

# **MATRIX**

**MATRIX, Intelligent Blockchain**

[www.MATRIX.space](http://www.MATRIX.space)

A perspective grid of thin gray lines covers the bottom half of the image, creating a sense of depth and a digital or architectural floor.

## About MATRIX

### What is MATRIX?

Designed to be the new generation blockchain, MATRIX leverages the latest AI techniques to revolutionize the landscape of cryptocurrency. MATRIX differentiates itself from previous blockchains by offering breakthrough technologies in building AI-enabled autonomous and self-optimizing blockchain networks, which feature multi-chain collaboration and decoupling of data and control blocks.

### Features of MATRIX — Intelligent Blockchain

- EASIER → Allowing everybody to design smart contracts without explicitly programming
- SAFER → Making blockchains more robust under malicious attacks
- FASTER → Enabling faster applications and transactions
- More flexible → Integrating public and private chains with the capability of adaptive optimizing



# MATRIX — An EASIER Blockchain

MATRIX

## What is EASIER with MATRIX

- With MATRIX, no programming expertise is needed any more for designing smart contracts. Anyone who needs smart contracts can directly implement them with natural languages.

## Why does MATRIX need to be EASIER

- Among the 70 billion people can write or speak, only 20 million can do programming. MATRIX allows a user base that is 350 times bigger than that of Ethereum. The larger use certainly guarantees the liquidity of MATRIX tokens .

## How to make MATRIX EASIER

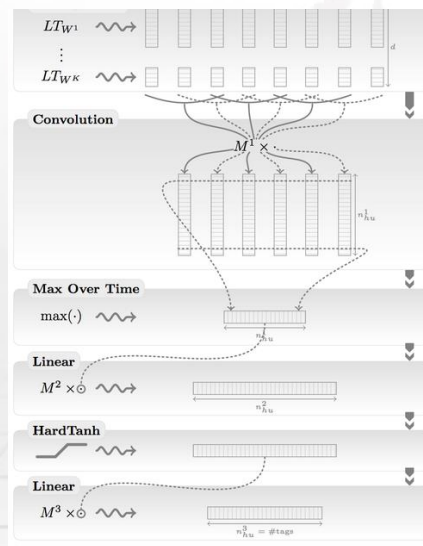
The AI techniques in MATRIX upgrade smart contracts to the next generation, intelligent contract. MATRIX revolutionarily extends the depth and breadth of blockchain applications by automatically generating contracts from prototyping concepts and making smart decisions based on historical data.

# Automatic Code Generation for Intelligent Contracts

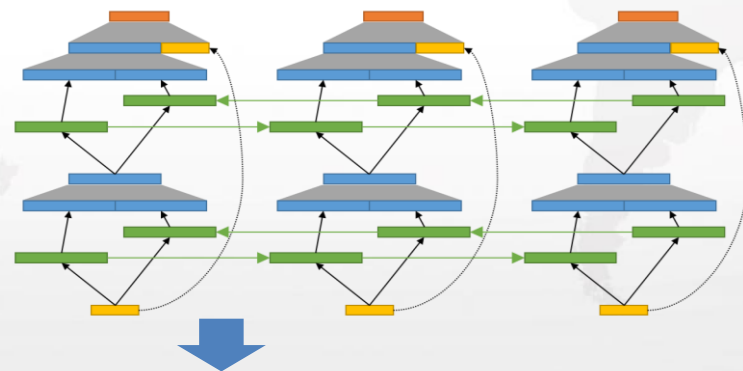
Script or natural language



Convolutional neural network for text feature recognition



Recurrent neural network for code generation



```
contract GavCoin
{
    mapping(address=>uint) balances;
    uint constant totalCoins = 1000000000000;

    // Endows creator of contract with 1m GAV.
    function GavCoin() {
        balances[msg.sender] = totalCoins;
    }

    // Send $ (valueInmGAV / 1000).fixed(0,3) GAV from the account of
    // (message.caller.address()) to an account accessible only by $ (to.address()).
    function send(address to, uint256 valueInmGAV) {
        if (balances[msg.sender] >= valueInmGAV) {
            balances[to] += valueInmGAV;
            balances[msg.sender] -= valueInmGAV;
        }
    }

    // getter function for the Balance
    function balance(address who) constant returns (uint256 balanceInmGAV) {
        balanceInmGAV = balances[who];
    }
}
```

Code for intelligent contracts



# MATRIX — A SAFER Blockchain

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## What is SAFER with MATRIX

- MATRIX leverage the power of AI to build a robust blockchain so as to maintain the safety of digital assets under malicious attacks.

## Why does MATRIX need to be SAFER

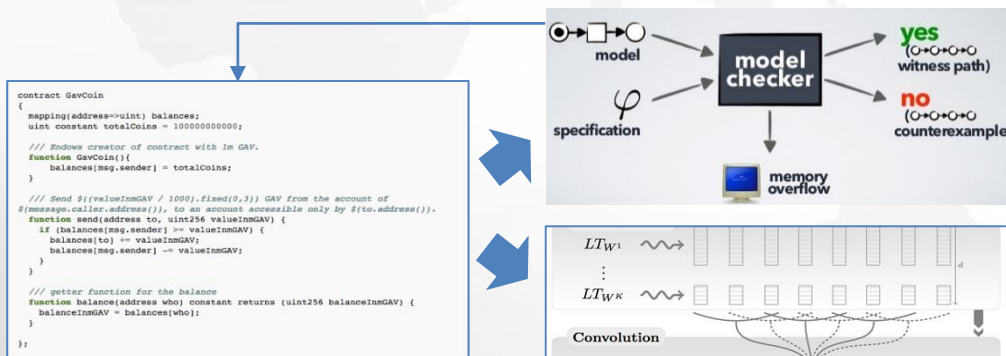
- The irreversibility and anonymity of blockchain transactions suggest that the digital can be under serious risk. The DAO attack already demonstrates how smart contracts can be exploited. The MATRIX blockchain is equipped with a powerful AI security engine, which is able to identify bugs and vulnerabilities in intelligent contracts.

## How to make MATRIX SAFER

- MATRIX offers an overall security framework consisting of four major components, 1) a rule-based semantic and syntactic analysis engine for smart contracts, 2) a formal verification toolkit to prove the security properties of smart contracts, 3) an AI-based detection engine for transaction model identification and security checking, and 4) a deep learning based platform for dynamic security verification and enhancement.

# Intelligent Contract Verification and Enhancement

## Formal Verification



```

pragma solidity ^0.4.2;
contract token { function transfer(address receiver, uint amount) }

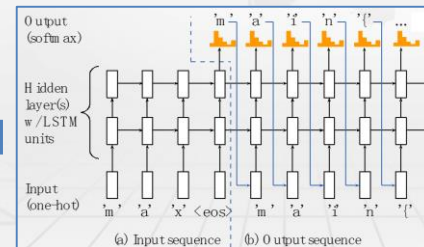
contract Crowdfund {
    address public beneficiary;
    uint public fundGoal;
    uint public amountRaised;
    mapping(address => uint256) public balances;
    bool fundGoalReached = false;
    event fundGoalReached(address beneficiary, uint amountRaised);
    event transferFailed(address sender, uint amount, bool isSuccess);
    bool crowdFundRaised = false;

    /* Data structure to hold information about campaign contributions */

    /* @ internalization: setup the crowd */
    function Crowdfund() {
        address _beneficiary;
        uint _fundGoal;
        uint _amountRaised;
        uint _balances;
        uint _transferFailed;
        uint _amount;
        address _beneficiary;
        fundGoal = _fundGoal;
        fundGoalReached = false;
        amountRaised = 0;
        balances = _balances;
        transferFailed = _transferFailed;
        amount = _amount;
        beneficiary = _beneficiary;
    }

    /* The function without rate is the default function that is called whenever anyone sends funds to a smart
    contract. It people {
        if (crowdFundRaised) throw;
        uint amount = msg.value;
        balances[msg.sender] = amount;
        amountRaised += amount;
        if (amountRaised >= fundGoal) {
            transfer(beneficiary, amount);
            fundGoalReached = true;
        }
    }
    }
    
```

## Simulator



DNN for  
security flaw  
Recognition

No-go

Success



# MATRIX — A FASTER Blockchain

MATRIX

## What is FASTER with MATRIX

- The unique dynamic hierarchy generation mechanism of MATRIX enables a blockchain network with superior transaction speed. The ultimate goal is to outperform the VISA system and delivers a throughput of 1M transactions/sec

## Why does MATRIX need to be FASTER

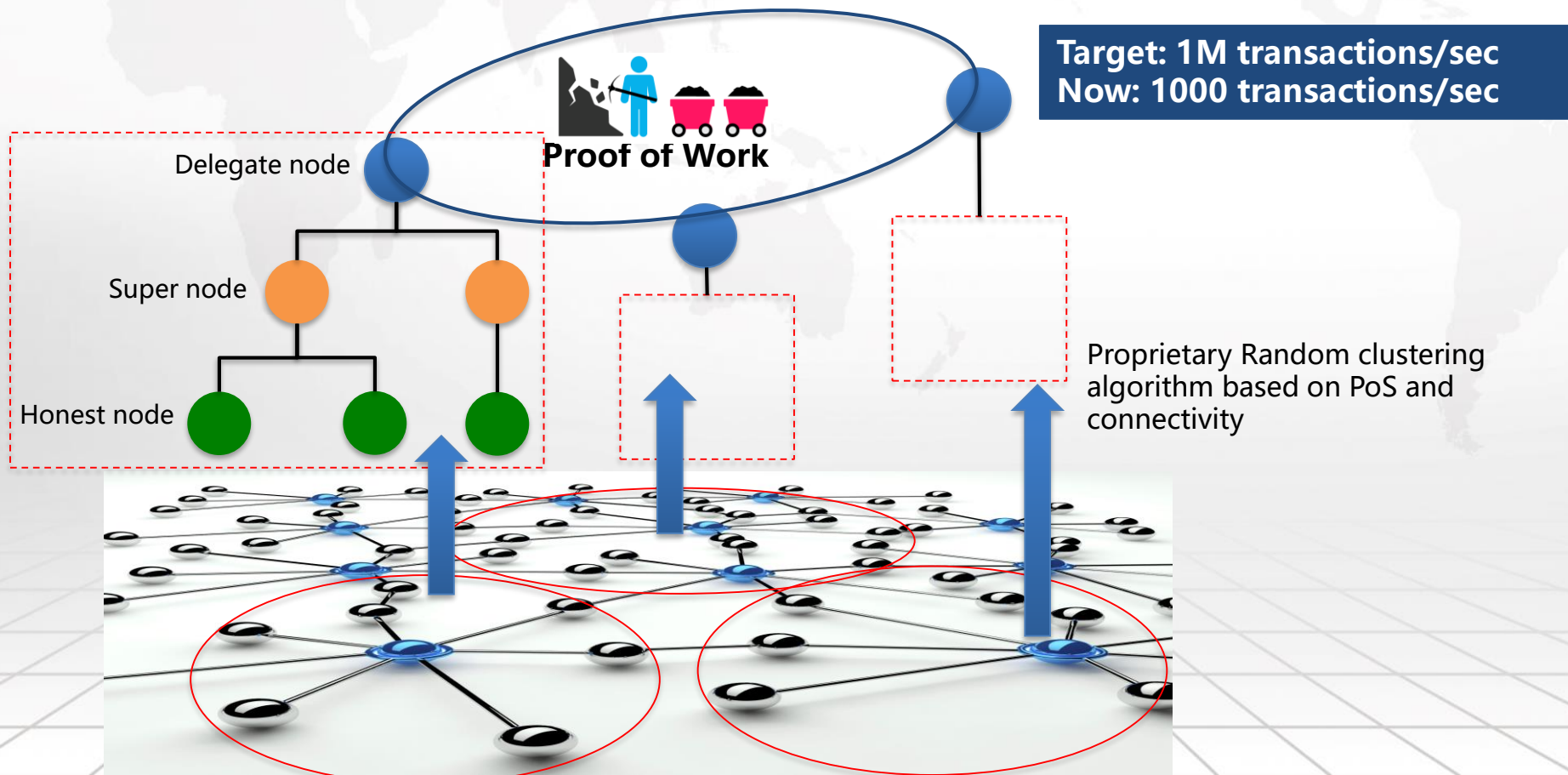
- The transaction speed is the most influential factor on user experience, while the transaction throughput is the most important feature to support large-scale commercial applications. By enabling an unprecedented transaction efficiency, MATRIX is designed to unleash the real power of blockchains.

## How to make MATRIX FASTER

- MATRIX enables high-speed transactions by dynamically generating a hierarchy in the blockchain network. An distributed clustering algorithm is devised to cluster nodes into disparate groups and a delegate is voted in each group with an evaluation function considering both fairness and randomness. The delegate nodes form a temporary P2P network to exchange transaction information and perform PoW computations. The winner delegate shares the PoW reward with other nodes in its cluster.



# PoW in Delegation Network







# MATRIX — A MORE FLEXIBLE Blockchain

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## What is MORE FLEXIBLE with MATRIX

- Evolutionary parameter optimization without triggering hardfork
- Intelligent integration of public and private chains with AI-based coordination

## Why does MATRIX need to be MORE FLEXIBLE

- Hardfork, which splits the community and devaluates the digital asset, is destined to happen in most blockchain projects
- The higher "FLEXIBILITY" means that MATRIX can dynamically adjust the parameters as needed so as to adapt to market needs
- The AI-coordinated multi-chain scheme meets different needs at the same time. For instance, MATRIX allows a bank to build a private business chain, which can also get data from and put transaction to the public chain.



# Feature of MATRIX — FLEXIBLE

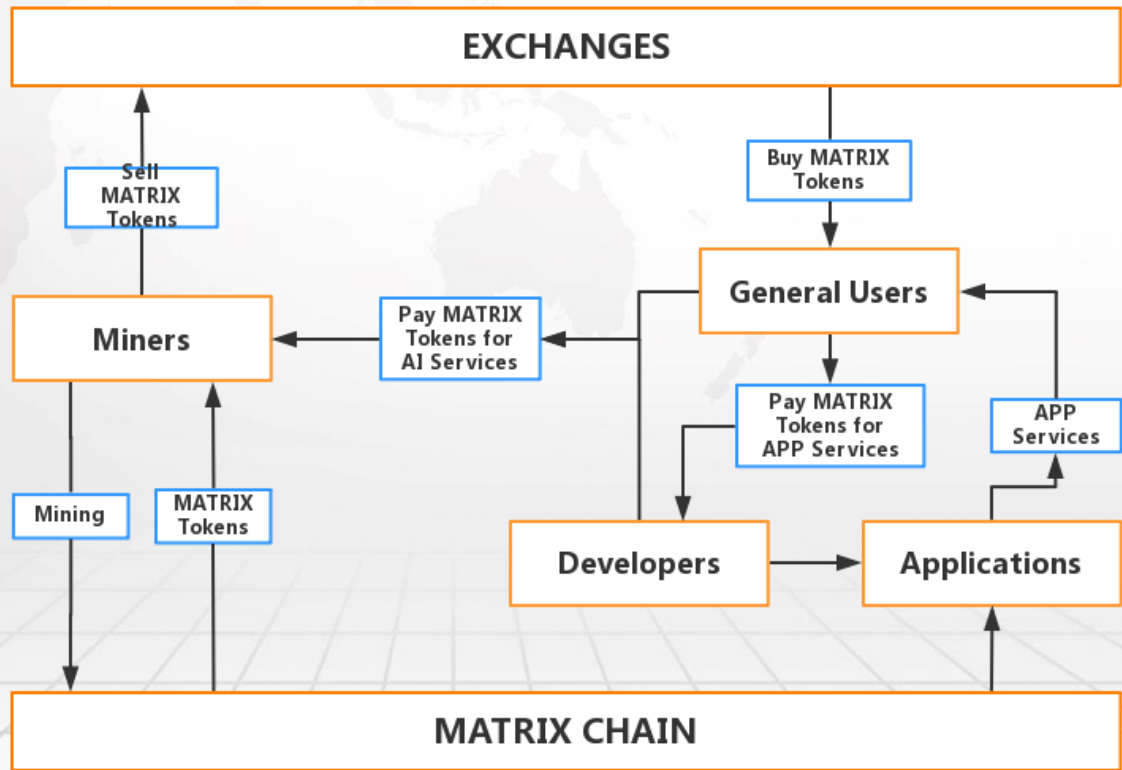
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MATRIX

## How to make MATRIX MORE FLEXIBLE

- A evolutionary proactive optimization engine is embedded in the bottom protocol layer of MATRIX so that blockchain parameters are dynamically updated according to external conditions. In addition to maintaining the efficiency and applicability, the dynamic optimization scheme prevents the risk of hardfork in each software release and parameter update.
- Every node in the MATRIX blockchain is associated with one control chain and at least one data chain. Both chains are coordinated by a distributed consensus scheme. The control chain is equipped with a rich set of AI models and behavioral specifications for data chains. The data chain performs data operations and collaborates with other chains and routers under the administration of the control chain. The introduction of the control chain enables MATRIX to exchange data and executes contracts with other blockchains.

# Ecosystem of MATRIX





## R&D Team

**AI Team:** Headed by leading AI scientists, the team members have extensive experiences in AI and industry analytics. The team has made contributions in over 10 national level research projects and won numerous awards in international AI challenges.



### **Prof. Yangdong Deng — Chief AI Scientist**

Prof. Deng is an associative professor of School of Software, Tsinghua University, where he has been a faculty member since 2008. Prior to Tsinghua, he was with Magma Design Automation as a consulting technical staff. He received his Ph.D. degree from Carnegie Mellon University and completed his ME and BE studies at Tsinghua University.

His research interests include machine learning, industry data analytics, and computer architecture. He has been the PI or Co-PI for numerous national level research projects. Since 2016, he has been the Vice Principle Architect of China Railway Rollingstock Corporation's Prognostics Health Management for High-Speed Trains Project, which focuses on leveraging modern machine learning techniques to revolutionize the operation and maintenance of railway vehicles. His book, Structural IC Design and High Level Synthesis, was adopted as the textbook of IC design by Tsinghua and many other universities. His work on deep learning based image detection was ranked #1 in many prestigious challenges (e.g. PASCAL VOC and COCO). He is the author or co-author of over 50 papers. He received many awards, including a best paper award on International Conference on Computer Design 2013, NVIDIA partnership professor Award, and Tsinghua Key Talent Award. He is in charge of designing machine learning algorithms and hardware architectures for the MATRIX blockchain.



## R&D Team

**Blockchain R&D:** Headed by leading communication and software experts, the team is comprised industry veterans with rich experience in networked software and cryptocurrencies.



### **Qinghua Li — Chief Network Architect**

Mr. Li is a leading expert of communication and IC design. He is a major contributor of many 4G, 4.5G(NB-IoT) and 5G standards of China. He was the chief architect of China's first WiFi transceiver IC. As a Co-PI, he led the design of the dispatch communication system of China's first aircraft carrier. His work on communication IC designs won numerous national awards. His book, Communication IC Design, was the best-selling textbook in this area and is used by many prestigious universities. He will lead the architecture design of the MATRIX blockchain.



### **Ethan Tian — Chief R & D Engineer**

Mr. Tian received his BS degree from Peking University. Prior joining MATRIX, he was a Senior R&D Engineer of Microsoft, where he was responsible for developing several major software systems and computing platforms. He has extensive experiences in building blockchains and related tools. Mr. Tian will lead the software design and implementation of the MARTIX block chain.



## R&D Team

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**Hardware Team:** Equipped with rich commercial IC development experiences, the team members are designing world-class AI and mining VLSI under the supervision of leading IC architects,



### **Dr. Tim Shi — Chief Hardware Scientist**

Dr. Shi is a veteran of the semiconductor industry. Prior to joining MATRIX, he was a Principal System Architect of AMD and also responsible for the technology partnership of AMD with companies and universities in greater china. Before this position, he held various position at different leading internaional IC companies such as Synopsys and ARM. Dr. Shi was also with Samsung Semiconductor as a senior chip design engineer (based at Samsung' s headquarters in Korea).

Dr. Shi received his Ph.D. degree from the Chinese Academy of Sciences in 2005.



# Business Team

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## **Owen Tao — CEO**

Mr. Tao received the bachelor degree in the double-major (physics and economics) program of Peking University. Holding the CEO positions in several high-tech startup companies, he has rich experience in managing product development. He supervised the development of the 3D virtual community, China's first embedded game advertising system and other Internet technology products. He also has strong skills in product operation and promotion. He led the development and operation of China's first cross-border e-commerce platform, which attracted 20 million users around the world. As the CEO of MATRIX, Mr. Tao is responsible for strategic decision making and product positioning.



## **John Zhu — Senior VP**

Mr. Zhu received his M.D. degree from Beijing University Of Posts and Telecommunications, and EMBA degree from University Of Minnesota. He has over 20 years of experience in management, marketing, and government relation. Mr. Zhu supervised the construction of a multi-satellite ground station for the Moon Discovery Project. He will in charge of ecosystem construction, application deployment, and company operation.





# Advisory Team

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## **Dr. Donglin Wang—Chief Advisor of AI**

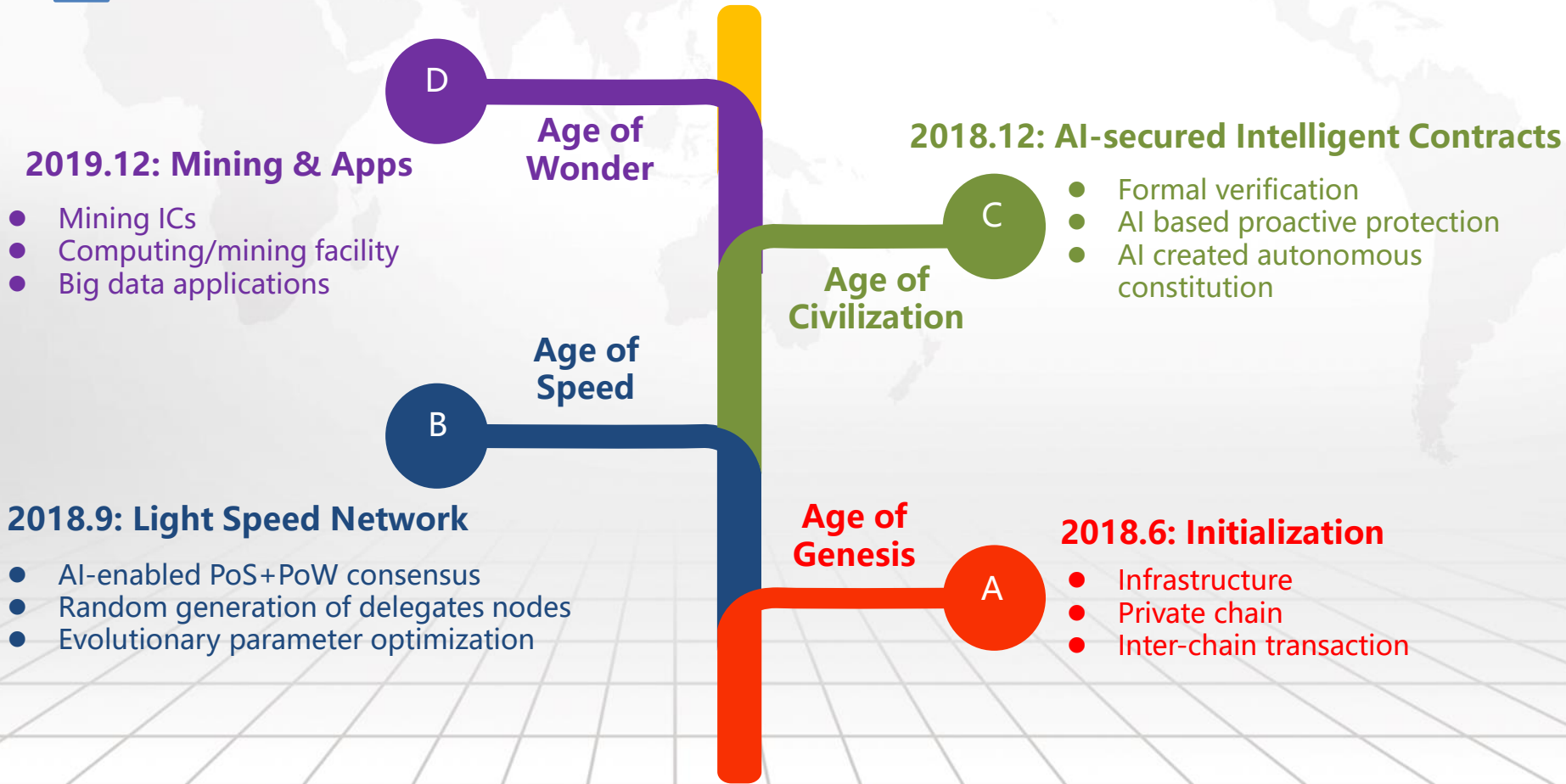
Dr. Wang is the director of National ASIC Design Center, Institute of Automation, Chinese Academy of Sciences. From 2009 to 2015 he served as the president of , Institute of Automation, Chinese Academy of Sciences. He was also on the advisory board of China' s Core Electronic Devices, High-end Generic Chips and Basic Software Project. He received two Second Class National Science and Technology Progress Awards and one First Class Defense Science and Technology Progress Awards. He was voted as the Expert with Outstanding Contributions to China' s Defense Science and Technology. Dr. Wang will provide strategic and technical advisory services to MATRIX' s AI algorithms and chip development.

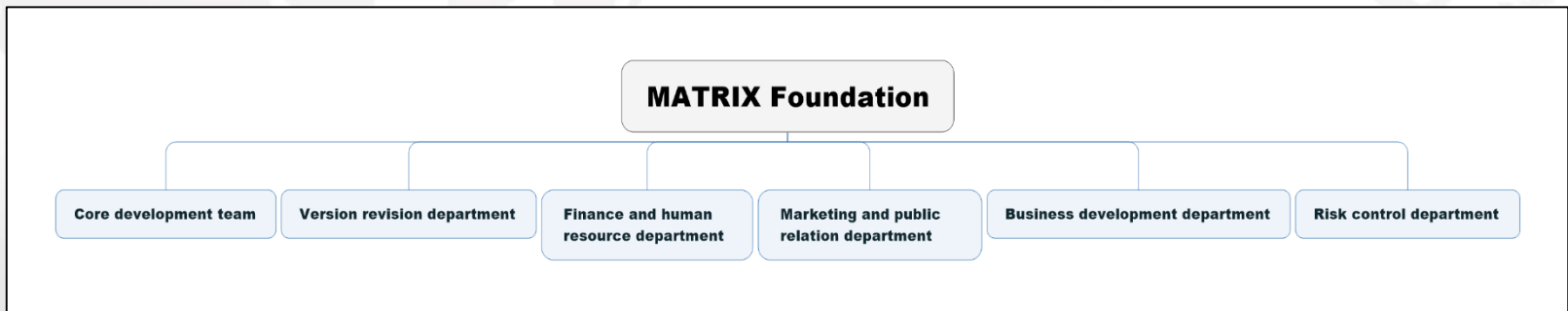


## **Tony Surtees**

Mr. Surtees is the founder and CEO of cloud-based content management platform Hyperlocalizer Pty Ltd. He has a high profile in the media, consumer and B2B industry sectors, he plays. His roles have included general management, strategy, marketing and operations in large public companies in Australia, Asia and the United States. He has also been an investor and mentor to managers in early stage private internet and technology businesses. At Yahoo Inc. (USA), Mr. Surtees launched new Commerce Group business units across 13 countries and was responsible for the launch of Yahoo Shopping. Mr. Surtees has a Master of Science in Management from the Stanford Graduate School of Business, a Bachelor of Commerce (B.Com) marketing major from the University of New South Wales, and a Company Director Diploma from the University of New England.

# The Road Map of MATRIX

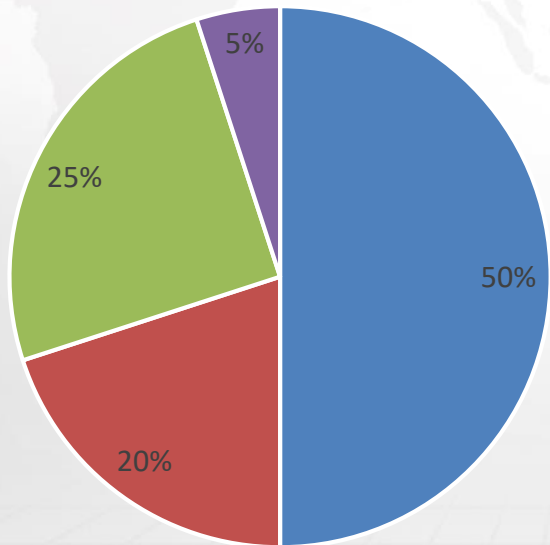




- **MATRIX foundation (hereafter called “the Foundation” ) is a non-profit organization. The Foundation is dedicated to supervising the development of the MATRIX project and promoting the governance transparency. It is also responsible for improving the collaboration, regulating the fund usage, and project operation.**
- **As a company limited by guarantee established in Hong Kong, the Foundation's primary objective is to promote the applications of the MATRIX platform and advocate governance and transparency.**
- **The governance structure of the Foundation is designed to promote sustainable development, effective project execution, and financial security. The departmental structure consists of strategy committee, core R&D team, version revision department, finance and human resource department, marketing and public relation department, ecosystem construction and resource development department, and risk control department.**
- **Upon its establishment, the Foundation will compose of the chairman, the chief scientists, administrators of MATRIX branches, and important partners. The terms of office for all members is three years.**



# Planned Usage of MATRIX Fund



■ R&D ■ Hardware ■ Business ■ Others

Expenditure	Budget
R&D of blockchain technologies	15%
R&D of AI technologies	15%
R&D of the 1st generation of ASIC and mining machine (Bayesian computer)	20%
Initial deployment of computing power on the blockchain	20%
Marketing and development of ecosystems	15%
R&D of applications	10%
Investment on related R&D activities and projects	5%
Total	100%

# MATRIX

Thanks for watching

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