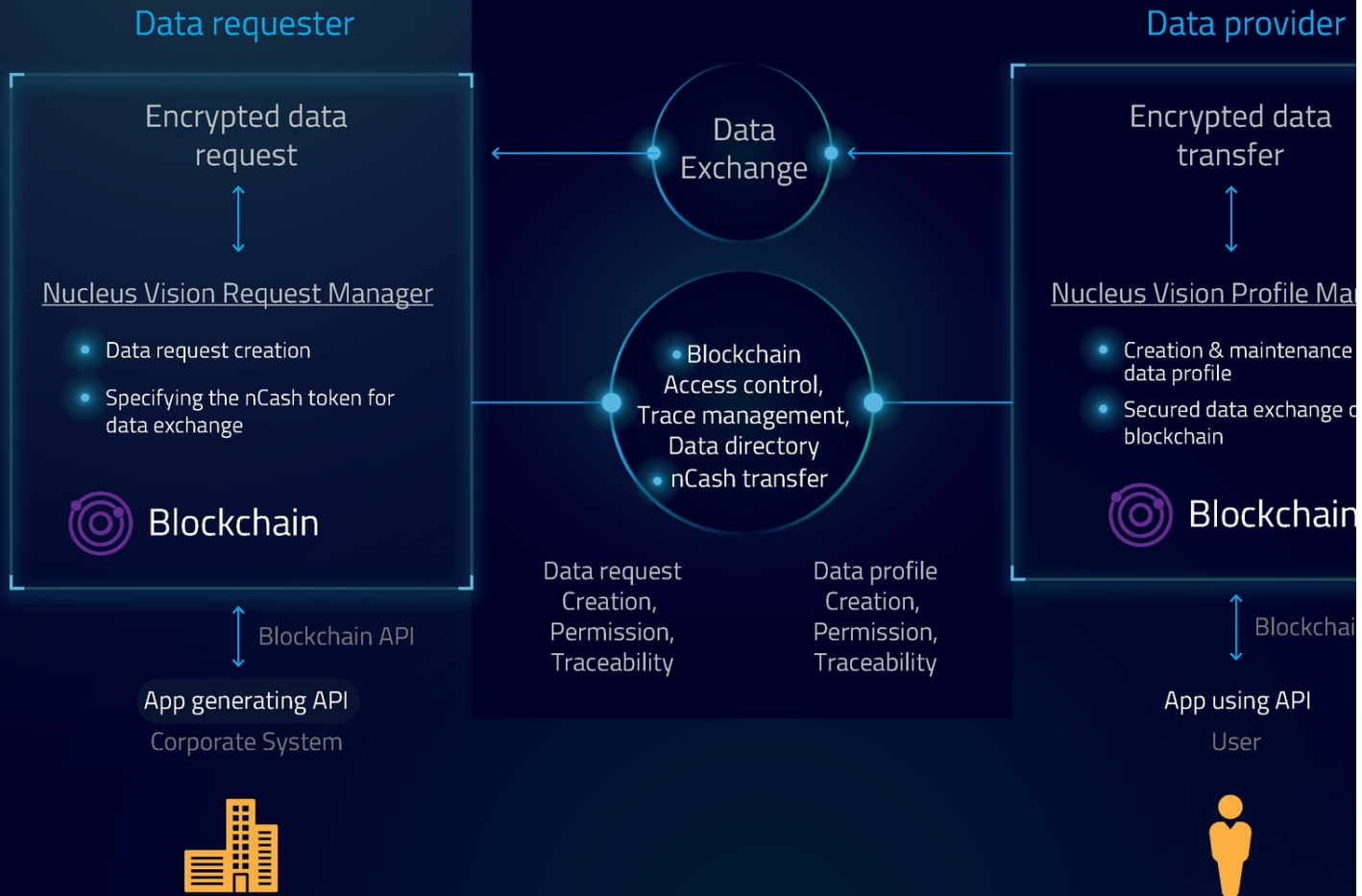
The security of the data exchange over blockchain is ensured by sending a public key to the data prov[...] encrypt the data prior to transfer in a way that can only be decrypted with the requester's private ke[...] data they receive has to be able to be verified, e.g., through a hash match.

Data Exchange Process

Once a data request has been determined to be viable, the data provider has the option to consent [...] contract. If the provider consents to the contract then their Nucleus Vision profile manager selec[...] decrypts the agreed upon data. This is accomplished by requesting the private profile key of the provid[...] combining it with the locally stored half. Next, the data is hashed and sent to the contract as a referer[...] the authenticity of the data transfer. The Nucleus Vision profile manager then encrypts the data w[...] requester's public key. Once the Nucleus Vision request manager receives the data, it decrypts it w[...] appropriate private key. The data exchange is validated by the NucleusVision contract manager a[...] transfer of the nCash tokens to the provider is executed.

Nucleus Vision Contract Manager

Data requester

Data provider

Encrypted data request

↕

Nucleus Vision Request Manager

- Data request creation
- Specifying the nCash token for data exchange

◎ **Blockchain**

↕ Blockchain API

App generating API

Corporate System

Data Exchange

- Blockchain
  Access control,
  Trace management,
  Data directory
- nCash transfer

Data request
Creation,
Permission,
Traceability

Data profile
Creation,
Permission,
Traceability

Encrypted data transfer

↕

Nucleus Vision Profile Ma...

- Creation & maintenance ... data profile
- Secured data exchange ... blockchain

◎ **Blockchain**

↕ Blockchai...

App using API

User

Management of ID and Data over Blockchain

We have tried to keep the set of blockchain operations to be minimal to limit the computational and tra... tional costs. The minimal set of operations is chosen to optimize the cost, performance, nCash tr... tracking, and latency calculations.

The resulting system will be developed in stages, each stage of the development represents a viable p... that addresses pressing issues for both data providers and data requester, and culminates in a fully ... tralized, consent-based, data exchange. The resulting system has the potential to nurture the next g... tion of personal data products and AI-based customized experiences, finally allowing internet users to ... their data work for them.

ORBIT Use Case

1   Customer walks inside the store

2   IoT data infrastructure protocol activates and recognizes the customers

3   Nucleus Vision finds data from third parties - such as telecoms, banks, e-commerce players

4   Nucleus Vision stores the encrypted source of data.

5   Nucleus Vision notifies stores about customer's presence and informs the retailer about ava data points associated to customer.

6   Nucleus Vision also informs the retailer about the set of available data for the customer a with projected sales upside of customer intelligence.

7   Retailer pre-authorizes Nucleus Vision about the
    a. combination of customer segment and data points to be gathered
    b. nCash reward to the customer for successful customer authorization

8   When the customer walks inside the store then the customer receives a notification rega data request from the retailer and associated reward.

9   Customer authorizes the data exchange with the retailer

10   Customer gets rewarded with nCash token

11   Data APIs fetch data from the respective locations and store the data in the customer's pho

12   Nucleus Vision neural models run the analysis inside the customer phone to gather ag
shareable intelligence. Following activities take place inside the customer's phone
a. Data storage (only for the transaction, which the customer authorized)
b. Data curation
c. Predictive analysis - get customer lifetime value