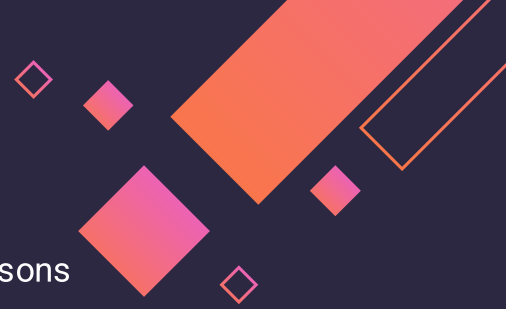# MUNHUMUTAPA AFRICA BLOCKCHAIN

WHITEPAPER PRESENTATION

2024

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- All references in this paper to the Munhumutapa Alphablockchain platform, regardless of tense, are intended to be references to how the platform will function when it is fully operational.

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Achievements and future development

FOREWORD

Blockchain has revolutionalised how the world sees and utilizes the internet. As the embodiment of decentralisation, it has mapped a way to develop networks and services for everyone, that most importantly, do not belong to anyone other than the collective.

THE
BLOCKCHAIN

001

What's in a name?

The blockchain is named "Munhumutapa" after the Munhumutapa Empire, a medieval kingdom that once flourished in present-day Zimbabwe.The term Munhumutapa is a Shona word that translates to , "Human Conqurer" in English.

INTRODUCTION

The Munhumutapa Blockchain is a distributed network that aims to empower Africans and the African diaspora by providing a innovative digital platform that encourages collaboration, provides universal access to digital services and empowers today's African society.

By leveraging blockchain technology, Munhumutapa aims to address some of the challenges faced by the African continent, such as limited access to financial services, high transaction costs, and lack of opportunities for innovation and growth.

WHAT IS MUNHUMUTAPA AFRICA BLOCKCHAIN?

The Munhumutapa Blockchain is a trustless distributed ledger network system written in the Java programming language. Its architecture is underpinned by a multi-chain hosting capability enhanced by out-of-the box, turnkey smart contracts, "distributed applications" to maximize its functionality. The blockchain is designed with scalability, affordability, and ease-of-use in mind and it's core purposesupport a digital financial ecosystem for the African digital economy through peer-to-peer digital transactions.

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ARCHITECTURE

MUNHUMUTAPA ACCOUNTS

To access the blockchain and it's functions, users are required to create an account on the blockchain from which they gain access to Munhumutapa's system. Accounts on Munhumutapa are free to generate and take a recognisable address format which is easy to memorize and can be shared with other users of the blockchain for transaction purposes.

ACCOUNT ADDRESSES

All Munhumutapa accounts are secured by a passphrase and private key are are identified on the blockchain by a unique public key and a Reed-Solomon format account address that is easy to remember and is more user-friendly.

Account Address: MUNHU-XXXX-XXXX-XXXXX

CHAINS

THE MUNHUMUTAPA BLOCKCHAIN IS A MULTI-LAYERED PLATFORM WITH AN ANCHOR & MULTIPLE CHILD CHAINS CALLED BETACHAINS.

MUNHUMUTAPA CHAIN LAYERS

ANCHOR CHAIN

This is the main chain of the platform and is where blocks are generated, signed, broadcast and added to the blockchain

BETACHAINS

These are chains hosted by the alphachain. Each betachain processes its own transactions before they are sent to the alphachain for inclusion in blocks.

Transaction System

Block

Betablocks

Betachain One

Betachain Two

Betachain Three

Betachain Four
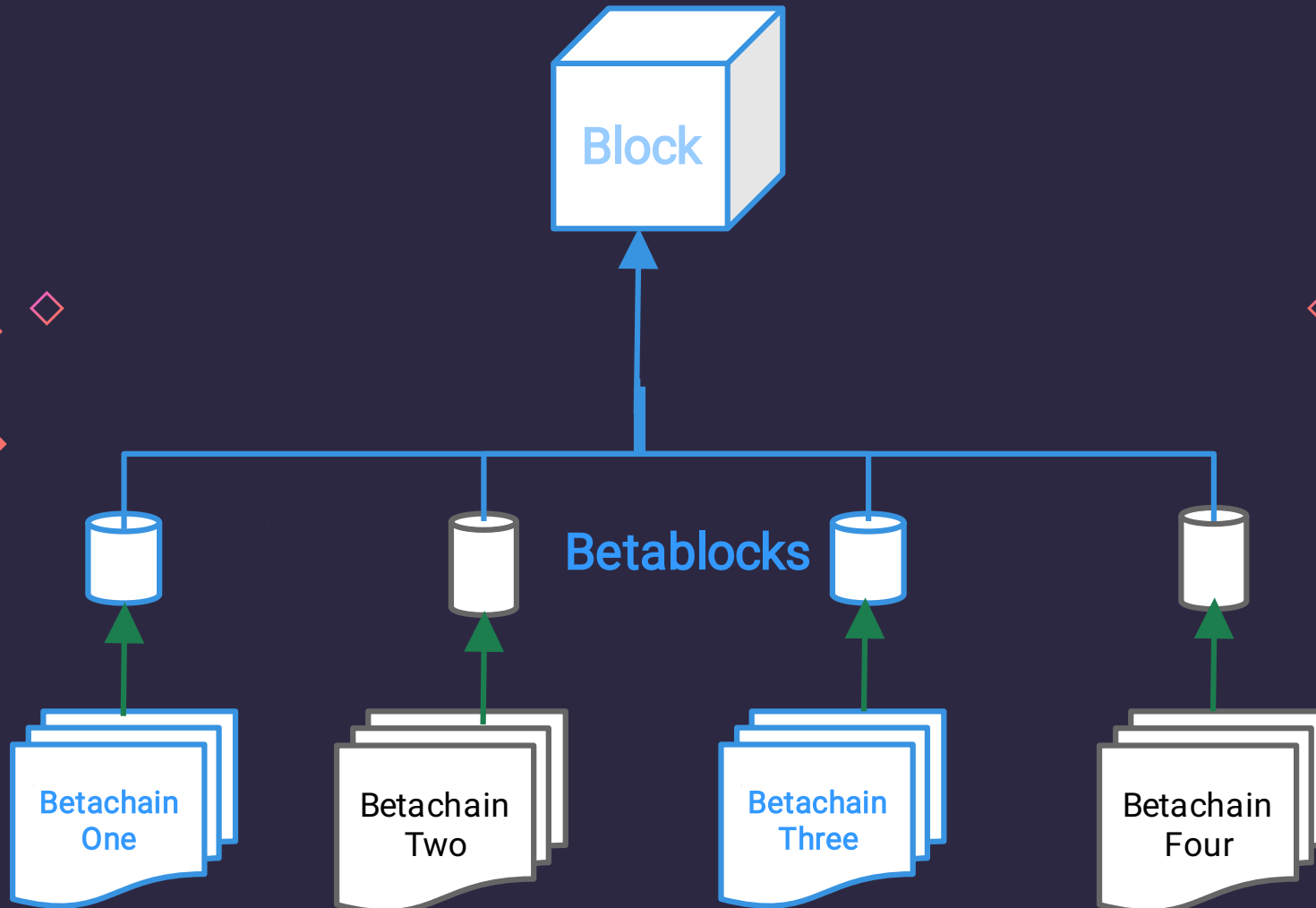
◆ Security

◆ Consensus

◆ Blocks

✔ The anchor chain is the blockchain's engine, recording, validating and storing transaction data.

✔ Security of the entire platform is provided by the chain as blocks are generated here.

✔ Consensus for transaction processing and account states is also provided by the chain for all carried chains.

✔ Blocks are created on this chain and therefore it's coin is the only valid stake for block generation.

MUNHUMUTAPA BETACHAINS

- Betachains carry distributed applications features of the platform..

- Distributed Applications found on each betaChain are dependent on its use and general application.

- BetaChains can either be publicly accessible (non-permissioned) or private (permissioned).

- Each betaChain has a special activated accounts that provide an essential service of transaction processing called '**BINDING**'.

- These betaBlocks are then forwarded to the anchor chain for recording into the distributed ledger and broadcast across the network.

TRANSACTION PROCESSING: BINDING

Binding involves the collection of transactions from the same betaChain and batching them into a single entry called a **betaBlock** by specially activated accounts called binders.

A betaBlock can contain between 1 to 100 transactions and the entry of each transaction in a betaBlock depends on the fees charged by the binder for the service. To cover these fees required by the binder, a transaction is therefore submitted together with attached fees that the submitting account wishes to offer the binder.

As a result, a transaction is only accepted if it's attached fees is equal to or greater than the minimum binder fees required by the network.

BINDERS

Binding is an activated option and requires manual setup:

- Binders set the fee they charge to accept a betaChain transaction. This fee is collected from the fees attached to each submitted transaction.
- Binders also specify the maximum fee they can pay a forger to accept their generated betablocks.
- Binders specify the maximum fee amount of they are willing to pay as extra for their generated betablocks.
- Binders can pick the types of transactions they are willing to process.
- Binders can also choose to charge a flat fee or a proportion based calculation in the acceptance and processing of transactions.

TRANSACTION RECORDING

BetaBlocks forwarded from betaChains are collected by block generators called , "Blocksmiths", that insert them into blocks which are added to the the chain and broadcast across the network. Much like the binding process, betaBlocks are only accepted if the binder has enough fees to cover the cost of entry of their forwarded betaBlocks.

In addition to betaBlocks, transactions submitted directly on the anchor chain are also colliand entered into blocks and are required to attach fees equal to those paid by binders .

BLOCKSMITHS

Blocksmiths are Munhumutapa accounts that generate blocks based on the following conditions:

- ✔ The account is unlocked on a connected and up-to-date node.
- ✔ The node is not on a fork.
- ✔ The account holds at least, the set minimum required fee balance.
- ✔ The account balance has been held by the account for a minimum of 1440 previously generated blocks.

BLOCKS

A block is a collection of valid transactions executed on Munhumutapa alphachain plus binded betachain transactions.

Blocks on Munhumutapa contain a maximum of 10 transactions.

In each block, every Betachain has a reserved slot for one betablock.

A block can be forged whether full, partially full, or with no transactions at all.

Each block is signed by it's forger which gives it a unique generation signature.

BLOCK PARAMETERS

- A block version, height and block identification tag
- A block's timestamp
- A hash of the previous epoch and its timestamp
- The public key and identification of its forger
- The ID and hash of the previous block
- The number of transactions stored in the block
- The total fees associated with the block.
- transaction data of entries in the block and respective transaction identification
- The payload length and hash value of its payload
- The block's generation signature

TRANSACTION METRICS

1000
TPS

12s
BLOCK
TIME

120s
TRANSACTION
CONFIRMATION
TIME

Network Proof-of-Stake (nPoS)

Consensus Protocol

Parameters

The Munhumutapa blockchain uses a consensus algorithm that depends on the following to determine the next block generator:

① Account Balance

② Node connections

③ Number of network block generators

④ Total Stake Balance In Network

⑤ Nodes in Network

Formula

b = account balance

p = number of up-to-date peers in network

t = total stake of block generators in network

g = number of block generators in network

m = max balance of blockchain

$$effectiveBalance = \frac{b * p * t}{g * m}$$

The account with the highest effectiveBalance is more likely to generate a block

SECURITY ANALYSIS

S   **SHUFFLING ATTACK**

Fails as forging requires a balance static for at least 1440 against a max rollback of only 720 blocks

S   **SELFISH FORGING**

Fails because the base target increases with time since the last block ensuring other accounts eventually generate a block

%   **51% ATTACK**

Fails since the target value is also dependent on the network which can blacklist the attacking node while boosting the other node accounts.

N   **NOTHING AT STAKE**

Unlikely as nodes on a fork are disconnected from thereby reducing the target value for the forger and diminishes their forging power.

SECURITY ANALYSIS

HISTORY ATTACK

H

Fails since forging can only be undertaken by a node less than 720 blocks behind the expected blockchain height at any given time.

GRINDING ATTACK

G

Fails because a node running on a different algorithm is immediately blacklisted by other nodes as a fork and cannot contribute to the chain.

DISTRIBUTED APPLICATIONS

003

Overview

A suite of zero-code decentralised finance (de-fi) services are found on Munhumutapa and include:

Money Transfers & Payments System

Digital Assets System

Transaction Approval System

Digital Certificates System

Decentralised E-commerce Store

Account Domain Naming System

Ticketing System

Digital Content Streaming & Purchases System

Gaming System

ShamwariPay Money Transfers & Payments

ShamwariPay is a distributed application that offers a range of financial services, including cross-border payments, remittances, and digital wallets. The system aims to simplify and streamline financial transactions across Africa, making it easier for individuals and businesses to send, receive, transact and manage money.

ShamwariPay Services

The ShamwariPay system offers services which include:

- Money Transfers

- Cross-border Transactions

- Money Remittances

- Bill Payments

- Personal Banking

- Corporate Banking

- Currency Exchange

Digital Asset System

The system provides a platform for the issue, management and transfers of digital asset which are known as 'totems' on Munhumutapa.

The digital asset system comes with preloaded tools which allow the management of digital assets without the need for advanced technical or coding skills or special infrastructure.

FEATURES

- ✔ Holder management
- ✔ NFT support
- ✔ Exchange platform
- ✔ Dividend management
- ✔ Supply controls
- ✔ Distribution tracking

APPLICATIONS

- ✔ Digital title deeds
- ✔ Intellectual Property management
- ✔ Serialization of goods
- ✔ Membership management

Digital Certificates

The digital certificates application is a certificates authentication and verification system. It allows users to issue certificates as digital media whilst enabling third party persons to verify this issuance remotely. The system works by storing the original certificate data against which a shared copy can be compared.

APPLICATIONS

- ✔ Educational Certificates
- ✔ Compliance certificates
- ✔ Membership Certificates
- ✔ Attendance Certificates

MESSAGING SYSTEM

The system allows users to send and receive multimedia messages between Munhumutapa blockchain accounts.

Message encryption is supported enabling end-to-end encrypted message exchanges making it a secure for the sharing of confidential and sensitive information and media.
Messages can also be directly added to transactions between accounts as attachments for various purposes including context, receipting and bill sharing.

POLL SYSTEM

The Polling System is a decentralised, publicly verifiable polls management application that lets users create, participate and verify polls on betachains.

The system is secured by the blockchain and guarantees transparent and credible digital voting to be conducted remotely and securely.

Poll creators can specify preferred poll conditions, time periods, eligibility and options which are enforced by the blockchain system itself.

ACCOUNT DOMAIN NAMING

The domain application is the blockchain's account naming system that lets users register custom usernames for their accounts which other users can use to find and reference the assigned account.

Domains assigned to accounts carry a .munhumutapa appendix which basically confirms the existence of a domain and its respective ownership account.

Assigned domains are unique and no two accounts can be registered with the same domains but can however be transferred from one account to another provided the recipient account has no current registered domain.

E-COMMERCE STORE

The distributed application is a decentralised marketplace and shopping platform that allows the buying and selling of goods, products and services between user accounts.

The application is underpinned by a custodial system that monitors and tracks purchases and deliveries to autonomously settle payments and deliveries for each transaction.

ADVANTAGES =

- ✔ Sales across borders
- ✔ Trustless payments settlements
- ✔ Sales tracking
- ✔ Wider markets
- ✔ Access to goods and services on a continental scale.

MUSIC

The distributed application is a storage, sales and streaming platform for music content.The stores music data which holds the intrinsic digital information of a particular track used to identify it for copyrights.

The platform introduces a music streaming of system which facilitates direct streaming revenue settlement from the streamer to the artist without third party facilitators. Music purchases are also supported with the same direct payments system used in streaming.

By providing a decentralised music payments settlement system, artists can host their music on multiple sites but have all their revenue collected to one Munhumutapa account which make for greater flexibility, accountability and listernership statistics collections.

WATCH

The distributed application is a platform that provides a system for the management of purchases and streaming of video content. The system is also a decentralized database for content that can be used as a distribution medium for digital visual content.

Content added to the platform can be any visual content from music videos, film and television productions, documentaries and live events.

Viewers of content are able to purchase or stream this content through payments facilitated by the distributed app.

PRICING

004

TRANSACTION FEES

TOTEM ISSUE	POLL CREATION (per Kb)	DOMAIN REGISTRATION
$USD100	$USD0.20	min$USD100
MESSAGE (per kb)	CERTIFICATE ISSUE (per Kb)	SHAMWARIPAY
$USD0.10	$USD0.10	min$USD0.10

SWOT ANALYSIS

005

SWOT ANALYSIS

STRENGTHS

The multi-chain system makes for broader industry applications.

WEAKNESSES

Lack of an Ethereum type smart contract capability (future development)

OPPORTUNITIES

The platform will stimulate domestic African digital trade and the greater economy.

THREATS

Difficulties in creating USSD platforms due to reliance on mobile network operators.

ROADMAP

006

PHASE ONE

OCT 2019

Conception of idea

MAR 2020

Research & Study Of Existing Projects

JUNE 2020

Preparations to fork ARDOR

NOV 2020

Genesis Of Munhumutapa Blockchain

DEC 2019

Feasibility & Market Study

MAY 2020

ARDOR chosen as base project for fork

AUG 2020

Snapshot of ARDR balances on ARDOR

DEC 2020

Network and stability monitoring

PHASE TWO

JAN 2021

Release Of Project Whitepaper

MAY 2021

Start Of 1st round airdrop

JULY 2021

Update To project Whitepaper

SEPT 2021

Development Of nPOS consensus protocol

APRIL 2021

Building of community of users

JUNE 2021

End of 1st round airdrop

AUG 2021

Network monitoring and data collection

NOV 2021

Testing of nPOS consensus protocol

PHASE THREE

JAN 2022

Release of Munhumutapa 2.1.1

MAR 2022

Industry engagements

MAY 2022

Resolution to radically further develop the blockchain

NOV 2022

Continous development and testing of updates

FEB 2022

Wallet UI updated

APR 2022

Wallet UI and test Android mobile app release

JUNE 2022

Further development of Munhumutapa begins

DEC 2022

Review of development and further development recommended

PHASE FOUR

MAY 2022

Development of phase Three ends

JULY 2023

Beta-Testing of Phase Three development begins

SEPT 2023

Further tesing of Phase Three Development

NOV 2023

Monitoring of testnet and new distributed applications

JUNE 2023

Business exploration and market analysis

AUG 2023

Preperation of testnet for Phase Three development

OCT 2023

Testnet integration of Phase Three development successful

DEC 2023

Release of Munhumutapa 2.2.4 beta

PHASE FIVE

JAN 2024

Beta Testing of
Munhumutapa
2.2.4 system
and API

APRIL 2024

Engagement with
authorities for
regulatory
compliance

JUN 2024

Partnership exploration,
discussions and
engagement

PRESENT

RESOURCES AND LINKS

007

TESTING

Test Wallet - https://test.webapp.munhumutapa.org:22024

Test API - https://test.webapp.munhumutapa.org:22024/api

Download - bitbucket.org/munhumutapaalpha/munhumutapaalphablockchain/downloads/

Do you have any questions?

Visit: https://munhumutapaalpha.js.org

Email Us: munhumutapaalpha@outlook.com

GitHub: https://github.com/munhumutapaalpha/Munhumutapa

Bitbucket: https://bitbucket.org/munhumutapaalpha/munhumutapaalphablockchain/