



ink
PROTOCOL

Decentralized reputation and payments for peer-to-peer marketplaces

Listia Inc.

Ink Protocol Whitepaper, Public Draft v9 – June 20, 2018

<https://paywithink.com>



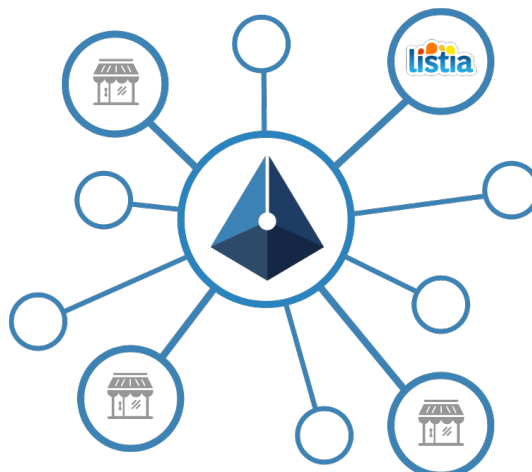
Summary

Ink Protocol (“Ink”) was developed by Listia, a P2P marketplace for buying and selling used goods online. Launched in 2009, the marketplace now has over 10 million registered users who have exchanged 100 million items. The company has raised \$11MM in venture capital from prominent investors.

In 2018, Listia introduced a new decentralized reputation and payment system called Ink, which is powered by the Ethereum blockchain and Ink Protocol Token (“XNK”), an ERC20 compatible token. Ink helps users safely send and receive payments in P2P marketplaces while earning a public reputation for every completed transaction. Ink greatly enhances the buying/selling process through decentralized reputation and feedback ratings, decentralized escrow for secure payments, third party dispute resolution, and very low transaction costs.

Ink can be integrated into new or existing marketplaces and can also be used in marketplaces that don't directly handle payments. For sellers, accepting Ink builds up their public reputation, which allows them to start selling quickly on new marketplaces without needing to build a reputation from scratch. Buyers can view any seller's reputation across multiple marketplaces and confidently pay using either automated or human-mediated escrow contracts. Payments can be made and received natively using the XNK.

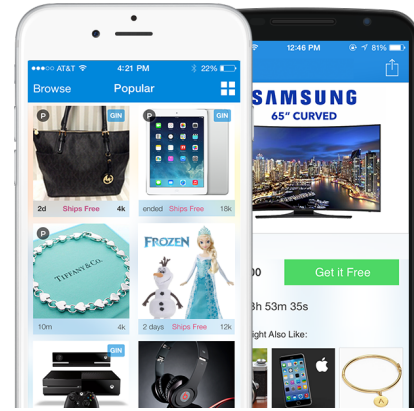
Ink has also become the new reputation and payment system within the Listia marketplace. Listia previously used a centralized virtual currency called Listia Credits for all transactions. Existing users with Listia Credits have had their balances converted to XNK, providing Ink with a tremendous boost for initial usage, stability, and network effects on day one. With large scale adoption and apps that can be used in multiple marketplaces at launch, Ink is well situated to become the preferred reputation and payment system in all P2P marketplace transactions.



1. History & Vision

About Listia

The Listia marketplace (<https://www.listia.com>) was founded and launched in 2009 as a “Marketplace for Free Stuff.” Listia’s vision is to create a safe, easy, and rewarding way for people to get rid of the unused stuff lying around their homes. Today, the community consists of 10 million registered users who have exchanged 100 million items through the Listia mobile apps and website. Listia has raised over \$11MM in capital from prominent Silicon Valley venture capital firms and investors, including General Catalyst, A16Z, Y Combinator, SV Angel, Founder Collective, Max Levchin, Naval Ravikant, and others.



Listia is unique because its users buy and sell goods exclusively using a centralized virtual currency the company created called “Listia Credits,” which have been in circulation since launch. Users earn Credits by selling things in the marketplace and then spend those Credits to buy other things in the marketplace. Credits can also be earned through various activities, such as interacting with listings or other users, inviting friends, completing special offers and goals, or they can be purchased directly from Listia.

Today’s Listia Credits

As it works today, there are a couple of key reasons why the Listia marketplace works better with the Credit system than it would with real money. For example:

- Used goods are difficult to value

When Listia was created, marketplaces were already huge, yet people in the U.S. still have over \$3,100 of unused goods in their homes. It seemed that unless an item was worth a lot of money, people had little incentive to price and list those items for sale. Listia invented new ways to motivate people to start selling these types of items by creating a marketplace that is fun, easy to use, and rewarding in non-monetary ways. Price was no longer something that held people back, and users love buying and selling their used items using Credits.

- No or low transaction fees

People who sell items in some of the most popular marketplaces generally pay upwards of 10%-20% in transaction fees. The marketplace takes a portion of the fee as its profit, but a large part of the fee is used to facilitate the transfer of funds because transferring real money between people is an expensive process due to credit card and bank fees, escrow services, chargebacks, fraud, etc. Listia Credits allow users to trade items without fees, and thus extract more value than existing marketplaces. This is especially important for lower-priced items where fees effectively kill any incentive to sell in the first place.

On their own, these two reasons have been the catalyst to support the exchange of over 100 million items since 2009. However, with technology constantly evolving, and the advent of smart contracts and decentralized currencies, Listia now has a chance to revolutionize not only the Listia marketplace, but all third-party marketplaces by establishing a decentralized payment system specifically designed to handle trustless transactions, reputation, and feedback.


Introducing a new decentralized reputation and payment system

Listia Credits have worked exceptionally well over the past 8 years, albeit with plenty of ups and downs along the way. Now, after years of running a marketplace and a virtual currency, Listia is introducing a new decentralized cryptocurrency and reputation system called Ink Protocol (“Ink”), which is powered by the Ethereum blockchain and Ink token, “XNK,” an ERC20 compatible token. Ink is designed specifically for P2P marketplace transactions where trust between the buyer and seller may be limited.



Ink is not only useful on Listia, but it also serves as a fully decentralized reputation and payment system for any P2P transaction, independent of marketplace. Ink has the power to create, disrupt, and adapt to the world’s largest online marketplaces by publicly sharing reputation information on the Ethereum blockchain.

Because of its decentralized nature, sellers can bring their reputation with them to sell on multiple marketplaces simultaneously or move from one marketplace to another without having to rebuild their reputation. Buyers can also view any seller’s reputation and confidently pay using escrow contracts with optional third-party mediation. Payments can be made directly using XNK.



To support these use cases, Ink can natively solve some of the most common and difficult transacting issues on a pure P2P marketplace. With these features, Ink has a big advantage over not only Listia Credits, but also traditional forms of payment:

- Decentralized Reputation and Feedback
- Decentralized Escrow
- Third Party Dispute Resolution
- Very Low Transaction Costs

It's important to note that most current marketplaces, like Listia, were never built to be 100% decentralized. All marketplaces, however, can benefit from decentralized payment and reputation. The Ink Protocol utilizes the XNK token to allow users to port their reputation from platform to platform and make payments, using one payment application regardless of the marketplace. So, while Ink supports all of the above features, individual marketplaces have the freedom to customize Ink's integration to fit their community. Each marketplace that uses Ink can establish its own rules and implement dispute resolution protocols as it sees fit, and users who use Ink for transactions on unmanaged marketplaces are free to choose their own third-party mediator, an automated contract, or none at all.

Timeline

June 2009 – Listia Inc. is founded and receives funding from Y Combinator

August 2009 – The Listia marketplace launches

October 2009 – Listia announces \$400K angel round

April 2011 – Listia launches iOS app, announces \$1.75MM seed round led by A16Z

January 2012 – Listia reaches 1M registered users, launches Android app

January 2013 – Listia partners with Best Buy to power the Listia Rewards Store

October 2013 – Listia announces \$9MM series A led by General Catalyst

February 2014 – Listia allows Bitcoin to be bought and sold in the marketplace

November 2014 – Listia first experiments with creating a cryptocurrency

December 2015 – Listia launches the Credit Exchange, allowing sellers to earn USD

April 2016 – Listia launches Credits + Cash feature

June 2016 – Listia launches Listia Plus

September 2016 – Listia integrates shipping labels and tracking

May 2017 – Listia hits 10MM registered users

June 2017 – Listia begins work on Ink Protocol design and whitepaper

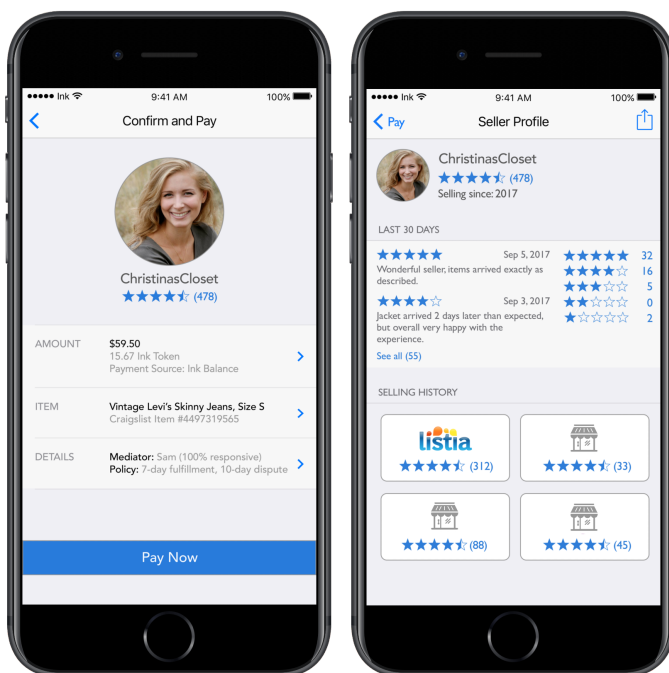
September 2017 – Listia publishes website and Ink Protocol whitepaper

- November 2017** – Listia introduces the Ink Protocol project publicly
- January 2018** – Ink Protocol public launch
- February 2018** – Ink Protocol network goes live and ready for everyone to use!
- February 2018** – XNK distribution event
- February 2018** – Listia.com XNK integration goes live!
- Q1 2018** – Developer Portal launched
- Q2 2018** – Marketplace Partnerships

Immediate utility, growth and network effects


Unlike other recently launched cryptocurrencies, Listia has a large community of users who have already generated millions of dollars in revenue using the Listia Credits virtual currency. Ink has been fully integrated into the Listia marketplace and replaced Listia Credits, resulting in widespread adoption and immediate usage of Ink at launch. With the current install base, that means millions of real user wallets went live and there is enough transaction liquidity to start using Ink as intended today.

At launch, the Listia marketplace was able to jumpstart Ink via millions of buyers with XNK balances, sellers with feedback and reputation, and also kick off the network effects in a way that makes the platform fully functional on day one.



Ink Pay app and Ink Protocol on other marketplaces

In addition to integrating with the Listia marketplace, Listia also created a standalone payments app, “Ink Pay,” so users of other marketplaces can build their reputations and start using Ink immediately without having to wait for those marketplaces to integrate it. The app is designed to obscure everything related to blockchain and cryptocurrencies, so anyone can start using it. Buyers and sellers simply meet up and instantly send payments, while generating a publicly accessible reputation for each other.



As more people start using Ink, their reputation and transaction history begins to grow, and each additional completed transaction adds to their trustworthiness. This public history, stored on the Ethereum blockchain, is incredibly useful in P2P transactions to establish trust and credibility. Being able to move around and carry your reputation with you to any other marketplace will be a huge benefit; therefore, any marketplace that supports Ink natively can improve the trust and success rate of its community.

Ink also has the power to disrupt marketplaces that choose not to share reputation and feedback information on the blockchain and that attempt to monopolize that data. With Ink, new marketplaces can quickly launch with instant trust and feedback in place, while adding to the rapidly growing public feedback and transaction history. Trusted users can see every completed transaction online as something that they should be rewarded and credited for, and marketplaces that refuse to give them public credit on the blockchain for their activity will be viewed as incomplete or unsatisfying experiences. Users can migrate to marketplaces that give them public recognition, proving better user experiences across every marketplace at once.

2. The Ink Protocol Token (XNK) and Features

Purpose



Ink is a decentralized reputation and payment system powered by the Ethereum blockchain and a native ERC20 utility token: XNK. It is designed specifically for P2P marketplace transactions where trust between the buyer and seller may be limited. Ink enhances the buying/selling process by helping users safely send and receive payments in P2P marketplaces while also earning a publicly viewable reputation. Payments within Ink are sent using XNK.

Token implementation

Ink is implemented on Ethereum as a Smart Contract and includes an ERC20 compatible utility token, XNK, which is used for payments. XNK is a general-purpose cryptocurrency that is:

- Fixed supply
- Fractionally divisible
- Non-inflationary
- Fungible and transferable



Smart Contract features

Ink solves some of the most common and difficult buying and selling issues on a P2P marketplace through the following features:

- Decentralized feedback

After every completed Ink transaction, the buyer can leave feedback for the seller about that transaction. Ink does not support the seller leaving feedback about the buyer, because this is typically not useful nor is it actionable since sellers usually cannot choose their buyers.

Feedback consists of a rating and a comment about the transaction, which are stored on the Ethereum blockchain. The feedback entry identifies the transaction that the seller was involved in, and it can be seen by anyone with access to the public Ethereum blockchain and Ink Smart Contract.

Any person or marketplace will then be able to look up the feedback history for a specific seller to determine their trustworthiness before choosing to buy from that seller.

- Decentralized reputation

Reputation refers to the seller's entire feedback and transaction history. The feedback and transaction history for an individual seller can be read from the public data within the Smart Contract and used by anyone to assign a

reputation score based on those signals. Ink does not include a specific algorithm or calculation method to compute this score, because it should be marketplace- or app-specific.

However, not all information should be treated equally. Ink transactions include information about the parties involved, who mediated the transaction, what happened with the transaction (confirmed or refunded), the feedback rating and comment, and optionally, the purchased product. Each marketplace has access to all of this information



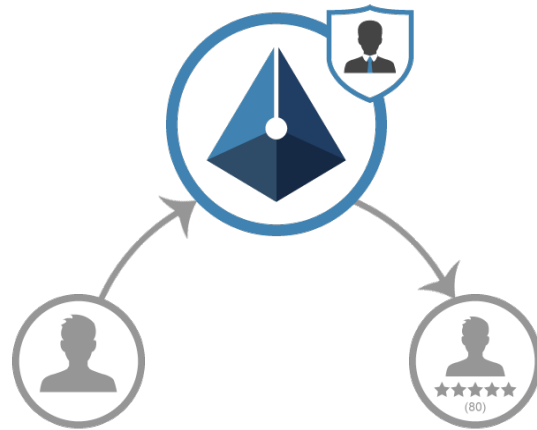
and can filter it as it chooses. For example, as more third-party marketplaces start using Ink, certain marketplaces may be untrustworthy, and transactions recorded through them may hold little to no value when scoring reputation within another marketplace. Additionally, to prevent gaming the system, transactions where users simply transfer XNK to each other without context should not be used in a reputation score.

- Decentralized escrow with third party dispute resolution

Ink natively supports decentralized escrow to create a safe way for buyers and sellers to transact. When a buyer pays, the XNK are held by the contract until the buyer indicates that the items have been received. At that point, the tokens are released to the seller and the transaction is finalized. This also serves as a staking function within the protocol. The seller must stake their reputation against the tokens until the buyer receives their item.


However, sometimes the transaction in a P2P marketplace does not go as planned. For example, the item may arrive damaged, the seller may lie about shipping an item, or the item may not be as described. In this case, most centralized marketplaces will help resolve your dispute by having a customer support team member assess the evidence and decide whether a refund is necessary.

Ink supports this in a decentralized way by allowing users to assign a human or automated mediator to every transaction. The transaction mediator exists as a third party Smart Contract that anybody can create. For example, marketplaces can create their own mediation contract to be used by their customer support staff, and individuals may set up their own contracts and provide mediation services to others.



- Mediation and Transaction Fees

To create incentives for marketplaces, apps, and users, Ink allows mediators in a transaction to take a transaction and/or mediation fee in the form of XNK. The fee



structure is defined by the mediator's Smart Contract and can be setup as either a flat fee or a percentage fee. The mediator has the option of taking both a transaction fee on every transaction and/or a mediation fee on transactions where the buyer and seller actually need the mediator's assistance.

Marketplaces that incorporate Ink will likely set up themselves as the mediator of every transaction within the marketplace and take transaction fees and/or mediation fees as part of their business model. It is also possible that individuals may set up mediation services where they can get rewarded to help mediate disputes on marketplaces. It will be up to the buyers, sellers, and the community at large to vet these third-party mediators by auditing their public Smart Contracts and mediation histories, all of which will be viewable on the Ethereum blockchain.

- **Linked Addresses**

Buyers and sellers within Ink are designated by their Ethereum addresses, which is how you uniquely identify a specific user and pay that user. Over time, users may accumulate multiple addresses that they use on different marketplaces or apps. These addresses would all have their own transaction and feedback history and thus differing reputations. Ink allows users to link addresses they own to merge their feedback and transaction histories and create a single reputation. Linked addresses cannot be unlinked.

- **Owners**

Ink allows a transaction to be associated with an owner (which is usually an app or marketplace). The owner's contract must authorize the buyer to create the transaction. This gives reputation services the ability to know which transaction belongs to which marketplace. With that knowledge, reputation can be heavily influenced by that marketplace's credibility.

Transaction States

Ink distills a typical marketplace transaction into a series of states, which are defined below. This flow was developed based on the team's many years of experience running Listia and dealing with myriad of outcomes and edge cases that can occur during a marketplace transaction. A full diagram of a transaction's various states is included below as well.

- **Initiating a Transaction**

All transactions are created by the buyer. The buyer specifies:

1. Who the seller is (represented by an Ethereum address)
2. The price of the item in tokens
3. The metadata of the transaction (this is a hashed representation of the metadata)
4. Optionally, the mediator, the mediator and mediation policy, and owner addresses

At first, it may seem strange that the buyer is initiating the transaction, but this structure prevents an extra call to the Ethereum blockchain. In practice, apps supporting Ink wrap the entire process for buyers and sellers such that either the buyer or seller can create a transaction. Additionally, even though a buyer initiates the transaction, it does not mean that the seller is automatically held accountable for the transaction. The seller must approve the transaction before it is considered legitimate. The seller can also just ignore it completely. Meanwhile, the buyer's funds are held in escrow by the transaction.

- **Revoking a Transaction**

If the buyer and seller do not agree on the terms of the transaction, the seller simply ignores the transaction. The buyer however, has to revoke the transaction to get her tokens back from escrow.

- **Accepting a Transaction**

The specified seller can accept the transaction if he agrees to the buyer's specified terms. Accepting the transaction means that the seller can confidently begin to process and ship the purchased item because the payment is secured in escrow.

- **Transaction in Progress**

Upon acceptance, the transaction is now in progress, and the seller is now on a fulfillment timer to deliver the goods as promised. The length of time allowed for fulfillment (e.g., two weeks) is defined in the mediation policy specified in the transaction. At this point, one of four things can happen:

1. If the item is not delivered within the fulfillment time, the buyer has the option to dispute the transaction.
2. If the buyer receives the item and all is well, she would confirm the transaction and the payment will be moved to the seller's address from escrow.
3. The seller can refund the transaction if something went wrong and the seller accepts fault.

4. Enough time (defined in the mediation policy as the “transaction time”) has gone by and the buyer has neither confirmed nor disputed the transaction. The seller is now able to confirm the transaction himself and receive payment.

- Transaction is Disputed

After the buyer disputes the transaction, the seller has a chance to respond. One of four things can happen:

1. The seller can escalate the dispute to the mediator to determine the transaction’s outcome.
2. The seller can refund the transaction.
3. The buyer can confirm the transaction.
4. The buyer can force a refund on the transaction after a time (defined in the mediation policy as the “escalation time”) has passed.

- Transaction in Mediation


After escalation, the mediator should begin collecting information to make an informed decision on the transaction’s outcome. The mediator is granted a period of time, defined by “mediation time” in the transaction’s mediation policy, to complete this work. During this period, neither buyer nor seller can act on the transaction.

In the rare case that the mediator is non-responsive or late in its response (the “mediation time” has passed), the buyer and seller each have two options available. The buyer can choose to confirm the transaction, thus transferring the payment to the seller. The seller on the other hand can choose to refund the transaction. Alternatively, both the buyer and seller can unilaterally settle the transaction, causing a 50/50 split in the payment going to buyer and seller. For all three of these outcomes, the mediator receives no mediation fee.

After the “mediation time,” and until the buyer or seller have acted, the mediator can still respond to the dispute.

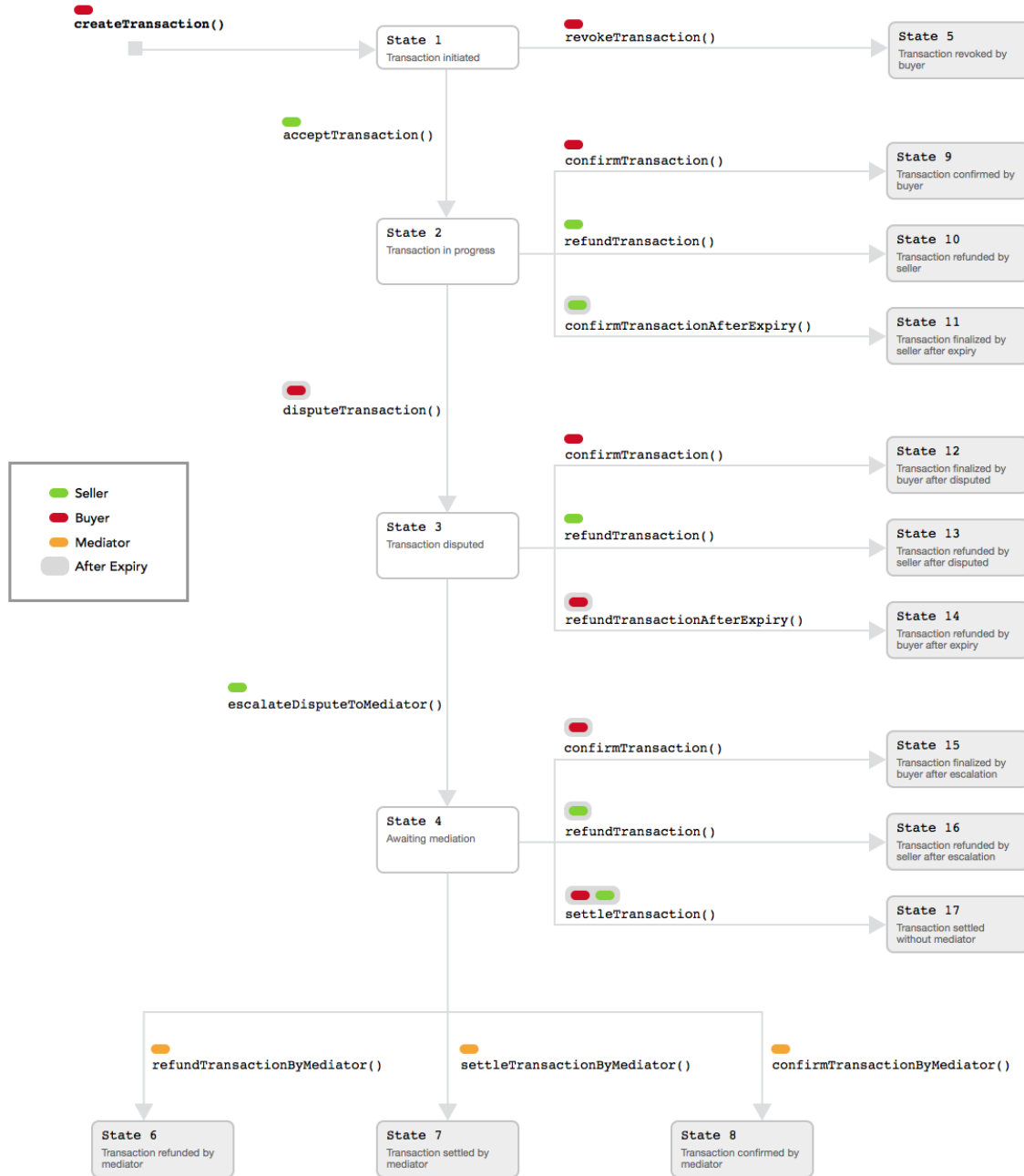
- Transaction is Mediated

The assigned mediator is responsible for making a decision after collecting enough information from both buyer and seller. The mediator can do one of the following:

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1. Refund the transaction—payment goes back to the buyer, less the mediator's fee.
 2. Confirm the transaction—payment goes to the seller, less the mediator's fee.
 3. Settle the transaction—the payment is divided between the buyer and seller at the mediator's discretion. The mediator can also take a mediation fee at this point as well.

Ink Contract State Diagram

Transaction with Mediator



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3. Integration with the Listia Marketplace

Replacing Listia Credits

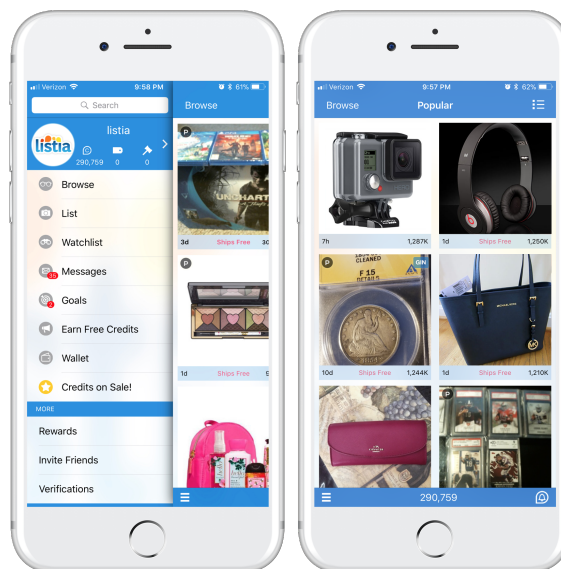
XNK has fully replaced Listia Credits as the main currency on the Listia Marketplace, and Ink has become the main reputation system within the marketplace. Users can buy and sell items using XNK and earn additional XNK for engaging with users, listings, and advertisers in the marketplace. It has been a seamless transition for current Listia users who are already accustomed to using Listia Credits to buy and sell in the marketplace.

Existing Listia users can simply login and verify their accounts, if they have not done so already, before exchanging their current Listia Credits for XNK. This exchange of Credits for XNK was available at launch and for at least 6 months after the launch. At launch, new listings and prices in the marketplace have been converted from Credits to XNK, so each user's buying power remains the same. This serves as an initial anchor and stabilizer for XNK's market price.

Since launch, users have also begun to earn XNK in the same places where they used to earn Listia Credits, such as achieving certain goals and incentivized engagement, referring other users, and completing tasks and offers. The amounts of these rewards change and the requirements to earn rewards may change over time. Users are still able to obtain XNK to spend or make up the difference when they don't have enough to buy an item.

Millions of consumer wallets

Listia has integrated virtual XNK wallets for each Listia user account. Listia creates and maintains the wallets for the transactions within the Listia marketplace, but Listia also supports withdrawals and deposits to and from external addresses via the public Ethereum network. Within the Listia marketplace, Listia manages the transactions for each user and hides the complexities of dealing with public/private keys, Smart Contracts, etc. Currently, Listia maintains its own centralized off-chain transaction history to speed up transactions and avoid fees, while



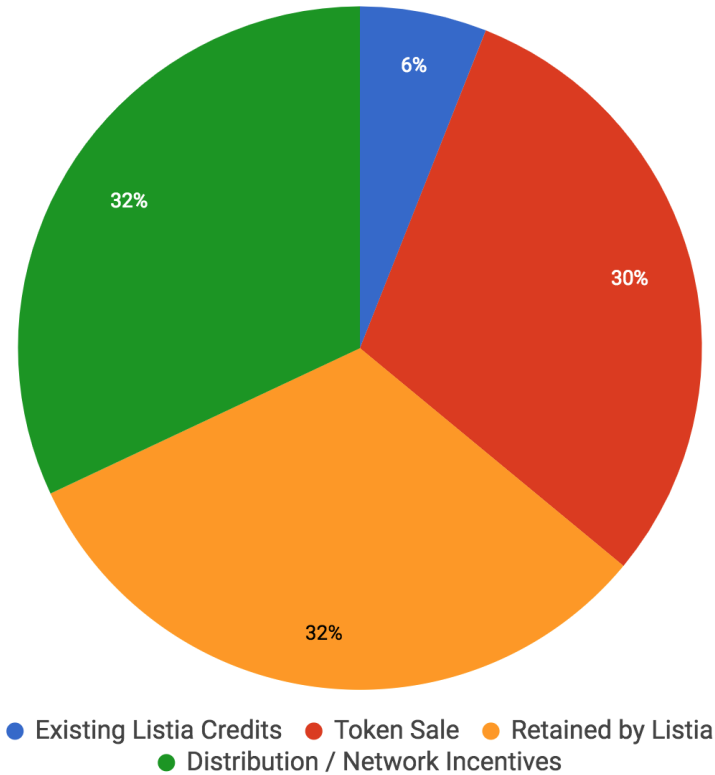
separately settling fully completed transactions on the Ethereum blockchain, as needed, to publicly record reputation and feedback.

4. Token Distribution & Economics

Token distribution

At launch, XNK was distributed as widely as possible during a token distribution event. The distribution consisted of exchanging existing Listia Credits for XNK, and also one private and two, public capped Presales of XNK.

Token allocation



Token sale terms

- Ethereum ERC20 Token called XNK
- 500 Million Ink Protocol Tokens Issued (500,000,000 XNK)
 - 6% reserved for existing Listia User Credits
 - 30% sold via one private Presale, and two public, capped Presales
 - 32% retained by Listia, vested over 3 years
 - 32% allocated for distribution and incentivizing the network, released over 3 years
- Token Price: 1 ETH = 7,500 XNK
- \$15MM Maximum Sale Cap

5. Team

The Ink team came together in 2009 to build Listia into a community where over 100 million items have been traded. With more than 8 years of experience building a P2P marketplace, the team is now focused on applying this experience and creating the foundation for the decentralized marketplaces of the future.

<https://www.paywithink.com/#team>

6. FAQ

“For Listia, what is the benefit of switching from Credits to XNK?”

- XNK is fungible and because it is an ERC20 token, it can be transferred freely.
- Listia no longer needs to act as a central authority to issue and oversee the Listia Credits, which, in the past, led to inflation issues.
- Listia is designed to replace its centralized reputation, feedback, and escrow systems with Ink’s decentralized system.

“Why create Ink and not use existing tokens or cryptocurrencies?”

- From a technology standpoint, you could certainly use other cryptocurrencies purely for payment, but Ink is more than just a payment system. Ink is all about decentralizing reputation and helping buyers and sellers connect and pay safely no matter which marketplace platform they choose to use. The Ink token is required to write to this new

reputation network and is the best way to guarantee that payment is made to the correct person.

- The price of XNK should also be decoupled from the price of ETH and other purpose-built cryptocurrencies, as Ink's market cap should be tied to the gross merchandise volume of the goods and services being purchased and sold in P2P markets and not the price of running contracts in Ethereum or by Ethereum policies.
- Most importantly, creating a native token helps create strong user incentives and build powerful network effects. Ink is designed from the ground up specifically for P2P marketplace transactions.
- To truly jumpstart these network effects, Listia distributed XNK to millions of users in the existing Listia marketplace. These are power users who were already buying and selling using Listia Credits. It is not possible to do this with an existing cryptocurrency such as ETH or BTC.

“What incentive is there to use XNK? Will the velocity be too high to support the token economy?”

- XNK is designed to function as a cryptocurrency, so buying and selling with XNK will typically be cheaper than converting back and forth between fiat currency each time, because of credit card and/or bank fees. So, for users that are buying and selling frequently within either the Listia marketplace or other marketplaces, it makes sense to use XNK, so they can purchase goods or services through the token at a later time.
- Managed marketplaces also incentivize using XNK for buying and selling goods through lower service and transaction fees.
- Ink has a staking function built directly into the protocol in the form of the escrow feature, which naturally reduces the token's velocity. During this time, the seller prepares and ships the item while staking their reputation against the tokens in escrow until the buyer receives the item.

“What unique functionality will Ink provide that is not already present in other tokens and cryptocurrencies?”

- Ink is built specifically for a typical transaction within a P2P marketplace and thus includes the following built-in features: decentralized reputation and feedback, decentralized escrow, and third-party dispute resolution.

“Why would other companies use Ink over starting their own coin or token?”

- Any app can certainly start their own token for transactions within their own ecosystem. Ink, however, can generate the network effects necessary to become the *de facto* standard for the way people buy and sell products with each other because Ink: (1) created a purpose-built token for P2P marketplace reputation and payments; (2) got its token into the hands of millions of people on day one; and (3) is the first of its kind.
- Once enough users have built up their public reputation within Ink, it will be difficult to incentivize them to move to a new system.

“Will companies be willing to share proprietary data from users?”

- Ink is designed to capture the fundamental details about a transaction, so it does not require other companies to actively share any proprietary or sensitive data about its users. The data within the Ink ecosystem is built organically one transaction at a time, with a big boost from the Listia marketplace integration.

“Why would other marketplaces use Ink instead of only fiat currency like USD?”

- Listia has also built a simple payments app so users of huge marketplaces can start using Ink right away, without needing any integration or support from those marketplaces.
- Many companies like Airbnb rely heavily on user reputation and feedback, which, to take Airbnb as an example, is why they have insurance for home renters and require deposits for guests. If users could access Airbnb with existing transaction histories, things like insurance rates could decline, and there would be lower fees for home renters accepting Ink. Guests would not need to place deposits each time, then get them refunded, because they could use the Ink escrow feature, which would automatically settle funds as needed.
- Marketplaces that exchange money for services try to control feedback scoring and reputation within their marketplace. However, for the service provider that is providing great quality service, they still have to request the user/purchaser to leave positive feedback. The decentralized reputation and feedback built into Ink rewards service providers with a better payment option and automated way to earn a reputation and receive feedback. Marketplaces working together on one blockchain have more power to root out bad service providers while making it more efficient and rewarding for good providers.