PIPAR
WHITE PAPER

NEXT-GEN DECENTRALISED ZERO TRUST MARKETPLACE ON THE NEAR BLOCKCHAIN V0.1.0
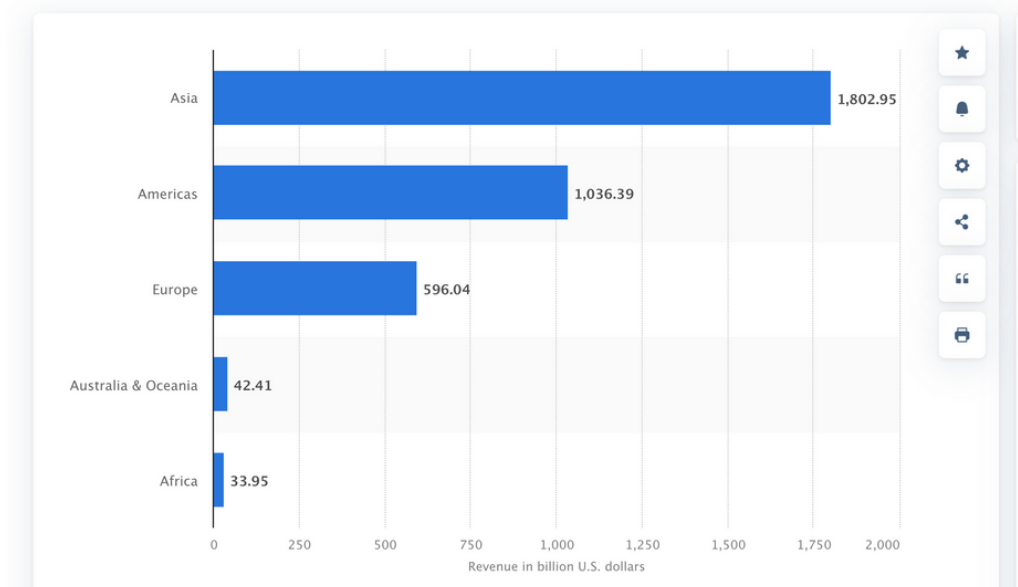
Onyedika Edewor

onyedika.edewor@pipar.xyz

Abstract

Global adoption of e-commerce is under threat by centralised players looking to exploit the market for their own selfish interests. They take advantage of people by setting high prices of goods at a fraction of the production cost. People buy from these centralised marketplaces because of the risk of buying from smaller vendors, even though they are willing to sell cheaper. The likelihood of losing hard-earned money combined with the high cost of recovery measures increases the general populace's reliance on these centralised marketplaces. This paper seeks to make the case that e-commerce transactions can be highly decentralised to make peer-to-peer transactions of goods possible, no matter the distance or high absence of trust between the participants.

Introduction

E-commerce has seen constant growth over the last two decades; data from Statista clearly buttresses this:

Total retail e-commerce revenue worldwide in 2022, by region
(in billion U.S. dollars)

Region	Revenue in billion U.S. dollars
Asia	1,802.95
Americas	1,036.39
Europe	596.04
Australia & Oceania	42.41
Africa	33.95

But, as you can see, the growth is regional. What could be the primary reason? Categorically, developed economies are better suited to adopt e-commerce as a default mode of shopping for new products. They have better road networks, better network coverage, and a better legal system. The cost of shopping for these products online in developed economies is significantly lower compared to their counterparts in underdeveloped economies. Goods have a better delivery time, return policies are superiorly more favourable, and initiating legal processes for redress of ill-purchased goods is noticeably faster.

In spite of all these challenges faced by under-developed economies in Africa, some APAC countries, and Latin America, there's a way to help these economies catch up to global e-commerce trends. Systems like blockchain and smart contracts will transcend these economies and accelerate e-commerce adoption while drastically mitigating the risks of peer-to-peer transactions online.

Blockchain technology is described by IBM as "a shared, immutable ledger that streamlines the process of recording transactions and tracking assets in a business network." An asset may be physical (such as a home, car, money, or land) or intangible (intellectual property, patents, copyrights, branding). On a blockchain network, practically anything of value can be tracked and traded, lowering risk and expenses for all parties. Smart contracts are "a computerised transaction protocol that executes the terms of a contract," according to Nick Szabo.

Combining these technologies solves the problem of the need for centralised middlemen and enables anyone to trade with anyone from anywhere across the globe with zero trust. The smart contract mitigates the risk that any party will act maliciously, but where this happens, the smart contract reverts the transaction and puts the parties to the transaction back to status quo. The buyer receives their money back, and the seller keeps their product.

Market Analysis and Potential

According to Statista, the growth rate of e-commerce transactions is expected to reach $6.03 trillion in 2023. While jumping to $9.04 trillion in 2027.

Regionally, these figures greatly differ from each other. Africa captures only $55 million of the total e-commerce transactions globally. These also include Latin America, which has the second lowest transaction capture. This alone makes the case that these regions need more transparent and highly secure systems to trade with each other.

Also, africa is expected to grow from 1.34 billion in 2020 to 2.5 billion by 2050; that's a big uptrend in population growth. If the right systems of peer-to-peer e-commerce transactions are put in place and 15% of this population shops online, that's a $1.1 trillion share of the global total market share. A big opportunity lies in building systems that will help power future e-commerce transactions in within these regions.

Benefits to Users

By utilising blockchain technology and smart contracts in e-commerce transactions, the need for a middleman is eliminated. A buyer and seller will have a smart contract mediate the transactions between them. This way, there's no need for the participants to trust each other. And if anything goes wrong, the smart contract reverts the parties to the status quo.

But intrinsically, the core benefits of using blockchain and smart contracts in e-commerce transactions are:
- Use of NFTs in tracking and proving ownership of physical goods and items.
- Automated execution of e-commerce transactions without the need for intermediaries, thereby reducing transaction costs.
- Trustless transactions.
- Removes the high cost associated with building trust in today's brick-and-mortar commerce.
- Competitive prices from large pool of vendors.

Competitive Analysis

A typical e-commerce marketplace has inventory features, a chat system feature, and a payment gateway feature. While these features have been the bedrock of e-commerce innovation over the years, they are not enough to bring about equal adoption of e-commerce across all regions. Pipar Marketplace seeks to provide additional features like the use of blockchain and smart contracts for transactions, the customization of products by a seller at the request of the buyer, tokenizing these products as NFTs, and tracking their ownership perpetually.

Technical Details

Pipar is built on a layer 1 blockchain called NEAR PROTOCOL. NEAR is a sharded, developer-friendly, proof-of-stake public blockchain. The transaction cost is next to zero, bolstering the path to bringing the next billion people into crypto. Pipar Marketplace is a smart contract that runs on the NEAR blockchain; it has a smart contract within its own smart contract.
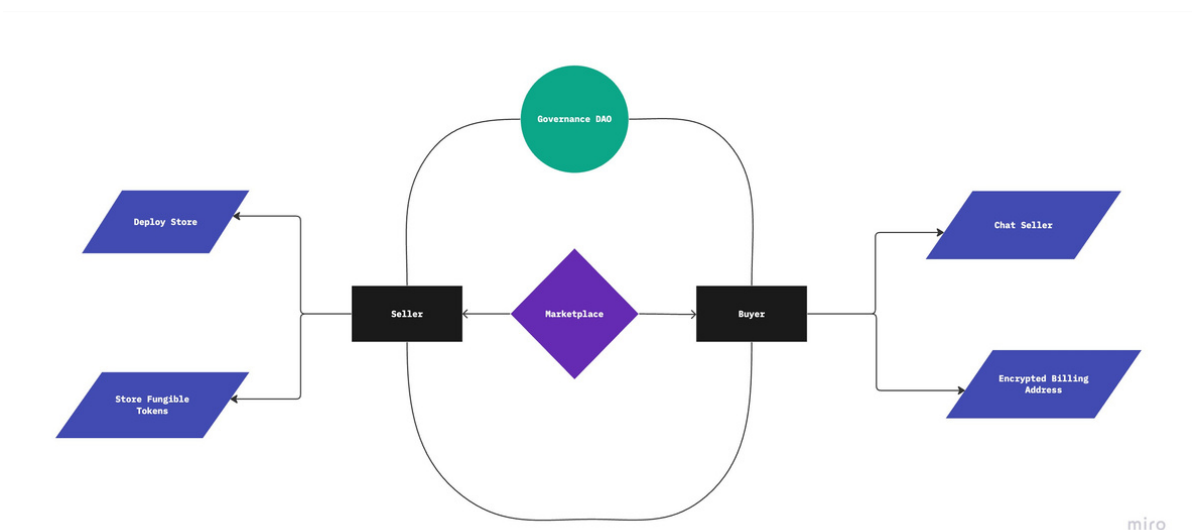

This inner smart contract is used to deploy a store for any seller seeking to list their products on the Pipar Marketplace. It's this store that helps a seller tokenize a physical product as NFT, then list it on the marketplace, and anyone can then purchase it.
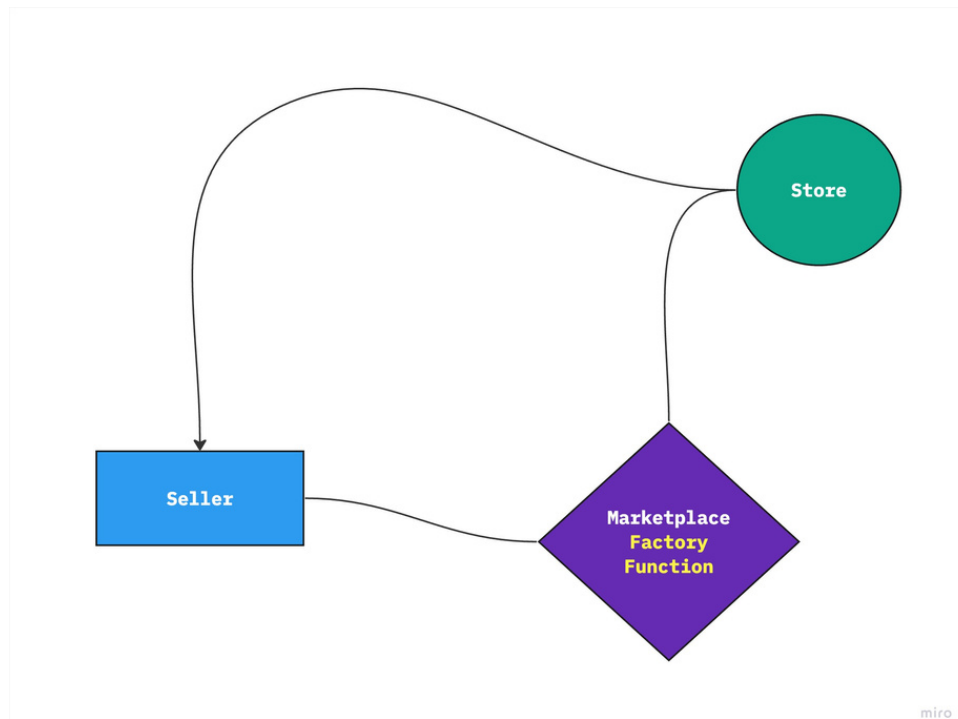
The marketplace gives both the buyer and the seller direct access to each other via chat system and empowers the seller to create a specific product unique to a buyer's choice after an agreement has been reached by both of them. This makes the shopping experience highly customised.

A store smart contract is deployed as a sub account of the Pipar Marketplace named account. Here's an example:
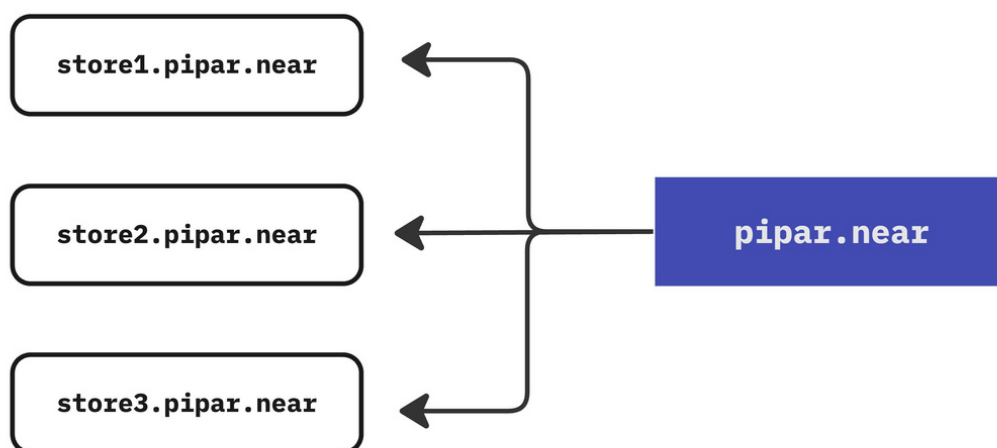
This sub account is then passed to the seller, and only the seller can call non-public methods on the smart contract:

Here's the marketplace factory function code used in creating and deploying a new store:

Code block

```
Promise::new(subaccount.clone())
        .create_account()
        .add_full_access_key(public_key)
        .transfer(STORE_BALANCE)
        .deploy_contract(include_bytes!("../wasm/store
            .wasm").to_vec())
        .function_call("new_default_meta". (to_owned(),
            init_args, NO_DEPOSIT, PGAS)
```

Code explanation: This code creates a new Promise object by cloning an existing subaccount. It then creates a new account, adds a full access key using a public key, transfers a specified balance to the new account, deploys a contract using a WebAssembly file, and finally calls a function named "new_default_meta" with some arguments.

miro

Adding A Product to Your Store

To add a product to your store as a seller, you need to call a private method in your smart contract that will tokenize the product details you provide as NFTs. Automatically, this will be visible in the marketplace since every store deployed on Pipar is already indexed. Buyers come to your store and mint these products as NFTs while locking the purchase funds in the marketplace smart contract pending when you successfully make a delivery of the purchased product.

Transactions

Anyone can buy from any seller on the marketplace as long as they lock in the total purchase amount of the product. Upon locking of funds, the NFT will be sent and locked in the buyer's wallet until the transaction is completed. If they choose to cancel the transaction, the NFT will be sent back to the seller by the Pipar marketplace smart contract.

A transaction has five (5) states: Approved, Shipped, Delivered, Disputed, and Cancelled. A transaction cannot be in two states at the same time.

Encryption

When a buyer is making a purchase, billing information needs to be provided to enable the seller successfully make a delivery. The Pipar Marketplace enables the buyer to encrypt this billing information using its Ed25519 signing key pair together with the seller's Ed25519 public key. Upon approval of the transaction, only the seller can decrypt this billing Information from the buyer using its private Ed25519 signing key pair.
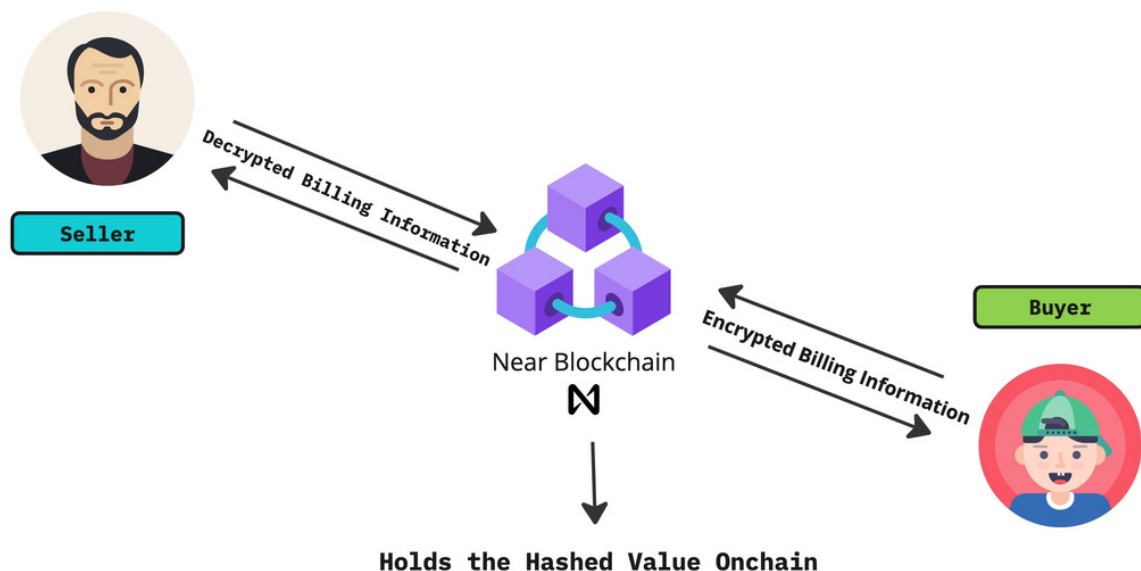
Rewards and Loyalty

Pipar Marketplace enables sellers to launch loyalty programmes in-store to keep their existing buyers coming back for more. This is done by the seller deploying a Fungible Token smart contract on a sub-account of its store account.

A buyer can acquire these fungible tokens as rewards after successfully completing a purchase with a seller. They can then use these tokens to get discounts on future products listed by the seller or entirely purchase new products from the seller using these tokens.

Disputes

A transaction may be disputed by a buyer in these instances:

 1. The seller has not shipped out the product after the product timeout has elapsed and has de facto marked the transaction as shipped. Where the transaction has not been marked shipped by the seller and the product timeout has elapsed, the buyer will get an automatic reversal of the funds locked in the smart contract without the need to open a dispute.

 2. The seller has shipped the product and the buyer has received it, but the product does not meet the specifications described by the seller.

The buyer has the obligation to mark the transaction as fulfilled if the seller has delivered the product as described and on time. A seller may also open up a dispute if, after meeting all expectations, the buyer refuses to complete the transaction.

Governance

The marketplace is governed by its decentralized autonomous organization (DAO). It is open to all who meet its membership standards. When there's a dispute in the marketplace, the members of the DAO will be able to vote on who's right and who's wrong between the buyer and the seller.

It takes seven votes to decide on a transaction, and the outcome will be executed immediately. All disputes must be resolved within 72 hours.

To ensure that voting members are not corrupted in the voting process, they must stake an amount of marketplace tokens on every dispute they seek to vote on.

If they remain fair throughout the voting process, they will get additional token rewards plus the one already staked, or else they run the risk of losing their staked token.

Risk Analysis

There are factors that could hinder the adoption of blockchain and smart contracts in e-commerce transactions. Anti blockchain and smart contract Regulations within these different jurisdictions are a primary factor to consider.

Bans can be placed on the use of these decentralised marketplaces, like the Pipar marketplace.These anti regulations can be minute if properly managed. Another factor to consider is the legal complexities of cross-border e-commerce transactions.

One way to mitigate the risks of these types of transactions is to stay current with the latest laws and regulations affecting them across different jurisdictions.

Conclusion

E-commerce transactions must be open, decentralised, and self executing using smart contracts to reach their full potential. A new e-commerce marketplace needs to be put in place to help mitigate the risk of peer-to-peer transactions in the commerce industry.

Pipar Marketplace seeks to be the solution to these problems faced by both the seller and the buyer, thereby creating a safer world to buy and sell.