

# TTC

## whitepaper



version 1.4.2

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## SUMMARY

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**We believe the designers, artists, scientists, programmers and creators are the unsung heroes behind brands that make magic happen in our lives. The brands are the seal of these creators' souls: they symbolize their blood, sweat and tears. We believe that we should cherish brands and its creators, protect them, encourage them to keep going and strengthen the connection between people and brands.**

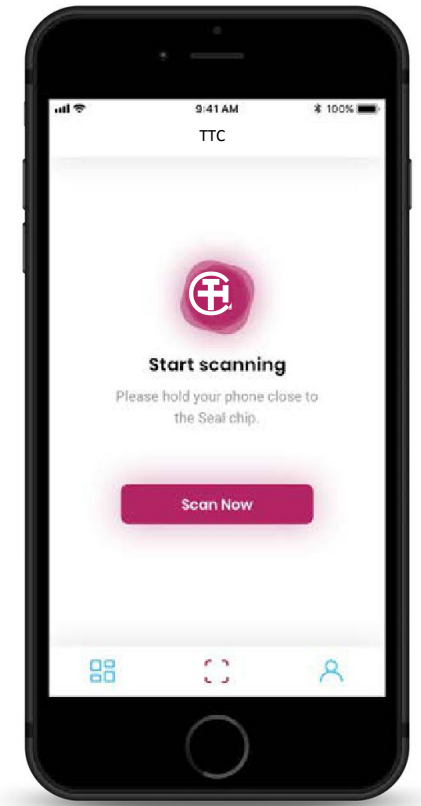
**T**abs Tracking chain, tag Tracking, or anti-counterfeiting cloud, or **TTC** is a product certification and service platform supplied by a blockchain that will provide product trust for consumers and manufacturers. TTC enables anyone to be confident, quickly and economically to verify the authenticity of any products that enable TTC DAPP. TTC proprietary technology **USES** its compatible TTC chips to be effective, safe and distributed in conjunction with any physical manufacturing product. After the TTC chip is integrated, the product is paired with the digital counterpart on the block chain. Authenticity can be verified by simply clicking or scanning any smart device.

The Seal app allows anyone to check if a Seal-enabled product is genuine. A simple tap with your smartphone lets you scan the Seal NFC chip, which is embedded in products, and shows you information about the product.

The Seal chip, Seal app and the Seal Network provide authenticity and other services for products and brands. We use dynamic NFC chips instead of static QR-codes and RFID for better security and copy protection of the chips itself.

By facilitating a secure tokenized version of a physical product, Seal allows product-specific services to operate such as transferring ownership, theft prevention, insurance, but also brand activation campaigns and product analytics.

For the first time in history, brands can earn money from items sold through the secondhand trade, while simultaneously protecting their markets from counterfeiters, by leveraging blockchain technology.



## DISCLAIMER

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Seal and its team take your safety and security very seriously. Please be aware that with all blockchain activities in general, and Initial Coin Offerings (ICO's) specifically, come significant risks. These risks may for instance comprise of complete or partial loss of tokens, loss of value, technology flaws, insufficient or incorrect information and regulatory changes. You are explicitly warned to ensure that you fully understand these risks before engaging in blockchain activities, especially in the Seal ICO. Further elaboration on these risks may be found in the risks section of this document. Should you have any questions regarding these risks, please let us know by contacting us via e-mail. If you do not fully understand these risks, you are kindly requested to seek advice on the matter and if that is not possible, you are kindly requested to not participate in the Seal ICO. This document is subject to change.

### Target Audience

This document is intended for people who have experience purchasing blockchain tokens. If you have not regularly participated in prior token sales, nor fully understand risks associated with it, we strongly advise against participating in the Seal token sale. Each participant fully accepts any risks associated in the process of the token sales, distribution and accepts that no guarantees will be made for the tradability of the token, nor protection against the exposure of volatility which may occur, resulting in a large difference in the value of Ether between the purchase date and the date Seal tokens are tradable.



## mission

to create a more genuine world, out  
of love for creation.



## WHY SEAL

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### Out of love for creation

We believe that the designers, artists, scientists, programmers and creators are the unsung heroes behind brands that make magic happen in our lives. The brands are the seal of these creators' souls: they symbolize their blood, sweat and tears. Together they turn ideas into reality, transform things into culture and bring us confidence, laughter and joy in our lives.

Therefore, we believe that we should cherish brands and its creators, protect them, encourage them to keep going and strengthen the connection between people and brands. We want to pave the way to a genuine and enriching world, without fakes or soulless products and their devastating consequences.

We aspire to ignite a renewed appreciation for the world's most beloved and worthwhile brands. Out of love for creation.

### Origin story

Bart and Joris worked together on a social mobile games startup in the past. Back in 2013 they put their gaming hardware to work mining Bitcoin and Litecoin after office hours. They quickly figured out that coupling NFC technology with the blockchain could disrupt counterfeiters, and that this is a use case with the potential to put the blockchain into the hands of millions of people. Although their initial work was done back then, they knew the market was not ready yet. In 2017, they realized it was time to put their master plan to work, and so they did. Born as children of an artist whose work fell victim to counterfeiters more than once, Bart and Joris know first hand how devastating counterfeiting is to the lives of creatives.

### Company Overview

Bloomsix Established in 2008

- Founded Bloomsix as a publisher and developer of premium social mobile games
- Based in Amsterdam, the Netherlands
- Independent company

Pivot to blockchain

- Started mining Bitcoin and Litecoin in 2012 using gaming hardware
- Developed primitive version of the Seal Network concept

Seal Network started

- Developed first prototype in Q3'16
- Set up the Seal Network team in 2017
- Refined the proposition
- Token sale preparations



## WHAT IS SEAL

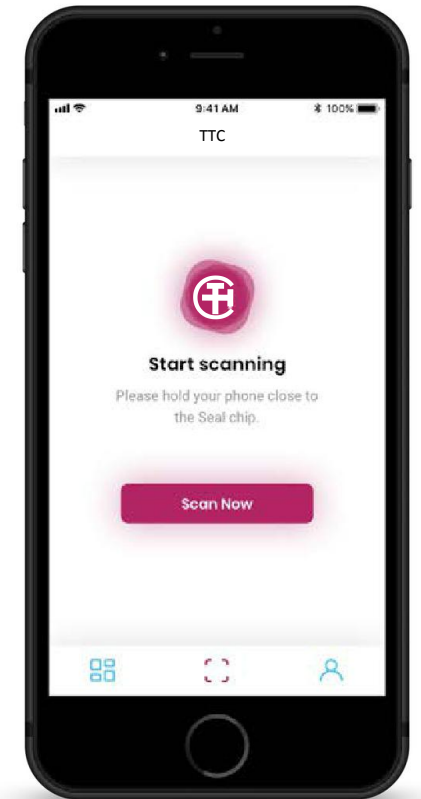
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Seal is the best way for anyone to check if a product is genuine or fake. Seal combines NFC chips, which are embedded into physical products, the Seal app, and the Seal Network to provide a fast, simple, and secure way to provide products authenticity and other services.

By facilitating a secure tokenized version of a physical product, Seal allows product-specific services to operate such as transferring ownership, theft prevention, insurance, but also brand activation campaigns and product analytics.

Seal lets brands earn money every time their products change owners. For the first time in history, brands can earn money from items sold through the secondhand trade, while simultaneously protecting their markets from counterfeiters. Using the power of the blockchain, authenticity can be checked and ownership can be transferred decades from now, even if the product itself is discontinued, as long as people contribute to the decentralized Seal network.

Seal wants to bring back confidence to consumers and allow for brands to interact with their most heavily vested customers in the most direct way the internet has ever seen. Together, we build a better world in which consumers appreciate the creative work of makers and stop feeding the counterfeit economy.



problem

# counterfeiting conundrum

- ① Primary Market Counterfeiting
- ② Secondary Market Counterfeiting



Secondhand Market



Midnight Shift

# scope of the problem

1

## NO PROPER PROTECTION

Nike is the most frequently imitated brand, but **no brand is immune**. Counterfeits reach the **EU & US** by the **hundreds of millions** of units. Unlicensed products are produced during midnight shifts and sold through parallel import.

2

## MINDBOGGLING MAGNITUDE

85% of global counterfeiting originates from Asia. **20% of China's total production** is counterfeit goods. Global counterfeit products are projected to rise to **\$1954 billion\*** by 2022

3

## GEOPOLITICAL SCALE

**OECD** states counterfeiting has **scourging impact on economies**. The profits end up funding cartels and terrorist cells. It is a bigger revenue stream for crime rings than the drug trade. Safety of people globally is jeopardized by fake medicine, airbags and airplane parts.

4

## SECONDARY MARKET

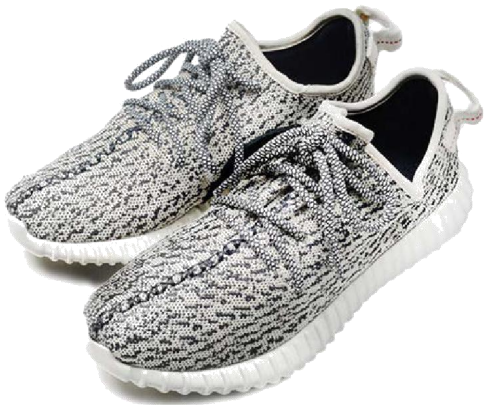
It is almost impossible for people to differentiate genuine from counterfeit products. Especially on the secondary market where fraudsters run amok, and there is no trust in the counterparty.

\* The Economic Impacts Of Counterfeiting And Piracy, A Report prepared for BASCAP and INTA by Frontier Economics, 2022 predictions





DIFFICULTIES RECOGNIZING COUNTERFEIT FROM GENUINE PRODUCTS



SCOPE OF THE PROBLEM

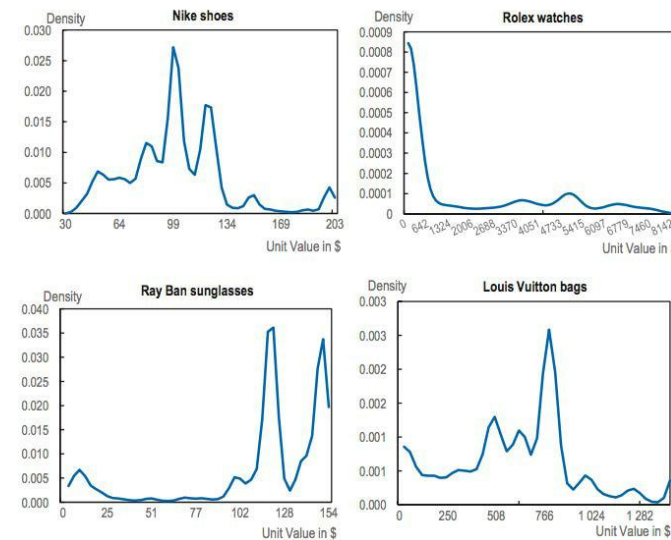
Counterfeiting Targets

In its essence, counterfeiting is the arbitrage of a product’s extrinsic value. A brand’s sensitivity to counterfeiting depends on the extrinsic value of its products. Extrinsic value is usually derived from brand equity but it can also be derived from other sources such as certifications in the case of medicine.

Secondary Submarket

Counterfeiters target both primary market and secondary markets. In primary markets prices are similar to authentic products. In secondary markets prices may vary widely (Note: The secondary market is not the same as the secondhand market). According to a study by the OECD, counterfeit Ray-Ban sunglasses, Rolex watches, Louis Vuitton bags and Nike shoes with very low prices target the secondary submarket. In this submarket the prices are substantially reduced when compared to the original because consumers seek IP infringing products intentionally (OECD, 2016, p55-138). Products may be advertised as proxies or replicas when sellers do not pretend that the product is authentic. Instead, the seller may argue that the product is of similar quality to the original. Although Seal cannot address this segment of the market directly, it can be addressed by the use of Seal by customs control.

Fig. 1.: Unit value distribution of counterfeit Nike shoes, Ray-Ban sunglasses, Louis Vuitton bags and Rolex watches.



## SCOPE OF THE PROBLEM

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### Primary Submarket

Counterfeit products in a higher price category belong to the primary submarket. These counterfeits do not only infringe IP, but also intentionally deceive consumers. The prices for these products are only slightly below the original product and are often sold as authentic products at a discount. The Seal Network protects this market. The OECD estimates the international trade in counterfeit products was up to \$461b in 2013, or 2.5% global trade. This amount does not include domestically produced and consumed counterfeits nor counterfeits that were distributed online.

This is an 80% increase to the OECD's 2007 findings. A recent report by Frontier Economics (2017) has extended the OECD report. Its authors estimate that the value of international and domestic trade in counterfeit and pirated goods in 2013 was between \$710b and \$917b after taking into account the value of domestically produced and consumed counterfeits. In addition, the total economic and social losses amount to another \$737bn to \$898bn. These losses are associated with missed foreign direct investments, fiscal losses, displacement of legitimate economic activity and criminal activity. Frontier Economics' forecast for 2022 paints a grim future. The total costs of the counterfeiting industry in 2022, excluding software is between \$1516bn and \$1954bn. Over 85% of all counterfeit products are produced in China at the time of writing.

The companies that suffer most frequently from counterfeiters are registered in OECD countries, namely the United States, Italy, France, Switzerland, Japan, Germany, United Kingdom, and Luxembourg. Companies from China and other emerging economies are increasingly victimized as well.

Notable brands include Nike, The North Face, Cartier, Hermès, Levi's, Tiffany & Co, Coach, Ugg, Ralph Lauren, Disney, Ray-Ban, Michael Kors, Gucci, Chanel, Louis Vuitton, Adidas, Rolex, Apple, Marc Jacobs, Bulgari, Samsung, Mac, Burberry, Christian Dior, Viagra, Marlboro and many, many more. Brands address this problem via brand protection agents, IP lawyers and alliances against counterfeiting; [react.org](https://react.org) and [iacc.org](https://iacc.org) are two notable anti-counterfeiting alliances. At the time of writing, Seal is the only listed product security member of the International Anti-Counterfeiting Coalition combining blockchain and NFC chips (<https://www.iacc.org/membership/members>). Seal is supported in the form of an advisory role by the founder of React (<https://react.org/our-members/>).



## SCOPE OF THE PROBLEM

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### **Secondhand market**

The secondhand market is extremely sensitive to corruption and very low in consumer trust. Many products lose value in the secondhand market, but the products that Seal targets typically act as value stores. The integrity of the secondhand market dictates whether or not the brand can sell products at a price premium. Customers will churn en masse once trust in the authenticity of products in the secondhand market is jeopardized, because collectibility is drastically reduced when counterfeiters pollute the market. In other words, when counterfeits flood the market, consumers will no longer feel safe purchasing those products. They will not just stop buying, but exit the market altogether (for instance by selling off their collection).

The secondhand market is the place where value stores form a lucrative trade, such as in the case of collectibles, comics, vinyl, wines, sneakers, designer clothes, leather goods and other vintage or limited edition products. These categories are prime targets for counterfeiters, thus the demand for authenticity is highest here.

The secondhand market is the biggest market in size, since the market size is the sum of all products ever sold, not just the ones that are for sale right now, yet data on the secondhand market is lacking because there is simply no way for brands to capture that data properly. Since these markets behave autonomously, beyond the control of the brands, the brands are unable to interact with this market. The result is that brands cannot monetize the secondhand market even though this is where most of the money from products with collectible value is made. Brands only profit at the initial point-of-sale, not on after sale transactions.

Products are traded both offline and online. Although buyer protection options exist on certain online platforms (eBay), many platforms do not offer this (Facebook). However, counterfeits often go undetected until after the product is resold again to a more sophisticated or professional buyer. Unwitting buyers will not initiate buyer protection simply because they believe the product is authentic when in fact it is not. Companies like Amazon, Flipkart, eBay and Alibaba suffer tremendously from counterfeiters active on their platforms. Blockchain technology is at its best in environments where trust is low, since it is a system where trust is no longer required. Therefore, the secondhand market is in dire need of a blockchain based authentication solution.



## SCOPE OF THE PROBLEM

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### Midnight Shifting

Midnight shifting occurs when legitimate manufacturing partners of the brand produce a licensed product run during the day, but also create an unlicensed product run during the night. The licensed product run is sold through the legitimate supply chain, whereas the unlicensed product run is sold on the black market or entered into the legitimate supply chain via conspiring distributors. These products are not counterfeited, but they do constitute intellectual property theft by the manufacturer.

Brands trust their manufacturing partners with their trade secrets, namely the designs, models, methods, materials and processes required to make their products. In midnight shifting, the manufacturer uses the trade secrets it was entrusted with against its own client.

Midnight shifting competes directly with the brand by undercutting prices. Since the quality of the product is exactly the same, midnight shifted products are extremely harmful to the brand and are almost impossible to detect or control.



# solving the problem

1

## CURRENT SOLUTIONS ARE INSUFFICIENT

Static solutions like QR-codes, holograms and RFID will eventually be copied and compromised. The Seal Network's blockchain and NFC chips are tamper resistant.

2

## MAKE IT EASY TO AUTHENTICATE

One tap is all it takes to verify the authenticity of a product. Anyone can now check if a product is genuine. No additional knowledge about other counterfeit detection measures is needed.

3

## REMOVE FINANCIAL INCENTIVE

While products can still be copied, the Seal chips in combination with the Seal Network cannot. We therefore make it impossible for counterfeiters to make money from selling counterfeit products.



## CURRENT SOLUTIONS

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Today, many anti-counterfeiting methods exist. Some of these include watermarks, security threads, invisible ultra-violet inks, color-shifting inks, holograms, product numbering, fluorescent fiber, Moiré patterns, micro-print and many others. Anti-counterfeiting is an endless cat- and-mouse game between counterfeiters and security specialists. Inevitably, all offline authentication methods become compromised, as long as a sufficiently large financial motive exists.

The aforementioned methods vary in sophistication. One problem is that specialized training is often required to appraise whether or not the more sophisticated anti-counterfeiting methods are violated.

**Consumers are still victims because they do not have the knowledge to distinguish genuine products from fakes.**





# seal platform

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## NFCCHIPS

Products with embedded  
NFC chips



## SEALAPP

Consumer-friendly app for  
NFC-enabled smartphones



## SEALNETWORK

Blockchain database and  
Seal tokenization



## SOLVING THE PROBLEM

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### ONLINE AUTHENTICATION

Online authentication is the only way to ensure authenticity, but the data that resides on the product's embedded chip can be copied as well. Copies would still point to a valid product entry in the database. In order to solve the problem there must be a way to ensure the data is not duplicable. The blockchain is only one part of the solution. A dynamic chip, one that changes state each time you interact with it, prevents fraudsters from passing off the chip as real because every time an attempt is made to verify it, the data itself changes. The genuine and the counterfeit product will have out of sync information on it, which indicates the product is tampered with.

### MAKE IT EASY TO VERIFY

Checking whether a product that you intend to buy is authentic or not should be easy. Consumers cannot be expected to appraise the authenticity of products by looking at minute details and knowing production anomalies. The anti-counterfeiting method must be tamper-proof, but it should also be effortless to verify the authenticity.

**Seal makes it easy for anyone with a smartphone to recognize genuine or fake products.**

### REMOVE FINANCIAL INCENTIVE

Counterfeiting is driven by financial motives. To stop the cat-and-mouse game between counterfeiters and security specialists, the ability to monetize large-scale counterfeiting must cease. Instead of fortifying the product itself with special markings or hard to counterfeit materials, we embed chips that are authenticated on a blockchain. We bring all these technologies together in the Seal platform.

**Fig. 2:** Fake and real Adidas Yeezy shoes are difficult to distinguish for regular consumers.



## SOLVING THE PROBLEM

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### INCENTIVIZE ADOPTION

The way to disrupt counterfeiters is by creating the conditions that will lead brands to adopt Seal. Brands pay millions in brand protection and legal costs each year. Seal turns anti-counterfeiting into a profit center, and turbocharges the platform with a plethora of valuable services. Each time ownership is transferred the brand offsets the cost of the chip and makes a profit. The ability to make a profit over the course of the product's lifecycle easily justifies the adoption of Seal, while also fortifying themselves against counterfeiters. This model disrupts the counterfeit economy by turning a cost-center into a profit center.

### RESTORE MARKET INTEGRITY

The secondhand market suffers most from counterfeiting because value stores are lucrative counterfeit targets, the size of the market is enormous and it is both easy and low risk to scam regular people. Seal solves this by completely removing ambiguity out of the equation. Not only is checking authenticity foolproof, brands can finally monetize the secondhand market for the very first time in history. This is a major milestone, since many of the world's value stores have product lifecycles well over 25 years. As the product ages, the value increases and the demand increases. The effect is that products will change hands countless times over the course of its lifecycle, making money for brands along the way. The Seal Network blockchain is what allows the service to operate for such a long time, even though normally brands may go bankrupt or get acquired, technology gets abandoned or products are discontinued. As long as people dedicate nodes to the network, the system will work.

Sites like eBay and Amazon will be able to integrate Seal technology so that they can verify high-end products before they get listed. This will be a major boon for consumer confidence in the online secondhand market trade, where millions of trades happen daily and consumers are frequently duped.



## MORE THAN ANTI-COUNTERFEITING

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Seal is more than an anti-counterfeiting platform. With Seal, we enable services to be used with each unique product on the Seal Network. A short list of possible services include:

**Verify Authenticity (Already implemented)**

Consumers check the authenticity of a product.

**Register ownership (Already implemented)**

Consumers claim ownership of a product. For insurance, P2P transactions & theft prevention.

**Transfer ownership (Already implemented)**

Consumers transfer ownership of a product. This allows brands to earn money on the secondary market

**Theft-Prevention**

Consumers mark products as lost or stolen. Displays a custom message triggered when scanned.

**Track Parallel Trade**

Brands track the origin of products and see where they are being sold.

**Product Recalls**

Brands issue a product recall / product replacement by informing customers when they scan the faulty product.

**Product Analytics**

Seal provides geospatial/time series product analytics to brands.

**Custom Integration**

Brands use tokens to pay for API calls that redirect to a custom source such as an app or browser.



## SERVICES EXPLAINED

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### Theft-Prevention

When people register ownership of a product it is registered on the blockchain. Unfortunately, sometimes products are lost or stolen. Especially when it comes to expensive products, the risk of theft is high and owners have no effective way to track or retrieve stolen items. Seal protects these consumers by offering a powerful theft-prevention service.

In the case of lost or stolen products, the owner can flag the item as lost or stolen using the Seal App. He or she can enter a custom message that will be displayed the next time the product is scanned. This message could be a request to return the product to its rightful owner alongside a name and phone number.

In the case of theft, the thief will not be able to sell the product since the buyer will read the message and find out that the product is 'hot'. Upon scanning the lost or stolen item, the smartphone will send timestamp and geolocation data so the product will be tracked and can be retrieved. Thieves will therefore no longer be able to make a profit by selling their ill-gotten gains.

Seal's theft-prevention technology has far-reaching implications because, for the first time in history, it empowers victims of theft to retrieve their most valuable items. This technology is so powerful that we believe theft may become a thing of the past.



## SERVICES EXPLAINED

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### Track Parallel Trade

Parallel trade is the import of products from another country without the permission of the brand. While this sounds innocent, this is a major issue for brands. Prices for products are often based on the strength of the economy and the tax regime the product is sold in. Major distributors from tier 2 economies undercut prices in tier 1 economies by illegally importing and selling the products for less than the manufacturer's suggested retail price (MSRP).

There are several reasons why parallel trade is difficult to combat. The complexities of running a global organization make it difficult to keep track of all distributors in all jurisdictions. The fact that subsidiaries have their own profit & loss (P&L) responsibilities mean that on a micro level the subsidiary benefits from the sales to parallel trade distributors, but on a macro level the company suffers on an unprecedented scale, perhaps as much as from counterfeiting itself. This type of governance on an international scale is extremely difficult, because target driven employees working at a subsidiary may knowingly sell to distributors participating in parallel trade in order to fulfill economic pressures that are part of the business reality. But overall, distributors work hard to prevent detection in fear of losing their distributorship.

Seal solves this problem in an elegant manner. With Seal, each product can be designated for a specific country. For each individual product it is known which distributor has purchased it. If a range of products is scanned in a market other than intended, the brand will detect which distributor has participated in parallel trade. Relying on Seal, brands are now equipped to deal with parallel trade with a level of clarity and accuracy that was never before possible.



## SERVICES EXPLAINED

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### Product Recalls

A product recall is a request to return a product after the discovery of safety issues or product defects that might endanger the consumer or put the maker/seller at risk of legal action. They pose a severe threat to the reputation of a brand. Though a good reputation has a warding effect against negative information in the minds of consumers, an ill-handled product recall can destroy the reputation of a brand quickly. After all, reputation is simply a scorecard of every promise a brand makes to its stakeholders, and whether or not it lives up to those promises.

But product recalls are not easy, in fact they are major logistical challenges. It is impossible to trace all the different owners of each individual product, whether sold directly or on the secondhand market. Typically, the consumer returns the goods, regardless of condition, to the seller for a full refund or modification.

Seal facilitates streamlined product recalls. Brands can issue a product recall via Seal by marking only the specific range of products that were affected. A push notification and email can be sent to the smartphones of all owners eligible for a product return. Upon scanning the faulty item, affected consumers will receive a warning message and instructions from the brand to safely return the faulty product.



## SERVICES EXPLAINED

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### Product Analytics

Currently, retail analytics for physical goods is primitive at best. Brands can analyze scanner data, but not much more. Scanner data is data on sales of consumer goods obtained by 'scanning' the barcodes for individual products at electronic points of sale in retail outlets. The data can provide information about quantities, characteristics and values of goods sold as well as their prices. This works for high volume commodity items such as groceries, but is much less useful for expensive products that often serve as value stores because (1) the volume is much lower and (2) the most interesting data is created after the point-of-sale. Seal provides geospatial and time series analytics so that brands can understand:

- (1) Collectibility index - How frequently do products change hands on the secondhand market?
- (2) Track product streams - How do products move over time?
- (3) Detect ambassador hubs for precision marketing - Find pockets of fans and collectors to understand where marketing efforts should be concentrated
- (4) Identification of growth and decline areas
- (5) Drill-down from country level to city level or even store level
- (6) Identify theft areas
- (7) Identify which specific products are popular in which region
- (8) Measure retention and brand engagement
- (9) Decision support and dash-boarding for executive team, R&D and marketing
- (10) Combine demographic and behavioral variables to segment and target products better

Brands are currently completely in the dark about actual usage of customer behavior and after-sales product movements. Seal brings the concept of the insights-driven organization to a whole new level by enabling brands to see what is happening to their products after they are sold, for the first time in history.



## SERVICES EXPLAINED

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### Custom Integration

Brands are encouraged to make custom brand experiences using the Seal platform. By default, scanning a Seal chip opens the Seal app where the inventory of all the customer's items is listed. Brands may wish to change it so that scanning the Seal app opens the brand's own app instead of the Seal app. Seal facilitates this by allowing the technology to be embedded in third-party software by using an API. API calls redirect to a custom source such as an app or browser. The product will still appear in the inventory list of the Seal app, but scanning the product will launch a custom event such as launching the brand's app instead of the Seal app.

Some examples are:

- (1) General interaction with the brand app (Nike+ app)
- (2) Loyalty app
- (3) Access to exclusive content, such as bonus tracks from music artists, books, emojis or in-game items
- (4) Access to behind-the-scenes or making-off material
- (5) Purchasing refills or replacements of consumable products
- (6) Product service and support
- (7) Access to a limited edition item obtainable only if you own a complete set of products

We are sure brands can come up with better ideas. That is why we partner with brand agencies (VARs) to come up with ideas to integrate Seal with the brand's app in a compelling, customer-centric way. Seal's custom integration enables brands to control the retention of its customers, maintain their interest in the products and keep the brand top of mind.





## VISION

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# 01

### Master plan - Phase 1 Infrastructure of Authenticity

Seal's investments in the platform will lay the groundwork for the world's infrastructure of authenticity. This infrastructure is the basis upon which a service ecosystem can be built upon. Perhaps most notably, it would provide a way for brands to gather data and perform geographic and time series analysis on product streams. This is a leap forward in the maturity of insight-driven organizations. Other services are not limited to the previously highlighted services. In the future, Seal may further expand its service offering, for example with special customs and law enforcement software,

# 02

### Master plan - Phase 2 Convergence of E-Commerce & Retail

Seal has both E-Commerce and Retail applications. In retail, Seal can become a no-checkout method to pay for genuine products. Simply scan, pay and walk away. In E-Commerce, verifying and claiming the ownership of products could occur even before the product is shipped, or listed on sites like eBay or Amazon. Should the seller fail to send the product, the new owner can lock the product by marking it as lost or stolen.

# 03

### Master plan - Phase 3 Currency of Authenticity

Seal establishes itself as the currency of authenticity. The currency is optimized for transacting consumer goods. Using Seal to pay for products while directly claiming ownership provides both buyer and seller a **guaranteed exchange of goods**. With regular FIAT transactions, there is no way to tell with certainty whether (a) the product is genuine and (b) physical money / banknotes are not counterfeited.



# Market for Giants

“One week after his product hit Kickstarter in December 2015, Sherman was shocked to see it for sale on AliExpress”

[goo.gl/SiqTAh](https://goo.gl/SiqTAh)



\$2810 billion Value of counterfeit and pirated goods



\$1244b Displacement of legitimate economic activity



\$1870b Wider economic and social costs



5.4m Global employment losses



the perfect storm

# Right Time

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“So what you need is a traceable, identifiable, authenticable technology in products and **you would be absolutely amazed how little there is in the world**”

[goo.gl/W91N4U](https://goo.gl/W91N4U)

↗ Unprecedented growth, sophistication and scale of counterfeiting

💰 Cost of embedded-NFC chips has decreased

📱 NFC just recently opened up for iOS-developers

🕒 Token Sale demand is at an all-time high (this will not last forever)


⚡☁ Brands need to fight back, but don't have the tools





the perfect storm


# Right Place

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 **NXP** and many brands are also located in the Netherlands

 The Netherlands ranks 3<sup>rd</sup> in global blockchain development

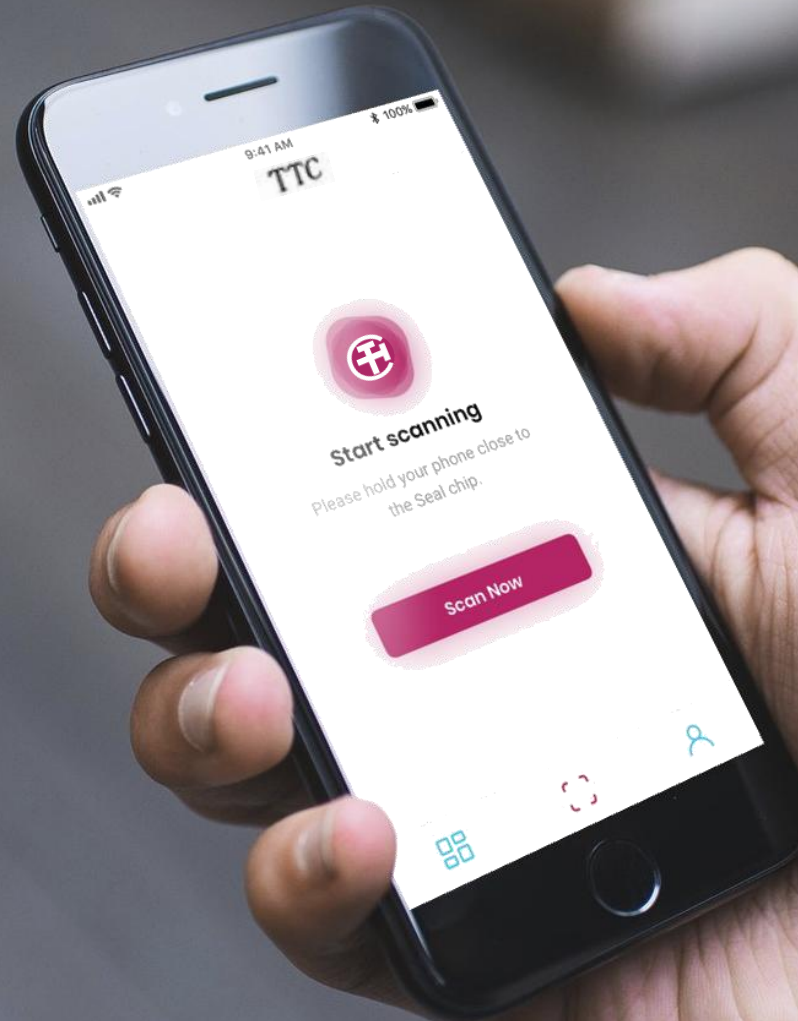
 World-class tech talent

 Influx of talent from the UK due to the Brexit





- Technology

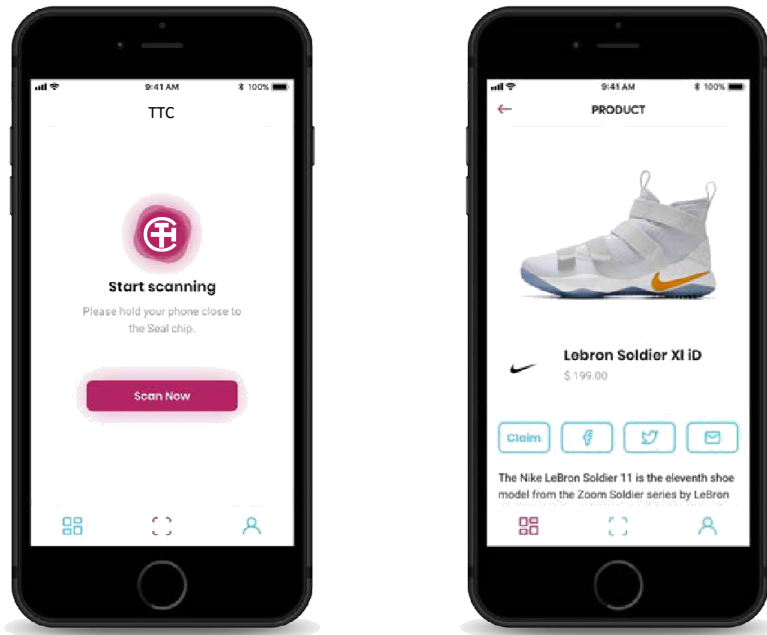


## SEAL APP

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### Initial Product

Seal has developed a working version of the product. The Seal app is compatible with Android and iOS (iPhone 7 and up). Current features include authenticity checks, ownership transfers and inventory management. The product is scheduled to be downloadable in the Google Play Store and Apple App Store later this year.



### Current implemented features

- Android and iOS compatible
- Authenticity checks
- Ownership transfers
- Inventory management



## NEAR FIELD COMMUNICATION

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### NFC Protocol

Products are represented as data on near-field communication (NFC) chips, a subset of radio frequency identification (RFID) tags. RFID is the process by which items are uniquely identified using radio waves. NFC is a specialized subset of RFID technology. Specifically, NFC is a branch of High-Frequency (HF) RFID, and operates at the 13.56 MHz frequency. The standards and protocols of the NFC format is based on RFID standards outlined in ISO/IEC 14443, FeliCa, and the basis for parts of ISO/IEC 18092. These standards deal with the use of RFID in proximity cards. NFC tags do not have their own power source. Instead, they are powered by the electromagnetic energy transmitted from the RFID reader. Because NFC devices must be in close proximity to each other, usually no more than a few centimeters, it has become a popular choice for secure communication between consumer devices.

### Semiconductor Suppliers

Seal has selected NXP Semiconductors to deliver cost-effective secure NFC chips for the Seal Network. NXP Semiconductors is based in Eindhoven (the Netherlands) and is the global market leader in NFC technology. NXP and Sony are the inventors of NFC technology. Seal plans to develop an optimized proprietary chip in the future. However, this depends on the economic performance of the project. Seal chips cost approx \$0.25.

### Inlays

NFC inlay chips are custom designed and manufactured by a trusted facility in Germany. Inlays range from heat resistant and washable plastic casings suitable for fashion items to flexible thin-film electronics and printed materials, such as cards and stickers. The small footprint of NFC chips make them suitable for a broad range of applications and the available inlays make it possible to embed it in virtually any type of consumer product. Inlays cost between \$0.03 and \$0.20 depending on the type and specifications.



## CURRENT CHIP TECHNOLOGY

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The chip uses AES cryptographic authentication (advanced encryption standard) and allows to automatically and securely connect to a web service by just tapping the tag without the need of a dedicated app installed on the mobile NFC device.

The chip supports digital signatures and 3-pass mutual authentication. It automatically generates unique authentication data upon every read-out which enables dedicated unique communication to each user based on predefined criteria. No app (in NFC device) is required to generate this tap-unique data consisting of CMACed information derived from the chip UID, a unique symmetric number generator and contained data. An NFC enabled device can automatically connect to a web-based service and based on the information contained in URL, the device can check the tags authenticity and verify the information validity.

When the chip is positioned in the RF field, the high-speed RF communication interface allows the transmission of the data with a baud rate of up to 424 Kbit/s. It features a 7-byte UID. To put this into perspective, the number of unique products that can be created from these UIDs is many times more than the total number of sand grains on earth.

Seal chips use three AES 128-bit application keys. To put this into perspective, a single 128-bit key would take 1.44 billion years to crack. The chip is applied to prove uniqueness, originality and physical tag presence are required. Seal chips are read-only and are compatible with current Android and iOS devices.

### Security features:

- Three AES 128-bit application keys featuring key versions
- Incremental NFC Counter, which counts each tap
- AES based dynamic CMAC as part of the NDEF data
- Three-pass mutual authentication
- Plain, CMACed and encrypted communication (configurable)
- Secure retrieval of NFC Counter (optional)
- Digital signatures & 3-pass mutual authentication
- Tamper-resistant secure hardware

### Cryptographic Standard:

The chip core crypto function is compliant to FIPS PUB 197 (FIPS 197) Advanced Encryption Standard (AES). CMAC is calculated according to NIST Special Publication 800-38B, and uses only 8 even bytes from last encrypted block.





## SEAL CHIP APPLICATION

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### Dynamic Verification

Each Seal chip contains (1) a 7-byte UID, (2) a tap count that increments each time the chip is scanned and (3) a private key. Messages are signed with the tap count, the desired function (e.g. verifyProduct, registerProduct) and the private key. To claim ownership of a product your NFC device would create the following signature:

(1) `sig = sign(private key, message(tap count, registerProduct))`

This signature is always unique because the tap count is dynamic. In the hypothetical case where the chip would physically be duplicated the signature will fail to verify because the tap count differs from the original. Verification takes place **on the blockchain** via the following function:

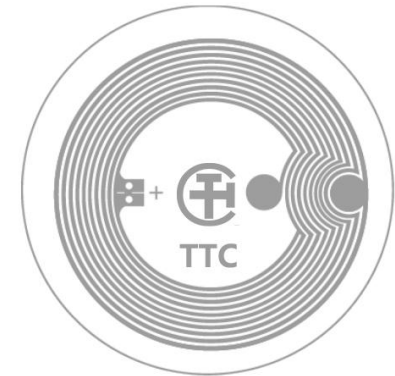
(2) `verify(public key, message, sig)`

### Digital Coupling

Manufacturers associate a product to a UID by using the Seal enterprise app intended for brands and manufacturers. This app allows brands to issue new products sized to the desired product run. The enterprise app listens for scanned UIDs (and private key/tap count) in order to associate the product to the UID the factory worker is interacting with. The product and its product information as issued by the brand is now cryptographically connected to the digital certificate of authenticity residing on the embedded Seal chip.

This process also solves midnight shifting by giving each product a unique identity that can only be issued by the brand. Once the product run is manufactured, the available product identities are depleted so that none are left for the midnight shifted product run. Since manufacturers are only able to embed as many chips as there are brand-issued certificates of authenticity, manufacturers can no longer produce additional copies that pass as genuine. Without a Seal chip that is linked to a brand-issued certificate of authenticity, midnight shifted products will not pass as genuine anymore.

Fig. 3: Seal NFC chip



## SEAL NETWORK

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### Ethereum Blockchain

The Seal token is an ERC20 token built on top of Ethereum that works in conjunction with NFC-chips. Seal aims to be the authoritative platform that millions of people can count on when acquiring new or used products. After carefully inspecting the blockchain landscape we have chosen Ethereum to launch Seal. The following considerations were taken into account to come to this decision.

### Scalability

Scalability is still a challenge for Bitcoin and Ethereum, but each are working on solutions to scale network throughput and increase transaction speed. Lightning, Raiden and Plasma each attempt to remedy the current issues that prevent wider industry adoption. Vitalik Buterin's envisioned Ethereum roadmap includes sharding as a way to address the current scalability issues. On top of this, native smart contracting is an attractive reason to adopt Ethereum. Seal is a member of the Enterprise Ethereum Alliance.

### Smart Contracts

We want to have the ability to embed smart contract logic into our solutions. Ethereum is by far the most popular smart contract blockchain available. Several other projects such as Neo, EOS and Stratis also exist, but we believe that Ethereum has the best support. Rootstock also offers a smart contracting alternative compatible with Bitcoin. While we recognize Rootstock's potential our experience with Ethereum gives us more confidence that we can build production-ready smart contracts in a timely and secure fashion.

**Fig. 4:** Seal is a member of the Enterprise Ethereum Alliance



## SEAL NETWORK

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### Availability of Engineers

Ethereum's smart contract technology is easy to learn. Due to Ethereum's sustained momentum, documentation and proper tooling (e.g. Truffle, Solidity) the availability of engineers is high and the learning curve is relatively low. Scaling the operation requires access to engineers who are skilled in writing blockchain applications using secure smart contracts. To ensure our business is not hindered by hyperinflation of blockchain engineering salaries we employ three methods: (1) attractive location, (2) direct access to top academic talent via a personal network, (3) using the most widely adopted smart contract technology.

### ERC20 vs. ERC223

Seal is built on the ERC20 token standard. ERC223 token standard has technical advantages compared to ERC20. Specifically, ERC223 eliminates the problem of lost tokens which happens during the transfer of ERC20 tokens to a contract (when people mistakenly use the instructions for sending tokens to a wallet). ERC223 allows users to send their tokens to either wallet or contract with the same function transfer, thereby eliminating the potential for confusion and lost tokens. Unfortunately, ERC223 lacks sufficient third-party support. In order to ensure widespread adoption of Seal and be compatible with exchanges, we have instead selected the ERC20 token standard. If, in the future, third-party support for ERC223 improves, Seal may migrate to the ERC223 standard.

### Blockchain

Depending on the developments of blockchain technology and the funds we will raise, we will need to develop our own blockchain to support higher transaction volumes, and reduce transaction fees. More information can be found in the scenarios section in this document.



## ARCHITECTURE

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### API-Gateway

The Seal API is the main method of interacting with the Seal Network. The gateway dispatches requests to the underlying microservices. This allows us to easily change and upgrade the underlying platform, while still maintaining backward compatibility with the Seal App, and other API consumers.

### Microservices

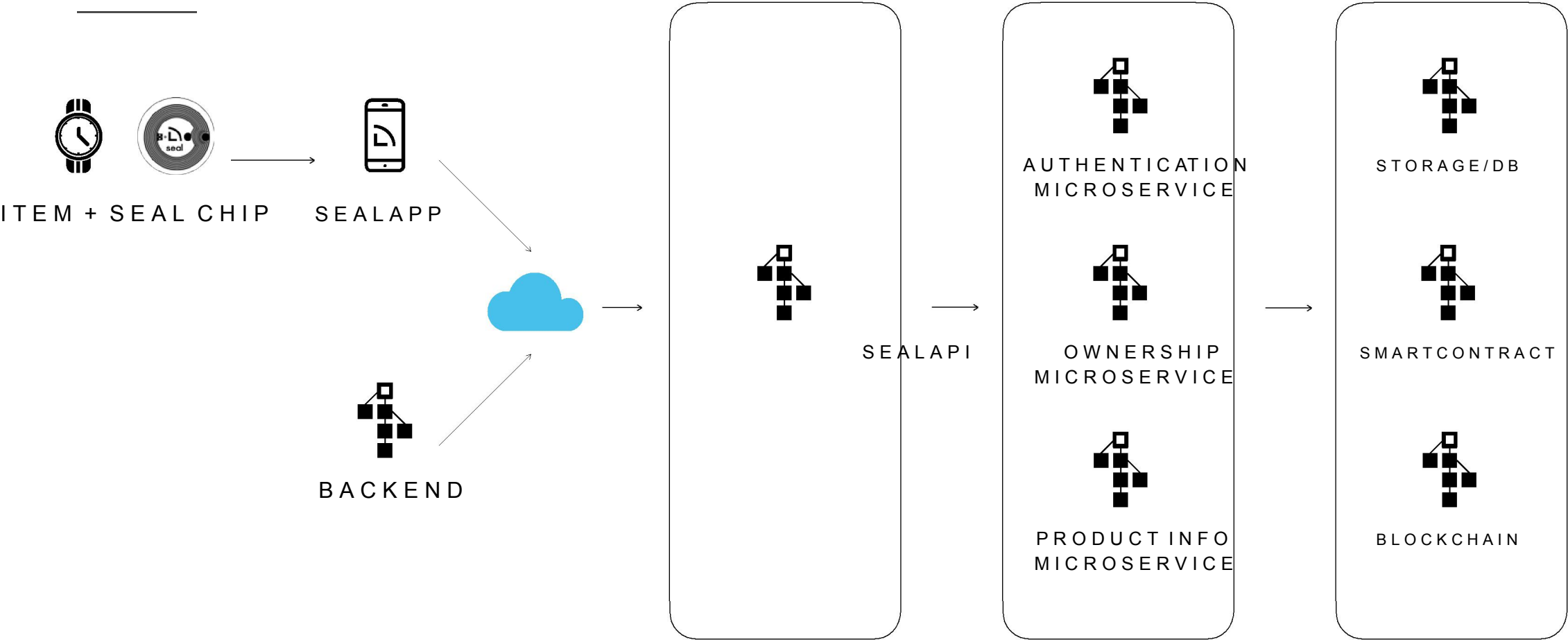
A microservices architecture is a flexible and efficient approach to building and operating software. Microservices split large applications into smaller components which are independent of each other. Each microservice does one thing and does it well. This allows us to split the huge amount of work which goes into building, deploying and updating the Seal Network into smaller, more manageable, and more isolated components.

### Blockchain

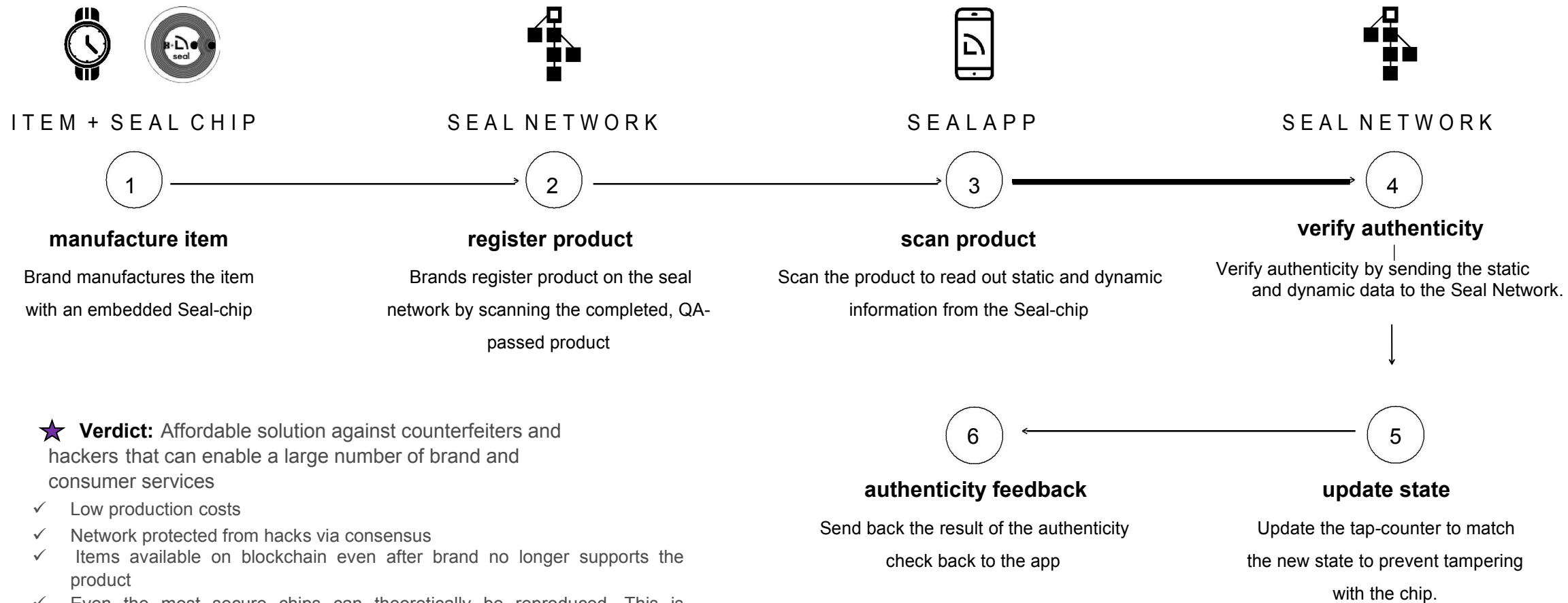
The Ethereum blockchain is used to store all transaction regarding a specific product, such as product information references, photo references, brand information, history about ownership, and supply chain information.



ARCHITECTURE



## TECHNICAL DIAGRAM



★ **Verdict:** Affordable solution against counterfeiters and hackers that can enable a large number of brand and consumer services

- ✓ Low production costs
- ✓ Network protected from hacks via consensus
- ✓ Items available on blockchain even after brand no longer supports the product
- ✓ Even the most secure chips can theoretically be reproduced. This is mitigated by using a dynamic tap counter to detect tampering and cloning.



# token usage



TOKEN UTILITY

Utility

Seal Tokens are used to pay for services by consumers and brands. The number of supported services will increase as we improve the platform. The current version of the app already provides authenticity checks and ownership registration. The table to the right displays all the features we have currently developed or scheduled. In the future brands might be able to pay customers for certain activities (e.g. via a loyalty system).

Currency of Authenticity

The ultimate goal for Seal is to become the currency of authenticity, a currency optimized for the exchange of consumer products. In this way, the Seal Token is a medium of exchange. This is not listed as a service since it does not require additional fees. If used in this manner, the Seal Tokens can be used as a currency to pay for products directly. Purchasing products with Seal Tokens directly claims ownership while payment to the seller occurs simultaneously via the blockchain. Using Seal to pay for products provides both buyer and seller a **guaranteed exchange of goods**. With regular fiat money transactions, there is no way to tell with certainty whether (a) the product is genuine and (b) physical money / banknotes are not counterfeited. The Seal Token acts as a currency that is optimized for transacting consumer goods, an especially powerful feature in the secondhand market trade. Sovereign currencies like USD or EUR are primitive in comparison to Seal and its powerful properties as a medium of exchange and utility token.

Decentralized Apps for Brands

Seal will help brands set up their own decentralized apps for their products on the Seal Network. Seal Tokens can be used to interact with these decentralized brand apps (bApps), each with their own logic and services attached to them. We envision a future where all major brands communicate with the Seal Network where Seal Tokens serve as the communication medium between the Seal Network and the bApps.

Seal Services:

- Verify Authenticity
- Register ownership
- Transfer ownership
- Theft-Prevention
- Track Parallel Trade
- Product Recalls
- Product Analytics
- Custom Integration





## TOKEN UTILITY

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### Value Creation

The value in the Seal ecosystem is linked to the brands that place their products on the Seal Network. Each service on the Seal Network costs a service fee. Brands decide on the price of ownership transfers so that it suits their product, strategy and brand image. The more value is captured and protected by Seal chips, the higher the value of the entire network becomes. This will depend on the total volume and value of these goods.

### Network Effects

The utility of Seal tokens increases as more and more brands adopt the platform. To explain how network effects improve utility, a classic example is a phone network where the utility of the first phone in the network is low, but becomes more useful as more people start using phones. Network effects will impact the value of Seal, for the same reasons the increasing adoption of Bitcoin and Ethereum has impacted their respective value. When more brands use Seal and when more services are available for use within the Seal Network, consumer adoption of the token will increase, together with its demand. With time, more and more products will reach the secondary market, where we expect Seal and its token to have the biggest impact.

### Tokens Required

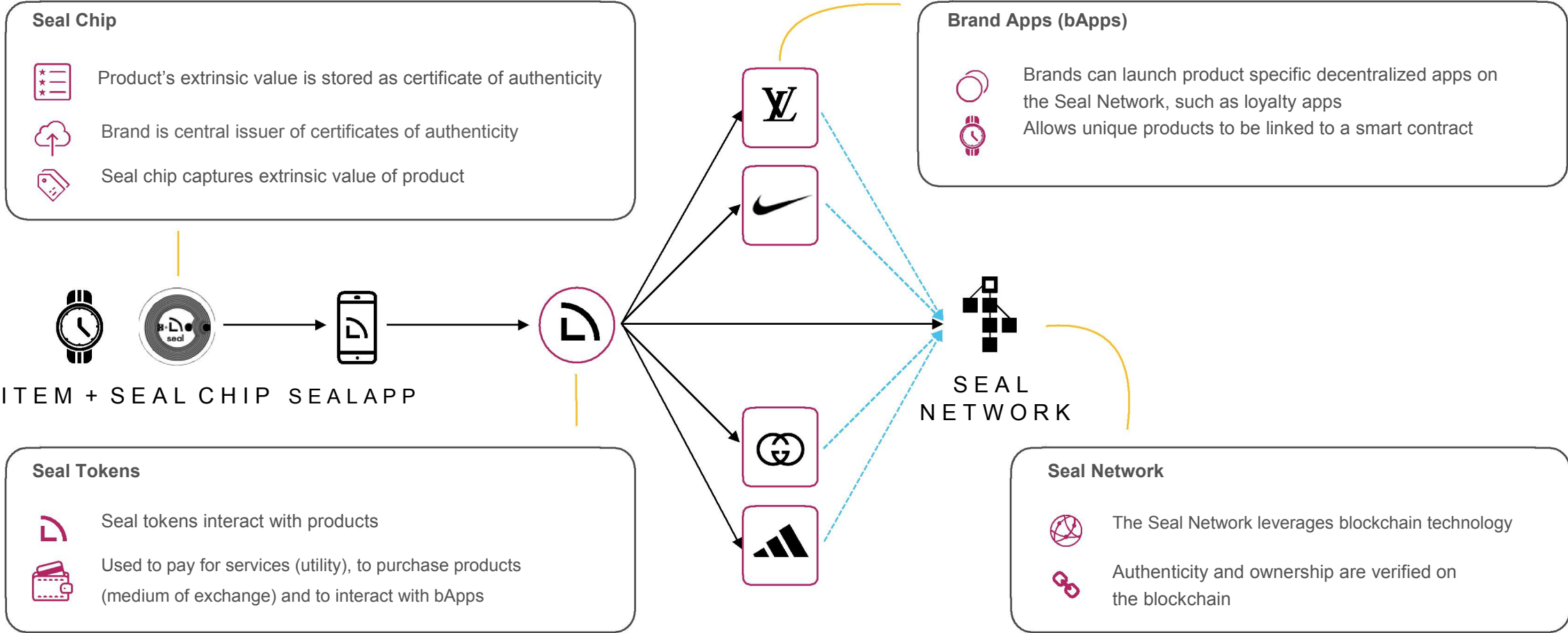
Seal tokens are required to enter the ecosystem. The Seal tokens power the Seal Network. They enable low-cost micropayments between the Seal Network, consumers, and brands.

### Future Use

Depending on future developments and regulations, additional properties can be added to the token. These properties could include voting rights or other token holder incentives.



TOKEN DIAGRAM



PRIMARY REVENUE STREAMS

Service Fees

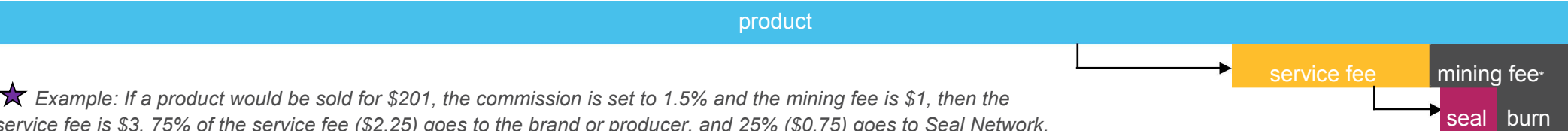
Brands pay 25% fee to the Seal Network on all service fees upon usage of the platform. Seal Network burns 5% of the fees it receives from brands. Service fees are determined by brands and do not include mining fees.



★ Example: If a brand sets the service fee at \$5, they will pay \$1.25 to Seal Network, and \$0.0625 will be burned. Assuming the mining fee is \$0.20. The total cost of the service will be \$5.20.

Product Payments

If Seal is used in the future to pay for products, ownership transfer is automatically included in the transaction.



★ Example: If a product would be sold for \$201, the commission is set to 1.5% and the mining fee is \$1, then the service fee is \$3. 75% of the service fee (\$2.25) goes to the brand or producer, and 25% (\$0.75) goes to Seal Network. 5% of the Seal fee (\$0.0375) will be burned. By comparison, current payment service providers charge ~ 3% transaction fees, without offering all the added utility of Seal.

\* Mining fees depend on the Ethereum network and are out of our control  
Note: Fees and distribution are subject to change



## PRICING RATIONALE

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Although our technology supports many different pricing strategies, we believe brands should decide on the price of ownership transfers so that it suits their product, strategy and brand image. Not all brands and products are equal, and service fees should reflect this. Ownership transfer fees for a \$20,000 Rolex watch should be higher than for a \$15 comic book. Brands will decide whether or not to adopt Seal based on whether it makes economic sense. Outfitting products with chips will increase manufacturing costs. An economic incentive offsets these costs. By allowing brands to set the price, they turn each product into a revenue stream that may generate profits over the entire product lifecycle, sometimes more than 25 years. Seal wants to empower brands, not dictate how they should operate their markets.

### **Alternative 1 - Static pricing set by Seal**

A static, predetermined price for ownership transfers that would apply to all products universally would result in universally low service fees because the system would need to be priced to the lowest common denominator. While at first glance this looks like a convenient model for consumers, there are notable tradeoffs to this system. It removes the ability for brands to monetize the secondhand market because the service fees will be negligible. The secondhand market is the most lucrative market and brands have not been able to monetize it yet. Static pricing is overly restrictive and defeats a large part of Seal's ability to reach mass market adoption.

### **Alternative 2 - Dynamic pricing**

Basing the price of ownership transfers on the current price of the product is a good idea, but it is very sensitive to abuse. One would need to create a blockchain solution using oracles. Those oracles would then calculate the price based on public market data, which is subject to third party market manipulation. There are countless ways for outsiders to abuse a system that would work like this, for example by listing a product for 100000% of its real price to skew the average market value, or by selling the product for \$1 on the secondhand market to dodge fees. We will continue to explore alternative pricing options in the future.



## SECONDARY REVENUE STREAMS

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### **Chip sales**

Seal will sell NFC chips to brands. Seal aspires to develop its own proprietary NFC chips in the future.

### **SaaS (Software as a Service) products**

Additional SaaS products, such as analytics tools and custom integrations, will be sold as subscriptions separately.

### **Consulting & Integration**

Seal offers integration consulting and onboarding services to new brands adopting Seal as well as support and training for the API.



## TOKEN SALE

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### Token Cap

- Initial Issue Quantity : 600,000,000TTC
- Price: 1ETH=10,000TTC
- Acceptable Kind : Ethereum
- Type : ETH
- Minimum Acceptor: 0.01ETH
- Hardtop: 24,000ETH
- Softtop : 3,000ETH

### 代币分配如下:

- ICO: 80%
- TTC Team: 17%
- Operating Cost: 3%

### Fundraising stage and discount:

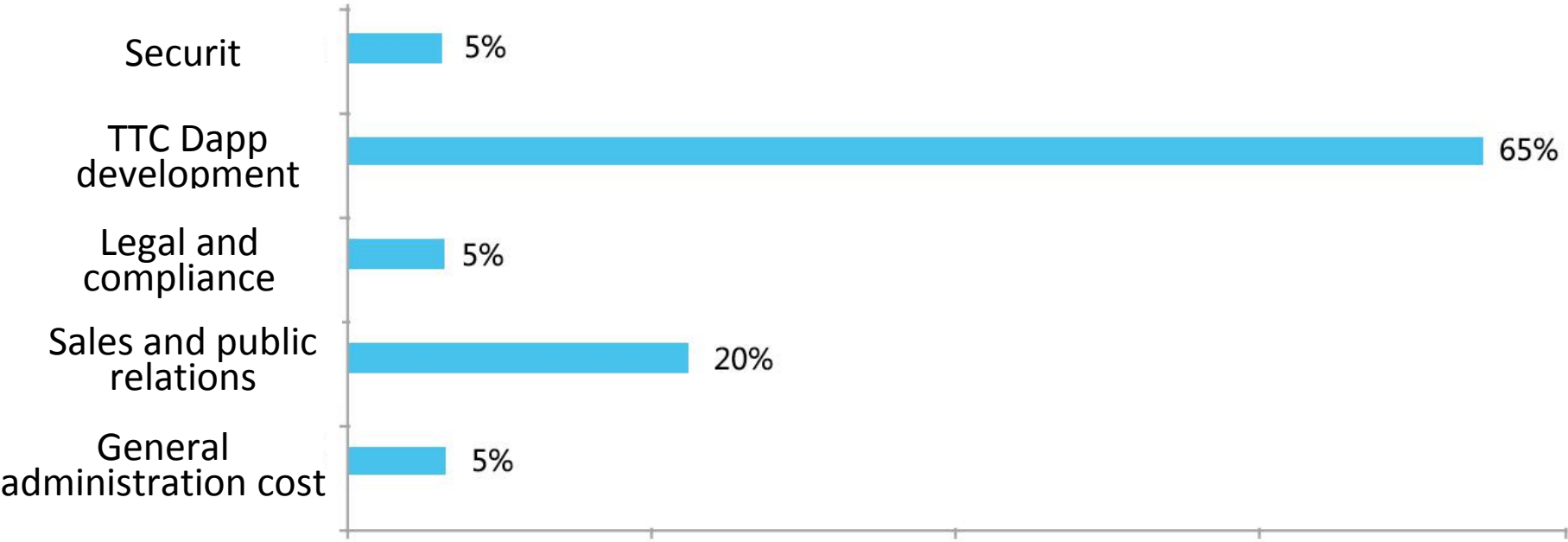
- the first stage : 2018.04.26-2018.05.25.  
15% discount:
- the second stage: 2018.05.27-2018.06.26.  
10% discount:
- the third stage: 2018.06.27-2018.07.26.  
5% discount:

*Example: a Buyer purchases 3.69m Seal tokens during mainsale, 123m (25%) of tokens remain. Buyer receives 1.23m  $[(3.69 / (492-123)) \times 123]$  additional tokens for a total of 4.92m tokens.*



USE OF PROCEEDS

We plan to use the funds generated in the token sale as follows:



# roadmap





## TECHNOLOGY ROADMAP

- 01 | SEAL APP**  
\$  
Basic app is created with NFC scanning. Authenticity checks implemented.
- 02 | BACKEND**  
\$  
The basic backend portal is created which allows brands to configure products for their production lines.
- 03 | CROWDSALE**  
Q 1 2 0 1 8  
Token sale and distribution.
- 04 | PRODUCT DEPLOYMENT**  
Q 3 2 0 1 8  
The first commercial products are deployed on the Seal Network.
- 05 | PRODUCT DEVELOPMENT**  
Q 4 2 0 1 8  
The Seal App and backend will be further developed.
- 06 | EXTRA SERVICES**  
Q 1 2 0 1 9  
The services portfolio is extended with other and brand-specific services.
- 07 | ANALYTICS**  
Q 3 2 0 1 9  
An analytics dashboard made for executives who wish to better understand their customers' behavior.
- 08 | BLOCKCHAIN R&D**  
Q 1 2 0 2 0  
A Seal blockchain is created and tokens are migrated from Ethereum to the Seal blockchain.
- 09 | CHIP DESIGN R&D**  
Q 1 2 0 2 1  
A more advanced proprietary NFC is developed together with a development partner.



CORPORATE ROADMAP

01

LEGAL & BUSINESS

\$

Set up the legal and business structure to protect IP and manage regulatory

02

PARTNERS

\$

Set up strategic partnerships with the IACC, Enterprise Ethereum Alliance and other.

03

PARTNERS

Q 2 2 0 1 8

Set up partnerships with NFC-, inlay-, and other suppliers.

04

TTC

Q 2 2 0 1 8

Standardize HR processes and controls to quickly scale team and manage performance.

05

TTC

TECHNOLOGY

Q 3 2 0 1 8

Scale the technology division tasked with the development and technical operations.

06

BRAND DEVELOPMENT

Q 3 2 0 1 8

Develop and address the needs of designated niche categories (wine, art, limited edition and luxury goods)

07

SALES & MARKETING

Q 3 2 0 1 8

Design & deploy an enterprise sales strategy to create a unified, scalable sales approach for Seal engagements.

08

PARTNER PROGRAM

Q 4 2 0 1 9

A partner program & certification model for value-added resellers is created (e.g. brand agencies & IP consultants)



# **project risks & mitigation strategies**



## PROJECT RISKS & MITIGATION STRATEGIES

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This section is intended to educate, inform and warn readers for some of the potential risks that may jeopardize the continuity of Seal and/or affect the value of tokens.

### **KYC (Know Your Customer) & AML (Anti-Money Laundering)**

Seal aims to be compliant with relevant KYC and AML laws. As these laws may differ per jurisdiction, you may be required or asked by relevant authorities to supply additional information. It could also be that because of local regulations or of future regulation changes, Seal shall be legally required to share certain information pertaining to you or your account with competent authorities, which may include personal or fiscal information, or be required to take certain actions, such as suspending your account. We encourage you to verify if this is the case for your local jurisdiction and if so, take the necessary steps to ensure you comply with your local jurisdiction.

### **Regulatory & Litigation risks**

Although cryptocurrencies are still unregulated in most parts of the world, there is a notable trend towards stricter governance and regulatory oversight. This is a step into maturity for the blockchain industry. There exists a significant risk of litigation due to the current ambiguity concerning the regulatory environment across many regions. This could result in significant financial penalties or cease and desist orders that may be too heavy for Seal to carry. There is a risk that future unfavorable laws will be enforced retroactively. While the exact details will differ from region to region, the spirit, or underlying reason for regulation, will be similar. Despite the current legal ambiguity Seal proactively displays duty of care by acting responsibly, in good faith, with integrity, transparency and honesty and to the best of our abilities. Our first and foremost intent is to build a viable business which includes reasonable governance. The regulatory system in which we operate is fairly strict and similar to the MiFID II guidelines. In order to comply with current and future laws, we require KYC from all token purchasers.



## PROJECT RISKS & MITIGATION STRATEGIES

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### Token aspects

The Seal tokens shall be distributed after the crowdsale to all purchasers who pass KYC and AML checks. After distribution, the tokens shall fulfill a utility function in the Seal Network as it enables interaction with the blockchain and the delivery of Seal products and services. Please take note of the fact that the project risks mentioned in this paragraph, such as the regulatory risks and Ethereum blockchain dependence, but also other factors which Seal cannot control, could heavily influence the token value relative to cryptocurrencies or fiat currencies. This is not a specific Seal or Seal-token risk, but affects all blockchain tokens. Please be aware that by participating in the crowdsale or other activities of Seal, you acknowledge that the primary function of the Seal tokens is enabling the Seal Network, and not being a value storage asset. Also, you accept that blockchain tokens inherently come with great risks, such as loss of value, theft, hacking or other complete loss of tokens, loss of usability and security and other weaknesses in Seal or third party software. Please be aware that it is your own responsibility to adequately hold, store and trade the Seal tokens, for instance by choosing a compatible wallet. If you do not fully understand these risks and obligations, we encourage you to get informed or obtain relevant counsel. If that is not possible or you still do not fully and completely understand the risks involved, we strongly advise you to not participate in the crowdsale or other Seal blockchain related activities. Of course, should you have any questions, we would be happy to answer them for you.

### Insufficient runway

Seal needs a significant financial runway. Semiconductor foundries may have lead times of at least six months. The business relies on revenue from complex enterprise sales engagements that may take six months to develop and an additional twelve months to adapt product designs, source inlays, alter the supply chain, integrate Seal into customer information systems, align legal & brand protection as well as marketing planning. It will take Seal a while to figure out the most efficient engagement process. Should our runway be insufficient we will attempt another financing round.



## PROJECT RISKS & MITIGATION STRATEGIES

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### Dependence on Ethereum

Seal is built on the Ethereum blockchain. This means that Seal is dependent on the continuity of Ethereum. All risks involved in Ethereum by transmission also apply to Seal, such as scalability, security and gas rates. Seal is also dependent on the technology roadmap of Ethereum. Failure to implement promised upgrades on Ethereum's side may adversely impact Seal. In order to mitigate this problem, in addition to other reasons, Seal wants to develop its own blockchain. This depends on whether we can accumulate the resources required to do so.

### Mining Ban

If due to future circumstances authorities ban the practice of mining (read: validating transactions for a reward in a decentralized manner), the hash rate of the network may drop to near-zero. This would make it impossible for Seal to operate its blockchain business. To mitigate this problem Seal would be required to alter the decentralized parts of the ecosystem into a completely centralized system in order to secure continuity of the business.

### Chip delivery

A semiconductor business is a high tech endeavor with many risks associated to it. Seal could be significantly jeopardized if, for whatever reason, we should fail to procure the proper chips. In order to mitigate our risks we intend to design our own proprietary chip alongside a manufacturing partner. Our preliminary research has budgeted new chip development starting from \$10m. This is desirable since it reduces our dependence on third parties, reduces the costs per unit in the long run and gives us an opportunity to integrate Seal specific optimizations.



## PROJECT RISKS & MITIGATION STRATEGIES

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### Loss of Key Personnel

The loss of key personnel could threaten the operation. The Seal core team has committed to contribute for at least the next two years. Part of their compensation is in Seal tokens that follow a vesting schedule. The impact of force majeure, such as sickness or death, is mitigated by ensuring redundancy in our team composition and by documenting processes as much as possible. We are actively looking to expand our team to reduce our reliance on key members. Our company culture states specifically that we look for growth-players. This is, amongst other reasons, to reduce our reliance on 'unicorns' who are difficult to replace. Looking for unicorns may impede our growth, thus we rely on processes in the company and strength of character in the team members.

### Search Risk

Although we believe that we have a strong proposition for brands, we are a vibrant startup. A large part of being a startup is finding out how to sell your product in the most efficient and compelling way. As mentioned before, Seal engagements are complex in nature due to the impact it makes on major parts of a brand's business. Seal is in search mode to find a product-market fit and tailor its sales process accordingly. This is most likely a lengthy process which could even result in Seal not being able to find a product-market fit at all. In order to mitigate search risk we have employed several advisory members. Our advisory member Max Blom Sr. is a founder and honorary member of [react.org](https://react.org), an anti-counterfeiting NGO active over the last 25 years in 90 countries. His experience engaging with brands, his stature in the brand protection field and his connections with industry captains will help us quickly navigate the search phase of our sales and marketing organization. Should this search bear no fruit at all, we may pivot the business to what works rather than what was promised in the whitepaper.



## PROJECT RISKS & MITIGATION STRATEGIES

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### **Warranties and indemnifications**

Please be aware that by entering into the Seal Token ICO or otherwise participating in Seal activities, you acknowledge that all information and services are provided "as-is". The Seal Network is still under development and although we aim to offer you the best service and products, we cannot guarantee its functionality, nor its availability. We make no representations or warranties of any kind. Except to the extent prohibited by law, Seal disclaims all warranties and shall not accept any liability or responsibility for the risks and consequences of participation mentioned here or otherwise. Your participation is completely at your own risk.





**team**



# Bart Verschoor

## Chief Executive Officer

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Seal is Bart's brainchild. Able to apply both left and right brain equally, Bart conjures up creative ideas and tests them using sophisticated data-driven methods. He is an expert dealmaker with vast international business development experience at Dell, Bloomsix and Deloitte. His talent for innovation enabled him to work on projects in IOT, robotics, blockchain and the FiWare consortium. Bart is a 99th percentile member of Mensa and holds a master in Marketing Intelligence from the University of Groningen graduating on the topic of conjoint recommender systems in addition to completing the honors leadership track.



# Joris Verschoor

## Chief Operating & Technical Officer

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Joris is a technology leader and visionary with deep technical abilities that have enabled him to successfully identify market opportunities for innovation and guide mere concepts through the complete process to delivery of full-featured market-ready products. He was a child prodigy who began writing code at six and was active in the demo scene in the 1990s, and he has spent the last twenty years building diverse solutions and product strategies for various employers, consulting clients, and his own entrepreneurial ventures. Joris is a respected advisor to corporate leaders and a technical leader who also contributes to technology community mentorship programs and conferences, having won several awards and recognition for his work.



# Team

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**Ilya Rool**  
VP / Relations



**! Michael de Blok**  
VP of Seal USA / IT



**! Yuri Scholte**  
Business Development  
Manager



**! Alexandra Moraga Pizarro**  
Blockchain / Quantum  
Security Engineer



**! Kian Ghiri**  
Marketing Strategist /  
Content Manager



**! Desley Mooij**  
Marketing Manager /  
Business Analyst



**! Joël Happé**  
Blockchain Specialist



**! Willem Nauta**  
Social Media Platform  
Manager

# Advisors

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! **Caterina Moraga Pizarro**

Channel / Brand Engagement

TBWAMobile Strategy

Account Director



! **Cees Geel**

Strategy / Semiconductors

Former VP and Managing Director

NXP Software & Strategy Advisor



! **Max Blom Sr.**

Negotiation / Brands

Founder, Chairman &

Honorary member of [react.org](https://react.org)



! **Esther Jacobs**

Brand Protection

Independent Brand Detective •

Massimo Mioretti • Marketing O'Neill



**Noah Boeken**

Ambassador

Serial entrepreneur and Influencer



! **Petri Kuivala**

Security / Semiconductors

Chief Information Security Officer NXP •

ex-CISO Microsoft • ex-CISO Nokia

## CLOSING STATEMENT

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The world is full of creators:  
designers, scientist, programmers and makers.  
They dedicate their lives to bring us the best -  
humbled by years of failure,  
driven by a dream they can't let go,  
powered by force of will...  
until one day their work turns into brilliance

It is the brand that seals it all,  
that connects us to the creators,  
adds value to our culture,  
and fulfills us with originality,  
inspiration and quality.

But it's an effort often overlooked -  
flooded by an overload of fake and soulless products,  
making it seem normal to expect emptiness in return.

Now, let's celebrate true creation,  
pay tributes to dedication,  
and enrich our lives with worthwhile brands.



