

# ATMatrix 技术白皮书

## ATMatrix Technical White Paper

连接区块链世界和人工智能世界的桥梁

# Blockchain with AI-a-a-S & Blockchain-based World AI

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## 背景 Foreward

“行业的巨头垄断市场，价格越来越高，出现很多不平等条约，而垄断会不断带来新一轮垄断，没有办法激励颠覆性的创造，行业无法有效发展” -- Vitalik

“Industry giants monopolize the market, the price is getting higher and higher, there are many unequal treaties, and monopoly will continue to bring a new round of monopoly, there is no way to encourage subversive creation, the industry can not effectively develop”

区块链的发展前景广阔的原因是因为目前非常多的行业存在垄断，人工智能就是这样一个领域，各大厂商相互割裂，基于目前人工智能的深度学习算法，每一个人工智能都是由大数据喂出来的一头怪兽，只有那些拥有大量数据的软件公司才能训练出更加强大的人工智能怪兽，因此，本来应该属于用户的数据却成为了互联网公司们争抢的有价值的资源，但是因为每个公司的业务类型不同，拥有的数据也多种多样，所以每家公司即使再强大，也多只能垄断一个领域的的数据，而不能垄断所有的数据，因此每家公司陷入了尴尬的自给自足境地，因为无法也不愿意交换和共享自己 有价值的资源（也就是数据），导致各自陷入了孤岛和困境。

The rise of Block chain can be attributed to the existence of monopolized industries, artificial intelligence is also a field that is monopolized. Major players secure their position through their advanced learning algorithms and access to a wealth of data, resulting in a data fed behemoth. Only those software companies with access to massive amounts of personal data to train a more powerful artificial intelligence can be competitive. Therefore personal user's data has become the Internet's most valuable resource.

But because each company's business type is different, their access to data is also different. So even if the company is powerful enough to monopolize a specific field of data, it cannot monopolize every field of data.

This results in an awkward internal conflict, because they need additional data to grow, but aren't willing to share their own resource (data) in exchange, resulting in slowed, "fragmented island" industry.

数据垄断带来的这些风险和问题，让区块链的去中心化有了用武之地，区块链有价值的應用方法，就是用来协调各方面的问题，不同公司之间的协调，不同实体以及机构之间跨越疆界，并以互信的方式进行充分互动，构建价值网络并相互交换价值，打破原先垄断的问题，在未来的人工智能网络中(也即我们所说的超级 AI 世界)让不同的人工智能服务可以共建一个生态。

Data monopolies bring these risks and problems, so if we leverage the decentralized nature of block chain, to address the roots of the problem, drive the cooperation between different companies, Entities, and institutions across the borders, in a fully trusted manner, establishing valuable trade networks and resolving the problems caused by monopolies. In the future world of artificial intelligence, (a.k.a. the super AI world) we will see an entirely new world built from the consolidation of artificial intelligence services.

## 概要 Overview

我们提出 ATMatrix 的解决方案：一种去中心化的，无需授权的，用户自定义人工智能服务和接口的开放区块链平台。整体设计结合了 oraclize.it, 比特股, 以太坊, EOS 等区块链项目的想法，侧重解决人工智能服务(AI-a-a-S)与 EVM 兼容的智能合约之间互操作性的问题，未来计划利用下一代区块链技术为 AI-a-a-S 搭建一个开放的经济系统，使得 AI 服务可以更多的交易和互操作，形成更强更丰富的人工智能。平台设计了 AI 服务接入方式，中间通过 ATMatrix 智能合约进行连接并将接入的 AI 服务无需授权的提供给任何人，使得 AI 服务提供者 and 使用者都更容易使用 AI 网络，整个过程不需要与中心化的平台、AI 公司进行交互。

Introducing ATMatrix: a decentralized, permission-less, customizable AI service and open interface block chain platform. The overall design combines the ideas of oraclize.it, Bitstream, Ethernet, EOS and other block chain projects, focusing on solving the interoperability issues between AI-aaS and EVM-compliant smart contracts.

ATMatrix will develop next generation block chain technology for AI-aaS to build an open economic system, enabling easier transactions and interoperability between AI services, resulting in the formation of more robust artificial intelligence.

The platform design allows AI services access, through ATMatrix smart contracts, without requiring authorization from anyone.

This allows users to easily interact with AI service providers on the AI network, the entire ecosystem can operate without need for a centralized platform or AI company to oversee it.

# 连接区块链世界和 AI 世界 Connecting the Blockchain and AI Worlds

共享 AI 的第一步，是我们如何通过区块链建立一个将不同 AI 服务连接到一起的服务，以及如何搭建区块链智能合约世界和 AI 世界之间的桥梁，让用户获益。我们将介绍如何用 DBot 技术链下共识技术来让区块链的智能合约和 AI 服务互相操作，我们将首先在以太坊上实现一个 Dapp 来向以太坊网络上的合约开放这种能力。在这个阶段，还将提供一个 ERC20 的 Token 合约，提供代币作为使用这些 AI 服务的燃料(手续费)。

The first step in sharing AI is how we can build a blockchain service that consolidates AI services and how to bridge the block chain smart contracts ecosystems and the AI ecosystems for the benefit of the user.

We'll demonstrate how to use the Dbot consensus chain technology to make block-chain smart contracts and AI services interoperate. Then we will deploy a dapp in the Ethereum testnet to enable this capability on the Ethernet network. At this stage, a ERC20 token contract will also be provided to provide tokens as fuel for the use of these AI services (handling fees).

超级智能的第二步，就是如何让更多 AI 和智能合约联系在一起的服务，而不是让部分参与者或者平台放在中心，包括更开放和无限制的 AI 接入，以及让更多区块链网络的智能合约连接进来(以 EVM 为例，包括 Ethereum, Ethereum Classic, Rootstock, Qtum, EOS)，因此第一步中的线下平台将演变成一个独立的区块链平台，Token 合约将迁移至独立链中变成主货币，这条独立区块链网络，将不同的 dbot 节点纳入其中(?? 如何纳入?)。

## ATMatrix 网络 ATMatrix Network

ATMatrix 可以解决智能合约中调用 AI 服务的问题。目前类似以太坊网络中的智能合约中的“智能”并不真正智能，“智能”的说法来自于“智能手机”，更倾向于自动化的意思，而 ATMatrix 通过引入 AI，可以让智能合约及区块链系统成为真正的“智能”。另外，由于目前类似以太坊网络中的这些 Dapp 生态，很多都是用智能合约实现并治理，当智能合约可以使用 AI 服务后，AI 将会给智能合约赋能，并帮助类似 Aragon 这样的智能合约实现 Dapp 的人工智能治理。

ATMatrix can address the difficulty of invoking AI services in smart contracts. In the past, smart contracts on the Ethereum network were not completely "smart", rather borrowed the "SMART" from "SMARTPHONES" Emphasizing the shared automation qualities. Whereas ATMatrix by introducing AI , can make smart contracts and block chain systems become truly "SMART".

In addition, the pre-existing Dapp ecosystem is implemented and governed by smart contracts. When the smart contracts can use AI services, AI will help smart contracts, in a way similar to Aragon smart contracts, to achieve Dapp AI governance.

ATMatrix 可以解决目前互相割裂的诸多 AI 服务之间相互调用的问题，因为 ATMatrix 通过 Dapp(或第二阶段的区块链系统)提供了一个去中心化的，无需授权，人人皆可访问的 AI 经济网络，解决 AI 参与方之间合作问题，ATMatrix 成为了 AI 生态的一个支付网络和具备智能合约能力的经济基础设施。

ATMatrix addresses the problem of mutual invocation between many fragmented AI services. ATMatrix through Dapp (or the next generation of block chain system) to provide a decentralized, permission-less, open AI economic network to solve the problem of cooperation between AI participants. ATMatrix will become an AI ecosystem payment network and a smart contract enabled economic infrastructure

## 无需互信的 AI 互操作 Trustless AI Interoperability

与传统 AI 服务相比，系统更加易于实施。加入 ATMatrix 网络非常简单：

1. 基于 ATMatrix 提供的 API 和 Schema 包装现有的人工智能服务
2. 开发 Dbot 的 Oracle 预言机程序，接入 AI 服务，并部署到 ATMatrix 的多个预言机 Relay 服务器中。
3. 开发调用 AI 服务的代理智能合约，定义价格和其他参数，并部署和注册到 ATMatrix 的 AI 服务管理智能合约中。

ATMatrix 将对常规用户开放提供 AI 服务调用接口，对常规用户隐藏所有复杂的区块链技术，但对社区开源这些复杂的技术规范和实现。

The system is easier to implement than traditional AI services. Joining the Atmatrix network is simple:

1. Use the ATMatrix provided API and schema package of existing AI services
2. Develop the Dbot Oracle Predictive Machine, connect to the AI services, and deploy to Atmatrix's distributed machine relay server.
3. Develop smart contracts that call AI services, define pricing and parameters, and deploy and register on ATMatrix AI Service management smart contracts.

ATMatrix will provide the AI service call interface to the user, which will manage the complex block chain technology, but looks to the community to develop the complex technical specification and implementation.

## 开放平台 Open Platform

ATMaxtrix 是一个可通过智能合约扩展的开放平台，从而实现与其它基于以太坊的 Dapps 的交互和协作。ATMaxtrix 的开源特性使得第三方开发人员能更好的在平台之上构建可交易应用程序。该平台可以支持多种应用程序。

ATMatrix is an open platform that can be extended through smart contracts to enable interaction and collaboration with other Ethereum Dapps. The open-source nature of ATMatrix enables third-party developers to build applications that can exchange with each other on the platform. The platform can support multiple applications.

## 术语 Terms

本节解释下面的文档中涉及的一些核心概念。

This section explains some of the core concepts involved in the following documentation.

### AI 服务(AI Service)

AI 服务是由具备大数据和人工智能服务能力的公司或个人提供的一种云服务，通常表现为云服务接口 API。

AI Services are a cloud service provided by companies or individuals with large data and artificial intelligence services, typically accessed by the Cloud Service Interface API.

## 用户账户 User Accounts

很多 AI 服务会根据不同的用户特征数据来进行相应的分析和回应，以提供更好的 AI 服务和用户体验。因此 ATMatrix 有必要在区块链的地址账户之外，为用户创建一个带有用户数据状态的账户，除了包含例如转账地址这样的值之外，还会包含其他更多的用户自定义信息，这些信息可以根据成本和隐私保护的不同考虑，存放在链上或类似 IPFS 这样的链下。另外，AI 合约应该可以接入类似 uport 这样的用户身份合约，来获取用户身份的认证信息。

Many AI services require different types of user data to deliver high quality analysis and responses, resulting in a better overall user experience. Therefore, it is necessary for ATMatrix to deploy external accounts of the block chain, creating a separate account with user status data. In addition to values such as a transfer address, additional user-defined information that can be stored on a chain or in a chain like IPFS, depending on cost and privacy protection considerations. In addition, AI contracts should be able to access user identity contracts such as Uport to obtain authentication information for user identities.

## ATMatrix DApp

拿以太坊智能合约平台举例，ATMatrix 将在以太坊上开发一个 DApp，这个 DApp 实际由一系列智能合约组成，包括主调用合约，代理合约，治理合约，Token 合约，用户信息管理合约等等。

Using Ethereum Smart Contract Platform as a model, ATMatrix will develop a DApp in the Ethereum Testnet. The DApp is actually composed of a compilation of smart contracts, including the main call contract, agent contract, governance contract, token contract, user information management contract and so on.

## DBot, DBot 服务器和 DBot 平台 Dbot Server and Platform

DBot 是一个 ATMatrix 引入的新的概念术语，用来表达衔接以太坊智能合约和 AI 服务之间所有事物和通信的用户定义程序，ATMatrix 将提供 DBOT 程序的开发规范，用户将可以依据这些规范开发 DBot 程序，并发布到 DBot 平台上面。DBot 平台由一系列 DBot 服务器组成并共同运行，Relay 服务器将由很多注册在 ATMatrix DApp 上的 DBot 账户来托管，这些账户会由治理合约通过合约定义的治理机制选择出来，只有经过这些账户的授权，DBot 服务器可以和 ATMatrix 进行通信。

DBot is a new technical term introduced by ATMatrix to express a user-defined program that connects facilitates communications between the Ethereum smart contracts and AI services. ATMatrix will provide the development specification for DBot programs, and users will use them to develop DBot programs and deploy them to the DBot platform.

The DBot platform consists of distributed Dbot servers, relay servers which are governed by DBot accounts registered on ATMatrix DApp. These accounts will be selected by a voting through a governance contract and only through the permission of those accounts can the Dbot server communicate with ATMatrix.

DBot 的注册信息，包括接口定义的指纹是存放在区块链上的，供 DBot 平台来查询和验证。每一类 AI 服务对应一个 Dbot 群组，这个群组中的 Dbot 共享同一种权限管理和治理机制，还有可能会共享一些智能合约来协助做链下共识。

DBot registration information, including the interface defined fingerprint, is stored on the block chain for the DBot platform to query and verify. Each type of AI service corresponds to a DBot group, in which the DBot shares the

same rights management and governance mechanisms, and may share some smart contracts to help with the off chain consensus.

DBot 平台负责接收来自用户(包括普通用户, AI 或智能合约)的请求, 并将请求发送给 ATMatrix DApp 负责解析请求和分发给负责相应 AI 服务的 DBot 服务群, 每个 DBot 服务节点实际上运行的都应该是一样的 DBot 程序, 用来请求 AI 服务提供商获取 AI 服务, 经过链下共识(预言机)之后再返回给 DApp 和用户。DBot 的概念部分来自于预言机(Oracle), 通过多中心的服务节点结合链下共识解决现实数据源可信性的问题, 但是 Dbot 的涵义更广, 不但包括预言机的可信数据, 而且包括智能合约与 AI 服务间的通信和互操作性, 强化的链下共识的部分。

The DBot platform is responsible for receiving requests from users (including ordinary users, AI, or smart contracts) and sends requests to ATMatrix DAPP for parsing requests and distributing them to the DBot Service group responsible for the corresponding AI services.

Each DBot service node should actually run the same DBot program, which is used to request services from the AI service provider, which will give a return to the DApp and the user only after off completion of chain consensus (prediction machine).

The DBot concept is derived from the Prediction Machine (Oracle), but uses off chain consensus to address the credibility problem of data sources through the consolidation of the multiple centralized servers. But the DBot has greater impacts, including not only the data reliability, but also enables the communication and interoperability between smart contracts and AI services, further improving off chain consensus.

## 链下共识 Off Chain Consensus

通用意义上是指在区块链网络和智能合约的外部, 利用预言机、DBot 等多中心化的机制获取数据源, 并经过特定共识程序, 在链下达成最终的共识结果数据源, 并将该结果数据源返回链上的过程。在 ATMatrix 中, 链下共识的过程经过改进, 参与链下共识的多中心账户和共识程序, 是可以参数化后经由链上智能合约选择和设定的, 最终提交给链上合约的数据源将包括由提供者签名的原始数据源, 以及最终的数据源。因为链下的多中心和共识程序由链上程序或合约提供, 因此链上程序或合约将可以对数据源的提供者以及链下共识过程做校验。

In a general sense, "Off Chain Consensus" refers to the calculation that occurs outside of the main smart contract and Block chain network. Oracles, DBots and distributed servers are used to access data sources, and apply the consensus algorithm off chain, resulting in data consensus which gets reported to the original chain.

In ATMatrix, the process of off chain consensus is improved, participating off chain consensus account and consensus procedure can be parameterized through the main chain's smart contract selections and settings, which will include the original data signed by the provider and the final data. Because the off chain consensus data draws from the original chain or smart contract, the chain program or contract will be able to verify the provider of the data source as well as the off chain consensus result.

# 需求和用户视角 Requirements and User Roles

## AI 服务提供商 AI Service Provider

指 AI 服务的开发和提供者，通过分析学习大数据，对外提供 AI 服务。

Refers to the development and deployment of AI services, leverages big data analytics learning, to deliver AI services.

## AI 合约开发者 AI Contract Developer

是指在 ATMatrix 平台上开发并发布 AI 合约并接入经过授权的 AI 服务的第三方开发者，AI 合约更像是 AI 服务和 ATMatrix 间的一个适配器。AI 合约提供者负责开发并部署这些合约收取恰当的手续费。AI 合约提供者有可能和 AI 服务提供商重合，但不是必须，也有可能是经过 AI 服务提供商授权，或者是 AI 服务提供商的客户。

A third-party developer who develops and deploys AI contracts on the ATMatrix platform and accesses authorized AI services. AI contracts are an adaptor between AI services and ATMatrix. AI contract providers charge appropriate fees for the development and deployment of these contracts. AI contract providers may overlap with AI service providers, but this is not always the case. It is also possible to be authorized by an AI service provider or are redirected users of another AI service provider.

## DBot 账户 DBot User

提供并负责运行 DBot 服务节点的账户，参与 AI 服务链下共识过程，任何人可以申请和注册 DBot 账户，但是成为某一组 AI 服务的 DBot 账户，需要经过系统投票选择过程。

Provides and is responsible for operating the Dbot Service node account, participates in the AI service off chain consensus process, anyone can apply and register a Dbot account, but to become a group of AI services Dbot account requires approval through the system voting selection process.

## AI 消费者 AI Consumer

通过恰当的解析 ATMatrix 网络中注册的 AI 服务接口和数据，任何开发者都可以开发 ATMatrix 的 AI 服务浏览器，便于 AI 服务使用者查询和使用 AI 服务。AI 服务使用者有可能是某个智能合约，也有可能是另外一个服务或程序，需要支付 ATM 代币才能使用 AI 服务，ATMatrix 系统受到代币费用后，将会根据服务表现进行自动分账。

By properly parsing the AI service interfaces and data registered in the ATMatrix network, any developer can develop an ATMatrix AI service browser that makes it easy for AI service consumers to search for and use AI services. AI service users may be a smart contract, or it may be another service or program. Using AI services will require payment in ATM tokens. After the ATMatrix system receive token fee, it will automatically execute based on the type of the service.

## 链上消费者 On Chain Consumer

### a. 为智能合约提供 Oracle 服务（事实型）

A. Providing Oracle Services for smart Contracts (fact type)

像竞猜对赌，以及法律文件等智能合约发布后，需要 oracle 激发后进行合约处理。例如，赌一场球赛的智能合约需要等待球赛的结果。这一类的结果都是事实型服务调用，但仍然会有作弊的服务商的可能。ATMatrix 可以调用多个 DBot，使用共识机制来甄别可靠的服务商。

After the issuance of smart contracts such as guessing bets, and legal documents, the Oracle is required to deal with the contract after firing. For example, a smart contract to bet on a game has to wait for the result of the game. This kind of result is a fact-type service invocation, but there will still be the possibility of cheating service providers. Atmatrix can invoke multiple Dbot, using consensus mechanisms to identify reliable service providers.

### b. 为智能合约提供 AI 服务

Providing AI services for smart contracts

数字资产文件以 hash 的方式存储在链上，有 AI 解读的需求。

数字资产校验：从 URL 取得数字资产内容，与 hash 的结果进行比对；

自然语言处理：从数字资产内容中进行实体识别，能回答一些基本问题。

Digital asset files are stored in the chain in a hash way, with the need for AI interpretation.

Digital Asset Check: obtains the digital asset content from the URL, compared with the result of the hash;

Natural language Processing: Entity recognition from the content of digital assets can answer some basic questions.

## 链下消费者 Off Chain Consumer

### a. 调用前无需训练模型、且无 session 的概念

A. The concept of no session without a training model before calling

例如，语音识别、车牌识别等 AI 服务。此类需求对 AI 服务提供商不要求是固定的，可以随机发往这类 AI 服务商中的某一个。



For example, speech recognition, license plate recognition and other AI services. Such requirements are not required for the AI service provider to be fixed and can be randomly sent to one of these AI providers.

#### b. 调用前无需训练模型、但有 session 和用户的概念

例如，闲聊问答。需要将请求发往固定的某个 AI 服务提供商，在问答的过程中 AI 逐渐了解调用方，达到越来越智能的目标。

#### B. Pre-call without training model, but with session and user concepts

For example, chat and quiz. Need to send the request to a fixed AI service provider, in the question-and-answer process AI gradually understand the caller

To achieve more and more intelligent goals.

#### c. 调用前需上传语料训练模型

例如，智能客服。需先提供领域知识进行模型训练，再提供服务。

#### C. Need to upload corpus training model before calling

For example, intelligent Customer service. We need to provide the domain knowledge to train the model and then provide the service.

## 技术实现 Technology Development

### 智能合约和 DBot 的通信方式 Smart Contract and DBot interoperation

智能合约是在区块链网络上每个节点中确定性的执行的程序，并对区块链账本做出修改，因此智能合约执行过程中无法直接访问外部数据或调用外部的服务接口，比如访问互联网上的资源等，因为这样做会引入非确定性，使得各个节点对合约执行的结果出现不一致。在 ATMatrix 中实现智能合约和 DBot 之间的通信是异步的，首先，智能合约对外部 AI 服务的调用将会触发事件，DBot 节点在收到这个事件通知后，将会根据事件的参数信息请求外部 AI 服务，并将得到的外部 AI 数据通过交易的形式发送到区块链对应的智能合约上，使得这些信息成为账本数据的一部分，从而消除非确定性。

A smart contract is a procedure for determining the execution of each node in a block-chain network. And make changes to the block chain book, so the intelligent contract execution process can not directly access external data or call external service interface, such as access to the Internet resources, etc., because this will introduce non-deterministic, so that the results of the contract implementation of the various nodes inconsistent. In Atmatrix, the communication between the intelligent contract and Dbot is asynchronous, first, the call of the intelligent contract to the external AI service will trigger the event, after receiving this event notification, the Dbot node will request an external AI service based on the event's parameter information and send the obtained external AI data to the intelligent contract corresponding to the block chain, making the information a part of the ledger data, thus eliminating

Non-deterministic.

这里的 DBot 可以是一个可信的第三方，也可以是一个 ATMatrix 通过治理机制选出的 DBot 服务节点

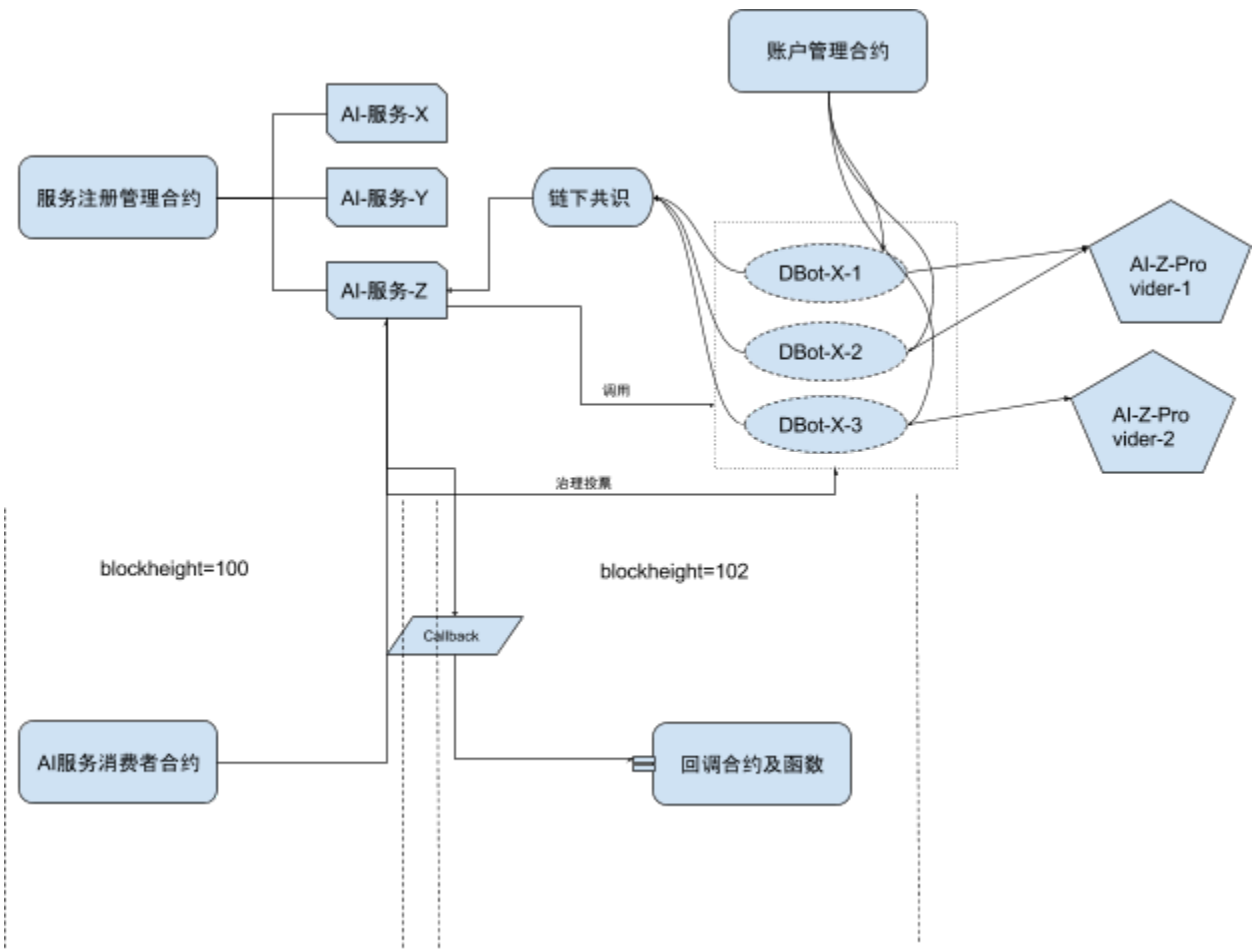
群。ATMatrix 通过 DApp 来实现一套用经济激励来保证数据可靠 Dbot 的机制，提供给其他智能来调用。这套机制包含如下几个部分：

The Dbot here can be a trusted third party, or it can be a Atmatrix Dbot service node selected through the governance mechanism

Group。Atmatrix through Dapp to achieve a set of economic incentives to ensure data reliable dbot mechanism, provided to other intelligence to invoke. This set of mechanisms consists of the following sections:

1. 需要一个 AI 服务注册管理的智能合约，以及对应的 DBot 账户管理策略。这些 Dbot 账户负责按照 AI 服务的接口定义和 AI 提供商，来运行对应的 DBot 节点。
2. 一个 AI 服务的查询服务，通过智能合约来查询，不需要消耗 Gas。
3. 当其他智能合约通过 AI 服务注册表智能合约调用某个 AI 服务时，实际上相当于发送了一个异步的请求并附带一个回调函数，调用者的智能合约将会继续执行，DBot 节点群通过注册表智能合约，在收到 AI 服务请求时间之后，将会在链下执行 AI 服务请求，并得到结果，这些 DBot 节点在各自得到数据后，在通过提交交易返回给区块链之前，需要经过 ATMatrix 的 DBot 平台提供的链下共识过程达成 终共识，形成统一的 终数据。
4. AI 服务注册表智能合约在收到 AI 结果之后，将 AI 结果中转给调用者设定的智能合约回调函数。
5. 区块链智能合约的回调函数，在交易调用并拿到 AI 结果之后，继续执行。
6. AI 服务注册表智能合约，在这个过程中负责调用者的燃料扣费，和 Robot 账户的经济激励和分账。至于 AI 服务提供商所需的费用则与智能合约无关，AI 服务提供商收取的费用将由 Robot 账户承担，Robot 账户可以在收到 Token 激励后，通过在交易所交易对应货币后支付给 AI 服务提供商。在有些情况下，支持某种 AI 服务的 Robot 账户可能就是 AI 服务提供商的账户，AI 服务提供商收取 Token 作为其经济收入。
7. 同一 AI 服务可能有多家 AI 服务商提供的不同服务组合而成，Robot 账户的治理策略、链下共识策略、分账策略等也可以参数化，可以自定义。
8. ATMatrix 将会为 Robot 节点和 AI 服务提供商提供开源程序，方便接入整个网络。
  9. 1. The need for an AI service registration management of intelligent contracts, as well as the corresponding Dbot account management strategy. These Dbot accounts are responsible for running the corresponding Dbot nodes according to the interface definition of AI services and the AI provider.
  10. 2. A AI services query services, through the intelligent contract to query, no need to consume gas.
  11. 3. When other smart contracts invoke an AI service through the AI Service registry Smart contract, it is actually equivalent to sending an asynchronous request with a callback function that the caller's smart contract will continue to execute. The Dbot node group through the registry intelligence contract, after receiving the AI service request time, will execute the AI service request in the chain, and obtains the result, these Dbot nodes after each obtains the data, after through submits the transaction returns to the block chain, Need to go through Atmatrix
  12. The Dbot platform provides the consensus process to achieve the final consensus, forming a unified final data.
  13. 4. AI Service Registry Smart contract after receiving AI results, the AI results transferred to the caller set the smart contract callback letter
  14. Number.
  15. 5. Block chain Smart Contract callback function, after the transaction call and get the AI results, continue to execute.

16. 6. AI Service Registry Intelligent contract, in the process responsible for the caller's fuel deduction fee, and robot account of the economic incentives and split. The cost of the AI service provider is irrelevant to the smart contract, and the fees charged by the AI service provider will be borne by the robot account, and the robot account can be paid to the AI service provider after receiving the token incentive through the exchange-traded counterpart. In some cases, the robot account that supports a certain AI service may be the account of the AI service provider, which the AI service provider collects token as its economic income.
17. 7. The same AI service may be a number of different services provided by AI Service portfolio, the robot account governance strategy, the chain of consensus strategy, accounting strategy, etc. can also be parameterized, can be customized.
18. 8. Atmatrix will provide open source programs for robot nodes and AI service providers to facilitate access to the entire network.



## 不同区块链平台智能合约间的互操作性 Cross-Chain Smart Contract Platform

DBot 平台可以与支持的智能合约平台上的合约进行通信互操作，但是存在不同的区块链网络，仅就 EVM 兼容的智能合约来说，目前就存在很多，除了以太坊之外，目前还有 RSK, Qtum, 正在开

发中的 EOS 和 Ethereum Classic, 那么这些 DBot 平台尚未支持的区块链网络上的智能合约如何与 DBot 通信。

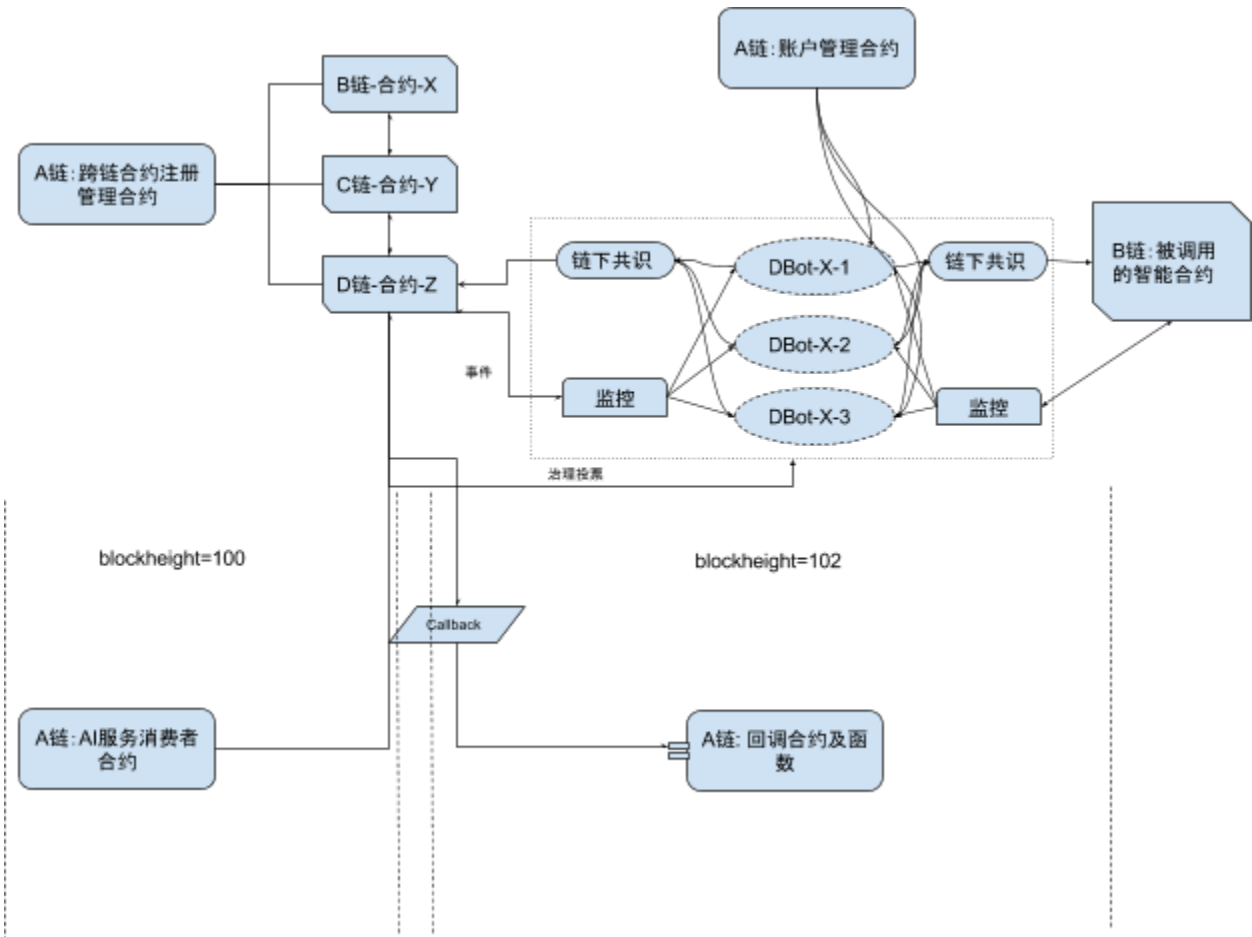
The Dbot platform can interoperate with the contracts on the supported smart contract platforms, but there are different block chain networks, in the case of EVM-compliant smart contracts, there are so many now that, in addition to the ether square, there are RSK, qtum, developing EOS and Ethereum Classic, and how the smart contracts on the block chain networks that have not yet been supported by these Dbot platforms communicate with Dbot.

DBot 平台(或之后的 Dbot 区块链)将提供不同区块链智能合约间互操作的能力。当某个智能合约想要操作另外一个区块链网络中的合约时, 将经过下面的步骤:

1. DBot 平台存在一个服务注册合约, 以及对应的 DBot 账户管理策略。这些 Dbot 账户负责管理互操作的合约, 并运行对应的 DBot 节点。
2. 智能合约通过注册表合约调用另一个合约时, 实际上相当于发送了一个异步的请求并附带一个回调函数, 调用者的智能合约将会继续执行, DBot 节点群通过注册表智能合约, 在收到合约调用请求时间之后, 将会在链下执行合约请求, 在交易确认之后, 将合约执行结束后的收条返回给之前区块链的调用者合约
3. 因为在被调用合约的区块链网络中存在收条证据和 Merkle 记录, 因此无需链下共识过程即可证明调用过程可靠和确定性, 所以在这里, 不需要链下过程。但我们仍然可能需要设定多个 DBot 账户用来竞争执行该调用, 以保证可靠性, 竞争执行的过程可以设定经济激励。
4. 调用者合约在收到收条, 并拿到结果数据之后继续执行。

The Dbot platform (or the later Dbot block chain) will provide the ability to interoperate between intelligent contracts in different block chains. When a smart contract wants to operate a contract in another block chain network, the following steps are taken:

1. The Dbot platform exists a service registration contract and a corresponding Dbot account management strategy. These Dbot accounts are responsible for managing interoperable contracts and running corresponding Dbot nodes.
2. When a smart contract invokes another contract through a registry contract, it is actually equivalent to sending an asynchronous request with a callback function the caller's intelligence contract will continue to execute, the Dbot node group through the registry intelligence contract, after receiving the contract call request time, will execute the contract request under the chain, after the transaction confirmation, after the contract execution end receipt returns to the previous block chain the caller contract
3. Because of receipt evidence and Merkle records in the block chain network of the called contract, there is no need for a chain of consensus process to prove that the calling process is reliable and deterministic, so there is no chain process. But we may still need to set Multiple Dbot accounts are used to compete to enforce the call to ensure reliability, and the process of competition execution can set economic incentives.
4. The caller's contract is continued after receipt is received and the result data is obtained.



## AI 服务授权管理 “AI Service” Rights Management

目前主要的 AI 服务提供商接入都需要授权，例如通过安全签名的方式，对<app\_key, app\_secret>进行签名，而这里的<app\_key, app\_secret>通常由 AI 服务提供者分配给 AI 服务调用者用户。对于 ATMatrix 来说，直接调用 AI 服务的就是 DBot 账户，但是由谁来 终调用 AI 服务通常是由系统选择或者投票竞选出来的，也就是说调用 AI 服务的 DBot 账户会动态变化，因此，在 AI 服务那里给哪些 DBot 账户分配访问令牌(Token)，以及如何正确的分配访问令牌(Token)变得困难。因此，在 ATMatrix 中，提出一种统一的 AI 服务授权管理办法，需要 AI 服务提供者对该授权访问方式提供支持。

At present, the main AI service provider access requires authorization, such as the signing of <app\_key and app\_secret> by means of a secure signature, where the <app\_key, app\_secret>, is usually assigned by the AI service provider to the AI service caller user. For Atmatrix, the direct call to the AI service is the Dbot account, but who will end up calling AI services usually by system selection or polling out, that is, the Dbot account that invokes the AI service changes dynamically, so it becomes difficult to assign access tokens (token) to which Dbot accounts are assigned to the AI service and how to properly assign access tokens (token). Therefore, in Atmatrix, a unified AI service authorization management approach is proposed, which requires the support of AI service providers for this authorization access.

因为在 ATMatrix 中，每一个 DBot 账户都会有一个对应的活跃<公钥，私钥>对，每一次调用 AI 服务时，DBot 账户需要用私钥对调用请求内容或其 hash 做签名，而 AI 服务通过 DBot 对应的账户公钥验证该签名，同时还需要通过 DBot 平台提供的状态查询服务，查询改 DBot 账户是否是有效的被选举出来具有操作该 AI 服务权限的账户。为了避免重放攻击(Replay Attack)，请求里面应该包含一个 nonce 随机数值，并且相应请求的 AI 服务应该对请求做避免重复性的校验。

Because in Atmatrix, each a Dbot account will have a corresponding active public key, private key, every a Times call AI service, the Dbot account needs to use the private key to the call request content or its hash to sign, and AI services through the Dbot corresponding to the account public key to verify the signature, but also through the Dbot platform provided by the State Query service, the query to change the Dbot account is valid to be elected with the right to operate the AI service account. In order to avoid replay attacks (replay attack), the request should contain a nonce random values, and the corresponding requested AI service should avoid repetitive checksums for requests.

## 路线图 roadmap

### 第一阶段: 以太坊 ATMatrix Dapp 和 DBot 平台

Phase 1: Ethereum ATMatrix Dapp and DBot platform

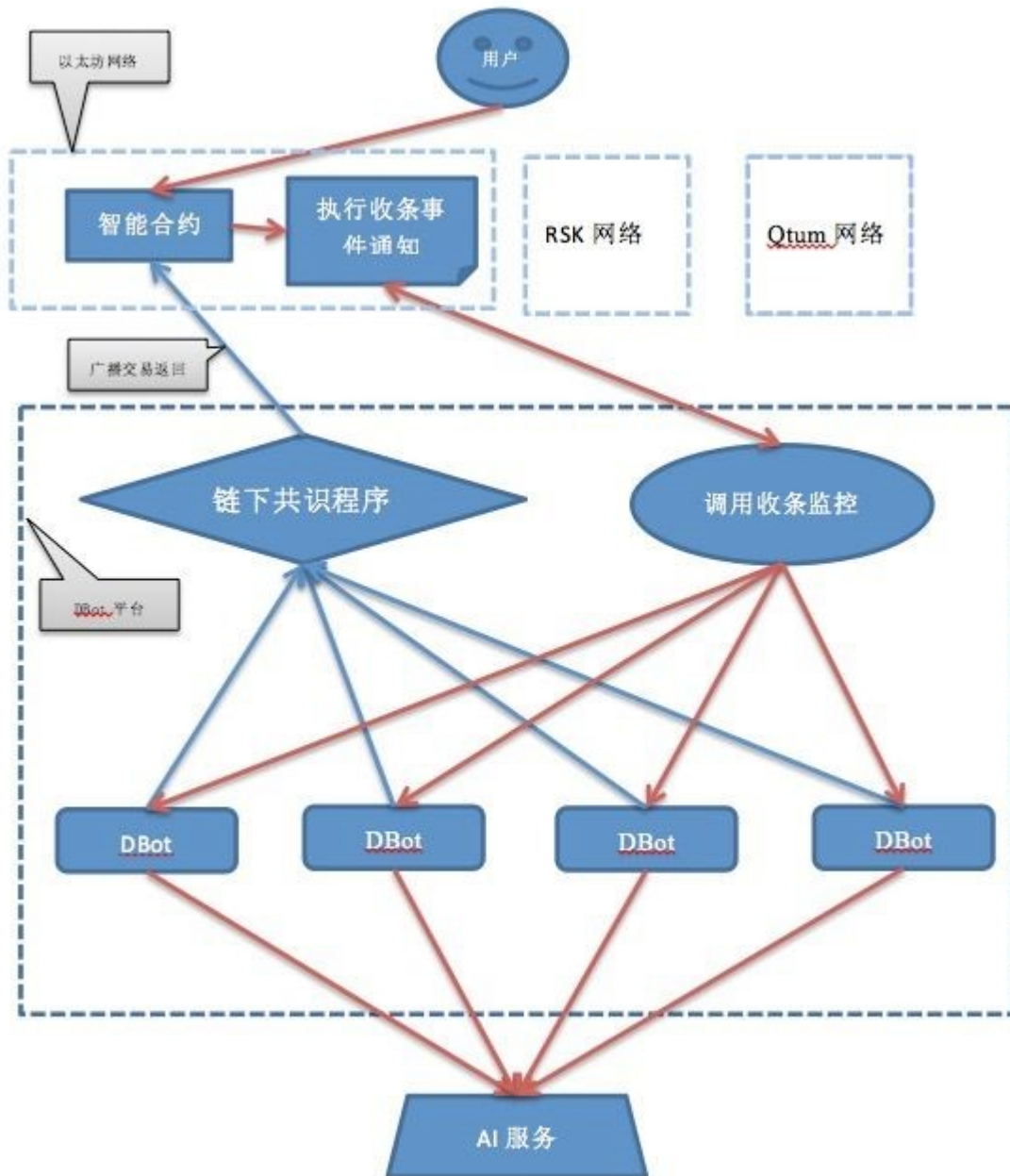
基于以太坊的 DApp

1. 服务管理合约
2. 账户管理合约
3. 代币合约
4. 治理合约
5. 支付合约
6. 分账合约

Dapp based on Ether Square

1. Service Management contract
2. Account Management contract
3. Token contract
4. Governance Contracts
5. Payment of contracts
6. Split contract

DBot 平台 DBot Platform



## 快速微支付通道和可扩展性 “fast” micro payments channel and Scalability

对于 AI 服务应用来说，存在高频次调用和低频次调用的区别。对于简单的事实预测类的 AI 服务来说，比如“2012 年的足球世界杯冠军是哪个球队”，可能被用于智能合约中作为判定条件，有可能并不会调用很频繁。但是在人工智能领域中，还存在一些其他类型的 AI 服务，比如聊天机器人或者客服机器人，他们的调用交互频次会非常高，由于目前区块链网络的性能限制，一方面是单笔交易的手续费成本还是比较高，另一方面网络负载性能(也就是 TPS: 每秒交易数)也不能满足高频词调用的需求。因此，利用类似雷电网络这样的高频微支付技术来扩展和改善性能就变得非常重要。

For AI service applications, there is a difference between high-frequency and low-frequency calls. For simple fact-predictive AI services, such as "the 2012-year-old football World Cup winner is which team" may be used in smart contracts as a condition of judgment, it is likely not to call very frequently. But in the field of artificial intelligence, there are other types of AI services, such as chat bots or customer service robots, their call interaction frequency will be very high, because of the current block chain network performance constraints, on the one hand is a single transaction costs or relatively high, on the other hand Network load performance (that is, TPS: Transactions per second) also can not meet the demand for high-frequency word calls. Therefore, it is important to extend and improve performance by using High-frequency micro-payment techniques like lightning networks.

### 比特币闪电网络 Bitcoin Lightning Network

闪电网络 ( Lightning Network)，简单来说，它的目的是将比特币的绝大多数交易带离区块链，而且不会牺牲可证性以及安全性。

闪电网络可允许创建“微支付渠道”，除了发起通道的初始交易之外，多笔比特币交易在无需与区块链进行互动的情况下，还能安全地进行。它也不存在交易对手的风险：如果任何一方终止合作，或者说在约定的时间内没有响应，该通道可以被关闭。

The Lightning Network (Lightning Network), in simple terms, is designed to bring the vast majority of transactions in bitcoin away from the block chain without sacrificing the evidence and security.

Lightning Network allows the creation of "micro-payment channels", in addition to initiating the initial transaction of the channel, multiple Bitcoin transactions in the case of no need to interact with the block chain, but also safe. It also does not have a counterparty risk: if either side terminates cooperation, or if there is no response within the agreed time, the channel can be closed.

这些在通道中的支付交易会瞬间完成，这与当前的比特币支付不同（往往需要 1 个小时的时间来完成交易验证）。更重要的是，支付是可路由的，它是跨越多跳路径的，这就像是互联网上的数据包。相对于为每一个新的合约方创建一个渠道，你可以维持一些渠道，连接少数良好的安全中介机构，并通过他们来完成交易。

从理论上讲，这种分布式小额支付网络（闪电网络）可以将比特币的日交易量扩充到数十亿笔每天，并且极少地使用到区块链，以及仅需少量的交易费。

然而，闪电网络需要再次对现有的比特币协议进行改动（虽然这是一个软分叉，即现有的区块链将继续完全有效），这项技术目前还处于早期阶段。

These payment fairs in the channel are completed instantaneously, which is different from the current Bitcoin payment (often takes 1 hours to complete the transaction validation). More importantly, payment is routable, it is



spanning multiple hops, which is like a packet on the Internet. Instead of creating a channel for each new contract, you can maintain a number of channels to connect to a few good security intermediaries and to complete the transaction through them.

In theory, this distributed micro-payment Network (Lightning Network) can expand the daily trading volume of Bitcoin to billions of dollars a day, and rarely use the block chain, and only a small amount of transaction fees.

However, the Lightning network needs to change the existing Bitcoin protocol again (although this is a soft fork, that is, the existing chunk chain will continue to be fully effective), the technology is still at an early stage.

## 比特币和支付渠道的概述 Bitcoin and Payment Channel Overview

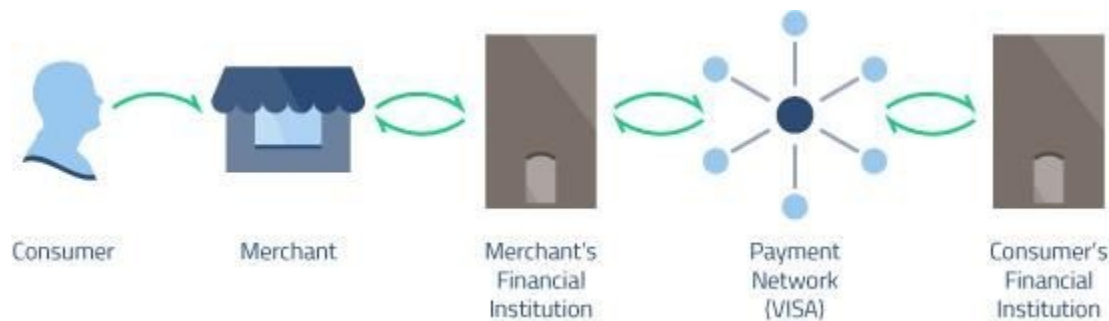
支付渠道是解决比特币的可扩展性、小额支付和零确认问题的一种可行途径。这个想法是让参与者之间直接进行交易，并不是通过区块链发送交易和使用它加密来确保信息安全，只是在需要结算机制时才使用区块链。现在已经有极少数关于建立支付渠道的想法，广为人知的就是闪电网络。

比特币闪电网络的想法是受目前电子金融系统运作原理的启发。我们的目标是借鉴一切了解到的成果，并将其有意义的部分应用到比特币中。因为这篇不是技术类文章，为了让大家了解在以太坊上建立支付渠道的好处，我们至少要对比特币闪电网络有个高层次的认知。

Payment channel is a feasible way to solve the problem of scalability, small payment and 0 recognition of Bitcoin. The idea is to allow direct trading between participants, not by sending transactions through a block chain and by using encryption to secure information, but by using a block chain only when a settlement mechanism is needed. There is already a very small number of ideas about how to build a payment channel, which is widely known as the Lightning Network.

The idea of a Bitcoin lightning network is inspired by the workings of the current electronic financial system. Our goal is to learn from all the results we have learned and to apply its meaningful parts to bitcoin. Because this is not a technical article, we should at least have a high level of awareness of the Bitcoin Lightning Network in order to get a sense of the benefits of establishing a payment channel on the Etheric square.

## 目前支付的授权过程 Previous Payments Authorization Process



一笔比特币交易涵盖几个部分，我们作简要讨论：

1.指向先前某人向你发送比特币的一笔交易（你拥有对应私钥的地址）

2.你发送到的比特币地址（实际上是锁定脚本）

A bit currency transaction covers several parts, and we briefly discuss:

1. Point to a previous transaction in which someone sent you a Bitcoin (you have the address of the corresponding private key)

2. The bit currency address you sent (actually the lock script)



3.加密签名证明你“拥有”已被花费的比特币和你创建了交易

3. Encrypted signature proves that you "own" the Bitcoin that has been spent and you created the deal

直接向接受者发送这笔签名交易，而不是对它进行广播，这就和（传统）支付本身一样便捷。唯一的问题是，只要交易不是发生在区块链上，你就可以选择把这些比特币发送给别人。

比特币交易是极其灵活的。两个人可以决定各自把一些比特币整合到一笔单独交易，只有他们同时进行加密签名，这笔交易才能对外发送。这是所谓的多重签名或 pay-to-script-hash，也是支付渠道建立的依据。

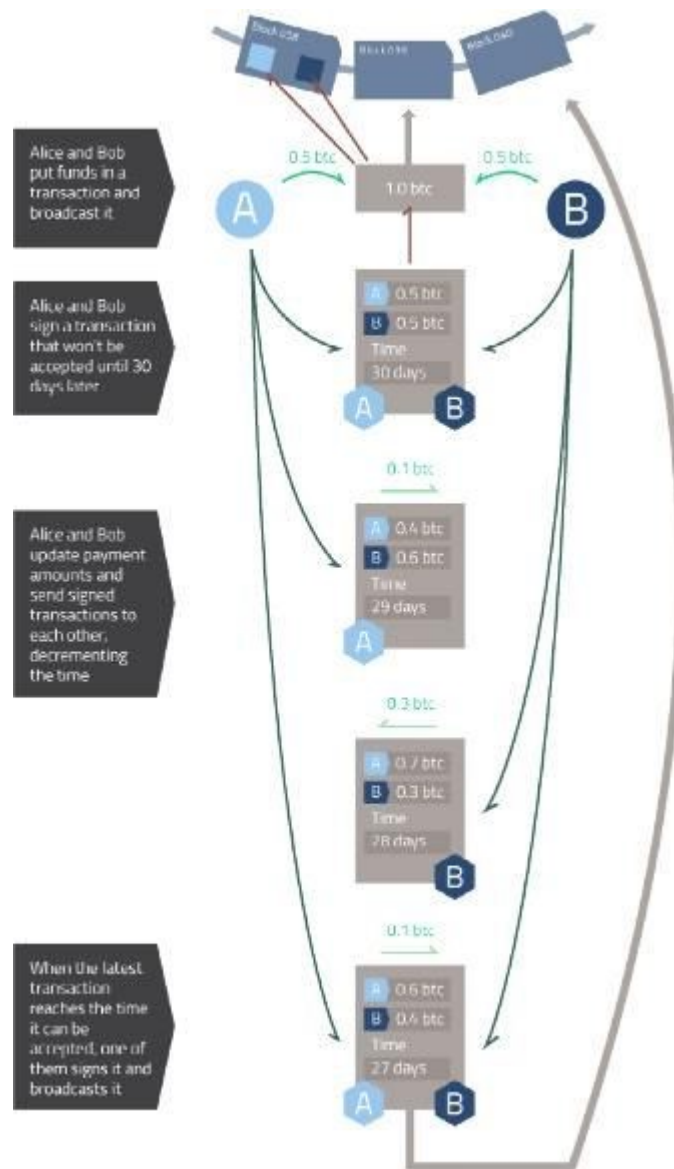
Sending the signature transaction directly to the recipient, rather than broadcasting it, is as convenient as the (traditional) payment itself. The only problem is that as long as the transaction doesn't happen on the block chain, you can choose to send the bitcoin to someone else.

Bitcoin trading is extremely flexible. Two of them can decide to integrate some bits into a single transaction, and the transaction can be sent only if they are encrypted at the same time. This is called multiple signature or Pay-to-script-hash, and is also the basis of the payment channel establishment.

如果 Alice 和 Bob 希望在他们之间建立支付渠道，他们中的一人或两人要把比特币整合到一笔特殊的多重签名交易，并在网络进行广播。然后，他们创建和签名一笔新交易，但原始的资金会 后回到他们手上，而且直至之后的某天才能使用（例如未来的 30 天）。当他们彼此需要发送资金时，各自的资金余额随之更新，同时会缩短交易可花费的时间（29 天，28 天，等...），后，新的交易变化会被广播到网络。

If Alice and Bob want to establish a payment channel between them, one or both of them will integrate Bitcoin into a special multiple signature transaction and broadcast on the network. They then create and sign a new deal, but the original money comes back to them, and it will not be available until one day (for example, the next 30 days). When they need to send money to each other, their respective capital balances are updated and the time spent on the transaction can be shortened (29 days, 28 days, etc.). , after the new transaction changes will be broadcast to the network.

支付渠道的创建和形成过程 Payment Channel Creation and Formation Process



因为这些信息只会在 Alice 和 Bob 之间传送，它们有助减少发生在区块链上的交易数，从而让区块链能大规模处理交易。它们也可视为即时支付，同时解决零确认问题，因为没有任何手续费，他们可进行任意面额的小额支付。唯一要考虑的是交易被广播到网络的时间，这取决于 Alice 和 Bob 什么时候关闭渠道，或者如果他们中的一个要停止交易（此时其他人会等待新的可被花费的交易被广播到网络，再向他们发送合适的比特币数额）。

但这只是发生在两者之间。真正让支付渠道有用武之地的是比特币能将它们链接在一起。如果 Alice 和 Bob 有渠道，Bob 和 Carol 有渠道，然后 Alice 可通过 Bob 支付给 Carol。Bob 或许收取小的手续费，但这比区块链的手续费要小得多。这里我们不会细谈，但在不必信任 Bob 的情况下可以实现这一切，只需添加一些规则就可确保交易的完成。这些新规则在比特币里尚不存在，但比特币有一天可能会用到。

Because this information is only sent between Alice and Bob, they help reduce the number of transactions that occur on the block chain, allowing the chunk chain to handle transactions on a large scale. They can also be treated as immediate payments, while the 0 confirmation problem is resolved, as there is no handling charge and they can make small payments in any denomination. The only thing to consider is when the transaction is broadcast to the network, it depends on when Alice and Bob close the channel, or if one of them is going to stop trading (while others will wait for new, tradable transactions to be broadcast to the network and send them the appropriate bitcoin amount).

But it just happens between the two. What really makes the payment channel useful is that bitcoin can link them together. If Alice and Bob have channels, Bob and Carol have channels, and Alice can then pay Carol through Bob. Bob may charge a small fee, but it's much smaller than the block chain. We won't go into detail here, but we can do it without having to trust Bob, just add some rules to make sure the deal is done. These new rules do not exist in Bitcoin, but Bitcoin may one day be used.

### 以太坊雷电网络 Ethereum Lightning Network

以太坊提高交易处理能力的方式主要有两个，一个是分片技术（shard），另一个就是状态通道技术（state channels）。雷电网络（Raiden Network）是状态通道技术在以太坊上的实现。

以太坊的雷电网络类似于比特币的闪电网络。雷电网络的基本理念是，用户可以私下交换转账签名消息，而不是所有的交易都放到区块链上处理。雷电网络通过以太坊网络中的点对点支付与保证金存款保留了区块链系统所具备的保障机制。参与方之间不断发生的交易在链下进行，但终可以在链上进行清算。

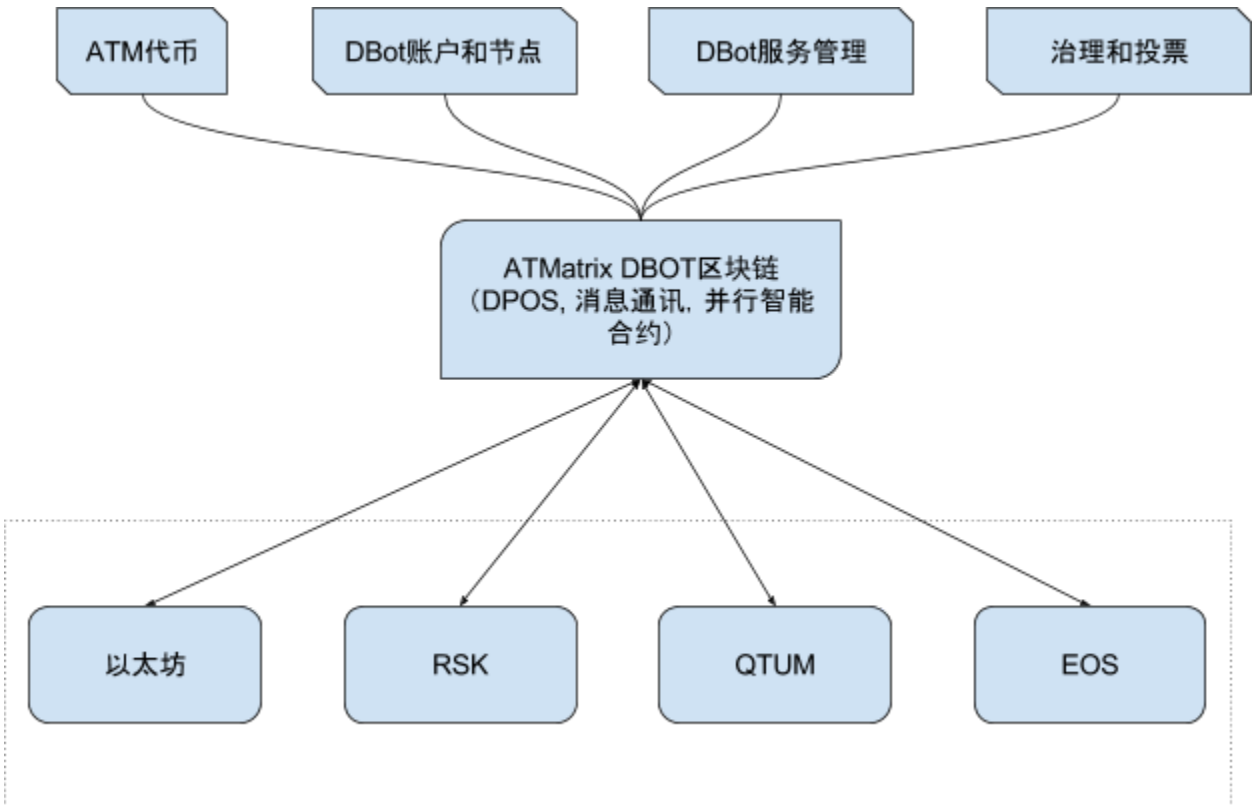
There are two main ways to improve transaction processing capacity, one is fragmentation technology (shard) and the other is state channel technology (channels). The Lightning Network (Raiden Network) is the realization of the state channel technology in the Etheric square.

The Lightning network of the etheric square is similar to that of a bit coin. The basic idea of the Lightning network is that users can exchange transfer signature messages in private, rather than all the transactions are placed on the block chain. The Lightning network preserves the guarantee mechanism of the block chain system through the point to point payment and margin deposit in the Ethernet square network. The ongoing transactions between the participants are carried out under the chain, but they can be liquidated on the chain.

## 第二阶段: DBot 区块链平台

- DBot 区块链支持 EVM 兼容的智能合约
- 改进的 DPOS 共识算法
- 改进的 EOS 手续费带宽流量控制方式
- 实现：Graphene(或 EOS) + EVM
- 借鉴 Ethereum 2.0 和 EOS 的分片、并行智能合约、消息通讯设计，每一组 AI 服务(可能是按照提供商分组)设置对应的分片区，将每一个 DBot 服务群链下共识的部分转至链上。
- ATM 代币迁移至 DBot 区块链作为主代币
- DBot 账户迁移至 DBot 区块链

- DBot 服务管理合约迁移至 DBot 区块链合约
- 为不同的 EVM 兼容的智能合约平台开发对应的互操作智能合约，提供不同区块链平台智能合约间的互操作性
  - RSK 互操作合约
  - Qtum 互操作合约
  - EOS 互操作合约
- 治理: 系统内置结合 AI 的代理投票治理合约
  - Phase two: Dbot block chain platform
  - Dbot block chain supports EVM compliant smart contracts
  - Improved Dpos consensus algorithm
  - Improved EOS fees broadband flow control
  - Implementation: Graphene (or EOS) + EVM
  - Drawing on the Ethereum 2.0 and EOS segmentation, Parallel intelligent contract, message communication design, each group of AI services
  - (possibly by group of providers) set up the corresponding fragment area, and move the consensus part of each a Dbot service group to the chain.
  - ATM tokens migrate to Dbot block chains as primary tokens
  - Dbot account migration to Dbot block chain
  - Dbot Service management contract migrated to Dbot block chain contract
  - Develop corresponding interoperability intelligence contracts for different EVM-compliant intelligent contract platforms, providing interoperability among intelligent contracts for different block-chain platforms
  - ORSK Interoperability Contract
  - OQtum Interoperability Contract
  - OEOS Interoperability Contract
  - Governance: System built in with AI proxy voting governance contract



## ATMatrix DApp(第一阶段) ATMatrix DApp (Phase 1)

### Token 合约

- 主代币为 ATM
- 与 ERC-20 标准兼容
- 支持第二阶段的 DBot 区块链主代币迁移账户管理合约
- DBot 账户管理
- 权限管理
- 接入第三方合约（例如 uport）的用户身份认证模块服务合约：注册，管理和

### 调用

- 服务名管理系统：<服务路径，服务定义>
- 服务注册定义组成
  - 服务名
  - 服务 Schema 标准: 调用方法和参数
  - 服务价格

- 服务对应 DBot 账户治理方式：投票、单个、
- 服务返回结果链下共识程序定义
- 服务返回结果回调合约和函数：DBot 平台将链下共识后结果，通过发起交易，调用合约和函数。
- 合约中服务调用方法：可以开放给其他合约调用
- 合约中服务内容的变更、注销
- ATM 消耗
- 服务的创建、变更、管理、注销需要消耗 ATM 手续费
- 服务的调用，需要消耗手续费，并支付服务价格给合约，如果 DBot 平台调用成功并返回后，合约进行分账，支付费用给 DBot 账户，如果调用失败，费用返回给调用者。

## 升级相关合约

- 合约的自治方式
- 合约的逻辑和数据分离
- Token contract
- Main tokens are ATM
- Compatible with ERC-20 standards
- Support for the second phase of the Dbot block chain primary currency migration account management contract
- Dbot Account Management
- Rights Management
- User authentication Module service contract for access to third party contracts (e.g. Uport): registration, management, and invocation
- Service Name Management system: Service path, service definition
- Service Registration Definition Composition
- 0 Service Name
- 0 Service Schema criteria: calling methods and Parameters
- 0 service Price
- 0 Service counterpart Dbot account governance: voting, single,
- 0 service return result chain consensus program definition
- 0 service return result callback contracts and functions: the Dbot platform will link the consensus results and invoke contracts and functions by initiating the transaction.
- Service invocation method in contract: can be open to other contract calls
- Change and cancellation of service content in contract
- ATM consumption
- 0 the creation, alteration, management and cancellation of services requires ATM fees
- 0 service calls, need to consume the handling fee, and pay the service price to the contract, if the Dbot platform call succeeds and returns, the contract carries on the balance, pays the expense to Dbot account, if the call fails, the expense returns to the caller.

- Upgrade related contracts
- The autonomy of the contract
- Contract Logic and data separation

## DRobot 平台(第一阶段) DRobot Platform (Phase 1)

- 链下共识程序的运行支持
- 提供 DRobot 服务器开源程序，供 DRobot 账户运行维护。
- 提供 DRobot 账户注册和 AI 服务开发工具
- AI 服务开放市场和浏览器
- AI 深度学习算法，算力开放市场

- Operation support of the chain Consensus program
- Provide Drobot server open source program for Drobot account operation maintenance.
- Provide Drobot account registration and AI service development tools
- AI Services open Markets and browsers
- AI depth Learning algorithm to open the market

## ATM 代币 ATM Tokens

发布于以太坊上的 ATM 代币合约将会兼容 ERC-20 标准。

ATM 代币可以作为用户使用 ATMatrix 区块链网络和 AI 服务的费用和燃料，也可以作为 DRobot 账户提供约定服务的激励报酬和 AI 服务提供商的收入。ATM 代币是 ATMatrix 网络的通用代币。

变成一个由 ATM 代币控制的去中心化数字化自治管理组织是 ATMatrix 网络的 终目标之一。

The ATM tokens issued on the etheric Square will be compatible with the ERC-20 standard.

ATM tokens can be used as a cost and fuel for users to use Atmatrix block-chain networks and AI services, as well as incentive compensation and AI service providers for Drobot accounts to provide contractual services. ATM tokens are universal tokens of the Atmatrix network.

Becoming a centralized digital autonomous management organization controlled by ATM tokens is one of the ultimate goals of Atmatrix network.

## 用户案例 User Case

本节列举了 ATMatrix 可以应用的一些典型场景和案例，仅仅是未来众多应用的冰山一角，更多的应用案例等待用户去发掘和想象。

This section lists some of the typical scenarios and cases that Atmatrix can apply, just the tip of the iceberg for many applications in the future, with more applications waiting to be explored and imagined by users.



## 智能合约调用 AI-as-a-Service 案例 Smart Contract Control of AI as a Service

智能合约的大优势之一就是不可中断的执行一段程序或者契约，但是某些契约的执行需要依赖依赖于一些外部的数据事实或者证据，通常来说这些数据事实会有一些可信的第三方通过提交数据提供，未来 AI 带了的趋势之一就是，可信的第三方将会变成多个可信的第三方分别提供的 AI，以达到更高的参与率与可靠性。

One of the big advantages of a smart contract is the uninterrupted execution of a program or contract, but the execution of some contracts relies on some external data facts or evidence, usually, these data facts will have some credible third parties through the submission of data to provide, the future of the trend of AI is that the trusted third party will become more than a trusted third party to provide the AI, to achieve higher participation rate and reliability.

例如某个保险相关的合约需要通过调用 AI 来获取下个月上海的天气状况(温度, 灾害概率), 以帮助该保险合同完成在该地区中与天气相关的赔率精算, 后续的保险赔付执行将根据这个赔率自动执行。因为智能合约是在诸如以太坊这样的网络中的每一个节点中确定性执行的, 任何的确定性差错都会带来网络共识的失败, 因此节点各自执行的确定性智能合约中无法直接调用外部服务, 他们将通过由链上智能合约选举出来的账户执行收集信息并执行链下共识过程后, 获取外部 AI 信息和数据。智能合约将因为有了 ATMatrix 提供的通向 AI 服务的桥梁, 获得了外部信息的高度及时性和可靠性。

For example, an insurance-related contract needs to be called by the AI to obtain next month's weather conditions in Shanghai (temperature, disaster probability) to help the insurance contract to complete the weather-related odds actuarial in the area, and subsequent insurance payments will be executed automatically according to this odds. Because a smart contract is deterministic in every a nodes of a network such as an Ethernet square, any deterministic error leads to a failure of network consensus, so that the nodes cannot invoke external services directly in the deterministic intelligence contracts they execute, and they will obtain external AI information and data after the collection of information and the implementation of the chain consensus process through an account that is elected by the smart contract on the chain. The smart contract will get the high timeliness and reliability of external information because of the bridge that Atmatrix provides to the AI service.

## 基于 AI 的智能合约去中心化治理 AI Based Governance of Decentralized Smart Contracts

Aragon Network[6] 提出了一种基于智能合约的去中心化司法仲裁机制, 本案例将在此基础之上做进一步的改进, 为去中心化的司法仲裁中的法官提供更加自动化高效和公正透明的支持, 主要从两个方面, 利用 AI 更加高效的事实数据和证据获取, 利用链下共识在 AI 事实数据的基础上更加透明的得出仲裁结论。AI 能否完全取代人类可能还有争议, 但是因为人类做出决策的过程存在于大脑黑盒之中, 有非常多的不确定性和不可信性, AI 有理由在他们擅长的深度学习和区块链确定性领域比人类做的更好, 未来去中心化自治组织(DAO)的治理将很有可能被 AI 取代, 但在此之前, ATMatrix 提供的 DRobot 账户仍然可以保留“法官”角色的功能, 与类 Aragon 的系统保持兼容, 但法官将可以被 AI 替换。

区块链网络强调确定性, 确定性带来信任和低风险, AI 替换仲裁法官将带来确定性的提升, 从而提高网络的信任, 降低系统风险。

Aragon Network[6] proposes a centralized judicial arbitration mechanism based on intelligent contract, and this case will be further improved on this basis. In order to provide more automated, efficient and fair and transparent support to the judges in the centralized judicial arbitration, the conclusion of arbitration can be obtained from two aspects, using the more efficient data and evidence acquisition of AI, and using the consensus of the chain to make more transparent on the basis of AI factual data. Whether AI can completely replace humans may still be controversial, but because the human decision-making process exists in the black box of the brain, there is a lot of uncertainty and credibility, AI has reason to do better in depth learning and block chain certainty than humans do, and in the future the governance of the centralized Self-governing Organization (DAO) will likely be replaced by AI, but before that, the Drobot account provided by Atmatrix can still retain the function of the "Judge" role, Compatible with class Aragon systems, but judges will be replaced by AI.

The block chain network emphasizes certainty, certainty brings trust and low risk, and AI replaces the arbitrator will bring certainty, thus improve network trust and reduce system risk.

## AI 服务的互操作性 AI Service Interoperability

目前的 AI 服务是割裂的，因为数据的不同，对应 AI 擅长的地方各不相同，比如 Alpha Go 只懂下围棋，微信的 AI 更懂社交，支付宝的 AI 更懂支付，谷歌的 AI 可能更懂搜索行为和热点，其他一些 AI 更懂语音或语义分析，类比于人类，现在的 AI 看起来更像是智能的一部分功能，比如只会游泳，只会走路，或者只会说话。未来的超级智能必定功能更加全面和丰富，比如当遇到一个对手需要下围棋时就调用 Alpha Go 的 AI 服务，当需要检索搜索时，就调用谷歌的 AI 服务，当需要分析对方的社交关系时，就调用微信的 AI 服务。

The current AI service is fragmented, because the data is different, the corresponding AI excels in different places, such as Alpha go only understand go, micro-letter of Ai more socially, Alipay ai more understand the payment, Google's AI may be more understanding of the search behavior and hot spots, other AI more understand the voice or semantic analysis, analogy with humans, now the AI looks more like a part of the function of intelligence, such as only swimming, walking, or only talk. The future of super smart will certainly be more comprehensive and rich, such as when an opponent needs to go on the call of the AI service, the alpha go when the need to retrieve the search, call Google's AI services, when the need to analyze the other side of the social relationship, call the AI service of the micro-letter.

ATMatrix 希望为这种未来的超级智能提供 AI 服务间的互操作性。当需要完成某件复杂的 AI 任务的时候，通过操作其他的 AI 服务来共同协作完成是经济可行的方式。在 ATMatrix 中，AI 服务的互操作性是通过智能合约和 DBot 平台来实现的，注册在 ATMatrix 注册表智能合约中的 AI 服务已经被标准化，其他 AI 服务所调用只需支付一定的费用，均可以调用。因为 ATMatrix 的开放、无需互信和无需授权的特点，ATMatrix 网络也可以理解为 AI 服务提供商和使用者之间的网络基础设施和价值交换网络。

Atmatrix wants to provide the interoperability of AI services for this futuristic super smart. When you need to complete a complex AI task, it is economical and feasible to work collaboratively through other AI services. In Atmatrix, the interoperability of AI services is achieved through intelligent contracts and Dbot platforms, the AI services registered in the Atmatrix registry Smart contract have been standardized, and other AI services are called to pay only a certain fee. Because of the openness of Atmatrix, the need for mutual trust and the need for authorization, Atmatrix networks can also be understood as network infrastructure and value-switching networks between AI service providers and users.

## 结论 Conclusion

传统的信息中介平台是互联网信息交换的重要应用，他提供了经济领域基于信息聚集和信任中介的合作基础。但是，在 AI 领域，因为数据在 AI 服务中的重要价值，使得利用信息中介平台很难达成价值交换和协作机制，共有链和基于共有链的 DApp 为各自分裂的 AI 服务参与者提供了这样一个价值交换和通信协作的网络。我们已经展示了如何通过 ATMatrix 来实现区块链世界和 AI 世界的桥梁，让智能合约和 AI 服务间都可以互相操作。我们也列举了该系统如何为未来的 AI 应用提供支撑。特别的，它具有传统信息中介平台所不具备的与生俱来的优越性。

The traditional information intermediary platform is an important application of Internet Information exchange, and he provides the cooperative basis of information aggregation and trust intermediary in the economic field. However, in the AI domain, because of the important value of data in AI service, it is difficult to reach the value exchange and collaboration mechanism by using the information intermediary platform, and the common chain and the dapp of the common chain provide such a network of value Exchange and communication collaboration for the split AI service participants. We've shown how to bridge the block-chain world and the AI world through Atmatrix, allowing interoperability between smart contracts and AI services. We also enumerate how the system provides support for future AI applications. In particular, it has the innate superiority which the traditional information intermediary platform does not have.

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