1. Preface

After 50 years of development, the electronic payment network has long been deviated from the consensus mechanism of industry associations and has become a centralized giant. For the protection of their own interests, the "giants" have adopted various strict and cumbersome rules and access mechanisms. However, due to the complexity of the organization, the implementation process is very opaque, which breeds bureaucratic inaction and corruption, resulting in low efficiency of payment innovation, complicated payment rate and high risk.

At the same time, the cryptocurrency ecosystem and the innovation of various industries stimulated by blockchain technology are rising. Based on blockchain technology, the future of cryptocurrency is immeasurable, with a compound annual growth rate of 31%. The total global market value of cryptocurrencies is expected to reach $1,806 billion by 2021. If 30% of the market value enters the circulation field, it will exceed the estimated global electronic payment market of $500 billion in 2018.

2. Overview

The vision of Alchemy GPS Singapore Pte. Ltd. (Alchemy is the brand name of Alchemy GPS Singapore Pte. Ltd. while ACH is the Token issued by the Alchemy, and is used as the abbreviation below.) is to provide open source protocols and rapid product development platforms for the ecosystem partners to help them with fast, secure, convenient, flexible and fast-growing global payment solutions, based on the decentralization, smart contracts and consensus mechanisms from blockchain technology.

Through the rich experiences of Alchemy and its eco-partners in mobile payment applications, the team is confident to lead the payment industry’s technology application in the blockchain era and to use the solutions where the traditional payment is popular with merchants. Through decentralized smart contract payment agreements and the incentives for the innovation capabilities of various payment technology companies, the team aims to activate the human wealth of technical talents, use the agreement to reach the consensus of the industry community, and guarantee the transparent implementation of rules with technology, so that the cryptocurrency can become an important part of the real-life transaction soon.

Alchemy’s strength lies in the team’s deep understanding of the payment industry and operational experience. The team knows the global payment technology trend of wallet payment, cross-border acquiring, corporate funds collection, collecting solutions for multi-level distribution and other traditional payment programs. It possesses a favorable network in the tech community in Asian payments.

The Alchemy decentralized payment network features are as follows:

- Open and scalable Alchemy consensus protocol to establish payment industry norms and promote changes in the payment industry
- Use lightning network technology to achieve real-time transaction of existing electronic payments
- Offer the most comprehensive support for various cryptocurrency payments for consumers and businesses to choose
- Online/Offline one-stop order; seamless integration with mainstream Smart POS; fast access to various applications for online SDK/Plugin/API
- Decentralized infrastructural network, operation and governance networks, including dispute arbitration, custody, credit scoring, risk control, anti-fraud, clearing, etc., to greatly improve operational Efficiency and reduce operating costs
- Basic payment functions and solutions for large-scale commercial applications:
3. Existing Problems

3.1. The Problems of Existing Electronic Payment

The existing electronic payments are controlled by centralized industry giants, causing numerous problems such as complicated and blurry rules, discretionary right, inefficient dispute management, and high fees, etc.

The traditional electronic payment ecosystem involves too many intermediate links and there are many problems. e.g.:

- Cross-border transactions are costly and inefficient
- Items of expenses
- A large number of transactions cannot be proceeded because there is no trust between the two parties, and the centralized giant does not provide guarantee services and payment channels

- Opaque access rules for merchant/consumer
- Serious security and privacy issues
- Long processing of transaction disputes
- Cumbersome process of reconciliation, settlement and clearing

For example, game developers are targeting products in the Southeast Asian market. They face various risks in payment:

- Local payment costs are high

In Southeast Asia and India, bank card and credit card penetration rate is low. The local mainstream payment method is the operator’s call charge, prepaid card recharge, etc. The cost of some payment channels is up to 30%-50%. They usually need multiple payment channels to lower the cost.

- Difficulties in sending funds back home

The fees charged by the overseas content platform through different payment channels can only be reached locally. For the funds to go back to China, it is required to solve the foreign exchange control issue and pay high taxes.

- Another typical example:

A multinational retailer in the Asia-Pacific region has retail stores and a unified retail management system in Sydney, Hong Kong, Dubai, Bangkok, Singapore, and Kuala Lumpur. In order to facilitate unified management, it is hoped to achieve unified receipt in various regions, but it faces many issues:

Since the acceptance of credit cards and wallets requires authorization from the card organization and the wallet issuer, and these authorizations are granted by country region and card variety, the retailer owns eight service agencies in the Asia Pacific region.
The service standards, clearing time, rates and surcharges of each service organization are different, and the adjustment of accounts due to the exchange rate conversion in multi-currency is also different, which brings a lot of work to the supplier management, financial management, tax planning and inventory management of this multinational retail enterprise.

Under the existing electronic payment structure, the efficiency of payment is low and the overall payment cost is high. The most important thing is: merchants and cardholders have no choice, no right of discourse, no right to price-setting or right to access the information on this old ecosystem.

The centralized organization that holds power does not focus on the user experience, payment product innovation, merchants and user interests. In the long run, the traditional payment industry has become stagnant, and it is urgent for it to be replaced by new forces.

The decentralization, de-trust, open and transparent, consensus-based, traceable, and tamper-proof features of the blockchain have brought huge innovation opportunities to the reform of the payment industry, allowing merchants, consumers and relevant participants in the payment industry chain to enjoy the benefits of an open, fair and unrestricted low-cost trade.

Cryptocurrency represents the next phase of currency development. The emergence of Bitcoin, other blockchains and second layer solutions have made it possible to achieve a brand-new electronic cash system entirely through peer-to-peer technology. Many cryptocurrencies and their visions have led to the continuous improvement of the overall blockchain ecology and technical capabilities. Increasingly, we are also seeing the trend and demand for integration with finance growing fiercely.

Payment is one of the core functions of currency and the need for crypto in value transfers is fundamental value of the entire cryptocurrency ecosystem and the catalyst for technical development in the financial field. Yet, despite the continuous breakthroughs and recognition of multiple cryptocurrencies in their technologies, visions and applications, the current role of payment for cryptocurrencies remains small in the cryptocurrency ecosystem.

One important reason why cryptocurrency payment has been unable to prosper is that compared with the electronic form of legal currency, cryptocurrency has a huge disadvantage in the convenience of payment. Regardless of online or offline payments, when people make daily purchases, there are usually only fiat payment options. If a person wants to use cryptocurrency to buy something, both the merchant and consumer need to install cryptocurrency wallets at the same time, which greatly increases the barrier for the public to use cryptocurrency payments.
3.2. Challenges of Blockchain Payment Platforms

Existing blockchain payment platforms have obvious deficiencies in their basic payment functions, operational support systems, and Blockchain technology infrastructure.

Overall, the existing blockchain payment problems can be roughly classified into following categories:

- Lack of basic payment functions for large-scale commercial applications

To realize large-scale commercial application, payments must be able to provide support for some of the following prime functions:

**Application Scenario 1:**

The real business application includes the scenario of payment party’s active payment (PUSHPAY mode), also includes the scenario where the payee actively initiates the debit request and automatically completes the deduction (PULLPAY mode). The PULLPAY mode scenario is applied in many areas such as Uber taxi automatic deduction and public utility payment (such as water and electricity coal payment). In the existing blockchain payment project, since consumers hold the private key, the payment must be initiated by the user. The payment could only proceed when consumers authorize and proactively initiates a payment request so only the PUSHPAY mode is supported.

**Application Scenario 2:**

In real business applications, there are complex requirements for the payment account system. For example, group chain institutions require “multi-level accounts”. Unlike common individual households, multi-level accounts need to support hierarchical relationships to correspond to group company organizational structure.

Multi-level accounts need to support “two lines of revenue and expenditure” (that is, “receipt account” only allows input, “payment account” only allows output), and need to support automatic collection of sub-account funds to the total account every day. At present, blockchain is designed for common users and does not provide more complicated applications. Traditional payment emphasizes that “the account is the core of payment”. Without a perfect account system, it is difficult to meet the daily payment needs of enterprises.

- Lack of operational support systems needed by commercial applications

Most current blockchain payment platforms focus on their technical application in the payment industry, and rarely consider the construction of the operational support system necessary for the commercial application of the payment platform.

In addition to technical research and development, the operational support system of a payment system is one of the core capabilities. Only by maintaining low-cost, high-efficiency operational capabilities can the platform expand and continue to operate on a large scale. The operational support system guarantees the service quality of the platform and is also an important source of various innovations.

- Infrastructure issues of blockchain technology

The existing blockchain technologies have many shortcomings in terms of transaction performance, cross-chain payment, and account support.
3.3. Comparison of existing blockchain platforms

Payment is one of the popular application areas of the blockchain, and many innovative projects have emerged. They can be roughly divided into the following categories:

- X-border remittance by working with traditional financial institutions: Ripple, Stellar;
- Wallet issuers: Circle, Bitpay;
- Providers for daily micropayments: Request, Nano;
- Cryptocurrency acquiring aggregators: Coingate, Coinpayments, Pundix;
- Decentralization ecosystem for crypto currencies: COTI, Graft;
- Payment solutions focusing on unique use cases: Pumapay, uTrust

In order to be widely applied, payment platforms using blockchain technology must exceed the efficiency, comprehensiveness and levels of quality relative to multibillion dollar competitors in the areas of practical experience, client use cases, and operational support. With that said, it is difficult for existing blockchain payment products to meet this kind of commercial requirement because of their varied value propositions.

<table>
<thead>
<tr>
<th>Positioning</th>
<th>Alchemy</th>
<th>Graft/COTI</th>
<th>Pumapay</th>
<th>Circle/Bitpay</th>
<th>Ripple/ Stellar</th>
<th>Request/Nano</th>
<th>Coingate/Coinpayments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target</td>
<td>Acquirers</td>
<td>Merchants</td>
<td>Merchants</td>
<td>Consumers</td>
<td>Financial Institutions</td>
<td>Merchants/Consumers</td>
<td>Merchants</td>
</tr>
<tr>
<td>Core Product</td>
<td>Payment Protocol</td>
<td>Merchant Acquiring</td>
<td>Subscription Payment</td>
<td>Wallet</td>
<td>Remittance</td>
<td>Micro Payment</td>
<td>Merchant Acquiring</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Basic Functions</th>
<th>Support multiple cryptocurrencies</th>
<th>Multi-level account support</th>
<th>Active payment (withholding mode) support for merchants</th>
<th>Combined payment, conditional payment, escrow payment, etc.</th>
<th>Peer-to-peer payment</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Operational Support</th>
<th>Escrow</th>
<th>Dispute Mediation</th>
<th>Credit Score</th>
<th>Security Fund</th>
<th>Risk Management and Anti-fraud</th>
<th>Cross-chain Payment</th>
<th>Smart POS Integration</th>
</tr>
</thead>
</table>

Alchemy vs Existing Blockchain Payment Platforms
We focus on providing payment protocols and open source development platforms that enable payment companies to adopt it with faster and cheaper service.
4. VISION

Alchemy envisions that backed by decentralization, smart contracts and consensus mechanism of blockchain, Alchemy would enable payment industry players to embrace the new era of payment technology by fully utilizing a series of open source protocols and open R&D platform to improve the efficiency of cross-border payments; to provide merchants and customers with a faster, more secure, more convenient, and more flexible global payment solution.

5. Goal

The Goal of Alchemy is to design the payment protocol through community consensus, to build a decentralized, trust powered infrastructure, to expedite the penetration of cryptocurrency into our daily life; and most importantly to return the rights of payment to the merchants, the customer and the market.

5.1. Decentralization

Alchemy achieves the decentralization of payment Networks by integrating with decentralizing Cryptocurrency wallets, deploying decentralized Technical structures, along with relevant operation And governance mechanisms.

With the frictions and pains working with traditional centralized payment networks such as Visa, Mastercard, UnionPay and other switching network, Alchemy payment network adheres to the concept of “decentralization” from payment currency, technical architecture, operation system and governance mechanism for our visions and goals.

We’ve applied the following technology and measures to achieve decentralization:

- **Decentralization of currencies**
  
  One of the most fundamental problems of traditional payment networks is that legal FIAT currencies are the exclusive options for transactions. This then helps centralized institutions retain power over the clearing and settlement processes.

  As a decentralized open ecosystem, the Alchemy payment network provides access to various assets that can be liquidated, including but not limited to various cryptocurrencies, tokens, credit payments and points of credit service providers, various forms of digital assets, and fiat currencies; ultimately helping to open up options for transactions and not limit them to one single form of currency. We believe users and merchants have the right to choose which currency to use for payment and settlements.

- **Decentralization of Technical Infrastructure**

  The product architecture of Alchemy is composed of five layers: the access layer, the solution layer, the product layer, core layer, and the blockchain network layer. Each of them acts in accordance with the innate principles of decentralization. Each layer is also defined through an open ACH payment consensus protocol to ensure consistency with decentralized applications.

- **Decentralization of Operational Mechanism**

  Based on a Service Level Agreement, Alchemy has standardized and categorized the daily tasks with a grading system. For example, merchant onboarding process, reconciliation, and settlement are facilitated through the automated and transparent execution of smart contracts; decentralized dispute settlement, decentralized exchange, and decentralized automated clearing houses are all applied to crowd-source the operational tasks to our ecosystem partners. By ensuring quality and efficiency with these operations, every player can expand fast at a more affordable cost by working together.
5.2. Large-scale Commercial Application

Alchemy meets the needs of large-scale commercial application by supporting complex account infrastructure, complex PUSHPAY and PULLPAY Payment models, complex transaction types and More reasonable business flow for payment services.

Modern businesses have many requirements for electronic payment providers but have to subject to all the friction we discussed earlier. Their collective needs continue to be left unresolved in any way. If these market demands cannot be met, or if the pain points cannot be addressed, then using cryptocurrencies as one of the mainstream forms of payment will not be realized.

The core demands to help achieve this ultimate vision of mass adoption are:

- **Support for complex account infrastructure**
  
  In addition to personal accounts, the commercial business also supports complex account types such as hierarchy accounts, escrow accounts, credit accounts, joint accounts, and high-frequency hotspot accounts.
  
  For example, many companies and enterprises have special needs for hierarchy of accounts, "payment-collection parallel" model, and payment consolidation accounts.

- **Support for complex payment models**

  Real payment cases include C2C (Customer-to-Customer), C2B (Customer-to-Business) and B2B (Business-to-Business). Different business models have corresponding payment models.
  
  For example:

In respect of merchants, the payment model can be divided into: PUSHPAY model with the payer as the payment initiator and PULLPAY model with the payee as the initiator;

In respect of a security model, the payment model can be divided into escrow transactions and standard transactions;

The payment model can also be divided into single payment and batch payment;

In respect of the type of payment, it can be divided into cryptocurrency payment, credit payment, and bonus point payment;

In respect of the corporate payment case, it can be divided into restricted batch payment (salary payment), capital consolidation, fund appropriation, and supply chain factoring.

- **Support for complex transactions**

  Transaction types in real world business are not confined to a simple model between users and merchants. Complex transaction types are also included such as combination payments, subscription payments, batch collection/payments, restricted payments, secured payments, document splitting, transfers, and corporate payments.

- **More reasonable support for payment service flow**

  Traditional electronic payment is greatly restricted by the various rules, regulations, and interface limitations of centralized payment institutions, which lead to the problems of business flow and capital flow, such as the various problems in cross-border receipts.

  Through Alchemy's payment network construction, the payment process can better meet the needs of business processes and helps with business innovation.

- **Smart contracts need to become easier to use and meet the requirements of commercial scalability**
Alchemy employs a large number of smart contracts to automate payments. However, the deployment and application of smart contracts must rely entirely on professional engineers. It can also be argued that smart contracts are still toys for “techy”. By providing visual friendly tools to template smart contracts, Alchemy will allow non-technical users to freely edit, create combination of smart contracts to adapt to their needs. At the same time, DAPP developers can launch various innovative smart contract applications in our smart contract app store for a fee.

5.3. Security and Trust

Alchemy is building a trust-driven ecosystem through credit scoring architecture to address payment security issues.

Various security issues, including fraud, malicious user attacks, phishing sites, and privacy exploitation, exist in the world of both online and offline payment. Therefore, creating a secure payment environment is the top priority for our solution.

The Alchemy ecosystem is trust-driven. To achieve this vision, we will take the following measures:

- Trust-driven ecosystem; merchant’s credit deposit; security fund; Privacy protection; credit scoring; decentralized risk management and anti-fraud

5.4. Sustainable Evolution

Alchemy is an open ecosystem that allows sustainable evolution.

As a basic network for payment, sustainable evolution of the platform is vital for Alchemy. To achieve this, the key lies in our continuous innovative capability by adhering to rules developed through community consensus. The common rules of the platform are guaranteed by governance mechanisms and consensus mechanisms. As for innovation, the development of electronic payment systems over the past few decades have fully demonstrated that as long as the power is granted to the innovators who are closer to the market, unlimited creativity will come along.

In terms of governance mechanisms, Alchemy adopts a completely open ecosystem, enabling participants to focus on what they are good at. Appropriate incentive mechanisms are applied to achieve maximum profit and to stimulate innovation through the market.

5.5. Operation with Low Cost and High Efficiency

Alchemy achieves low-costs and high efficiency through the decentralized operational support infrastructure.

Operating a payment network involves a large amount of work. This includes merchant onboarding, merchant integration IT support, customized demand for merchants, dispute resolution, clearing and settlements, customer service, risk management, and anti-fraud. The network cannot reach a scale if we cannot provide high efficiency with lower cost.

Alchemy fully exploits the power of blockchain smart contracts, focuses on smart contracts, promotes the decentralization and intelligent construction of the operating system, and relies on the decentralized operational support system to inspire eco-partners to participate in the Alchemy payment network with economic incentives, thus realizing the goal of low-cost and high efficiency.
6. Ecosystem

Alchemy Ecosystem

Alchemy ecosystem is composed of partners at the users’ end, partners at the merchant side/business end, partners of transaction service networks, and our developer community.
### 6.1 Partner and the User End

<table>
<thead>
<tr>
<th>Stakeholders</th>
<th>Requirements &amp; Interest</th>
<th>Responsibility in the Ecosystem</th>
<th>Product Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>User</td>
<td>Hold various cryptocurrencies; require attractive consumption scenes; Can overdraw as a credit card; Safe consumption and avoid malicious merchant fraud; Control the consumption data and avoid privacy leakage; tokenization data income; Can exchange mobile credit, with universal usage of points obtained from various merchants</td>
<td>Online Purchase; Offline Purchase;</td>
<td>User wallet; In-app payment; Online payment</td>
</tr>
<tr>
<td>E-wallet developer</td>
<td>They have user base and need to provide more usages for wallets</td>
<td>User wallet integration with Alchemy payment solution; User wallet; Digital identity APP</td>
<td></td>
</tr>
<tr>
<td>Issuers</td>
<td>Bank cards and virtual cards issuers and able to utilize the acquiring network of influential card association such as Visa, MasterCard, Union Pay</td>
<td>1. Apply for Visa/MasterCard, etc 2. Apple pay and google pay integration 3. Integration with smart POS</td>
<td>Virtual Card</td>
</tr>
<tr>
<td>High Traffic Website/APP</td>
<td>They have C end consumer base and need to provide a secure, fast and low-cost payment for users;</td>
<td>Website/APP integration with Alchemy payment solution</td>
<td>Payment SDK/Plugin/API/Gateway</td>
</tr>
</tbody>
</table>

### 6.2 Partner of Merchant Side/Business End

<table>
<thead>
<tr>
<th>Stakeholders</th>
<th>Requirements &amp; Interest</th>
<th>Responsibility in the Ecosystem</th>
<th>Product Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smart POS manufacturer</td>
<td>Integrate Alchemy payment solution with smart POS</td>
<td>Smart POS integration with Alchemy solutions</td>
<td>Wallet at the merchant side; Lightening Network+NFC payment solution; Virtual card solution</td>
</tr>
<tr>
<td>Merchants/ corporate service provider</td>
<td>They have merchant base and charge service fees by providing payment solutions</td>
<td>Expand merchants in their respective regions and provide them with ACHPAY payment network solutions including cryptocurrency receipts, universal points, corporate payments</td>
<td>Sales toolkit</td>
</tr>
<tr>
<td>Payment gateway service provider</td>
<td>Current payment solutions integration with cryptocurrency related payment solutions</td>
<td>Customized development of payment gateways for various industries and regions; merchant technical access support</td>
<td>SDK.Plugin/API/gateway sidechain (may issue their own tokens)</td>
</tr>
<tr>
<td>Software developer</td>
<td>Integrate competitive payment solutions in their software (multi-level account fund collection)</td>
<td>Software integration with Alchemy payment solutions</td>
<td>SDK.Plugin/API/gateway.</td>
</tr>
<tr>
<td>Industry solution provider</td>
<td>Integrate competitive industry payment solutions into their solutions</td>
<td>Cooperate with Alchemy and ecosystem partners in customizing industry solutions</td>
<td>Industry solutions sidechains (may issue their own tokens)</td>
</tr>
</tbody>
</table>
6.3. Partners of the Transaction Service Network

<table>
<thead>
<tr>
<th>Stakeholders</th>
<th>Requirement &amp; Interests</th>
<th>Responsibility in the ecosystem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cryptocurrency Issuers</td>
<td>Issued needs to have a consumption scenario</td>
<td>Integrate with Alchemy payment network to improve payment efficiency. Credit is granted to users and merchants, and the credit line is used on the Alchemy payment network. The risk of bad debts is borne by the credit service provider.</td>
</tr>
<tr>
<td>Credit payment service providers</td>
<td>Record user’s credit score and create more consumer scenarios</td>
<td>Credit payment gateways</td>
</tr>
<tr>
<td>Cryptocurrency assets issuers</td>
<td>Issued cryptocurrency assets require circulation or consumption scenarios</td>
<td>Cryptographic currency asset channel gateway;</td>
</tr>
<tr>
<td>Exchange</td>
<td>More cryptocurrency transactions</td>
<td>Exchange channel gateway;</td>
</tr>
<tr>
<td>Stable Coin service provider</td>
<td>Stable coins need more application scenarios</td>
<td>Stable coin channel gateway;</td>
</tr>
<tr>
<td>Liquidity service provider</td>
<td>Holding legal currency to maximize revenue</td>
<td>Alchemy node;</td>
</tr>
</tbody>
</table>

6.4. Developer Community

Developers are a vital part of innovating Alchemy ecosystem. Building a developer-friendly community is the core task of Alchemy. The participants of Alchemy developer community include:

- Payment consensus protocol developer: participating in the development of interfaces, service and product related to Alchemy Consensus protocols;
- Application developers: participating in the development of Alchemy ecosystem-related apps and services;
- DAPP developers: participating in the development of various DAPP in the Alchemy ecosystem;
- Member marketing developers: participating in the development of Member loyalty management, member marketing.
7. Product Features

It provides online and offline merchants and consumers (users) with a variety of payment and settlement modes in both fiat currencies wallet and cryptocurrencies, as well as industry solutions.

Alchemy Payment provides a hybrid payment integrated with both cryptocurrency and fiat currency. Different product forms can be selected according to different situations to meet the needs in various scenarios. It provides a data statistics system for all products, you can view historical transactions, payment reviews and other data.

7.1 Smart POS for Cryptocurrency

- Cryptocurrency and Fiat Currency Acceptance
- Lightning Network Express Payments

7.2 Cryptocurrency Payment Gateway

- Online and Offline Access Schemes including SDK/Plugin/API/Gateway
- Supporting Lightning Network Express Payments
- With PULLPAY+PUSHPAY lightning network, PULLPAY supports pre-authorization

7.3 IN-APP Payment SDK

It provides partners with a Lightning-network-based IN-APP payment SDK, embedded in the partners’ APP, achieving IN-APP Lightning payment.
8. Application Scenarios

8.1. Transnational Centralized Collection

Example

If a company has subsidiaries in multiple countries in Asia, which are managed by regional headquarters, then the assets of these subsidiaries need to be regularly and automatically aggregated to upper level headquarters.

The Alchemy payment network solution for the payment scenario of transnational centralized collection is:

- To facilitate this need, the transnational company opens Alchemy Hierarchy of accounts. The accounts are then set according to the company’s hierarchical architecture. Account of each level support sub accounts of various types (which are set according to the need of Accounting subjects), for example to support the "payment-collection parallel" model (which is commonly used in financial management of a group) then separate accounts for collection and payment can be set up for companies at each level.

- Hierarchy of accounts supports hierarchical authorization management models through which managers of the higher-level accounts could then set permissions for managers of lower-level accounts. For example, account permissions are limited to collection instead of payment, or to conducting restricted payments for designated accounts.

- When accounts at all levels of Hierarchy of accounts activate proactive Collection permissions, accounts of higher level can regularly conduct Automatic collections to account for lower levels within valid durations. This explains how automatic concentration of assets are accomplished in a multi-level system.
**8.2. Sub-Account of Direct-Selling Company**

**Example**

Direct-selling and distributing industries have a great demand for automatic accounts splitting and batch payments.

For direct-selling, distributing industries, Alchemy payment network solution to use cases of automatic account splitting and batch payment:

- Opening Alchemy hierarchy accounts for direct-selling companies. Accounts correspond to a hierarchical system of direct-selling architecture. At each level, accounts support sub-account of various types, e.g. collection account, payment account, splitting account can be set at each level.
- Business collection of direct-selling staff at each level goes to corresponding collection account.
- Each day, system automatically concentrates money of collection accounts of each level to master account of the direct-selling company.
- Direct-selling company formulates document splitting rule, which is saved in smart contract.
- When accounting staff of the direct-selling company initiates document splitting operations, smart contract automatically conducts document splitting according to document splitting rule. The money goes to document splitting account of direct-selling staff through batch payment.
8.3. Digital Entertainment Industry Payment

The digital entertainment market is an important target market for Alchemy. Its solution for digital entertainment market is as follows:

- Packaging Alchemy payment solution into forms such as SDK, API, and front gateway and then provide these to game developers who can select corresponding solutions according to their own RESEARCH AND DEVELOPMENT capabilities. For the simplest case, developers can just set up a few parameters to access Alchemy payment network.

- API is suitable for game developers with high proficiency in RESEARCH AND DEVELOPMENT who needs control over payment process. Front gateway provides complete platforms which include transaction system, payment systems. This is suitable for developers with lower proficiency in server development. SDK is suitable for cases In-APP payment or web games and for developers with moderate proficiency in server development.

- Alchemy payment solutions for digital entertainment industry includes various services such as cryptocurrency payments, subscription payments, credit payments, combined payments, and revenue splitting.
8.4. Offline Consumption

Typical cases of Alchemy payment solution for offline consumption:

- User for an offline merchant chooses cryptocurrency payments.
- Merchant creates a sale order with cash register app of smart POS. The app calls Alchemy SDK to acquire the collection address of the transaction.
- Alchemy transaction processing system generates payment transaction orders.
- Payment gateway returns information such as collection address, transaction order to Alchemy SDK of the smart POS.

- Alchemy SDK creates QR code for user to then scan and pay.
- User scans with the wallet APP to authorize the payment.
- Alchemy payment channel gateway polls to acquire transaction status of the blockchain order.
- Alchemy transaction processing system writes transaction order into a blockchain payment network.
- Alchemy payment gateway pushes real-time payment status to smart POS through WebSocket, notifying merchant of successful payment.
- User can also pay through the Lightning Network with the similar process.
8.5. Issuance and Circulation of General Bonus Points

Typical cases of Alchemy payment network applied to a general bonus points:

- Through Alchemy member loyalty management platform, merchant issues Token of its own brand, which is anchored in ACH (Alchemy Token).
- When users shop with merchants, merchant business systems then call general bonus point gateway of Alchemy platform.

- Based on smart contract setting, universal bonus gateway awards user with merchant Tokens.
- Users may check Token assets possessed through wallet APP and use the rewarded Token for payments in the future.
- Users can participate in transaction using rewarded merchant Token at the Alchemy decentralized exchange. Token can then be converted to ACH or Token of other merchants to accomplish Token conversion and circulation.
8.6. Cross-Border E-commerce Escrow Payment

For cross-border Ecommerce and C2C transaction at platforms like eBay, Taobao, third party participation is needed for escrow transactions due to lack of trust, and language barriers. During the process methods and processes encounter issues such as arbitration of transaction dispute, merchant fraud, and operational support.

Alchemy infrastructure such as decentralized operations can safeguard transaction and create a safe and trust-driven transaction environment.

8.7. Local currency exchange

Tourists traveling overseas, migrant workers sending remittances back home, and international students traveling abroad for short periods of time are all faced with the problem of local currency exchange. The problems are particularly acute in southeastern Asia, including high fees for transnational remittance service providers/exchange service providers, and stringent foreign exchange control policies of various governments.

Through Alchemy’s numerous online and offline partner network (such as Zerobank) and solutions, users can exchange local currency easily.

Typical circumstances, exchange currency at money-changers --- offline:

- Offline money-changers installed with preset Alchemy one-stop multi-currency receiving solution and can complete the acquiring of various digital currency and legal currency easily.
- The user uses our money-changer partner’s APP to find the nearest money-changers and quotes. At the same time, the user can view the exchange points and credit score in Alchemy.
- The user scans the merchant’s acquiring QR code at the money-changer to complete the payment.

- If you are concerned about fraud at the money-changer, you can Choose Alchemy to centralize the escrow service to ensure that the Transaction will proceed smoothly.
- After the merchant at the money-changer has successfully received payment through the smart POS, the local legal currency is then exchanged to the user.
- If an escrow service is used, currency is transferred from the escrow account to the money-changer merchant account only after the user makes the confirmation.
- If there are disputes during the transaction process, arbitration can be conducted through Alchemy decentralization disputes.
9. Roadmap

- **P1** Smart POS integration for accepting payments in cryptocurrency
- **P2** Payment acceptance on Lightning Network MVP
- **P3** PULLPAY MVP
- **S1** Offline payment acceptance solutions for cryptocurrency
- **S2** Merchant POC for offline payment acceptance
- **P7** Alchemy Hub v0.5 is released (support Raiden Network and State Channel)
- **P8** Alchemy Hub APP V0.5 is released (support Raiden Network and State Channel)
- **P9** Bitcoin P2P Purchase APP v1.0
- **P10** PULLPAY V0.8
- **C1** Community working group of Alchemy consensus protocol is established
- **C2** Alchemy Consensus Protocol v0.5 is released
- **P14** Alchemy Hub v1.5 is released
- **P15** Alchemy Hub APP V1.5 is released
- **P16** PULLPAY V1.5
- **S7** Multinational centralized payment acceptance solutions

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- **2019 Q1-Q3**
- **2019 Q4**
- **2020 Q1**
- **Q2**
- **Q3**
- **Q4**
- **2021 Q1-Q3**

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10. Team

10.1 Founding Team

John Tan
CEO
John is a growth guru with 8 years of experience leading the business development functions at leading payment service providers as well as PR agencies. Previous roles also include consulting for Fortune 500 companies, including Honeywell, RSA, DBS Bank and more.

Molly Zheng
Chairwoman & Co-founder
Molly has over 20 years of experience in the payment industry. She served as Senior Consultant at Paypal China, SVP of HSBC China, Director of GE Money and Chief Representative of MasterCard China. Her roles in the payment industry have required expertise and responsibility in more than twenty countries.

Shawn Shi
Chairman & Co-founder
Shawn is a seasoned entrepreneur with over 10 years of experience in Internet products. Before founding Alchemy, he was vice president of technology at China’s leading insurance company ZhongAn. Shawn has extensive marketing experience as well, and was the Head of Marketing at Chinese cybersecurity giant Qihoo 360.

Liang Chuan
CTO
Liang is a payment and internet products veteran with over 20 years of experience under his belt, including as CTO and Technical Director for leading payment companies, such as Chongqing Zhongwang Microfinance Co., Ltd., Beijing Changjietong Payment Technology Co., Ltd., and Yeepay.com.

Lv Bo
Head of Payments
Lv is an expert in B2C and B2B payment services. He began his career at Tencent as a product manager and in 10 years advanced to become the vice president at one of Asia’s largest payment companies before joining Alchemy.

Train Luo
Strategy & Talent
Train has been a developer of talent in the high-tech industry for the past twenty five years, working in both Silicon Valley and China to fill roles that are best suited to build technology venture bridges between both.
11. Alchemy Token

11.1. ACH

ACH is the token of whole Alchemy system. Its total volume is capped at 10 Billion, which cannot be increased. Merchants participating in the governance of node network and blockchain payment system need to pledge and consume ACH Token. Meanwhile, merchants and payers mine for and collect ACH tokens incentives by acting as payment participants. ACH holders have the rights to take part in governance activities.

Most of the ACH tokens will be distributed to payment participants, which are mostly merchants and payers. In this system, each merchant is running node as it is running a payment terminal. The money transfer is completed by the node and the node will receive a bonus after each successful transaction. The amount of ACH tokens in this bonus is determined by the transaction volume which will be distributed by the node to payers and itself. Alchemy has the ability to achieve regional operation on a global scale and the ACH reward system will differ according to factors such as country, region, merchant class and consumer class.
11.3. The Use of ACH

Alchemy is aware that relying on technical solutions and resources is not enough to quickly drive the adoption of cryptocurrency payments - which will require a wide range of participants and supporters. As such, a strong incentive program is necessary.

ACH is committed to building an efficient and fair token economic incentive ecosystem. Its core design revolves distributing reward tokens - which holds ecological rights and interests - based on contribution to drive positive impact on the ACH payment ecosystem.

The most important benefit for ACH holders is to receive income distribution. Alchemy can decide whether to buy back ACH from exchange and burning them or distribute income in BTC and other cryptos, per market observation.

11.3.1. ACH Payment Ecosystem and Incentive Mechanism

The ACH payment ecosystem mainly rewards two behaviors: payment and referral. Payment reflects to the action of being participant in the payment ecosystem. However, the number of payers using Alchemy cryptocurrency payment system is equally critical. Therefore, referral program to drive the growth in users within the community is extremely crucial to the development of the ecosystem. Alchemy is an advocate on providing payers with mixed payment options and believes payers should have the full freedom in choosing which currency to pay with. The introduction of ACH rewards, however, will incentivize more payers to choose to pay in cryptocurrencies and experience the benefits of crypto payments - granting them a fuller picture as to which payment method suits them better.

The mining difficulty to obtain ACH rewards will continue to increase over time and scale of users. This means that users, who conduct payment transactions and refer new users, at different stages will receive varying ACH rewards. During the early stages, mining difficulty will be lower and hence, provide a higher reward for early participants in the ecosystem. This is in line with the principle of establishing community consensus.

The ACH payment ecological reward pool has 4 billion ACH tokens, accounting for 40% of the total supply, which is expected to be distributed in 5 years.

11.3.2. ACH Payment Incentives Mechanism

Most ACH will be rewarded to both parties involved in a payment transaction. The core infrastructure that supports the operations of the payment system is the merchant node network. Merchants using Alchemy systems are defined as nodes, and payment and settlement transactions by merchants and payers take place on the merchant node network. The merchant node network is responsible for operations and maintenance of Alchemy’s payment scenarios and capital flow operations.

After each transaction is completed, the node network will receive a corresponding amount of ACH rewards based on the transaction volume. This reward will be distributed to merchants and users participating in the transaction in accordance with specific algorithm rules. The difficulty of obtaining rewards will continue to increase over time, and will increase with the increase in the total size of users. Logarithmic increment functions are used to control the mining difficulty to obtain rewards. The specific reward rules are as follows:

- The difficulty of obtaining ACH increases with time. Every interval is split into m minutes, where the difficulty of obtaining ACH within the same interval is fixed, and the difficulty of the next interval increases. The interval number starts from 1 (the interval number is also called the interval height h).

- The difficulty for users to obtain payment rewards is proportional to the total scale of users, and the difficulty coefficient is k.

- In the initial interval, for every payment equivalent of US$100, the merchant gets a ACH and the user gets k*b ACH. The initial difficulty of acquiring ACH at interval=1 is: \[ q_0 = \frac{100}{a+k} \]


• Interval difficulty $q$ increases with interval height $h$:

$$q = (k_1 \cdot \log_2 \left(\frac{b-1}{k_2} + 1\right) \cdot q_0$$

### 11.3.3. Referral Incentives

Referral incentives are used to reward invitation behaviors among users. The size of the incentive correlates to the number of invitees that ultimately joins the ecosystem into a consensus circle. Each consensus circle can accommodate 5 users and when the circle is filled, the referral incentives will be released. Note that every user can only join one consensus circle. When the interval height is $h$, the number of ACHs the user gets for every 100 USD payment amount:

$$c = \frac{100 \cdot k \cdot b}{q \cdot a + k \cdot b}$$

This is the referrer’s basic incentives before referral incentives.

- When the user joins a consensus circle, the reward is doubled, that is, the consensus circle reward is increased $s = c$
- When the user successfully invites $n$ new users to use Alchemy to complete a payment, the invitation reward will be increased $t = n \cdot 25\% \cdot c$
- When a new invited user uses Alchemy to complete an equivalent payment of US$100, the referrer gets a commission reward $r = 25\% \cdot c$

### 11.3.4. Development of Payment Ecosystem

The ACH for payment and referral incentives are issued directly through ACH wallet. For merchants, ACH will be deposited via the payment system used to conduct transactions. On the payer side, incentive distribution depends on the digital wallet used by the payer as Alchemy payment is compatible with all digital wallets. If the payer’s wallet is able to store ACH, the ACH reward will be directly deposited into the payer’s wallet; if the user’s wallet is not able to store ACH, the payer’s incentive will be pre-stored in an ACH address and will be prompted with claim instructions.

Regardless of how ACH rewards are disbursed, to ensure the safety of user assets and the safety of ACH rewards and recipients’ convenience, parties who use the Alchemy Pay payment system will be guided to use ACH wallet. This will further promote the healthy development of the ACH payment ecosystem and drive traffic into the network.

### 11.3.5. ACH Financial Ecological Network & Incentives

Small and medium-sized merchants are smaller in scale, hold undisclosed financial information, have poorer risk measures, and face adverse selection and moral hazards. As a result, credit scoring systems on these merchants are usually weak and mainstream financial resources and services are often not available for them. The payment business facilitates financial data which can be used to help these merchants break the aforementioned barriers – enabling information flow, capital and credit flow. Accordingly, the payment business is a solid foundation for the development of derivative financial services and solve the problem of information asymmetry. Furthermore, digital assets can be pledged to circumvent the issue surrounding insufficiency of merchants’ mortgage assets. There are far-reaching positive impacts in the building of a financial ecosystem based on ACH digital assets, which can benefit the entire cryptocurrency ecosystem.

**DeFi Between Merchants & Users**

We now know that ACH is used as holdings necessary for participation and incentive reward for participation in this business. At the same time, it can be used to provide merchants and users a safer, more convenient and greater flexible way to participate in DeFi business. For instance, Alchemy DeFi platform has ACH holdings requirements for lenders to freely conduct lending business – where the borrower is able to use digital assets as collaterals to initiate loan application. Alchemy will charge a fixed percentage of interest share as the platform share of the business, and provide incentives to both borrowers and lenders in the form of ACH. On the other hand, the ACH wallet has a system to calculate credit scores by analyzing data accumulated in payment and credit behaviors in the ecosystem.
"Ant Credit Pay" of the Crypto World
Alchemy creates a decentralized and secure version of Ant Financial's "Ant Credit Pay" built upon its payment infrastructure. A borrower can apply for loan based on his credit score on the platform and ACH holdings to obtain different amounts of credit and interest-free periods. Additionally, when users use cryptocurrency to pay, they may receive credit limits and enjoy the convenient "consume first, pay later" shopping experience. This consumer credit model will be supported by Alchemy in a wide range of scenarios.

11.3.6. Development of Financial Ecological Network

The ACH Financial Ecological Network will continue to grow on the back of the above two business models, based on the combination of financial needs and technological applications, and continue to advance in the following three areas, including but not limited to:

Credit business. Alchemy can provide credit business, develop a full supply chain digital currency financing system and build a digital financial service platform. Digital currency credit business can obtain higher interest income and promote the use of digital currencies such as ACH, and further reduce forex friction and improve asset utilization.

- For merchants, Alchemy can provide unsecured short-term digital currency loans based on their credit scores derived from historical transaction data. The loan assets include, but are not limited to, ACH and other mainstream digital currencies.
- For individual consumers, Alchemy can provide limited loans, based on historical payment data, and charge interest.
- For partners, Alchemy can provide digital currency credit line and charge interest based on their historical transaction flow within the merchant app.

Big data business. Alchemy conducts big data analysis on collected payment data. The analyzed and processed data can be exchanged with credit reporting agencies, financial institutions, and consulting companies to mutually confirm the validity of data and model orientation or monetized.

Financial intermediary business. Alchemy can establish digital currency integration and financing services between partners, merchants, consumers and exchanges, and collect information service fees and intermediary fees.
11.3.7. Financial Ecological Network Incentive Mechanism

The ecological incentive pool totals 1.1 billion ACH, accounting for 11% of the total ACH supply, is expected to be released over 5 years. The amount of reward is closely related to the profit of the platform’s financial business. That is, if the platform’s revenue of a certain business is high, the more ACHs will be rewarded to merchants or users participating in the business. At the same time, the size of ACH rewards will decrease over time as difficulty of obtaining ACH rewards increases.

First stage: Participants will receive an ACH reward equivalent to 50% of the platform revenue of the business segment. If the business is a non-Alchemy platform, the reward is shared by the participating parties in a certain proportion. The platform will issue a certain number of ACH rewards to participants every day based on the overall business development and calculated based on a dynamic difficulty algorithm. In the first stage, a total of 100 million ACH rewards will be disbursed.

Second stage: Participants will receive an ACH reward equivalent to 40% of the platform revenue of the business segment. If the business is a non-Alchemy platform, the reward is shared by the participating parties in a certain proportion. The platform will issue a certain number of ACH rewards to participants every day based on the overall business development and calculated based on a dynamic difficulty algorithm. In the second stage, a total of 300 million ACH rewards will be disbursed.

Third stage: Participants will receive an ACH reward equivalent to 30% of the platform revenue of the business segment. If the business is a non-Alchemy platform, the reward is shared by the participating parties in a certain proportion. The platform will issue a certain number of ACH rewards to participants every day based on the overall business development and calculated based on a dynamic difficulty algorithm. In the third stage, a total of 700 million ACH rewards will be disbursed.

Dynamic difficulty calculation formula for daily rewards:

\[ q = a \cdot M^\mu + b \]

where:
- \( M \) is the scale of platform financial business,
- \( \mu \) is the curvature coefficient (0 < \( \mu \) < 1),
- \( a \) is the reward coefficient,
- \( b \) is the starting point of stage \( i \) - ACH acquisition difficulty,
- \( P_i \) is the expected ACH internal business valuation at the end of stage \( i \),
- \( M_i \) is the starting financial business scale of stage \( i \),
- \( n_i \) is the starting point of stage \( i \) - ACH financial ecological rewards issued,
- \( q_i \) is the starting point of stage \( i \) - ACH acquisition difficulty,
- \( \Phi \) is the reward coefficient.
11.4. ACH Token Rights

Within payments scenario, ACH plays an important role as a holdings requirement for merchants to access the network. To prevent fraudulent transactions, merchants need to put up matching number of ACH according to their expected transaction size but will receive them back along with their rewards after proving they are a long-term and stable merchant node in the network.

ACH uses in network governance includes:

- Ecosystem anchor coin: The ACH as an anchor coin for the tokens issued by eco-partners
- Protocol fee: Partners who join the ecosystem and use Alchemy protocol need to pay a certain amount of Protocol usage fee
- Real-time payment: Consumers of ACH can enjoy real time transaction with low service fee
- Escrow deposit: For guaranteed transactions, both parties have to deposit a guarantee in ACH
- Service fee: Various service fees are priced in ACH, and ACH will leverage external stable coins to simplify the calculation of service fees.
- Dispute Arbitration Fee: Those involved in dispute arbitration must have certain number ACHs to avoid “non-interest attacks”. The proceeds of the arbitrator are issued in the form of ACH.
- Incentives: Users and merchants that contribute data will be rewarded with ACH; eco-partners, merchants, users who contribute to the ecosystem will be rewarded with ACH too.

ACH uses in Alchemy business ecosystem includes:

- The main right of ACH token is to participate in the ecological governance of the Alchemy network. In order to encourage ACH holders to participate for the long-term and actively participate in governance instead of speculative holding, ACH holders will receive remuneration (income distribution of partial payment service fees) for participating in the resolution and voting of network ecological matters.
- The important role of ACH in transaction scenarios is to serve as a mortgage currency for merchants to access the network. In order to avoid extraordinary transactions and fraudulent behaviors, merchants need to mortgage the total amount of ACH that matches their acquiring quota to obtain acquiring quota permissions, and obtain the part of the mortgage ACH refund and rewards after proving that they are a long-term and stable merchant node network.
- Payment ecological incentives: Both merchants and payer in the payment transactions and the referral of new users will receive ACH rewards.
- Financial ecological incentives: Participants in financial business will receive ACH rewards.
- Other incentives: ACH rewards will be given to users and merchants who actively contribute to sharing data; ACH rewards will also be given to ecosystem partners who contribute to the ecosystem.
- Lock-up Requirements: Lockup requirements for merchants' account opening, stable coin access, non-stable coin access, long-term lock-up by strategic partners, etc.
### 11.5. ACH Token Allocation

1.8 billion ACH token will be released at the start and 2.5 billion will be in lockup. 5.1 billion ACH tokens will be distributed to participants through the growing network and transaction mining. 6% of the total no. of tokens are perpetually locked in Alchemy payment network to ensure network mobility. The actual allocation below:

<table>
<thead>
<tr>
<th>ACH Allocation</th>
<th>Planned Use of Proceeds</th>
<th>Allocation</th>
<th>Lockup Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alchemy Pay Team</td>
<td>Retained capital held by the Alchemy Pay team for the ongoing development and operations of the Alchemy project</td>
<td>18%</td>
<td>To be released over 60 months from date of public launch (IEO)</td>
</tr>
<tr>
<td>Private Placement / IEO</td>
<td>Private placement/fundraising through marketing channels for early start-up research and development, marketing and operation of the Alchemy Pay project</td>
<td>18%</td>
<td>Lockup applies for all early/short-term/long-term investors, with varying periods.</td>
</tr>
<tr>
<td>Ecosystem Incentives</td>
<td>For early partners in the ecosystem: merchants &amp; enterprise partners, trading service network partners, developer communities, CTO alliance members. To incentivize contributions.</td>
<td>5%</td>
<td>Release in stages according to the milestones of the project plan signed with each ecological partner</td>
</tr>
<tr>
<td>Consulting Fees &amp; Advisors</td>
<td>Recognition for advice and resources provided to the Alchemy project</td>
<td>2%</td>
<td>24 months</td>
</tr>
<tr>
<td>Network mobility</td>
<td>Providing liquidity support for the Alchemy node network</td>
<td>6%</td>
<td>Locked within network and barred from entering exchanges</td>
</tr>
<tr>
<td>Mining (Payment)</td>
<td>Long term incentives for payment network</td>
<td>40%</td>
<td>Unlocked 5 years starting from 6 months post ACH launch</td>
</tr>
<tr>
<td>Mining (Fin-Eco)</td>
<td>Long term incentives for financial ecological network</td>
<td>11%</td>
<td>Unlocked 5 years starting from 6 months post ACH launch</td>
</tr>
</tbody>
</table>

![Token Allocation Pie Chart](chart.png)
11.6. Distribution of Funds

1.8 billion ACH token will be released at the start and 2.5 billion will be in lockup. 5.1 billion ACH tokens will be distributed to participants through the growing network and transaction mining. 6% of the total no. of tokens are perpetually locked in Alchemy payment network to ensure network mobility. The actual allocation below:

<table>
<thead>
<tr>
<th>Distribution of funds</th>
<th>Planned usage</th>
<th>Distribution proportion</th>
<th>Distribution of funds</th>
</tr>
</thead>
<tbody>
<tr>
<td>R&amp;D</td>
<td>Development and continuous improvement of Alchemy core platform</td>
<td>40%</td>
<td>R&amp;D</td>
</tr>
<tr>
<td>Security</td>
<td>Construction of payment network security system</td>
<td>5%</td>
<td>Security</td>
</tr>
<tr>
<td>Policy Compliance</td>
<td>Cost for regulatory compliance in various countries and regions</td>
<td>10%</td>
<td>Policy Compliance</td>
</tr>
<tr>
<td>Operation</td>
<td>Operational expenses of Alchemy</td>
<td>10%</td>
<td>Operation</td>
</tr>
<tr>
<td>Marketing</td>
<td>Growing the influence of Alchemy’s network via marketing activities for merchants and users</td>
<td>10%</td>
<td>Marketing</td>
</tr>
<tr>
<td>Alchemy Fund</td>
<td>Investment in technical projects related to the Alchemy industry to grow the Alchemy ecosystem</td>
<td>25%</td>
<td>Alchemy Fund</td>
</tr>
</tbody>
</table>
12. Risk and Disclaimer

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