MASVERSE®

MASCHAIN
WHITEPAPER

www.maschain.com

MASCHAIN

LAYER 1 PUBLIC-PERMISSIONED BLOCKCHAIN

Executive Summary

MasChain is a public-permissioned Layer-1 blockchain developed by Masverse to bridge the gap between blockchain innovation and institutional requirements. Powered by a Proof of Authority (PoA) consensus, it offers the transparency of public networks with the accountability and compliance readiness needed for real-world adoption. MasChain is built on Substrate and designed to support scalable, secure, and regulation-aligned applications across government, enterprise, and industry sectors.

Supported by growing adoption from local institutions and integration across use cases in certification, digital finance, and public service delivery, MasChain is emerging as Malaysia's sovereign blockchain infrastructure for trusted, interoperable systems.

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1. Introduction to Blockchain Technology

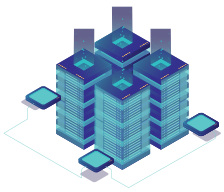
1.1 Background

Tech Evolution: 3 Major Technology Shifts

Computing (Machines)

Connectivity (Internet)

Decentralised (Blockchain / DLT)



WEB 2.0
Current Internet Model
Centralised & Tamperable
- Controlled by corporations & platforms
- Prone to data breaches
- Relies on intermediaries

Server

VS

WEB 3.0
Blockchain-Powered Internet
Distributed & Immutable
- No single point of failure
- Immutable records & encryption
- Trustless Transactions & Smart Contracts

Blockchain Node

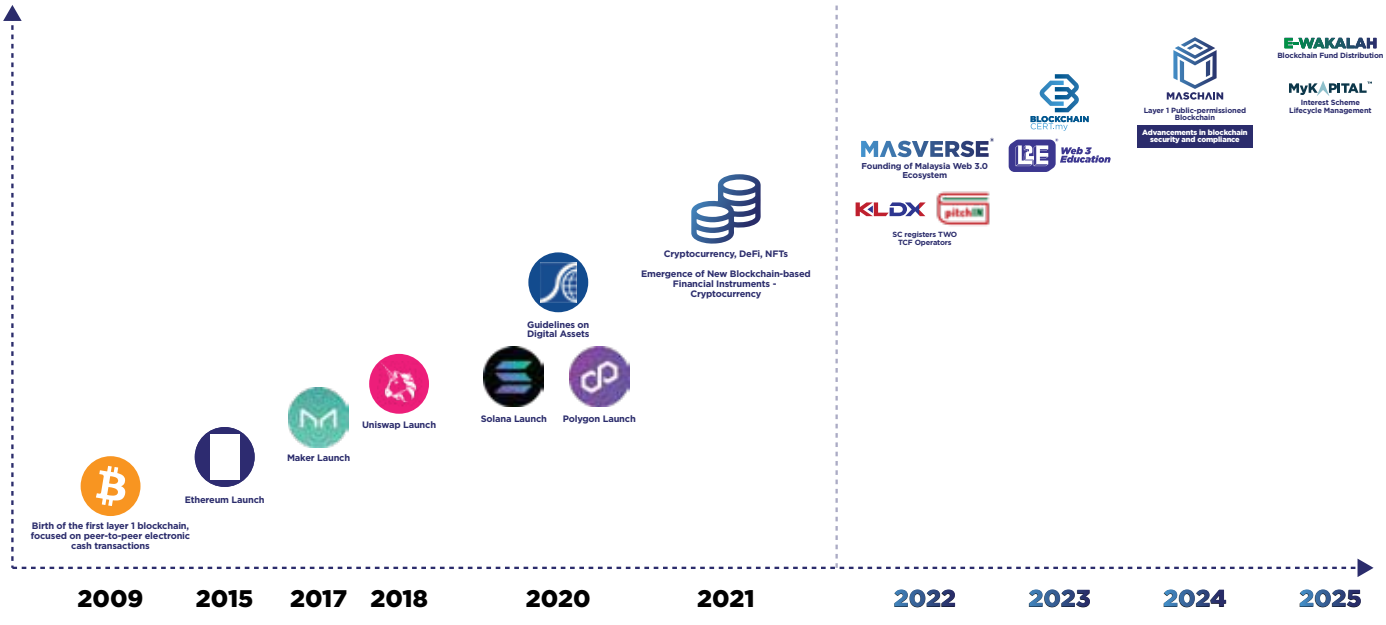
Blockchain technology emerged in 2008 with the introduction of Bitcoin, offering a decentralised, secure, and immutable ledger. Unlike traditional centralised systems, blockchain enables peer-to-peer transactions without intermediaries, providing greater transparency and trust.

The technology has since evolved significantly. The launch of Ethereum in 2015 introduced smart contracts and decentralised applications, expanding blockchain's potential across areas such as supply chain, healthcare, finance, and digital identity.

Web 3.0 builds on this foundation by creating a decentralised internet where users have greater ownership of their data and digital assets. It enables direct transactions, community governance, and the development of new digital economies.

Looking ahead, blockchain presents opportunities for widespread transformation. From tokenising real-world assets and streamlining ESG tracking to improving digital identity and enabling more inclusive financial systems, the technology is set to redefine how industries, governments, and societies operate in the digital era.

Timeline of Web 3.0 Technological Innovation



1.2 Problem Statement

Blockchain adoption remains limited across industries due to persistent challenges in security, compliance, scalability, and integration. MasChain is designed to address these issues and support real-world deployment across industry, enterprise, and government systems.

Two key barriers are:

◆ **Technical Expertise:**
Many organisations lack the skills required to implement blockchain effectively, which slows down adoption and innovation.

◆ **Cost of Adoption:**
High and inconsistent costs related to transactions, infrastructure, and integration make it difficult for organisations to commit to blockchain solutions.

MasChain provides a cost-effective, regulatory-aligned Layer-1 infrastructure built for real use cases in fintech, real-world asset tokenisation, digital credentials, licensing, ESG, compliance, and public services.

1.2.1 Challenges of Decentralisation and Anonymity in Public Blockchains Systems

Public blockchains have opened new possibilities in finance, governance, and digital services by enabling transparent, decentralised, and permissionless ecosystems. Features such as open access and user anonymity have driven the growth of decentralised finance and global peer-to-peer transactions.

However, these same features also present significant challenges. Anonymity makes it difficult to trace bad actors or enforce legal accountability. The absence of oversight raises concerns over scams, data misuse, and illicit activities. These risks undermine trust and conflict with the regulatory frameworks required by governments and institutions.

For enterprises and public agencies, adopting blockchain means addressing the need for compliance, control, and operational security. Many public blockchain networks lack the governance structure to meet these expectations, leading to hesitation among sectors that demand both transparency and accountability.

1.2.2 Why a Purpose-Built Blockchain is Needed

In addition to regulatory concerns, many institutions face practical barriers that limit blockchain adoption. Legacy systems are often incompatible with decentralised infrastructure. High transaction costs, limited technical expertise, and complex integration requirements create additional friction for industries and governments exploring blockchain use.

These challenges require a blockchain solution that balances innovation with structure. MasChain was developed to meet this need. As a public permissioned Layer-1 blockchain powered by Proof of Authority, MasChain maintains the transparency and resilience of public networks while introducing built-in accountability, governance, customisable access control, and compliance support.

MasChain is designed to enable meaningful adoption across sectors by providing a secure, cost-efficient, and regulation-ready foundation. It bridges the gap between the ideals of decentralisation and the operational realities of real-world deployment, addressing concerns around malicious activity and non-compliant behaviour.

Barriers to Blockchain Adoption in the Current Market

Unpredictable Costs

Blockchain's unpredictable costs, including scalability and transaction fees, create financial uncertainty for potential adopters.

Tech Know-how

Many organisations lack the specialised knowledge required for effective blockchain implementation, limiting adoption.

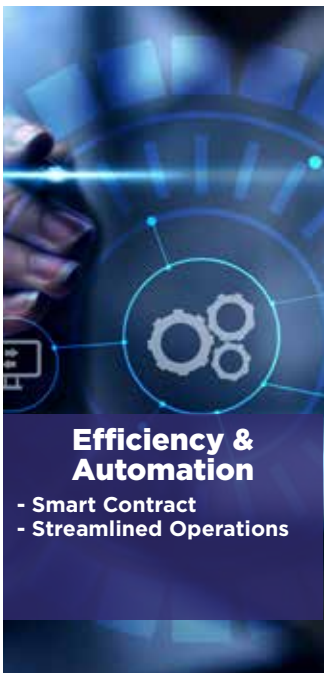
High Adoption Costs

The expense of acquiring talent and integrating existing systems with blockchain infrastructure deters businesses from adoption.

1.2.3 Revisit the Key Benefits of Blockchain Technology

Navigating the intricacies of blockchain technology within national boundaries presents an intriguing proposition for governments and enterprises keen to harness this cutting-edge technology. Assuming the necessary technical expertise is in place, consider the following key benefits of blockchain technology.

What Benefits Blockchain Brings?



Blockchain offers heightened security through encrypted transactions that are intricately linked to preceding ones. This creates a secure environment, particularly beneficial for financial transactions and sensitive data exchanges. For instance, in the banking sector, blockchain can secure transactions, making them virtually impervious to fraud. Similarly, blockchain's encryption capabilities can protect personal information more effectively than traditional systems.

Decentralisation is a fundamental advantage of blockchain technology. By distributing the ledger across a network rather than centralising it, blockchain reduces the risks associated with centralised control. This ensures data tamper-proofing and avoids single points of failure during cyber-attacks, thereby maximising system uptime and availability. Decentralisation is particularly beneficial in electoral processes, providing a transparent and tamper-proof system.

Blockchain's inherent audit trail feature enhances traceability by tracking the origin and journey of products or assets. In supply chain management, blockchain can verify product authenticity, track the journey from manufacturer to consumer, and combat counterfeiting. In the pharmaceutical industry, it can trace the lifecycle of medical products, ensuring compliance and safety.

Smart contracts, enabled by blockchain, streamline and automate processes, leading to faster transactions and fewer redundancies. This is particularly useful in legal processes and digital commerce. For example, smart contracts can automatically execute and enforce the terms of a digital services agreement upon receipt of payment, eliminating the need for intermediaries and reducing potential disputes.

The immutability of records on a blockchain ensures data integrity. Once information is recorded, it cannot be altered without consensus, which is crucial for maintaining accurate records. This feature is invaluable in sectors like healthcare, where patient records can be securely and permanently stored. Additionally, in academic credentials, products like BlockchainCert.my leverage blockchain to maintain unalterable and easily verifiable records of qualifications, preventing fraud.

1.3 Objectives of This Project

Masverse is committed to becoming a global leader in the Web 3.0 domain by driving innovation and establishing seamless global connections through cutting-edge Web 3.0 ecosystems. Our objectives include building a robust Web3 ecosystem by leveraging the latest blockchain advancements. We aim to develop a Public-Permissioned Layer-1 blockchain and a suite of blockchain-enabled applications. This ecosystem will serve as the backbone for various sectors, ensuring security, scalability, and interoperability.

We strive to make Malaysia a central hub for Web 3.0 innovation. This initiative will foster growth and success for governments, businesses, and institutions, positioning Malaysia as a key player in the global technology landscape.

Our efforts are geared towards enabling stakeholders to drive positive change both locally and globally. By providing the necessary tools and infrastructure, we aim to address global challenges and enhance the quality of life through technological advancements.

We are dedicated to making blockchain technology more sustainable and accessible. Our goal is to reduce barriers to adoption, ensuring that the benefits of Web 3.0 are available to a broader audience.

By achieving these objectives, Masverse will not only lead the Web 3.0 revolution but also create lasting value for all stakeholders, paving the way for a more connected, innovative, and prosperous future.

MasChain: Bridging Web 2.0 to Web 3.0
A Revolutionary Layer 1 Blockchain for Enterprises and Governments

MasChain, a next-generation Layer 1 blockchain by Masverse, is designed to bridge the traditional Web 2.0 ecosystem with the emerging Web 3.0 landscape. MasChain leverages the sophisticated Substrate framework at its core, renowned for its flexibility and robustness. This advanced technology is complemented by the innovative use of Pallets - modular components akin to smart contracts - enabling MasChain to expand its functionalities dynamically.

Central to MasChain's operation is its distinctive Proof of Authority (POA) consensus mechanism, chosen for its efficiency and scalability. This approach streamlines consensus and significantly enhances network scalability, a crucial aspect of modern blockchain applications. MasChain employs a selective node distribution strategy to maintain network security. Nodes, operated by selected trusted authorities, are strategically hosted across various data centres and locations in Malaysia, ensuring a resilient and secure network compliant with the highest standards of OWASP (Open Web Application Security Project) security protocols.

Interoperability and integration are cornerstones of MasChain's design. Recognising the importance of bridging Web 2.0 companies with Web 3.0 functionalities, MasChain provides a user-friendly API layer. This ingenious approach allows traditional enterprises to engage in Web 3.0 activities without the complexities of node management, smart contracts, or wallet integrations.

MasChain's smart contract capabilities are versatile and powerful, supporting both EVM and Rust. This dual compatibility opens doors for a wide range of developers, fostering innovation and creativity within the ecosystem. MasChain's native token, MasToken (MASV), is primarily used for transaction gas fees, anchoring the ecosystem's tokenomics.

Targeting enterprises and government agencies, especially those in the Web 2.0 domain, MasChain aims to facilitate a smooth transition into the Web 3.0 landscape. By focusing on these audiences, MasChain addresses the gap in the market for blockchain solutions that cater to the needs of established organisations looking to leverage the benefits of blockchain technology.

As a proponent of Environmental, Social, and Governance (ESG) principles, MasChain's choice of a POA mechanism over Proof of Work (POW) reflects its commitment to sustainability. This approach significantly reduces the environmental impact compared to traditional POW blockchains, aligning with Masverse's ESG values.

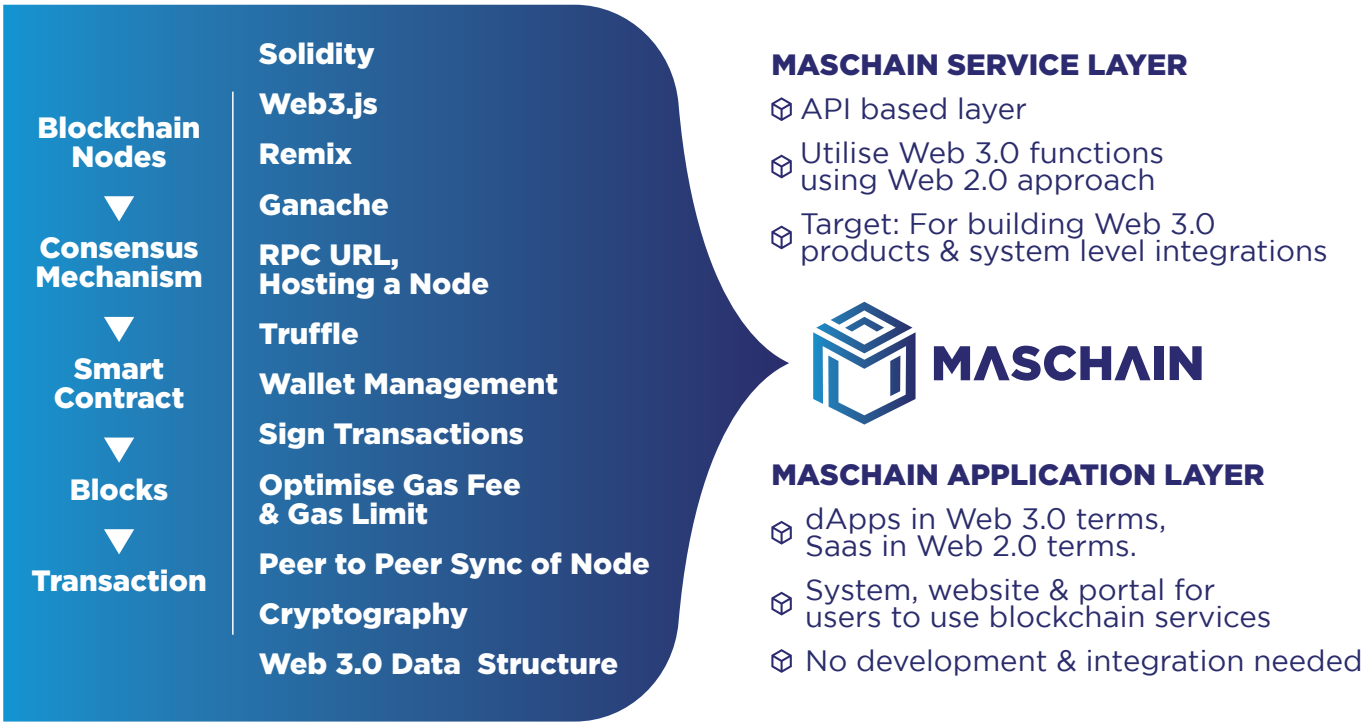
Looking to the future, MasChain is committed to expanding its ecosystem. This expansion includes broadening the API layer and developing more applications on top of MasChain, strengthening its role as a foundational layer for a multi-layered blockchain architecture. In terms of partnerships and collaborations, MasChain is strategically aligning with regulated platforms and enterprises within Malaysia, aiming to create synergies that enhance its value and capabilities.

MasChain's unique selling point lies in its dual-layered approach, combining a service application layer with an API layer. This design is specifically tailored to onboard Web 2.0 companies and regulators into the blockchain sphere, representing a significant strength and innovation in the blockchain landscape. By addressing these companies' and regulators' specific needs and challenges, MasChain is not just a blockchain platform; it's a bridge to the future of technology, seamlessly blending the established with the emerging.


MasChain revolusikan teknologi blockchain


Blockchain Specialist Masverse Launches Own Blockchain Platform, MasChain

The MasChain Architecture



MasChain's architecture can be viewed in three dimensions: The infrastructure, the service layer, and the application layers.

MasChain is viewed as the core of the whole ecosystem. In this Whitepaper, MasChain, layer-1 public-permissioned blockchain employs PoA consensus. Only reputable entities such as government agencies, reputable corporations, and associations will be the node(s) holders subject to Masverse's council members' approval. These nodes holders also will act as the council members later subject to council members' appointment for governing and upholding the trustworthiness of MasChain and MasToken (MASV).

The service layer in Masverse's architecture represents a crucial licensing tier, wherein a variety of software solutions are constructed akin to building blocks, fully operational on MasChain and accessible through API connections. This service layer encompasses an array of licensing products, including blockchain audit trail management, token management, blockchain record explorer, certificate/NFT minting management, wallet management modules, and additional offerings that are continually developed to meet evolving market needs.

Masverse's service layer goes beyond offering standard services; it strategically resolves compatibility challenges between legacy systems and blockchain technologies. Moreover, it mitigates the technical know-how barriers faced by current personnel operating these systems. The implementation of the Service layer significantly reduces the costs and time required for integrating blockchain technologies, thereby advancing Masverse's mission to catalyse the growth and widespread adoption of Web 3.0 technologies.

The Benefits of Tokenisation

Benefits	Description
Liquidity	Simplified architecture for liquidity provision and end-user access.
Accessibility	Global and/or expanded accessibility.
Settlement Efficiency	Faster settlement, reduced operational and intermediating costs via automated execution.
Transparency	Tamper-proof record of ownership that is publicly accessible, with stakeholders having a clear understanding of how tokenised assets are managed and governed.
Composability	Tokenised assets can be used across other services built in the same blockchain network. For instance, a user can use a tokenised security as collateral in a lending marketplace, or provide liquidity on a decentralised exchange.

On-chain tokenisation presents a suite of advantages that streamline financial transactions and broaden access to investment opportunities. Firstly, it enhances liquidity by breaking down assets into smaller units, facilitating their trade on a global scale with increased ease. This divisibility enables assets to be more readily bought and sold, thus improving market liquidity. Additionally, on-chain tokenisation promotes greater accessibility, allowing investors from diverse backgrounds to engage in a wider array of assets regardless of their location or investment size.

Moreover, it bolsters settlement efficiency by automating transaction processes, thereby reducing costs and delays associated with traditional settlement methods. Transparency is also heightened through on-chain tokenisation, as it establishes a publicly accessible record of all transactions on a blockchain, fostering trust and accountability within financial ecosystems. Lastly, on-chain tokenisation fuels composability by enabling different tokens to be combined and utilised in novel ways, fostering innovation and the creation of new financial products and services.

In summary, on-chain tokenisation revolutionises financial markets by improving liquidity, accessibility, settlement efficiency, transparency, and composability, thereby driving forward the evolution of modern finance.

2. Introduction to Corporate

Masverse, a trailblazer in the Malaysian tech industry, stands at the forefront of blockchain and Web 3.0 innovations. With a focus on delivering comprehensive blockchain infrastructure solutions, Masverse is driving the transition towards a more sophisticated, transparent, and secure Internet economy and Web 3.0 ecosystem.

Central to Masverse ecosystem's offerings is MasChain, a layer-1 blockchain infrastructure solution that supports various services such as Token Crowdfunding, smart contracts, blockchain certificates, fostering growth in the digital economy. MasChain's distinguishing feature lies in its public-permissioned nature within the blockchain ecosystem. This innovative approach seamlessly combines the openness and accessibility of public blockchains with the controlled participation of permissioned systems.

This hybrid model not only ensures enhanced security but also improves efficiency, making it an ideal choice for government and enterprise applications where trust, compliance, and control are paramount.

2.1 Milestones and Strategic Partnerships

MASVERSE® MILESTONES

2022

8th July 2022

The Founding of MASVERSE®

October 2022

Introduce **Masverse's Web 3.0 Ecosystem** to **MIDA & MDEC**

MIDA MALAYSIAN INVESTMENT DEVELOPMENT AUTHORITY

MDEC™

2023

February 2023

MOU signing with **Jabatan Pendidikan Negeri Kedah**

KEMETERIAN PENDIDKAN
JABATAN PENDIDIKAN NEGERI KEDAH

March 2023

Masverse Blockchain Tech Meeting at Estonia, Sweden & Spain

March 2023

Masverse presented **Blockchain Technology Solution & Web 3.0 Ecosystem** to **Deputy Prime Minister's Office**

PARLIMEN MALAYSIA

May 2023

The First Web 3.0 Micro-credential Programme in Malaysia with **Blockchain Certificate**

A•P•U ASIA PACIFIC UNIVERSITY OF TECHNOLOGY & INNOVATION

L2E®

July 2023

Opening of Masverse Web3 Hub at Juru Auto-City, Prai, Penang

MASVERSE® Web 3.0 Hub

July 2023

Launching of **Malaysia's First Web 3.0 Guidebook**

WEB3.0 Guidebook

July 2023

Information Exchange between **Masverse & Heitech Padu Berhad**

HeiTech®

August 2023

Appointed as
Token Crowdfunding Consultant for **Ni Hsin Group Berhad's Tokenomics Design & Blockchain Tech Deployment**

September 2023

Official Launch of
BlockchainCert Industrial BlockchainCertificate Solution & Zero Fake Certificate Campaign

September 2023

MOU Signing with
HQC Commerce Sdn. Bhd.

November 2023

MOU Signing with **National Association of Private Educational Institutions**

2024

February 2024

MOU Signing with
Majlis Sukan Negeri Pulau Pinang

February 2024

MOA Signing with
ADA Biotech

February 2024

Obtained
Malaysia Digital Status by MDEC

April 2024

Official Launch of
Masverse Web 3.0 Guidebook Volume 2

April 2024

Official Launch of
MasChain Layer 1 Public-Permissioned Blockchain

May 2024

Recognised as
Ministry of Finance Malaysia Certified Vendor

May 2024

E-Wakalah Management System engaged by **Lembaga Zakat Selangor**

June 2024

MOU Signing with **TARUMT**

August 2024

Partnered with **APUBCC** to host **DEVMatch Hackathon**

October 2024

Recognised as **Top 10** in **FIKRA ACE Accelerator** by Securities Commission Malaysia, MDEC & NEXEA

November 2024

Certified to **ISO 9001:2015**

May 2024

Appointed as **Token Crowdfunding Consultant** for **Sangkaya's Tokenomics Design & Blockchain Tech Deployment**

July 2024

Partnered with **Growth Charger** to host **BRIDG3 Hackathon**

August 2024

MOU Signing with **MIMOS**

November 2024

BlockchainCert.my is officially **MYSTI Certified**

December 2024

MoU signed with **Golden Education (China)** for **BlockchainCert Adoption**

2025

January 2025

Official Launch of
MASWALLET

February 2025

MoU signed between
MyKapital and **FISOM**

March 2025

MoU signed with
CariJob for **BlockchainCert**

April 2025

Official signing of
BGA X Masverse Joint Fund,
witnessed by MDEC

April 2025

Presented **MasChain**
at **Kemeterian Digital**

May 2025

MoU signed with
Universitas Islam Bandung (UNISBA), Indonesia

February 2025

Official Launch of
MyKAPITAL™

March 2025

MoU signed with
City University Malaysia

March 2025

Successfully completed
Blockchain Credentialing Pilot with
MOE & MSIA for **TVET students**

April 2025

Recognised as **Top 3**
Technology Service Provider
in **Market Driven Digital Innovation**
Programme by Deloitte & MDEC

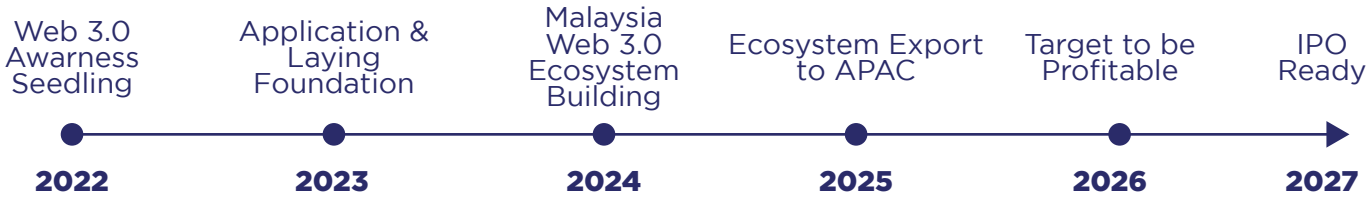
May 2025

MoU signed with
Malaysia Corruption Watch (MCW)

May 2025

Launched
TalentChain LMS System

2.3 Overview of Future Company Business Roadmap



Fiscal Year 1: Foundation & Ecosystem Launch

- Bridge interoperability between multiple blockchain networks
- Launch MasWallet – a secure, self-custodial digital wallet
- Roll out core applications and features:
  - Tokenisation modules
  - Industry-specific solutions for:
    - ◆ Logistics
    - ◆ Supply Chain Management
    - ◆ Education
    - ◆ Commercial Identity Management
- Integrate Real-World Assets (RWAs) onto the MasChain platform
- Enable integration with Decentralised Exchanges (DEXs)
- Host a Global Hackathon & Collaborative Grants to attract developers and innovators
- Launch MyKapital platform and onboard:
  - Existing SSM-approved interest schemes
  - New digital interest schemes
- Introduce TalentChain to support Malaysia's HRD training and credentialing ecosystem
- Strengthen logistics and supply chain blockchain integration solution
- Expansion to Indonesia, Phillipines, and Brunei

Fiscal Year 2: Ecosystem Expansion & Deepening Market Penetration

- Drive adoption in key sectors:
  - FinTech
  - Digital Credentials
  - Supply Chain & Traceability
  - Digital Government Services
- Secure international strategic partnerships and joint ventures, targeting:
  - Sovereign deployments in ASEAN markets
- Enhance the MasChain Service Layer to:
  - Simplify developer onboarding
  - Enable integration with enterprise systems
- Establish the MasChain Developer Community for collaboration and innovation
- Launch MasChain Certified Program to ensure:
  - Trust
  - Credibility
  - Ecosystem Standardisation
- Form strategic partnerships in:
  - Artificial Intelligence (AI)
  - Internet of Things (IoT)
  - Green Finance for advanced blockchain applications.

Fiscal Year 3: Ecosystem Maturation & Strategic Expansion

- Roll out MasChain 2.0 with enhanced scalability, modularity, and regulatory readiness
- Launch of additional TCF projects on MasChain
- Target of 10 million users on MasWallet
- Preparation for IPO in Fiscal Year 4

3. Technology and Use Cases – MasChain

3.1 Introduction

Since the immense popularity of blockchain technology gained through Bitcoin, many individuals and communities have begun creating their own blockchains, each aiming to achieve specific goals. For example, Ethereum implemented smart contracts to build and run programmes on the blockchain. In contrast, Polygon, a layer two blockchain built on Ethereum, addresses Ethereum's scalability issues and high transaction fees.

Currently, onboarding companies and industries onto blockchain technology is a major challenge due to its high complexity. To address this issue, we have developed MasChain, a public-permissioned blockchain aimed at solving various industry problems while providing easy access to blockchain infrastructure. MasChain allows enterprises and businesses to onboard and integrate blockchain into their systems through a more familiar approach using APIs. This not only solves their technical difficulties in operating a blockchain but also proves to be more cost-effective.

With the ongoing competition within the blockchain space, innovation has skyrocketed, leading to the emergence of various blockchain solutions and tools. One of the well-known frameworks is Substrate, which is used to build the Polkadot blockchain.

The Substrate is a highly customisable open-source blockchain framework allowing anyone to quickly build and launch a customised blockchain. It comprises individual sections called pallets, which act like libraries for certain functionalities, such as storing user identities or compiling Solidity and EVM smart contracts.

Today, our very own MasChain is also built using the Substrate framework. We have customised it to be a public-permissioned blockchain, utilising a Proof of Authority (PoA) consensus mechanism. MasChain is a decentralised, energy-efficient blockchain with low transaction fees. It is designed to support mass adoption and web2 industries by simplifying onboarding and lowering the entry barrier.

3.2 Roadmap for Technical Infrastructure

The MasChain Technical Roadmap outlines a strategic progression aimed at revolutionising blockchain technology through a series of meticulously planned phases. Beginning with foundational enhancements and extending into advanced developments and regional expansion, this roadmap signifies MasChain's commitment to innovation, security, and seamless integration within the blockchain ecosystem. By focusing on both immediate and long-term goals, MasChain aims to create a robust and versatile platform that supports a wide range of use cases, ensuring a future-proof blockchain infrastructure.

FY2025:

- **MasChain Mobile App Wallet:** Develop a mobile wallet application for MasChain.
- **Cross-Chain Integrations:** Integrate with existing public blockchains like Ethereum and Binance Smart Chain (BSC) to enable seamless digital asset relocation.
- **Advanced MasChain Explorer:** Develop a customizable block explorer for enterprises to select the information they wish to present.
- **Decentralised File Storage Support:** Implement support for decentralised file storage.
- **Developer Tools and Resources:** Improve developer tools, libraries, documentation, and SDKs.
- **Service Layer Enhancements:** Continuously develop and enhance the service layer to support various applications.
- **Application Layer Development:** Continuously develop new applications to support more use cases.

- **Physical Server and Data Center Setup:** Strategise and set up physical servers and data centers for blockchain nodes.
- **Custom Contract Module Development:** Enable users to deploy & manage their own Solidity smart contracts through the Enterprise portal and interact with it through RESTful API
- **Ecosystem Module Development:** Showcasing applications built by partners, which integrated with MasChain to promote application adoption and collaboration
- **Licensed DAC Integration:** Enables at least one licensed Digital Asset Custodian to integrate and support MasChain within their custody platform and services
- **Licensed DAX Integration:** Enables at least one licensed Digital Asset Exchange to integrate and support MasChain within their platform and services

FY2026:

- **Parachain Development:** Develop parachain to expand MasChain's ecosystem regionally.
- **Cross-Chain Integrations for Enterprises:** Integrate with other private blockchains and consortium blockchains for enterprise use cases, focusing on traceability.
- **Cross-Chain Communication:** Enable cross-chain communication between MasChain and its parachain.
- **Application Layer Development:** Continuously develop new applications to support more use cases.

FY2027:

- **Application Layer Development:** Continuously develop new applications to support more use cases.

3.3 Governance

3.3.1 Proof-of-Authority (PoA)

PoA stands for Proof-of-Authority, only selected nodes which passed our background check will be able to join and contribute to adding, processing blocks onto MasChain. This is to ensure only authorised nodes are able to access the mempool and perform consensus.

We will also partner with a few selected regulated parties to join our node holdings and be Masverse Council Members. MasChain is overseen and fully managed by a multisig wallet. The control of the multi-sig wallet are distributed and held by Masverse Council Members.

Additionally, any proposed changes or enhancements to the blockchain layer will necessitate majority approval from the Masverse Council, ensuring a robust governance and risk mitigation to prevent a single point of failure within the whole ecosystem.

3.3.2 Public-Permissioned Network

MasChain employs a public-permissioned model that allows for the creation of closed access networks through selective restrictions. These restrictions are enforced via authentication, which governs privileges related to administration, governance, and other key functions. This model can be customised to include both fully closed networks and more open networks with public access. In the latter scenario, while anyone can access the network, authentication is still required to grant specific privileges to predetermined users. This approach introduces additional considerations for security and risk mitigation.

3.4 Architecture

As mentioned in the introduction, we are utilising the Substrate framework, which is built using Rust libraries. This section further explains the inner workings of MasChain.

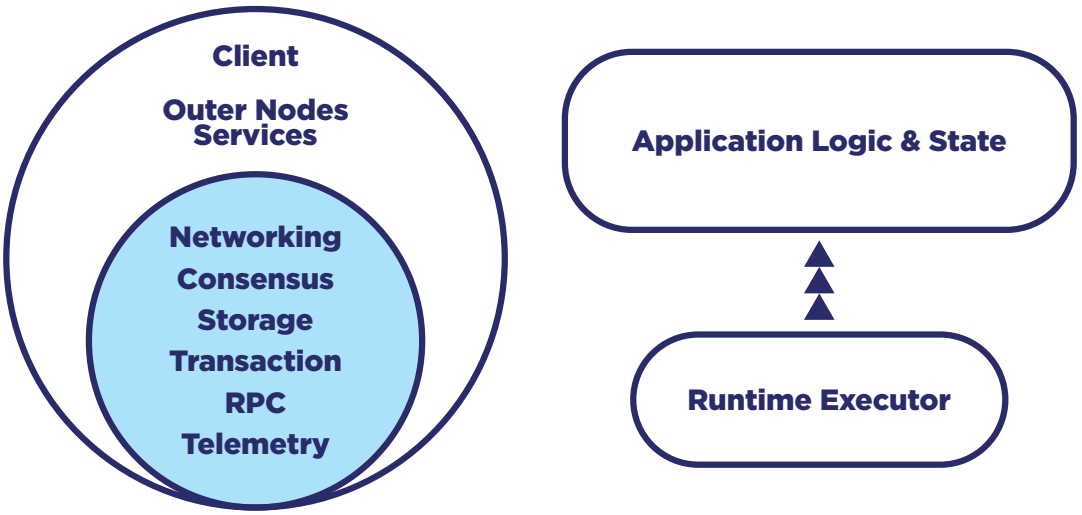
Client and Runtime

At a high level, a MasChain node consists of two structures:

1. A core client with outer node services that handles network activity such as peer discovery, managing transaction requests, reaching consensus with peers, and responding to RPC calls.

2. A runtime that performs all the business logic for executing the state transition function of the blockchain.

Below is a diagram that illustrates the separation of responsibilities in a simple manner to visualise the architecture.



Client Outer Node Services

The core client comprises multiple peripheral node services tasked with managing activities beyond the runtime environment. For instance, these services oversee peer discovery, transaction pool management, consensus establishment through communication with other nodes, and handling RPC requests from external sources.

Key Functions handled by the Core Client Services include:

1. **Storage**: External nodes maintain the current state of a Substrate blockchain using a streamlined key-value storage mechanism.

2. **Peer-to-peer Networking**: Utilising Rust's implementation of the libp2p network stack, external nodes facilitate communication with other participants in the network.

3. **Consensus**: External nodes engage with other network participants to ensure unanimity regarding the blockchain's state.

4. **Remote Procedure Call (RPC) API**: External nodes accept HTTP and WebSocket requests to enable user interaction with the blockchain network.

5. **Telemetry**: External nodes gather and furnish node metrics via an embedded Prometheus server.

6. **Execution Environment**: External nodes are responsible for selecting and managing the execution environment—whether WebAssembly or native Rust—for the runtime and dispatching relevant calls accordingly.

3.5 Runtime

The runtime is tasked with assessing the validity of transactions and managing alterations to the blockchain's state. Requests originating externally traverse through the client to reach the runtime, where state transition functions are executed, and the resulting state is stored.

The runtime is engineered to compile into WebAssembly (Wasm) bytecode. This architectural choice facilitates:

1. Seamless upgrades without the need for forks.

2. Compatibility across multiple platforms.

3. Verification of runtime integrity.

4. Provision of validation proofs for consensus mechanisms on relay chains.

3.5.1 Core Libraries

The core libraries are divided into three main areas of responsibility:

1. Core client libraries for outer node services.

2. FRAME libraries for the runtime.

3. Primitive libraries for underlying functions and interfaces for communication between the libraries.

3.5.2 Core Client Libraries

The essential libraries facilitating a Substrate node's network obligations, such as consensus and block execution, are Rust crates identified by the `sc_ prefix` in their crate names. For instance, the `sc_service` library orchestrates the construction of the networking layer for Substrate blockchains, managing communication between network participants and the transaction pool.

3.5.3 Primitive Libraries

At the foundational level of the Substrate architecture, primitive libraries offer control over fundamental operations and facilitate communication between core client services and the runtime. These Rust crates bear the `sp_ prefix` in their crate names.

These primitive libraries furnish the most basic level of abstraction, exposing interfaces for operations or interactions between the core client and the runtime. For instance:

1. The `sp_arithmetic` library delineates fixed-point arithmetic primitives and types for runtime utilisation.

2. The `sp_core` library furnishes a collection of shareable Substrate types.

3. The `sp_std` library exports primitives from the Rust standard library, rendering them compatible with any code reliant on the runtime.

3.5.4. FRAME Libraries for the Runtime

Rust crates employing the frame_ prefix in their crate names empower the construction of runtime logic and the encoding/decoding of information flowing into and out of the runtime.

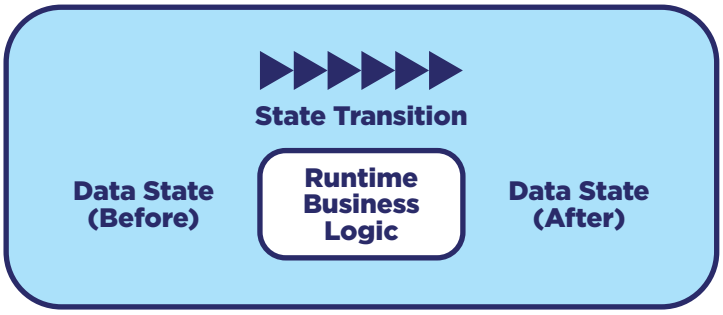
These FRAME libraries lay the groundwork for the runtime's functionality. For example, the frame_system library equips you with a fundamental set of functions to interact with other Substrate components, while frame_support enables the declaration of runtime storage items, errors, and events.

Beyond the infrastructure offered by the frame_* libraries, the runtime can integrate one or more pallet_* libraries. Each Rust crate bearing the pallet_ prefix represents a distinct FRAME module. Typically, pallet_* libraries are utilised to assemble desired blockchain functionality tailored to specific project requirements.

3.5.5 State Transitions and the Runtime

At its core, every blockchain serves as a ledger documenting every on-chain change. In Substrate-based chains, these changes are recorded in the runtime. Therefore, the runtime is often referred to as providing the state transition function.

As state transitions happen within the runtime, it's where you define the storage items representing the blockchain state and the transactions enabling users to modify this state.



3.5.6 Runtime Interfaces

The outer node is tasked with several responsibilities, including peer discovery, transaction pooling, block and transaction gossiping, consensus, and handling RPC calls from external sources. These duties often require the outer node to communicate with the runtime by either querying for information or providing information to it. This communication is facilitated by the runtime API.

In Substrate, the `sp_api` crate serves as an interface for implementing a runtime API. It offers flexibility in defining custom interfaces using the `impl_runtime_apis` macro. However, every runtime must implement the Core and Metadata interfaces. Apart from these mandatory interfaces, most Substrate nodes, such as the node template, implement the following runtime interfaces:

1. **BlockBuilder**: Provides functionality required to construct a block.
2. **TaggedTransactionQueue**: Handles validation of transactions.
3. **OffchainWorkerApi**: Enables offchain operations.
4. **AuraApi**: Facilitates block authoring and validation using a round-robin consensus method.
5. **SessionKeys**: Responsible for generating and decoding session keys.
6. **GrandpaApi**: Supports block finalisation within the runtime.
7. **AccountNonceApi**: Allows querying of transaction indices.
8. **TransactionPaymentApi**: Provides information about transactions.
9. **Benchmark**: Estimates and measures the execution time required to complete transactions.

3.5.7 Core Primitives

The Substrate framework doesn't impose strict requirements on what your runtime must provide to other layers, but there are essential data types that must be defined and adhere to specific interfaces to function within the framework.

These core primitives are:

1. **Hash**: Represents a cryptographic digest of data, typically a 256-bit quantity.
2. **DigestItem**: Encodes one of several "hard-wired" alternatives relevant to consensus and change-tracking, along with any number of "soft-coded" variants relevant to specific modules within the runtime.
3. **Digest**: A series of DigestItems, containing all information relevant for a light-client within the block.
4. **Extrinsic**: Represents a single piece of external data recognised by the blockchain. This typically includes one or more signatures and encoded instructions (e.g., for fund transfers or smart contract calls).
5. **Header**: Represents all relevant information about a block, including the parent hash, storage root, extrinsics trie root, digest, and block number.
6. **Block**: Essentially a combination of Header and a series of Extrinsics, along with a specification of the hashing algorithm used.
7. **BlockNumber**: Encodes the total number of ancestors any valid block has, typically a 32-bit quantity.

3.5.8 Frame

FRAME stands for Framework for Runtime Aggregation of Modularised Entities. It encompasses a wide range of modules and support libraries designed to streamline runtime development. In Substrate, these modules, referred to as pallets, offer customizable business logic for various use cases and features that you may want to integrate into your runtime.

For instance, there are pallets that provide frameworks for staking, consensus, governance, and other common activities, enabling developers to easily incorporate these functionalities into their Substrate-based blockchains.

3.6 Transactions & Blocks
3.6.1 Transactions

In general, transactions provide a mechanism for making changes to state that can be included in a block. There are three distinct transaction types:

- Signed transactions
- Unsigned transactions
- Inherent transactions

3.6.1.1 Signed Transactions

Signed transactions require the signature of the sending account, typically signed using the account's private key. Usually, the sending account pays a transaction fee, although specifics depend on the runtime logic.

In the most common type of transaction, the account initiating the transaction signs it with its private key. For instance, to transfer tokens to Alice, you'd call the `pallet_balances::Call::transfer` function in the Balances pallet using your account. Your account's key is used to sign the transaction, and you typically pay a fee for processing. Optionally, you can tip the block author for higher priority.

3.6.1.2 Unsigned Transactions

Unsigned transactions, on the other hand, don't require a signature and lack information about the submitter. They offer no economic deterrent against spam or replay attacks. Custom validation logic is necessary to guard against misuse and attacks, making them resource intensive.

For instance, the `pallet_im_online::Call::heartbeat` function uses unsigned transactions to allow validator nodes to signal their online status. Validators, registered in the network, can call this function without fees, as internal logic verifies their status.

3.6.1.3 Inherent Transactions

Inherent transactions, also known as inherents, are a special kind of unsigned transaction. Block authoring nodes add information directly to blocks without needing validation. These transactions, inserted only by the block authoring node, aren't gossiped or queued. Validators assume the data's validity.

For example, the `pallet_timestamp::Call::now` function lets block authoring nodes insert current timestamps, while the `paras_inherent::Call::enter `function enables parachain collator nodes to send expected validation data to the relay chain.

3.6.2 Blocks

In Substrate, a block consists of a header and an array of transactions. The header includes the following properties:

- Block Height
- Parent Hash
- Transaction Root
- State Root
- Digest

The transactions are bundled together as a series and executed according to the runtime logic. The transaction root is a cryptographic digest of this series, serving two main purposes:

1. It prevents any modifications to the series of transactions after the header has been constructed and distributed.

2. It allows light clients to efficiently verify that a given transaction exists in a block with only knowledge of the header.

3.6.2.1 Transaction Lifecycle

In Substrate, transactions carry data to be included in a block. Since this data originates outside of the runtime, transactions are often referred to as extrinsic data or extrinsics. However, the most common type of extrinsic is signed transactions. Therefore, this discussion on the transaction lifecycle focuses on how signed transactions are validated and executed.

Signed transactions include the signature of the account sending the request to execute some runtime call. Typically, this request is signed using the private key of the account making the request. In many cases, the account submitting the request also pays a transaction fee. However, specifics of transaction fees and other elements of transaction processing depend on the runtime logic defined.

Depending on the configuration of your network, you might have a combination of nodes that are authorised to author blocks and nodes that are not authorised for block authoring. If a Substrate node is authorised to produce blocks, it can process the signed and unsigned transactions it receives.

To reach consensus, two-thirds of the nodes must agree on the order of the transactions executed and the resulting state change like other deterministic finality algorithms, it will require at least 2f + 1 non-faulty nodes, where f is the number of faulty or malicious nodes. A majority of nodes in the network must agree on the order of transactions in a block to agree on the state of the blockchain and to continue securely adding blocks. To prepare for consensus, transactions are first validated and queued on the local node in a transaction pool.

3.6.2.2 Validating Transactions in the Transaction Pool

The transaction pool in Substrate utilises rules defined in the runtime to validate each transaction. These checks ensure that only valid transactions meeting specific conditions are queued to be included in a block. For instance, the transaction pool may perform checks such as:

- Is the transaction index (nonce) correct?
- Does the signing account have sufficient funds to cover associated fees?
- Is the signature used to sign the transaction valid?

After the initial validity check, the transaction pool periodically revalidates existing transactions. If a transaction is found to be invalid or has expired, it is removed from the pool. The transaction pool is responsible for ensuring transaction validity and ordering valid transactions in a transaction queue. Specific details of the validation mechanism, including fee handling, account verification, or signature validation, can be found in the `validate_transaction` method.

Adding valid transactions to a transaction queue -
When a transaction is deemed valid, the transaction pool places it into one of two transaction queues:

1. Ready Queue: This queue holds transactions that can be included in a new pending block immediately. If the runtime is built with FRAME, transactions must follow the exact order they are placed in the ready queue.

2. Future Queue: Transactions in this queue may become valid in the future. For instance, if a transaction has a nonce that is too high for its account, it waits in the future queue until the necessary number of transactions for the account have been included in the chain.

3.6.2.3 Invalid Transaction Handling

When a transaction is invalid, it is rejected and won't be added to a block. There are several reasons why a transaction might be rejected:

- The transaction has already been included in a block, so it is dropped from the verification queue.
- The transaction's signature is invalid, leading to immediate rejection.
- The transaction is too large to fit in the current block, so it is placed back in a queue for a new verification round.

3.6.2.4 Transactions Ordered by Priority

When a node is the next block author, it employs a priority system to order transactions for the upcoming block. Transactions are ordered from high to low priority until the block reaches its maximum weight or length.

Transaction priority is determined in the runtime and provided to the outer node as a tag on the transaction. In a FRAME runtime, a special pallet calculates priority based on the weights and fees associated with the transaction. This priority calculation applies to all types of transactions except inherents. Inherents are always placed first using the `EnsureInherentsAreFirst` trait.

3.6.2.5 Account Based Transaction Ordering

In FRAME-built runtimes, every signed transaction includes a nonce that increments each time a new transaction is made by a specific account. For instance, the first transaction from a new account has nonce = 0, and the second transaction from the same account has nonce = 1. The block authoring node can use this nonce when ordering transactions for inclusion in a block.

Transactions with dependencies are ordered considering the fees they pay and any dependency on other transactions. For example:

1. If there's an unsigned transaction with maximum priority value and another signed transaction, the unsigned transaction is placed first in the queue.

2. If there are two transactions from different senders, priority determines which transaction is more important and should be included in the block first.

3. If there are two transactions from the same sender with identical nonces, only one transaction can be included in the block. In this case, the transaction with the higher fee is included in the queue.

3.6.2.6 Executing Transactions and Producing Blocks

After valid transactions are placed in the transaction queue, a separate executive module manages how transactions are executed to produce a block. The executive module interacts with the system pallet and other pallets that compose the business logic for the blockchain. This module calls functions in the runtime modules and executes them in a specific order:

1. Initialising a block: This involves preparing the block for execution, setting up initial conditions, and ensuring all necessary data is available.

2. Executing transactions: The executive module iterates through the transaction queue, executing each transaction in the block according to the runtime logic. This process ensures that transactions are applied to the state in the correct order.

3. Finalising block building: Once all transactions are executed, the executive module finalises the block building process. This may involve updating block metadata, calculating the final block hash, and performing any necessary cleanup tasks.

3.6.2.7 Initialising a Block

To initialise a block, the executive module first calls the `on_initialize` function in the system pallet and then in all other runtime pallets. The `on_initialize` function enables you to define business logic that should be completed before transactions are executed. The system pallet `on_initialize` function is always executed first. The remaining pallets are called in the order they are defined in the `construct_runtime!` macro.

After all of `on_initialize` functions have been executed, the executive module checks the parent hash in the block header and the trie root to verify that the information is correct.

3.6.2.8 Executing Transactions

After the block has been initialised, each valid transaction is executed in order of transaction priority. It is important to remember that the state is not cached prior to execution. Instead, state changes are written directly to storage during execution. If a transaction were to fail mid-execution, any state changes that took place before the failure would not be reverted, leaving the block in an unrecoverable state. Before committing any state changes to storage, the runtime logic should perform all necessary checks to ensure the extrinsic will succeed.

3.6.2.9 Finalising a Block

After all queued transactions have been executed, the executive module calls into each pallet's on_idle and on_finalise functions to perform any final business logic that should take place at the end of the block. The modules are again executed in the order that they are defined in the construct_runtime! macro, but in this case, the on_finalise function in the system pallet is executed last.

After all on_finalise functions have been executed, the executive module checks that the digest and storage root in the block header match what was calculated when the block was initialised.

The on_idle function also passes through the remaining weight of the block to allow for execution based on the usage of the blockchain.

3.7 Consensus Mechanism

Every blockchain requires some type of consensus mechanism to agree on the blockchain state. For MasChain, it adopts the PoA consensus, also known as Proof-of-Authority. This means only selected and authorised nodes will be able to join the network and add blocks to the chain. In MasChain, consensus is achieved in two phases:

- **Block Authoring:** The process of creating new blocks.
- **Block Finalisation:** The process used to handle forks and choose the canonical chain.

3.7.1 Block Authoring

Before consensus can be reached, certain nodes in the blockchain network must be authorised to produce new blocks. The method by which the blockchain determines the nodes authorised to author blocks depends on the consensus model being used.

- **Centralised Network:** A single node may be responsible for authoring all the blocks.

- **Decentralised Network:** In a completely decentralised network without any trusted nodes, an algorithm must select the block author at each block height. This process typically involves a consensus algorithm such as Proof of Work (PoW), Proof of Stake (PoS), or a variant like Practical Byzantine Fault Tolerance (PBFT) or Delegated Proof of Stake (DPoS). These algorithms ensure that block authoring is distributed among network participants in a fair and secure manner, without relying on any central authority.

MasChain is currently using the Authority-based round-robin scheduling (Aura) algorithm to achieve consensus. The Aura consensus model requires a known set of validator nodes that are permitted to produce blocks. In this model, time is divided into discrete slots. During each slot, only some of the validators can produce a block. In the Aura consensus model, validators that can author blocks rotate in a round-robin fashion. In contrast, the BABE consensus model selects validators based on a verifiable random function (VRF) instead of the round-robin selection method.

3.7.2. Finalisation and Forks

As a primitive, a block contains a header and transactions. Each block header contains a reference to its parent block, allowing you to trace the chain back to its genesis. Forks occur when two blocks reference the same parent. Block finalisation is a mechanism that resolves forks so that only the canonical chain exists. A fork choice rule is an algorithm that selects the best chain that should be extended. Substrate exposes this fork choice rule through the SelectChain trait.

3.7.2.1. Deterministic Finality

It's natural for users to want to know when transactions are finalised or signalled by some event, such as a receipt delivered or papers signed. However, with the block authoring and fork choice rules described so far, transactions are never entirely finalised. There is always a chance that a longer or heavier chain might revert a transaction. However, the more blocks built on top of a particular block, the less likely it is ever to be reverted. This way, block authoring and a proper fork choice rule provide probabilistic finality.

If your blockchain requires deterministic finality, you can add a finality mechanism to the blockchain logic. For example, members of a fixed authority set can cast finality votes. When enough votes have been cast for a certain block, the block is deemed final. In most blockchains, this threshold is two-thirds. Blocks that have been finalised cannot be reverted without external coordination such as a hard fork.

3.7.3 MasChain Node Roadmap and Governance

MasChain's Proof-of-Authority (POA) Consensus

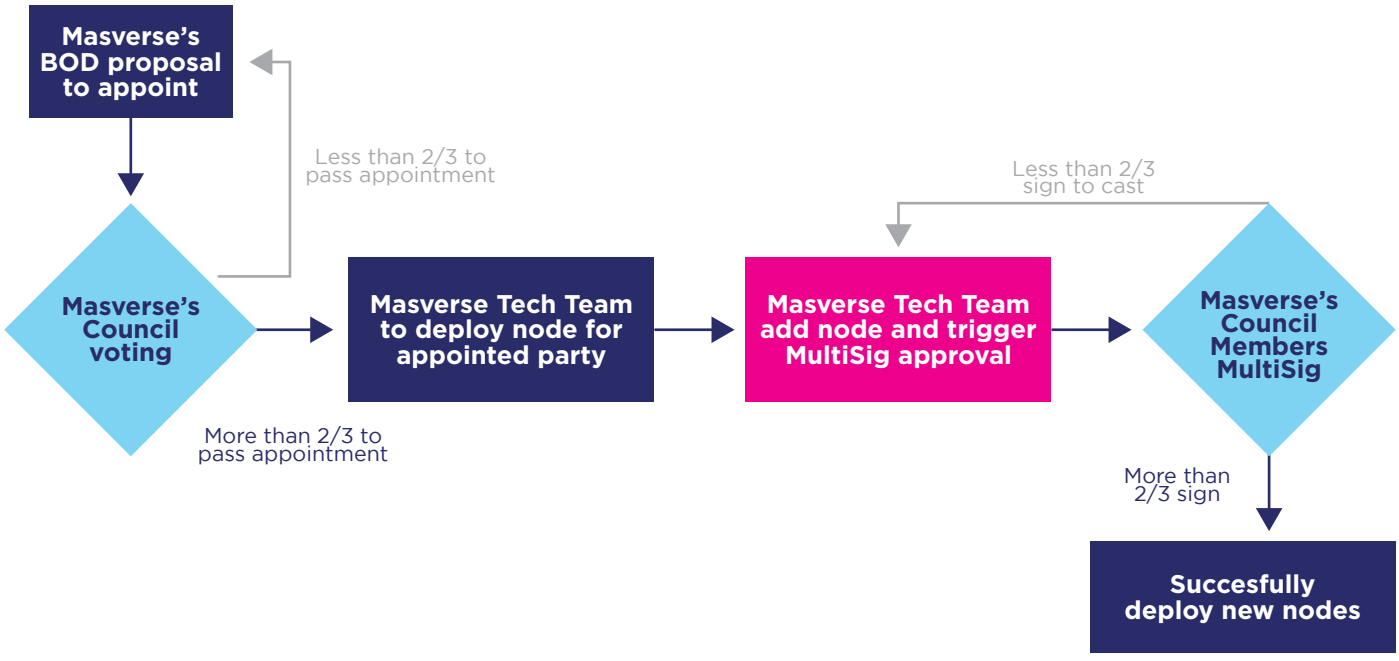
Deterministic Finality	: 2/3 of nodes are working
Faulty Node	: *f*
Node Validation	: Non-faulty nodes formula = 2*f* + 1 (A minimum of 4 nodes required to handle at most 1 node unsynchronised node and show on)
Total node	: 3*f* + 1

To eliminate single points of failure, no independent party should control more than one-third of the nodes to ensure working blockchain deterministic finality algorithm; to ensure integrity and working validator nodes, any independent party shall not hold more than *f* (faulty node) number of nodes based on node validation formula. Combining these 2 formula, since *f* will always less than 1/3 of the nodes, we conclude that any independent party shall not hold more than *f* amount of nodes, including Masverse group of companies should treated as one independent party.

To ensure data integrity and no single point of failure within the MasChain ecosystem, Masverse's Council will systematically appoint reputable independent third parties, as proposed by the Board of Directors, in progressive stages to become node validators (node holders). Masverse's council will ensure at least 2*f* + 1 of the nodes always be held by independent third parties, remaining maximum *f* number of nodes with Masverse to maintain its responsibility to drive continuous development and enhancement in MasChain ecosystem.

Each appointment of node holder will be contingent upon the approval of Masverse's council members, requiring a simple majority vote. Once appointed, the node holder is now eligible and potentially be appointed to become Masverse's council member subject to advice from Masverse's Board of Directors and voting from Masverse's council member. Each successfully appointed third-party Council member of Masverse may designate one representative to join the Masverse's council meeting and voting. These representatives will participate in governance discussions to effectively oversee the MasChain ecosystem, ensuring high network integrity and maximum uptime.

Node Holders Appointment Governance Process



The process for appointing and deploying a new Node Holder in the MasChain network begins with a proposal from Masverse's Board of Directors (BOD), which is then voted on by the Council. If the proposal receives a 2/3 majority approval, the Tech Team proceeds to deploy the node for the appointed party. Preparation of node deployment, once ready, 2/3 of the council need to sign the multi-sig to complete the new node deployment. Once 2/3 of the Council members sign off, the new node is successfully integrated into the network, completing the process. This ensures a secure and transparent governance procedure.

Responsibilities of Node Holders

1. **Maintaining Network Integrity:** Node Holders are responsible for ensuring the integrity and security of the MasChain network by validating transactions, adding them to the blockchain, and preventing fraudulent activities.

2. **Upholding Consensus Protocol:** Node Holders must consistently follow the PoA consensus protocol to maintain a fair, transparent, and efficient decision- making process. They are expected to be impartial and uphold the principles of the network whenever there is dispute arose.

3. **Ensuring Maximum Availability:** Node Holders must ensure that their nodes are online and operational at 99.99% up time, maintaining the reliability and stability of MasChain network. They are responsible for minimising downtime and quickly resolving any technical issues.

4. **Data Protection and Confidentiality:** Node Holders are obligated to protect the data within the blockchain, ensuring it is kept secure and confidential. They must follow best practices in cybersecurity to prevent unauthorised access to sensitive information.

5. **Reporting and Accountability:** Node Holders must report in monthly basis on their activities, network performance, and any issues encountered. They are accountable to the Masverse's Council and the MasChain community, ensuring transparency in their operations.

Clauses for Non-Performance

1. **Performance Review:** The performance of Node Holders will be subject to periodic reviews by the Masverse's Council. Failure to meet the performance standards set forth by the Council may result in a warning or penalty.

2. **Notice of Non-Compliance:** If a Node Holder is found to be non-compliant with their responsibilities, they will receive a formal notice from the Masverse's Council. The notice will detail the specific areas of non-compliance and provide a timeline for rectification.

3. **Voting for Removal Clause:** If a Node Holder fails to rectify their non- compliance within the given timeline, the Masverse's Council reserves the right to call a vote for their removal. A 2/3 majority vote among the Council members will be required to remove the Node Holder from their position.

4. **Immediate Suspension Clause:** In cases of severe misconduct or actions that threaten the integrity of the network, the Masverse's Council has the right to immediately suspend the Node Holder's access to the network, pending a formal vote for removal.

5. **Replacement and Reassignment Clause:** Upon the removal of a Node Holder, the Masverse's Council will initiate the process of appointing a replacement. The outgoing Node Holder must ensure a smooth handover of duties and data to the incoming Node Holder to prevent any disruption to the network.

As extended elaboration from point #4 of Clauses for Non-Performance, **severe misconduct or actions** that threaten the integrity of the MasChain network could include the following:

1. **Unauthorised Data Manipulation:** Altering, tampering, or falsifying transaction data or records within MasChain to achieve personal gain or to benefit a third party.

2. **Collusion and Fraudulent Activities:** Engaging in collusion with other Node Holders or external entities to manipulate MasChain's consensus outcomes, bypass security protocols, or engage in fraudulent activities that compromise the network's integrity.

3. **Security Breach Facilitation:** Intentionally or negligently allowing unauthorised access to the network, such as by sharing private keys, bypassing security measures, or failing to protect sensitive information, leading to potential breaches or exploits.

4. **Conflicts of Interest:** Acting in a manner that creates a significant conflict of interest, such as holding a position or stake in a competing network or entity, that could compromise impartiality or the network's overall security.

5. **Violation of Non-Disclosure Agreements (NDA):** Breaching NDA by accessing, duplicating, or attempting to resell sensitive data without authorisation, which could lead to data leaks, loss of trust, or financial damage to the network and its participants.

6. **Refusal to Comply with Governance Decisions:** Willfully refusing to comply with decisions or directives issued by the Masverse's Council, especially those related to network upgrades, security measures, or disciplinary actions, thereby undermining the governance and operational effectiveness of the network.

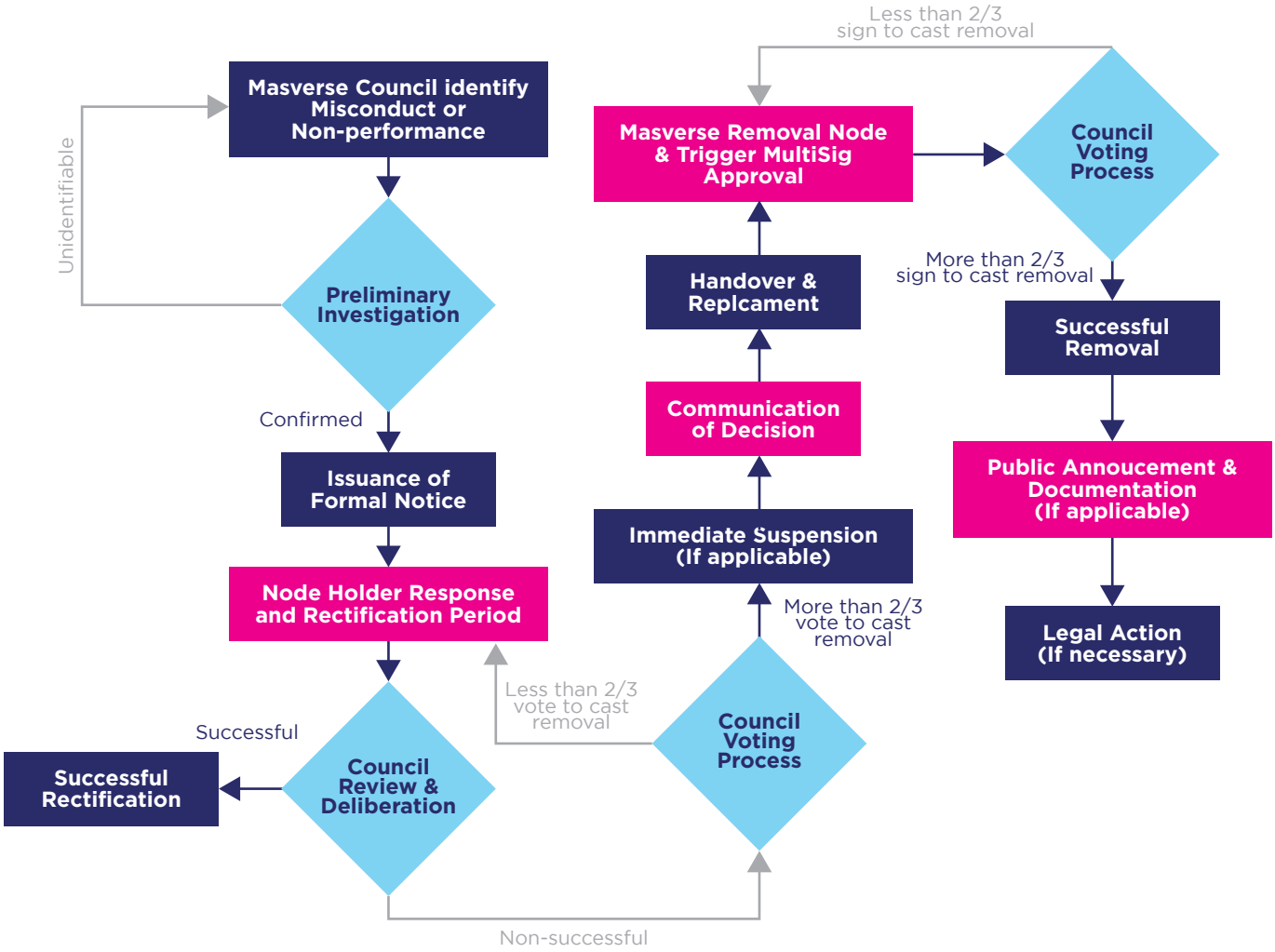
7. **Sabotage or Malicious Actions:** Engaging in or facilitating sabotage, such as deploying malware, intentionally causing node downtime, or otherwise attempting to disrupt the network's operations and stability.

8. **Misuse of Authority:** Exploiting the authority granted by the PoA consensus for personal gain or to exert undue influence over the network's operations in a way that undermines trust and transparency.

9. **Spreading False News:** Deliberately spreading false or misleading information about the MasChain network, its operations, or its participants, with the intent to cause panic, damage the network's reputation, or manipulate market perceptions.

These actions, if detected, would warrant immediate suspension and potential removal by the Masverse Council, along with possible legal action to safeguard the network and its participants.

Node Holders Removal Governance Process



The Node Holder removal process in the MasChain network starts when the Masverse Council identifies potential misconduct or non-performance. A preliminary investigation is conducted, and if the issue is confirmed, a formal notice is issued to the Node Holder, allowing time for rectification. The Council then reviews the response. If the issue is not resolved, a vote is held, requiring a 2/3 of the council to approve the removal and need to sign the multi-sig to remove the Node Holder. In severe cases, immediate suspension may occur. Upon successful removal, responsibilities are handed over, and if necessary, public announcements and legal actions follow.

MasChain's Proof-of-Authority (POA) Nodes Compensation Plan

Before TGE	: Monthly server usage invoice reimbursement + 500 units of MASV
After TGE	: "Monthly 2,000 units of MASV" or Monthly cloud usage invoice reimbursement + 500 units of MASV" whichever higher

The MASV allocation to the node holders will be recorded and published to MasChain portal for monthly basis. 10% of MASV allocated for 'Community Allocation' (please refer to 5.2.2 Ecosystem and Community Allocation) will be sufficient to compensate and incentivise 20 node holders for up to 13 years. In the case where 10% of MASV has been fully utilised, Masverse's council may discuss and vote on the new ways of compensation and incentivisation with advice from Masverse's BODs. This may involve the changing of compensation and incentivisation model to profit sharing methodology, subject to voting with majority 2/3 of Masverse's Council members' approval.

MasChain's Proof-of-Authority (POA) Node Allocation Roadmap

Stage 1: Early Main-Net Launching Stage (Completed)

$Node_1$: Masverse
$Node_2$: Masverse
$Node_3$: Masverse

Stage 2: 5 Nodes Before Private TCF 1.0 Activity

$Node_1$: Masverse
$Node_2$: PLC/GLC/Legal Firm or Licensed Entities under BNM/SC/SSM/MOF/MCMC
$Node_3$: PLC/GLC/Legal Firm or Licensed Entities under BNM/SC/SSM/MOF/MCMC
$Node_4$: PLC/GLC/Legal Firm or Licensed Entities under BNM/SC/SSM/MOF/MCMC
$Node_5$: PLC/GLC/Legal Firm or Licensed Entities under BNM/SC/SSM/MOF/MCMC

Stage 3: 9 Nodes Before Public TCF activity

$Node_1$: Masverse
$Node_2$: Masverse
$Node_3$: Masverse
$Node_4$: PLC/GLC/Legal Firm or Licensed Entities under BNM/SC/SSM/MOF/MCMC
$Node_5$: PLC/GLC/Legal Firm or Licensed Entities under BNM/SC/SSM/MOF/MCMC
$Node_6$: PLC/GLC/Legal Firm or Licensed Entities under BNM/SC/SSM/MOF/MCMC
$Node_7$: PLC/GLC/Legal Firm or Licensed Entities under BNM/SC/SSM/MOF/MCMC
$Node_8$: PLC/GLC/Legal Firm or Licensed Entities under BNM/SC/SSM/MOF/MCMC
$Node_9$: PLC/GLC/Legal Firm or Licensed Entities under BNM/SC/SSM/MOF/MCMC

Stage 4: 9 Nodes Gradually Increase to 20 nodes after Public TCF Activity

$Node_1$: Masverse
$Node_2$: Masverse
$Node_3$: Masverse
$Node_4$: Masverse
$Node_5$: PLC/GLC/Legal Firm or Licensed Entities under BNM/SC/SSM/MOF/MCMC
$Node_6$: PLC/GLC/Legal Firm or Licensed Entities under BNM/SC/SSM/MOF/MCMC
$Node_7$: PLC/GLC/Legal Firm or Licensed Entities under BNM/SC/SSM/MOF/MCMC
$Node_8$: PLC/GLC/Legal Firm or Licensed Entities under BNM/SC/SSM/MOF/MCMC
$Node_9$: PLC/GLC/Legal Firm or Licensed Entities under BNM/SC/SSM/MOF/MCMC
$Node_{10}$: PLC/GLC/Legal Firm or Licensed Entities under BNM/SC/SSM/MOF/MCMC
$Node_{11}$: PLC/GLC/Legal Firm or Licensed Entities under BNM/SC/SSM/MOF/MCMC
$Node_{12}$: PLC/GLC/Legal Firm or Licensed Entities under BNM/SC/SSM/MOF/MCMC
$Node_{13}$: PLC/GLC/Legal Firm or Licensed Entities under BNM/SC/SSM/MOF/MCMC
$Node_{14}$: PLC/GLC/Legal Firm or Licensed Entities under BNM/SC/SSM/MOF/MCMC
$Node_{15}$: PLC/GLC/Legal Firm or Licensed Entities under BNM/SC/SSM/MOF/MCMC
$Node_{16}$: Reserve for Local Malaysian's Community
$Node_{17}$: Reserve for Local Malaysian's Community
$Node_{18}$: Reserve for Local Malaysian's Community
$Node_{19}$: Reserve for Local Malaysian's Community
$Node_{20}$: Reserve for Local Malaysian's Community

**Remark: If the allocated nodes to certain parties not fulfilled, Masverse's Council will appoint third party legal firm as an escrow to hold the nodes on behalf until the allocated nodes successfully given out.*

In some consensus models, block production and block finality are combined, and a new block N+1 cannot be authored until block N is finalised. As you've seen, in Substrate, the two processes are isolated from one another. By separating block authoring from block finalisation, Substrate enables you to use any block authoring algorithm with probabilistic finality or combine it with a finality mechanism to achieve deterministic finality.

If your blockchain uses a finality mechanism, you must modify the fork choice rule to consider the results of the finality vote. For example, instead of taking the longest chain period, a node would take the longest chain that contains the most recently finalised block.

3.8. Subchain & Cross Chain Communication

One of the biggest potential use cases in the future for MasChain is where we have a subchain or parachains as described in the Substrate framework. This is one of the many benefits of using the Substrate framework.

Cross-consensus communication relies on a message format—XCM—that is designed to provide a generalised and extensible set of instructions for completing transactions across boundaries created by different consensus systems, transaction formats, and transport protocols.

The XCM format expresses the content of the message. Each message consists of a set of instructions requested by a sender that can be accepted or rejected by a message recipient. The message format is completely independent of the message protocol used to send and receive messages.

3.8.1. Message Protocols

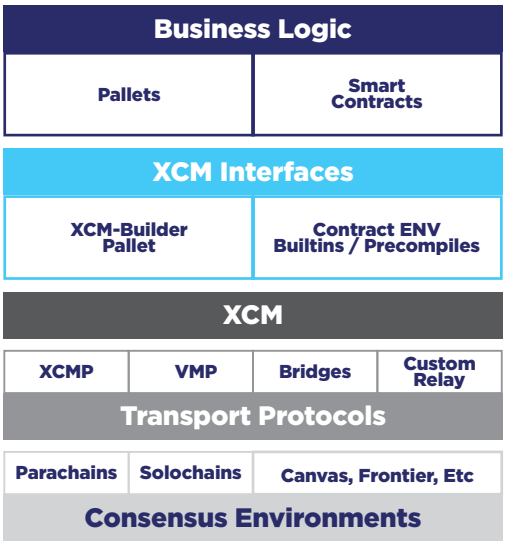
There are three main communication channels, or message protocols, used to transport messages between chains in the ecosystem:

1. **Upward Message Passing (UMP):** This protocol enables a parachain to pass messages up to its relay chain.

2. **Downward Message Passing (DMP):** This protocol enables the relay chain to pass messages down to a parachain.

3. **Cross-Consensus Message Passing (XCMP):** This protocol enables parachains to exchange messages with other parachains connected to the same relay chain. It provides a horizontal, parachain-to-parachain communication channel.

While upward and downward message passing protocols provide vertical communication channels, XCMP offers a horizontal communication channel between parachains. However, since the full XCMP protocol is still under development, an interim solution called horizontal relay-routed message passing (HRMP) is used to route messages intended for a parachain through the relay chain. HRMP is expected to be deprecated once XCMP is released to production.



Although these message passing protocols are the primary means of communication between chains in the Polkadot ecosystem, the XCM (Cross-Chain Messaging) itself isn't limited by these transport protocols. Instead, you can use XCM to express many common types of transactions regardless of where the message originates and its destination.

3.8.2. Messages in the XCM Format

There are four important principles you should understand about messages that use the XCM format:

- **Asynchronous:** Messages are asynchronous. After you send a message, there's no expectation that the sending system should wait for a response indicating the message was delivered or executed.
- **Absolute:** Messages are guaranteed to be delivered and interpreted in order and executed efficiently.
- **Asymmetric:** Messages are asymmetric and don't return any results back to the sender. You can only communicate results back to the sender separately using an additional message.
- **Agnostic:** Messages are agnostic and make no assumptions about the consensus systems between which messages are passed.

As this definition indicates, the message is simply a call to execute an ordered set of instructions. The Instruction type is an enumeration data type, and the order in which the variants are defined generally reflects the order in which they are used when constructing a message. For example, the WithdrawAsset instruction is the first variant because it is typically executed before other instructions — such as BuyExecution or DepositAsset — in the ordered list of instructions.

Most of the XCM instructions enable you to perform common tasks such as transferring an asset to a new location or depositing an asset in a different account. The instructions that perform these types of tasks allow you to construct consistent messages that do what you expect them to do regardless of how the consensus system you communicate with is configured. However, you also have the flexibility to customise how instructions are executed or to use the Transact instruction.

3.8.3. Execution in a Virtual Machine

The Cross-Consensus Virtual Machine (XCVM) is a high-level virtual machine equipped with an XCM executor programme that executes XCM instructions it receives. The programme executes these instructions sequentially until it reaches the end or encounters an error, at which point execution stops.

As XCM instructions are executed, the XCVM maintains its internal state using specialised registers. Additionally, it has access to the state of the underlying consensus system where the instructions are being executed. Depending on the operations performed, XCM instructions might change a register, the state of the consensus system, or both.

For example, the TransferAsset instruction specifies an asset to transfer and its destination. When executed, the origin register is automatically set based on the message's source, identifying where assets should be taken from. Another register manipulated during XCM instruction execution is the holding register, used to temporarily store assets awaiting further instructions.

Several other registers in the XCVM handle specific tasks. For instance, the surplus weight register stores any overestimated fees, while the refunded weight register stores refunded surplus weight. Typically, you can't directly modify the values stored in these registers. Instead, values are set when the XCM executor programme starts and manipulated by specific instructions, under certain circumstances, or according to certain rules.

3.9. Gas Fees

Based on our survey, one of the major obstacles for ordinary people or even enterprises to adopt blockchain solutions is the high transaction fees and price fluctuations. However, with MasChain, fees are not calculated using the conventional fluctuating gas fees. Instead, we track API calls usage on our blockchain. We also have the flexibility to opt for tier-based pricing. Depending on the transaction made, higher complexity actions will incur higher fees per transaction. Below explains more on the charging approach:

1. **For Enterprise Users:** Those who link their credit card with our MasChain Enterprise Portal will have their usage directly charged to their credit card at the end of their billing period. The funds received will be used to rebuy MASV in the market after TGE. This ensures a lower entry barrier for enterprise users and aligns with their familiar processes.

2. **Alternative for Enterprise Users:** After TGE of MASV, they can buy MASV and deposit it into their Enterprise MasChain Wallet. At the end of their billing period, we will directly deduct MASV from their MasChain Wallet.

3. **For Public Users:** When transferring tokens/NFTs that don't have quoted market value, the fees per transaction will remain the same as per the API. The fees in MASV will be deducted from the sender's wallet.

4. **For Public Users with Market Value Tokens:** When transferring tokens with real market value, the fees per transaction will remain the same as per the API. The fees will be deducted from the token being transferred from the sender's wallet.

3.10. Developer Resources & Tools

You can head over to our MasChain Service Layer Docs at here. MasChain provides easy integration and a low learning curve to allow all sorts of industries and businesses to onboard and tap into the world of blockchain. Every onboarded business can utilise the blockchain just by calling our API, which is programming language agnostic and compatible with all sorts of modern technology integrations such as websites, mobile apps, or browser extensions. Almost every developer would be equipped with the knowledge of using an API.

3.11. Technology Use Case
3.11.1. Blockchain Certification

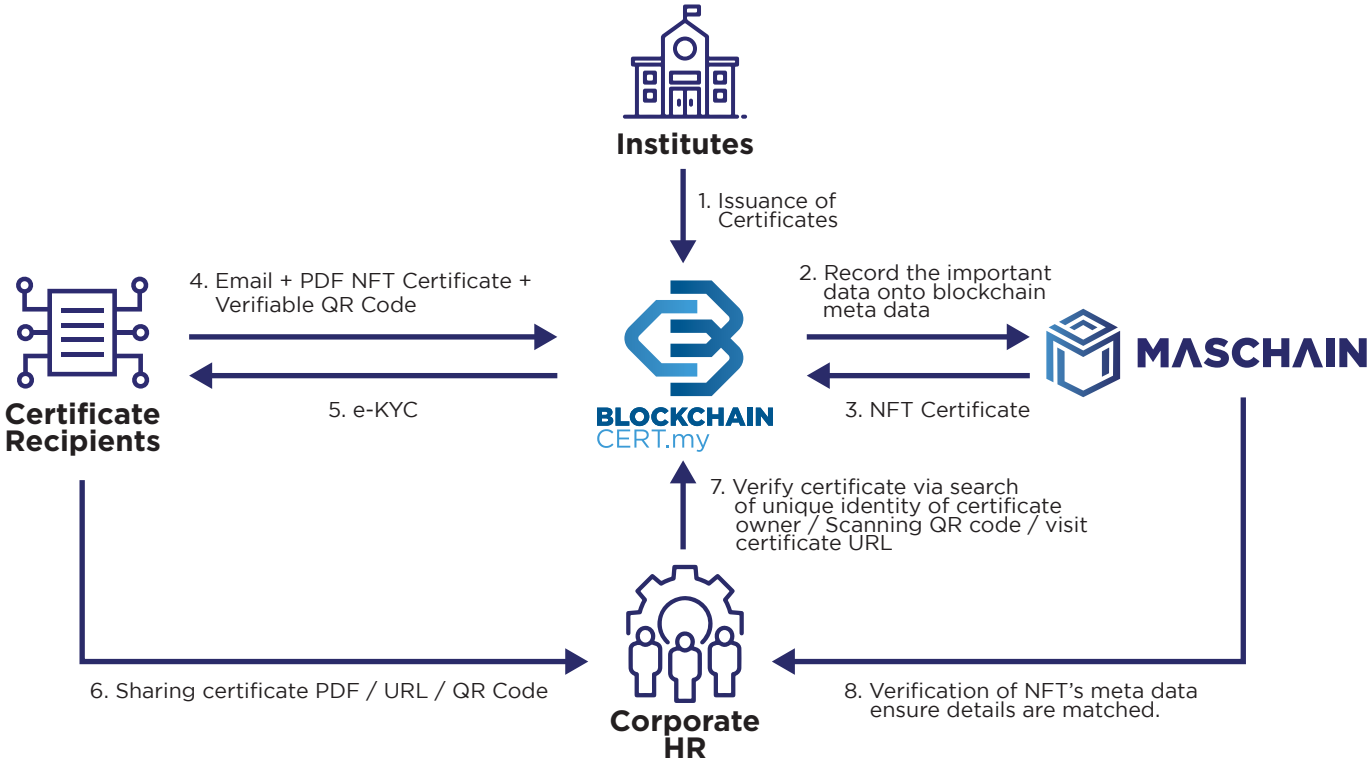
Masverse's blockchain certificate solution, BlockchainCert.my revolutionises verification processes, ensuring tamper-proof credentials within the education, skill training, Halal industry & license providers. This solution caters to government and private schools, skills development, Halal compliant training certification, and more. By leveraging MasChain's layer 1 blockchain technology, BlockchainCert.my establishes a secure, tamper-proof system for verifying educational credentials, effectively eliminating the issuance & acceptance of fake certificates.

1. **Encryption and Decentralisation:** BlockchainCert.my encrypts users' educational data and stores it on a decentralised blockchain network. This ensures that data is not stored in a single central location, reducing the risk of unauthorised access or data breaches.

2. **Permissioned Access Controls:** MasChain implements permissioned access controls, allowing only authorised parties, such as educational institutions and training issuance authorities, to access specific parts of the educational data. This ensures that sensitive information remains protected and only accessible to those with the proper authorisation.

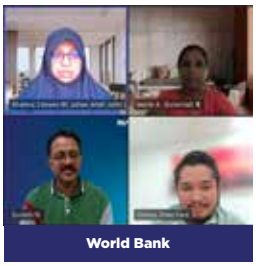
3. **Privacy by Design:** BlockchainCert.my prioritises privacy by design principles, integrating privacy features into the platform's architecture from the outset. This includes data minimisation, where only necessary information is collected and stored to further protect user privacy.

With over 100 institutions already onboarded and adoption continuing to grow, BlockchainCert.my's platform has become the industry standard for trustworthy credential verification in government and private schools, skills development, and Halal compliant training certification. Similar solutions could be applied to commercial use cases such as licensing for business operations and special services, certificates of origin for products, and proof of identity for association membership and government enforcement officers.



3.11.2. Blockchain Fund Distribution – E-Wakalah System

Zakat, a fundamental pillar of Islamic finance, plays a crucial role in wealth redistribution to support the needy. However, traditional Zakat management, particularly Wakalah Zakat, faces significant challenges in transparency and effectiveness. In collaboration with Lembaga Zakat Selangor (LZS), we have identified key issues, including a lack of transparency and accountability, difficulties in tracking transactions, and reliance on manual processes, which lead to potential misuse of funds and erode public trust. Additionally, inefficiencies in disbursement and limited accessibility of Zakat-related information hinder timely aid to recipients and informed decision-making.



To address these issues, Masverse has developed a solution that leverages blockchain and smart contracts to ensure data immutability and efficient process automation. Zakat funds are represented as tokenised Ringgit Malaysia, enabling transparent tracking and retrieval of all transactions between Wakalah and Asnaf. Moreover, there is no real cash or bank cash involved throughout the distribution process by Wakalah, ensuring that donations can only be channelled to registered Asnaf. This robust framework not only secures current operations but also allows for potential expansion into other Zakat or Halal market ecosystem use cases.

This innovative framework unlocks unlimited potential applications, such as tracking NGO donations, distributing IP royalties, and more. By enhancing transparency, accountability, and efficiency, our solution aims to restore public trust and ensure that Zakat fulfils its noble objectives with the highest standards of integrity and effectiveness.

User Flows

3.11.3. Capital Market – Asset or Securities Tokenisation

Following the announcement by the Prime Minister of Malaysia, Anwar Ibrahim, regarding the Labuan International Business and Financial Centre (IBFC)'s Islamic Digital Asset Centre (IDAC) initiative during Global Forum on Islamic Economics and Finance (GFIEF) on 28th May 2024, which aims to raise and invest funds digitally using blockchain technology, the topic of asset-backed tokens and securities tokenisation has gained significant traction in the Islamic finance industry. This initiative includes the introduction of Islamic asset-backed tokens and an Islamic digital finance sandbox, highlighting the increasing interest in these innovations. Additionally, securities tokenisation is gaining recognition in the capital market for its potential to enhance liquidity for previously illiquid securities or assets, such as sukuk bonds and government bonds, which were traditionally accessible only to sophisticated investors.

Despite these advancements, the traceability of ownership of these assets becomes challenging when tokenisation occurs on a public blockchain, where tokens can end up in the hands of anonymous parties and potentially be used for illegal financial activities. This has raised substantial concerns. MasChain, a public permissioned blockchain, addresses this issue by ensuring that all participants undergo thorough KYC (Know Your Customer) processes. By restricting token exchanges to within this secure network, MasChain prevents potential misuse and ensures the integrity and traceability of tokenised assets.

3.11.4. Identity Management

MasChain's identity management system empowers users with self-sovereign identity, allowing them to exercise control over the information they share with third-party systems. Users can selectively disclose specific pieces of information, ensuring their privacy and data sovereignty. By giving users control over their identity data, MasChain fosters trust and transparency in digital interactions, leading to stronger relationships between users and service providers. This feature significantly enhances the user experience for individuals engaging with websites integrated with MasChain. Users are no longer burdened with the repetitive task of entering their information multiple times. Instead, they can securely input their data once and selectively share it with chosen third-party systems.

Process Flow

1. **For Users:** When a new user registers their account on MasChain, they are required to undergo an electronic Know Your Customer (e-KYC) process to ensure the validity of their identity. This process mandates the submission of a valid form of identification, affirming that the user registers with their authentic identity. Upon successful completion of the e-KYC process, a soul-bound token (SBT) is generated and transferred to the user's wallet. This SBT serves as an immutable representation of the user's verified status, indicating that the user has undergone successful verification, and it is explicitly stipulated that the token is non-transferable.

2. **For Third-Party Systems:** Third-party systems seeking to utilise MasChain's identity management must first apply for access to specific user information. Basic details such as name and wallet address are readily available by default. However, for more comprehensive information such as token balance, transaction history, received certificates, KYC status, and similar data, separate applications are required. Consequently, when a user interacts with a third-party system, they are presented with a comprehensive overview of the information that will be shared with the third party. Importantly, data is only shared with third-party systems upon explicit approval by the user, ensuring transparency and user consent in the sharing process.

4. Meet Our Team

Chief Executive Officer - Chew Kian Kok

Chew Kian Kok (KK), a distinguished finance graduate from Shanghai Jiao Tong University, embodies unwavering confidence and visionary leadership as the co-founder and CEO of Masverse. Since immersing himself in the blockchain realm in 2018, KK swiftly emerged as a pivotal figure in this transformative technology landscape, driven by his innate passion for innovation and deep understanding of market dynamics.

KK's outstanding leadership has earned him widespread recognition, including the prestigious Hurun China Under 30s To Watch in 2020, highlighting his significant impact and leadership qualities within the industry. Believing deeply in the economic potential of blockchain, KK persistently works towards building real-world applications with this technology.

Guiding Masverse, KK adeptly steers strategic initiatives and economic endeavours, propelling the company to unprecedented heights. His strategic acumen and business development prowess have positioned Masverse as a pioneering force in the blockchain industry, consistently pushing boundaries and spearheading innovative solutions that redefine decentralised technologies.

KK's vision extends beyond mere innovation; he is committed to building a robust Web 3.0 ecosystem that drives adoption and empowers users. Masverse is not just a blockchain infrastructure company; it's a cornerstone of KK's vision for a decentralised future, where every individual can benefit from the transformative power of blockchain technology.

Chief Marketing Officer - Richard Koay Seong Chuan

Richard Koay is a distinguished figure in the blockchain industry, serving as the Co-Founder and Chief Marketing Officer at Masverse. With an educational background in Electrical and Electronics Engineering from Liverpool John Moores University and professional experience as a Process Control Engineer at First Solar, Richard possesses a profound understanding of technical intricacies and operational efficiencies.

With over 11 years of experience in finance and marketing management, Richard brings a diverse skill set to his role at Masverse. As the Chief Marketing Officer, he leverages his expertise to drive the adoption of MasChain and enhance its market presence. Richard spearheaded the 'Zero Fake Certificate' campaign, a pioneering initiative to combat educational fraud, achieving endorsement from over 100 top educational institutions and organisations within two months. This initiative not only bolstered trust in academic certifications but also reinforced Masverse's position as a leader in blockchain solutions.

Richard excels in collaborating effectively with technical teams, ensuring that Masverse's products are built upon a solid architectural foundation. He aligns MasChain with the latest market trends and technological advancements, guiding the team towards innovation and market leadership. His deep technical acumen and strategic vision are essential for the intricate development of cutting-edge blockchain technologies, including the groundbreaking MasChain.

Chief Financial Officer - Koay Seong Jiann

Koay Seong Jiann (SJ) holds a pivotal role as the Group Chief Financial Officer at Masverse. Leading the Token Crowdfunding (TCF) arm of Masverse and serving as a key advisor, SJ possesses a diverse skill set, including financial management, strategic business development, and advisory expertise. SJ's proficiency covers a wide range of areas, from enterprise risk management and investor relations to operations management and corporate finance.

His leadership in the TCF arm of Masverse demonstrates his ability to navigate complex financial landscapes and drive strategic initiatives for optimal market positioning and investor relations. SJ's strategic acumen and deep understanding of corporate finance make him an invaluable asset in shaping Masverse's financial future, ensuring sustainable growth and success in the ever-evolving digital landscape.

With extensive experience in financial management and a keen eye for emerging technologies, SJ has played a crucial role in establishing robust internal accounting, finance, and costing systems at Masverse. His proactive approach in securing funding and fostering collaborations has been instrumental in ensuring the company's financial stability and facilitating strategic partnerships. SJ's exceptional skills in data analysis have significantly contributed to informed decision-making, driving Masverse's expansion in the market.

SJ has successfully managed the funding of Masverse, showcasing his ability to effectively manage financial resources to support the company's growth initiatives. His leadership in the TCF arm of Masverse underscores his role in pioneering new financial instruments and capital-raising methods, contributing to the company's innovative approach to fundraising and market expansion. With a comprehensive background in financial management, business development, and technology, SJ positions himself as a driving force behind Masverse's financial success and innovation.

Chief Brand Officer - Venus Khor

Venus Khor, the esteemed Chief Brand Officer at Masverse, is a leader at the forefront of Web 3.0 innovation. As a core member of the founding team, Venus plays a pivotal role in shaping the strategic direction and brand identity of Masverse's flagship blockchain projects.

With a Master's in Communication and Advertising from RMIT University and a Bachelor's in Communication and Media Studies from Edith Cowan University, Venus is globally recognised for her ability to craft cross-cultural brand narratives and strategic communication. She brings 14 years of experience working with and guiding global brands in their branding development as a brand strategist.

In her role at Masverse, Venus leads the brand identity and narrative, shaping its positioning in the competitive blockchain industry. She is known for building brand trust, raising awareness, and fostering understanding among stakeholders. Her collaboration with government authorities and regulators helps cultivate an ecosystem conducive to economic growth through Web 3.0 adoption. As a pioneer in Web 3.0 initiatives, Venus bridges the gap between technology and real-world industry applications, continuously shaping the narrative of Web 3.0 and inspiring others to embrace its transformative potential.

Chief Technology Officer - Teh Lee Jie

Teh Lee Jie is the Chief Technology Officer behind MasChain, a pioneering Layer 1 blockchain by Masverse in Malaysia. Holding a First-Class Honors degree in Software Engineering from the University of Malaya, Lee Jie blends technical expertise with strategic vision. His proficiency in Java, MySQL, and blockchain technology drives the development of scalable, secure blockchain solutions.

As the CTO, Jie leads MasChain with a unique mix of technical know-how and visionary leadership. His background includes designing software and automation solutions to enhance business efficiency and scalability, crucial for MasChain's robust Layer 1 blockchain.

Jie's rigorous approach to requirements specification and user acceptance testing ensures MasChain meets high standards of functionality, security, and user experience. Under his guidance, MasChain is poised to set new benchmarks in innovation and operational excellence in the global blockchain landscape.

Head of Business Development - Chung Zhao Farn

Chung Zhao Farn is a distinguished leader in business development, currently serving as the Head of Business Development at Masverse. He brings a wealth of experience in digital technology and strategic growth. Previously, he played a crucial role at the Malaysia Digital Economy Corporation (MDEC), where he managed blockchain initiatives, driving significant digital investments and fostering the development of the blockchain ecosystem. His leadership extended to ACCESS Blockchain Malaysia, where he facilitated key partnerships that bolstered innovation and collaboration within the blockchain community.

During his tenure at iPay88, Farn excelled in digital payment solutions, consistently surpassing sales targets and closing key accounts, contributing to the company's robust growth in the fintech sector. He also led a B2B (SaaS) sales team at Food Market Hub, focusing on strategic merchant onboarding and enhancing business-to-business relationships, further demonstrating his ability to drive business success across different platforms.

Farn's expertise is underpinned by strong skills in business development, strategic communication, and sales management. His approach combines keen insight into market trends with a proactive stance on technology adoption, making him a pivotal figure in transforming business landscapes. Farn's leadership not only achieves targets but also inspires innovation and fosters a culture of continuous improvement and technological advancement.

Director of Communication & Innovation - Dr. Suresh Naidu Sadasivan

Dr. Suresh Naidu Sadasivan is an experienced Certified Blockchain Expert by the US-based Blockchain Council and a Certified Blockchain Solution Architect by Blockchain Training Alliance, Canada. With a demonstrated history of working in the education and training industry, he holds a Degree in Law (LL. B Hons) from the University of London, an MBA (IT Sector) from Staffordshire University, and is completing a DBA from City University of Paris.

Dr. Suresh lectured in law and business at Asia Pacific University of Technology and Innovation (APU) for almost 12 years and in other education sectors for another eight years before joining BLOKTEX as an innovation advisor on blockchain implementation. His leadership roles include serving as an executive committee member of ACCESS MALAYSIA, Director of SPNDS Edu Future Resources, and Advisor of Innovation and Communication for landorc.io, a lending blockchain start-up based in Dubai.

His contributions extend to the Blockchain Council (US) as a member and Director of Academics for the Blockchain Council (Malaysian Chapter). He also serves as the Senior Blockchain Consultant for APU. In October 2022, he took on the role of Director of Communication and Innovation at Masverse Sdn. Bhd., dedicated to accelerating Web 3.0 adoption in Malaysia through a collaborative ecosystem.

Group Compliant Officer - Ko Hsiao Ping

Ko Hsiao Ping, a Malaysian legal professional holding the esteemed position of Senior Associate at Julius Leonie Chai in Wilayah Persekutuan Kuala Lumpur, is a significant asset in the development of MasChain, Masverse's blockchain project. His educational journey includes a Bachelor of Laws (Hons) from the University of Malaya, culminating in his graduation in 2017. Shortly thereafter, he was admitted as an Advocate and Solicitor of the High Court of Malaya in 2018. This robust academic foundation has endowed him with a profound understanding of legal principles, procedures, and intricacies.

His specialisation in equity capital markets, mergers and acquisitions, and corporate and commercial matters positions him as an ideal legal counsel for MasChain. The blockchain industry, with its regulatory complexities, demands legal expertise to ensure compliance. Ko Hsiao Ping's proficiency in these areas guarantees that MasChain adheres to legal standards, fostering trust and credibility within the blockchain sector.

As a Senior Associate at Julius Leonie Chai, Ko Hsiao Ping's practice areas encompass Corporate & Commercial Law, Capital Markets, Mergers & Acquisitions, and Private Equity & Venture Capital. These domains align seamlessly with MasChain's development requirements. They involve legal aspects related to fundraising, partnership agreements, and business operations, all of which are essential for the success of a blockchain project.

Ko Hsiao Ping's legal acumen, coupled with his rich experience in corporate and commercial law, establishes him as an indispensable resource for Masverse in the development of MasChain. His ability to navigate legal complexities, forge strategic partnerships, and communicate seamlessly across languages positions him as a pivotal contributor to MasChain's triumph in the blockchain industry.

Advisory Member - Lawrence Yew

Lawrence is professionally a dual-licensed financial advisor (BNM and SC). He has helped over 500 families of busy working professionals and business owners achieve their financial goals through diversified portfolios of property, financial instruments, and private placements. Lawrence and his team have also successfully raised startup angel funds, working capital funding for a billion-dollar-revenue company, and funding for pre-IPO fintech and oil and gas companies. In real estate, Lawrence works closely with boutique and listed developers.

As the co-founder of two agricultural startups focused on cash crops and specialty crops, Lawrence has experience running successful businesses. He is also an angel investor with a particular interest in EdTech, HealthTech, and Agrotech. A serial property investor, Lawrence knows best how to maximise investment returns through real estate. Apart from his certifications in accountancy and finance, Lawrence holds a law degree from Northumbria University and a valuation certification from the Royal Institute of Surveyors Malaysia. He is currently a certified business coach with 10X CEOs.

Advisory Member - CT Choo

CT. Choo brings over three decades of legal and commercial experience to MyKapital, a blockchain-powered platform under Masverse. As the founding Chairman of the Federation of Interest Scheme Operators Malaysia (FISOM), he is a recognised authority in the Interest Scheme industry under the purview of the Companies Commission of Malaysia (SSM). He played a pivotal role in the formulation of the Interest Schemes Act 2016 and was instrumental in establishing Malaysia's first investment-based Interest Scheme.

His strategic advisory background spans corporate finance, regulatory structuring, and alternative fundraising models, having advised on schemes collectively valued at over RM800 million. CT. Choo also serves as a member of SSM's Panel of Experts for the Interest Schemes Blueprint 2020 to 2024. His inclusion as a co-founder strengthens MyKapital's credibility, regulatory alignment and scalability, positioning the platform as the national standard for digital Interest Scheme lifecycle management.

Advisory Member - W Labs

W Labs is a premier advisory organisation specialising in the Web 3.0 gaming sector. Headquartered in Singapore with a global team, W Labs has established itself as the leading Web 3.0 gaming community and service provider across the Asia Pacific region. They offer a comprehensive suite of services that encompass original content creation, research, consulting, operational support, investment, incubation, in-depth advisory, and global marketing for Web 3.0 games.

Their advisory role is critical in supporting the launch and growth of Web 3.0 games, with services tailored to various stages of development and budget constraints. W Labs has contributed to the success of notable projects like SERAPH, a popular Diablo-like game, and BAC Games, a pioneer in the H5 casual games market. Their in-depth advisory and incubation services have enabled these games to achieve significant milestones, such as top sales on platforms like Opensea and rapid sell-outs of NFTs.

In addition to project-specific services, W Labs fosters a vibrant gaming community through their platform WGGDAO, hosting regular community events and AMAs, which have grown to over 20,000 members. They also maintain a strong media presence, being a trusted source in the Web 3.0 gaming narrative with extensive coverage in top-tier Asian crypto media.

Research Partner - Teoh Wei Cheng, Stratos Pinnacle

Wei Cheng is from Stratos Pinnacle Sdn Bhd (S-PAC), a market research, analytics, and consulting firm based in Kuala Lumpur, Malaysia. They provide holistic and incisive locational, consumer, and industry insights that help businesses succeed in the communities they choose to serve.

As a joint venture between two established market research and consulting companies, Stratos Consulting Group and Pinnacle Analytics, they bring 60 years of combined experience in research, client management, and analytical abilities.

They believe there is no greater power for growth than a community that discovers what it cares about, and their goal is to ensure that the community your business serves cares in return.

MASVERSE®

MASCHAIN

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