



How Digital Asset Infrastructure Carries A City to Become a Web 3.0 Hub

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Foreword



Edward Au
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As our world becomes increasingly digital, it is essential that cities keep pace with the latest innovations to remain competitive. Hong Kong has long been a leader in finance and trade, and now it is looking to establish itself as a hub for digital assets. With the growing importance of digital infrastructure in the development of smart cities, the need to embrace new technologies like blockchain and distributed ledger technologies has become paramount.

In the age of digital transformation, cities that invest in robust digital infrastructure can create a solid foundation for the thriving innovation of Web 3.0. This requires an understanding of the challenges and opportunities that come with the rise of digital assets, such as the need for secure and accessible custody solutions. By embracing the decentralized systems enabled by Web 3.0, cities can create more secure and transparent networks, driving greater collaboration and value creation.

The benefits of Web 3.0 are clear, including increased privacy, reduced censorship, and greater control over personal data. However, realising these benefits requires cities to invest in the necessary digital infrastructure to support this new paradigm. Additionally, cities can leverage their existing resources to create a supportive ecosystem for Web 3.0 startups and entrepreneurs, offering access to funding, mentorship, and networking opportunities, as well as co-working spaces and innovation hubs.

With the advent of Web 3.0, cities must recognize the crucial role of digital infrastructure in shaping the future of our communities. By investing in this infrastructure and fostering a supportive ecosystem for innovation, cities like Hong Kong can lead the way in this exciting new chapter of the internet.

"Web3 is a new generation of Internet driven by Distributed Ledger Technology with focus on decentralisation. I believe that Web3 will be widely and effectively applied to many aspects of the global economy in the future. We are only at the beginning of the revolution.

To develop Hong Kong into a Web3 frontrunner, a well-developed digital infrastructure is essential. The government has done a lot of work in this regard. For example, the latest Policy Address continues to enhance the 5G infrastructure. The Budget explores the development of an Artificial Intelligence Supercomputing Centre. As a next step, we should devise a forward-looking yet practical Web3 development strategy and regulatory framework."

The Honourable Duncan Chiu
HKSAR Legislative Council
Member Technology & Innovation
Constituency



"Predicting the future is imaginative and fascinating, especially when the future is closely relevant to each of us. Web 3.0 represents a new paradigm in the development of digital economy, it is not only a commercial transformation driven by new technology, but also an innovation approach towards sustainable social value creation. The technical and commercial value of Web 3.0 presents vast opportunities for growth and innovation, with potential applications across a wide range of industries. As the world moves toward Web 3.0, the transformation of cities into digital asset creation and trading centers is increasingly dependent on digital infrastructure. From the perspective of practice, adopting a government led development model for Web 3.0, encouraging Web 3.0 innovation and application with strong plans and policies, and guiding its healthy development with regulatory measures and norms has become a consensus among major countries around the world.

Hong Kong's strong digital infrastructure, friendly business environment, and thriving fintech and blockchain industries position the city to take advantage of the opportunities presented by Web 3.0 innovation. With the rise of decentralized technologies and blockchain-based applications, Hong Kong has the potential to become a hub for digital asset creation and trading, as well as a leader in the development of new Web 3.0 applications and platforms. Furthermore, Hong Kong's strategic location in the Asia-Pacific region, coupled with its established financial markets and international trade connections, make it an ideal gateway for businesses looking to expand into the growing digital economy."

Mr. Li Ruigang
Member of The Task Force on Promoting and
Branding Hong Kong



Thank you for your support

Web 3 Partner



Contributors



#1

The Inevitable Future of Digital Asset Custody and Opportunities and Challenges for Hong Kong



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Chief Operating Officer
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To establish Hong Kong as a global Web3 hub, it is essential to develop, support and strengthen the city's blockchain infrastructure. This encompasses establishing secure and reliable blockchain network, cultivating a vibrant builder community, crafting enabling regulatory structures, offering secure and accessible custody solutions, and launching education initiatives. Among all, digital asset custody plays an essential role as the gateway for the impending institutional adoption of digital assets.

I. Custody as the Gateway

Digital asset custody is key to the safekeeping of a customer's digital assets. It sets a foundation for the creation, management, and exchange of digital assets, which enables services like trading, banking services and prime brokerage, to name a few.

Custody addresses two of the biggest concerns that institutions have when it comes to safekeeping and growing their digital assets: security and accessibility.

Custodians are constantly evolving to meet the needs of investors and users through new technologies and innovations such as multiple-party computation (MPC) enabled private key management, hybrid solutions for access to both CeFi and DeFi, off-exchange settlement services, real-time exchange reserve monitoring, etc.

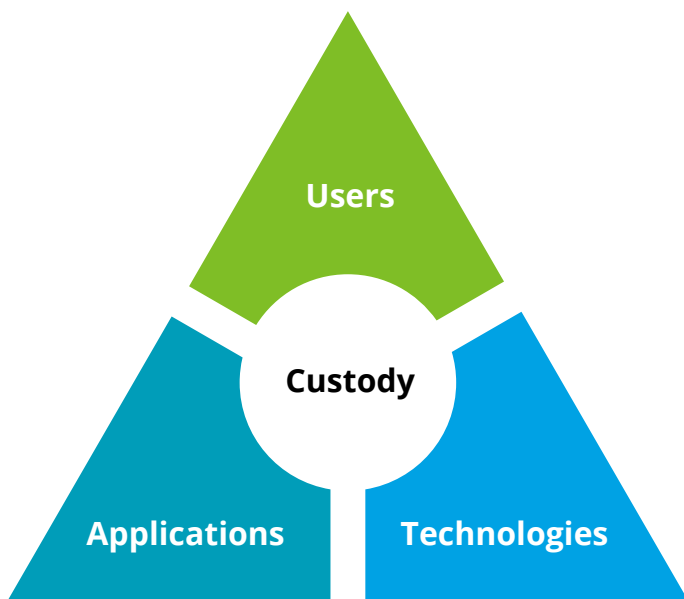
Since the beginning of 2019, total assets under custody (AUC) is estimated to have grown an impressive 600% to cross US\$200 billion[1]. This has caught the attention of investors globally, who pumped in over US\$4.5 billion of funding into the space in 2021 from just US\$850 million the year before[1].



II. The Trinity Model

To understand the evolving role of custody in the blockchain ecosystem, a trinity model needs to be introduced where custody is at the center of the trinity of users, applications and technologies. In the past few years, it became gradually evident these three factors are the main driving forces behind the development of the digital asset custody industry.

The Trinity of Digital Asset Custody



a. User Growth - Quantity and Diversity

Currently, it is estimated that there are over 420 million[2] digital asset owners. As the number of owners grows, there is also a significant shift in their composition. In the early days, it was mostly cyberpunks and geeky programmers, but now we have DAOs, crypto funds and a growing number of large corporations and financial institutions. These institutional big players have distinctly different needs when accessing and interacting with blockchain applications compared to individual users.

b. Fast Evolving Blockchain Technologies

The blockchain ecosystem is constantly evolving with new technologies emerging rapidly, from Bitcoin in 2009 to the introduction of smart contracts on Ethereum in 2015, to alternative Layer 1 blockchains like Avalanche

and Cosmos, and the rising Layer 2 chains like Arbitrum and Optimism. Going forward, we will see more and more Layer-1s, application-specific blockchains, and even modular blockchains with layered rollups. This multi-chain, multi-layer environment will inevitably lead to asset, user and application fragmentation.

c. Blockchain Application Explosion

Before 2020, the top blockchain applications were mainly crypto exchanges and wallets and some payment services. Since then, smart contracts have fuelled an explosion of new blockchain applications. In just a short span of 1-3 years, DeFi, NFT and DAOs have become massive multi-billion dollar sectors in their own right. On top of all that, we have GameFi, SocialFi, and the list goes on. With over 4,000 DApps[3] now, the concept of Web3.0 is undeniably going mainstream.

III. The Inevitable Future of Digital Asset Custody

Given the fast changing landscape of users, applications and technologies, custodians have to evolve beyond a simple safety box. We have 4 key predictions on the inevitable future of digital asset custody.

a. Secure Key Storage → Full Stack Solution

Blockchain applications are built on a four-layered stack, consisting of the blockchain, smart contract, protocol, and application layers. Custodians are expected to understand the workings of each layer and integrate them seamlessly. They will need to develop full stack solutions to enable users to securely and efficiently connect to the underlying blockchains, access any smart contract and protocol, and interact with various applications.

b. Fragmented User Experience → Unified User Experience

It is evident that the future of the blockchain world will involve multiple chains and layers. This implies that users will have to access each blockchain and its applications through different entry/access points, leading to poor user experiences and inefficiencies. Custodians must find a way to facilitate the transfer of data and assets while also enabling interoperable and composable operations across currently siloed blockchains. Most importantly, all of this must be accomplished with a unified and easy user experience.

c. Retail User-Oriented → Enterprise-grade Programmability

The demand for customizable custody solutions will continue to rise as more and more professional teams enter the crypto space. Their participation in different protocols and applications will lead to more specialized requirements.

d. Centralized Infrastructure → Distributed Key Management

Centralized key management has several advantages. First, it is easier to achieve compliance. Also, it is considered a more institution-friendly solution since it integrates easily with legacy systems and workflows. However, its chief disadvantage is that it represents a single point of failure. This has been demonstrated by many successful attacks on centralized custodians and exchanges, throughout crypto history. Additionally, it lacks transparency without constant audits.

We believe that distributed key management is the foundation for more powerful blockchain applications, such as universal keyless wallets, social recovery, on-chain trust, segregation of duties/rights, and even new breeds of blockchain applications never before considered. Many efforts have been made in this space, including but not limited to custody solutions based on MPC, and hybrid key management that combines account abstraction and smart contract custody.

IV. Opportunities and Challenges in Hong Kong

Hong Kong, as an international financial center, has the potential to become a global hub for digital assets, but it faces both challenges and opportunities. Hong Kong has a strong traditional finance industry and deep capital market, which provides a solid foundation for the development of digital assets, as it can offer access to liquidity, expertise, and infrastructure. Moreover, Hong Kong has a large pool of investors and customers who are interested in digital assets, especially from Asian markets.

Consequently, digital asset development in Hong Kong has been closely tied to the financial sector since its inception. This environment makes it relatively straightforward for Hong Kong to generate use cases that bridge the gap between blockchain technology and the real economy,

providing Hong Kong with a considerable advantage in pursuing its Web3 ambitions. For instance, in February 2023 Hong Kong offered the first tokenized green bond issued by a government globally, offering HK\$800 million of Tokenized Green Bond under the Government Green Bond Programme (GGBP)[4].

Custody holds the key to institutional adoption of digital assets and ultimately, the mainstream adoption of crypto in the real world economy. For Hong Kong, it is essential to stay in the frontier of the evolving custody industry and remain up-to-date in order to maintain a competitive edge.

a. Regulatory Framework

Hong Kong has one of the most sophisticated financial market regulatory frameworks in the world. This framework can be leveraged and referenced for digital asset regulation. Hong Kong's approach to blockchain regulation currently adheres to the same high standards as traditional finance. This is reflected in the city's crypto policy motto, "same business, same risks, same rules."

The regulatory framework in Hong Kong is currently implemented through a top-down approach that favours incumbents. While this approach effectively facilitates collaboration among the government, financial institutions, large Web2 internet companies, and blockchain-native businesses, it also limits opportunities for grassroots developers and entrepreneurs. To ensure that blockchain technology continues to thrive on creativity and energy from the bottom-up, it is essential to strike a balance between top-down regulation and bottom-up innovation.

The traditional financial regulatory framework may not fully account for the unique dynamics of the blockchain industry. The digital assets ecosystem is constantly and rapidly evolving. As a result, regulators may struggle to keep pace with technological advancements to avoid over-regulations or under-regulation that could stifle growth or create risks.

Hong Kong can be a global leader in providing clear and consistent guidance and supervision for digital asset businesses, and ensure start-ups, institutions and investors feel secure and confident in operating in its jurisdiction.

b. Technology Ecosystem

To build an ecosystem for innovation and entrepreneurship, Hong Kong needs to attract and support world-class infrastructure builders technology. Only a robust and scalable infrastructure, which includes cloud computing, blockchain, digital asset custody, cyber security, and even AI, can enable the security, interoperability, and evolution of digital assets.

Custody is a core component of this infrastructure. A strong custody industry can help to mitigate the risks associated with digital assets ownership and increase investor confidence in digital assets, which in turn drive mainstream adoption of digital assets. For Hong Kong, having a robust and trusted custody industry can be a competitive edge in the global digital asset landscape.

Since digital asset custody is a new and developing field, Hong Kong has a unique opportunity to shape and establish best practices and standards for the industry. This can be achieved by setting high standards for security and transparency, and incorporating the latest technology solutions.

2023 presents an ideal opportunity for Hong Kong to reclaim its status as a global leader in digital assets and a Web3.0 hub. With trust in the blockchain industry at an all-time low, there is ample room for reinvention. Hong Kong can leverage its strengths in traditional finance, embrace innovation and diverse talents, and craft a sound and sensible regulatory framework to restore confidence and shape the industry's narrative and development trajectory.

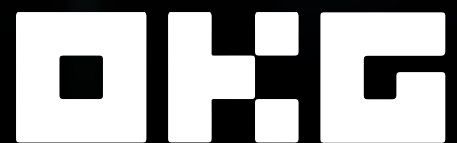


#2

DeFi and CeFi infrastructure for digital assets landscape



Jeff Ren
Chief Executive Officer
OKG Technology



More than 10 years after the birth of the Bitcoin system in 2008, we have witnessed exponential growth in the crypto industry. The total market cap of cryptocurrency has been above \$1 trillion from 2021 and even almost reached \$3 trillion during the bull market at the end of 2021[5].

The central topic is the current status of the infrastructure of CeFi and DeFi, which support users to better explore the crypto world, and we will also present an outlook on subsequent development.

1. CeFi Infrastructure

One of the prevailing ways of managing the exposure of cryptocurrency is through centralized finance(CeFi). CeFi is literally a mimic to the legacy financial markets. Companies act as custody, exchange platform and lenders of users' assets. And by allowing users to store, trade, earn interest, borrow, lend and pay using cryptocurrency, CeFi has been an easy and efficient way to onboard retailers and institutions into the crypto world.

Centralized exchanges are a significant component when it comes to the CeFi industry. There are in total \$218 billion users' digital assets claimed by the top 15 exchanges[6]. Binance, OKX and Coinbase are the three representatives among their peers. We also observed several other corporates aiming at providing all-in-one crypto-related financial services to not only retailers but also institutions. Like Amber and Matrixport enable their clients to get loans, structured product, OTC, and staking services which were reported handling multi-billion assets and serving hundreds of institutional clients. With the emerging need from institutional clients who have a higher requirement for intermediaries and also centralized exchanges being the target of hackers, the need for custody services steadily increases. Fireblocks and Copper are outstanding figures among their peers. By using MPC technology, these two companies successfully onboard many institutions as their clients.

1.1 Infrastructure Platform

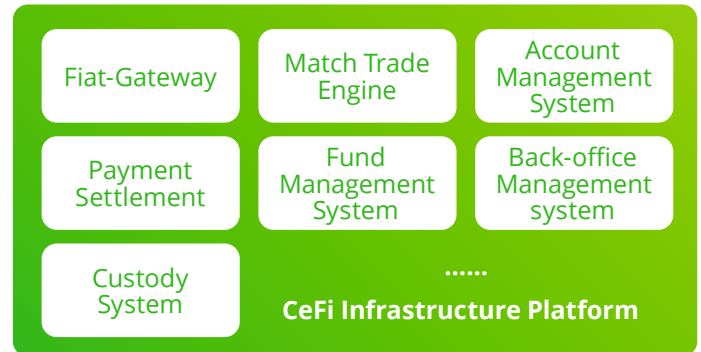


Figure 1: CeFi Infrastructure Platform

Similar to financial institutions such as stock exchanges and commercial banks, they are usually managed and owned by a single institution, which users must trust. CeFi technology mainly follows the system logic of traditional financial institutions, and the core involves three aspects:

- Gateway, payment and settlement. Fiat on/off-ramp service providers can help users using their credit/debit cards or bank accounts directly purchase or sell cryptocurrency to onboard users to the Web3 world. Like Moonpay who claims to have served more than 5M users.
- Custody, account and fund management system. How CeFi corporates can successfully win users' trust by ensuring that their funds are safe stored in these corporates have been prioritized. There are explorations like publishing Proof of Reserve(PoR) reports, integrating third-party custodians or partnering with third-parties to monitor the accounts. CeFi entities need to prudently consider the best way of ensuring the security of the user assets on their platforms.
- Trade matching engine. The transaction is basically designed with an order book to ensure high liquidity, which means that liquidity is a function of the number of buy and sell orders on the book. In addition, there are also market makers related to this. Market makers like Tower and Jump Trading offer bids and asks the market to provide liquidity and depth.

1.2 Regulations

The regulation is evolving with the exponential growth of the crypto market. Countries like the US, Japan, Germany and other developed countries and regions have published a related regulation framework for cryptocurrency. Companies need to register with the authorities and comply with related laws such as AML/CFT. While there are other countries like Mainland, China has officially banned activities like crypto mining and trading.

1.3 The current challenges

Counterparty risk and lack of transparency are the very first argument CeFi entities are questioned. In the current CeFi circumstances, it is usually the centralized exchange who acts as the intermediate, starting trade execution, storing users coins and processing the whole transaction. And unlike the decentralized protocols where all the activities are managed by smart contracts and can be tracked by on-chain data, users need to trust such entities that they can withdraw their funds whenever they need, and also believe in these entities that can keep their funds free from security hacks. We saw the collapse of FTX who misappropriated users' assets without consent and disclosure that underscored such concern and deeply destroyed users' trust.

Even though many authorities have published their regulation framework, they still need to go beneath the surface of crypto regulation. Several well regulated entities failed by misappropriating and mismanaging clients' assets indicates that the authorities not only need to provide guidance but also need to tap on the actual operations of such entities. Besides, the regulations are highly focused on AML related codes but may also need to tap on consumer protection. Luckily, several regulators are looking at this field and planning to strengthen the requirement of risk management methods, product standards and further protect consumers' rights.

2. Defi Infrastructure

2.1 Defi infrastructure components

The fundamental layer is the blockchain protocols such as Ethereum, BSC, Tron etc. TVLs on those blockchain peaked around Nov 2021 at 175 billion, and slowly decreased afterwards. It stabilized at around 30 to 50 billion. Ethereum dominates the market share by having around 60% of TVL, followed by BSC, Tron, Arbitrum, Polygon, etc. The competition among such blockchains has yet to end.

The defi applications built on top are essentially smart contracts which is meant to providing similar services the traditional financial systems do while ruling out the intermediaries. The main applications so far have been focused on decentralized exchanges, borrowing and lending marketplaces, oracles, yield farming etc. One of the main advantages of decentralized exchanges compared with centralized exchanges is the ability for users to keep control of their private keys; Lending protocols have been another fast-growing sector of DeFi. Besides, the demand for earning supersized returns led to the proliferation of smart contracts that aim to maximize the yield from holding crypto tokens.

2.2 DeFi Tech Stack

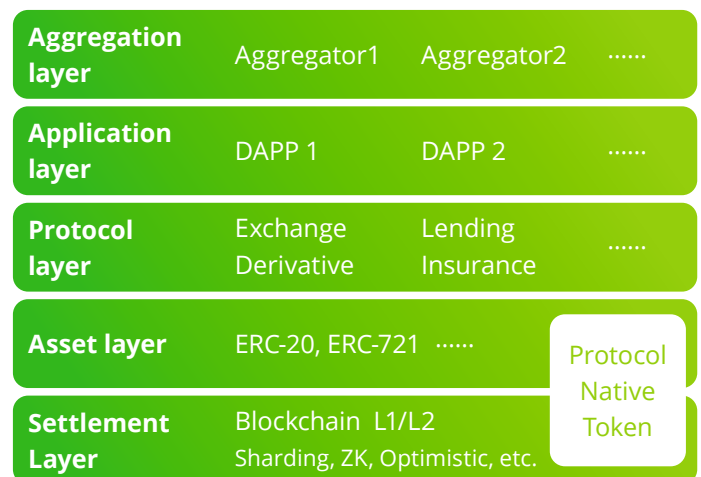


Figure 2: DeFi tech stack[7]

This stack model shows how DeFi applications and protocols are built in a layered way.

- The Settlement layer is the blockchain been used, which contains the basic operating rules of the ecosystem. Transactions are actually executed at this layer. A number of technologies have also emerged into this layer to improve the performance and scalability of blockchain, such as Sharding, ZK etc.
- The Asset layer is built on the foundation of the Settlement layer and contains the created crypto assets, such as BTC, ETH and etc. Each protocol or project can define its own tokens according to business needs to meet the operation of the economic model.

- The Protocol layer, in which the main function of decentralized finance is reflected, including trading, lending, derivatives, insurance, etc. This layer provides the core business logic for the entire ecosystem. Also provides underlying services for the application layer.
- The Application layer, which contains user-oriented applications that interconnect with protocols and standards in Protocol layer. As the interconnection of smart contracts occurs through a web browser-based front-end interface, the protocol is easy to use and provides an excellent user experience.
- The Aggregation layer is essentially an extension of the application layer. Aggregators run user-oriented platforms that communicate with many different applications and protocols, simplifying otherwise complex transactions. Users can use applications running on this layer to make informed decisions and optimize the benefits obtained by using DeFi applications.

Obviously, the mutual construction of the layers involved is manifested in two aspects. On the one hand, the realization of every function of DeFi is the result of interconnection and interaction between layers. On the other hand, how scalable, decentralized or vulnerable a layer depends on the characteristics of the underlying blockchain (especially the consensus mechanism).

2.3 The current challenges

Regulation challenges

Regulations of financial activities usually have three main goals. First of all, the regulation is to prevent the use of funds for illicit activities, money laundering or tax evasion; secondly, it means protecting each party in financial markets against fraud and abuses; and lastly, it is to ensure the integrity of markets and payment systems and overall financial stability.

Currently, DeFi solutions haven't yet met those goals. A clear regulatory framework on DeFi from all perspectives could help. But the current problem is the anonymous and permissionless nature of DeFi apps and the underlying blockchain protocols make it hard for regulators to use the same framework applied for centralized intermediaries, such as who can open a bank account, what documentation must be supplied, or how information can be collected and stored.

Technology challenges

The decentralization of the ledger also has implications for the scalability of the network. Intuitively, as the ledger becomes more decentralized, more copies need to be distributed and more resources need to be spent to achieve the protocol consensus and make blockchain secure. This trade-off between decentralization, security, and scalability was famously formulated by Vitalik Buterin. The trilemma has attracted a lot of attention and a large number of new blockchain solutions have been introduced to simultaneously achieve the three goals.

3. Follow-up outlook

As can be seen from the above, both the CeFi and DeFi fields already have a relatively complete infrastructure platform that can provide users with various services. However, problems and challenges follow as well. In 2022, huge loss being made due to a series of black swan events like FTX, Luna, and hacker attacks. And the blockchain industry needs more technology and infrastructure to ensure asset security. At the same time, it is also necessary to improve the performance and efficiency of the infrastructure and achieve higher scalability. So what can be the future of blockchain industry ?

3.1 ZK and Rollup technologies continue to land practice

The merging of Ethereum has limited performance improvement, while the expansion based on Rollup might provide a new solution. The focus of Rollup upgrades is to improve performance and compatibility while reducing costs. ZK Rollup has been favored by the community but limited to a greater extent due to its difficulty of being EVM compatible. In addition, the introduction of EIP4844 will greatly reduce the gas of Rollup. In this field, ZK Rollup has a long-term advantage, which uploads a smaller data to the chain without need of 7-day challenge period. With the development of zkEVM, the biggest problem that plagued ZK Rollup is going to be overcome. Though ZK Rollup has more use cases than other mechanisms, the main contradiction in the development of ZK Rollup is that the generation speed of ZKP is slow while the cost is high.

3.2 The multi-chain network will promote the vigorous development of the whole ecosystem

What Cosmos conceived to build an ecosystem consists of multi-chains can lead to further development of the blockchain industry. Application chains are independently built with the help of the development tools of the main-chain, and have the advantages of cross-chain and shared security within the ecosystem built by the main-chain. It is no longer a problem for DApp applications to build their own blockchains in terms of technical implementation. However, DApp Chain is limited by other conditions: (1) Maintaining its own network security requires greater costs; (2) Whether the features of the main-chain itself match DApps' need, such as performance, user habits, EVM compatibility, etc.

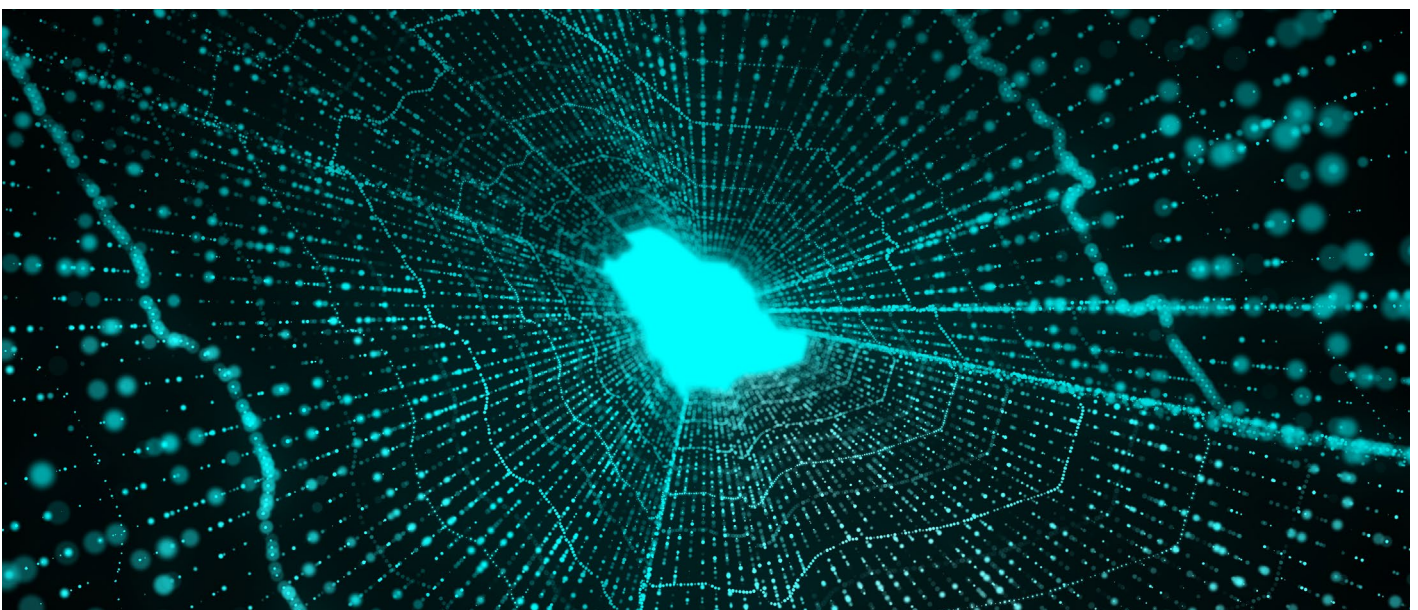
3.3 Decentralized storage shows great potential

While decentralized storage hasn't gained much traction this year, they are showing signs of continued progress. More real needs, more access channels and more advanced functions have appeared or will soon appear in the storage sector. The first is that the storage protocol stores more real data. Filecoin implemented the Filecoin Plus (FIL+) plan at the end of 2022, and the amount of real data storage continues to increase. Compared with the fluctuations in the crypto market, these demands are more stable and are expected to

continue to increase, which can provide a living environment for storage protocols. The second is accessibility. By providing more network access, the storage protocol will penetrate into more aspects of Web 3 and strengthen its fundamental role. The third is that more functions will appear. The most important upgrade of storage is that it can be superimposed on the computing layer, and then more functions beyond the scope of the hard disk will be realized.

3.4 Global regulation will be further strengthened

In 2022, it was witnessed that some protocols was drawn concern from authorities. Tornado cash was sanctioned by the US Department of the Treasury, members of Ooki DAO were prosecuted by the CFTC, discussions on whether Ethereum is a security, etc. In the next year or two, with the introduction of crypto asset regulatory frameworks and the implementation of regulatory policies in various countries, relevant legislation specifically targeting on-chain protocols may be introduced, such as the DeFi "embedded supervision" scheme being tested by the European Union. On-chain protocols may be required to meet anti-money laundering measures such as KYC and AML. When the costs of supervision, prosecution, and law enforcement are effectively reduced, relevant supervision of on-chain protocols will be strengthened.



#3

Web3: the trust foundation for next-generation digital economy



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Since the emergence of computers in the 1840s, a new technological cycle has appeared every 10-15 years. Web2.0 is the current internet era we are in, built primarily on the user-to-service-side BS/CS architecture, where users can freely participate in content creation and sharing. In the Web3 era, we can not only read and interact with information on the internet, but also transmit assets. Everyone can enjoy decentralized services in various fields such as computation, storage, and assets, and become owners and managers of their own information data.

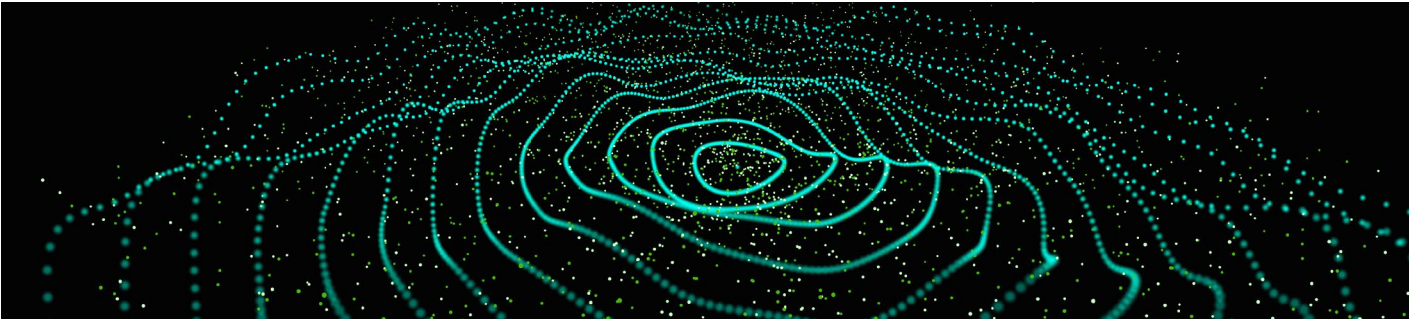
Web3 will open up a brand new digital era. We believe that blockchain technology will empower the next era of internet. According to a report from a16z, it is estimated that the global Web3 user base will reach 1 billion by 2031. As the next-generation infrastructure network of the internet, Web3 is still in its infancy, but its demand is rapidly exploding. For example, DID (Decentralized Identity) provides a basic foundation for trusted digital identity and data interaction across institutions. Users can trust real-world identity credentials on the internet with encryption security and data privacy protection. Digital innovation in the field of goods, such as NFT, helps brand permanent preservation and creative dissemination through the virtualization of real goods. At the same time, Web3 has also brought innovative applications in multiple fields such as finance, organizational forms, and digital space.

With the gradual deployment of Web3 ecosystem, the transition from platform-centric to individual-centric data and identity management will give birth to new technologies and business models that adapt to this demand. In this context, Web3 will provide solutions to the current situation of data monopoly, privacy risks, and algorithmic discrimination, and promote the intergenerational transformation of the network towards equality, governance, and an open value internet.

In the Web3 era, Tencent Cloud is dedicated to helping builders accelerate the adoption of decentralized technology, with our support to the global Web3 ecosystem development and a full suite of cloud-based products and infrastructure.

Blockchain is the fundamental element for the Web3 ecosystem to embed a decentralized infrastructure that verifies blocks and transacts data. Take the most popular blockchain Ethereum as an example, it is constructed of around 12,000 nodes across more than 100 countries, though more than 50% of the nodes are geographically hosted in the United States [8]. An Ethereum node is simply any computer running the software needed to connect with the Ethereum network, and it could be self-built with local physical machine, or it could be hosted on a cloud server [9]. As of today, more than 60% of the Ethereum nodes are hosted on third-party who are mostly cloud service providers [10], for a number of reasons such as, low setup cost, elastic scaling, high server uptime, and pay-as-you-go subscription mode.





Apart from Ethereum, other popular blockchains such as BNB Chain, Polygon, and Avalanche are also supportive of promoting cloud environment for the general public to set up the respective blockchain nodes in order to enhance resource decentralization and network stability. Other important elements for the Web3 ecosystem are those different kinds of decentralized protocols, such as cross-chain bridge, data storage, network routing, and data warehouse. These protocols are often built upon cloud environment to lay the initial foundation and ensure fast go-to-market, and in the longer term classify the machine specification on cloud environment for the mass market to run nodes to spread out the decentralized network and achieve fair consensus mechanism.

Given the architecture of a Web3 application is different from a normal Web2 application, in that the application needs to call on-chain data in real-time, the entry barriers for developers to build Web3 applications are raised higher and thus different kinds of Web3 oriented developer tools have emerged. The most notable solution is RPC (Remote Procedure Call) node provider, who ease the developer's burden of setting up and managing their own blockchain nodes and provide reliable and comprehensive connections to major blockchain ecosystems. RPC nodes of different blockchains as highlighted previously could be set up on cloud to ensure global coverage and optimal network connections.

As the Web3 community values the importance of digital ownership and fair governance, DID (Decentralized Identity) and DAO (Decentralized Autonomous Organization) are the two popular areas of innovations incurred from the Web3 ecosystem. There are specialized toolkit providers who develop services in cloud environment and provide easy access to DID and DAO based on different blockchain infrastructure. Intermediate Web3 service providers could

rely on cloud technology to achieve fast go-to-market and serve the global Web3 developer base and user base elastically and reliably.

Leveraging the underlying blockchains and the middleware tools, builders are thus enabled to develop Web3 decentralized applications that ensure true data ownership and embark new user experience. One notable use case is DeFi (Decentralized Finance) which refers to financial products such as trading platform and lending platform but built upon blockchain networks. Such DeFi projects write smart contracts to automatically execute orders and could utilize RPC nodes to call and write data from blockchains. Projects could also use cloud servers to build user interface and provide additional data analytics functions to add values to user experience.

As Ethereum enters its 10th year of development and Bitcoin is a year away from its 4th halving occurrence, the Web3 community eye on games to onboard more users and achieve mass adoption. There is an industry-wide push for fully on-chain games, but given the maturity of the existing industrialized game development process and player's appetite for high quality game display, most Web3 native game studios and Web2 traditional game studios are utilizing cloud to develop in off-chain environment, and leverage blockchains to legitimize digital ownership. There is a wide selection of cloud-based products such as cloud rendering and low-code SDKs such as digital avatar available to ease studios' development burden from scratch, and empower them to focus on game logics design and tokenomics design.

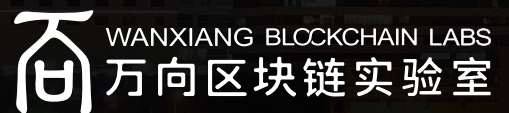
From infrastructure to mass adoption, we aim to work with developers around the globe to better understand the essence of Web3 and together shape the next generation digital economy.

#4

Building a blockchain technology ecosystem in Hong Kong



Yu Du
General Director
Wanxiang Blockchain Labs



Hong Kong's Web3 Industry Welcomes New Opportunities

On October 31, 2022, the Financial Services and the Treasury Bureau of Hong Kong officially released the "Policy Statement on Development of Virtual Assets in Hong Kong", outlining the government's policy stance and approach towards developing a vibrant sector and ecosystem for virtual assets. Following the statement, Hong Kong has established a regulatory framework that includes agencies such as the SFC, FSTB, and HKMA. As a global financial center with a well-established traditional financial system and strong capital markets, Hong Kong is also committed to becoming an international center for innovative technology by issuing multiple supportive policies around funding and talent attraction. All these factors have laid a solid foundation for making Hong Kong a global Web3 hub. The global development of the Web3 industry is a technological competition in essence. A developed international Web3 hub requires a digital-asset-based technical infrastructure, globally recognized Web3 application products, and supporting technology and service systems to sustain the stable, efficient operation of Web3 industrial chains worldwide. Therefore, establishing a mature, prosperous, and multi-layered blockchain technology ecosystem will contribute to the development of Hong Kong's Web3 industry.

Hong Kong's Unique Advantages

Hong Kong has unique talent resources in the development of the Web3 industry. As an international metropolis, Hong Kong has a relatively open immigration policy and a high degree of internationalization in languages, transportation, culture, and currency policy etc., giving it an advantage in attracting outstanding talents from around the world. Additionally, Hong Kong has five top 100 universities, a strong pool of international experts and scholars, and world-

class scientific research and industrial platforms, providing a solid foundation and mature mechanisms for cultivating top innovative technology talents. The Hong Kong government has also proactively formulated short-term and long-term talent training and introduction strategies, increased funding for talent system, and promoted international cooperation to establish a sustainable and continuously optimized top innovative technology talent reserve. As a special administrative region of China, Hong Kong has a strategic advantage in rapidly becoming an international center of innovative technology, relying on the strong support of a series of national policies such as the Outline Development Plan for the Guangdong-Hong Kong-Macao Greater Bay Area. China has the world's largest higher education system, with a population of 240 million receiving higher education, and many large technology companies and research institutions are playing an increasingly important role in the global innovation field, providing important intellectual support for the development of the innovative technology industries in Hong Kong. Meanwhile, mainland China is one of the largest global blockchain talent gathering places with valuable experience and a development foundation in the Web3 industry, serving as an important source of Web3 talents for Hong Kong.

Development of Blockchain Technology Ecosystem in Hong Kong

Over the past decade, blockchain technology has evolved significantly. It is no longer limited to the early days of Bitcoin's peer-to-peer payment system or the chaotic era of token speculation following the emergence of smart contracts. Instead, the technology has moved towards a direction that emphasizes practicality, scalability, and maturity in its applications.



Building a blockchain technology ecosystem in Hong Kong

In recent years, blockchain technology applications have progressed from payments to decentralized finance (DeFi). The growing popularity of non-fungible tokens (NFTs) has ignited GameFi and metaverse, attracting a large number of Web2 builders to the Web3 industry. However, high barriers to entry continue to impede broader industry recognition and deter users from engaging in the field. Additionally, compliance concerns in DeFi applications can raise doubts about asset safety among users. As a result, it is crucial to educate users better and encourage developers to engage in ecological and technological advancements.

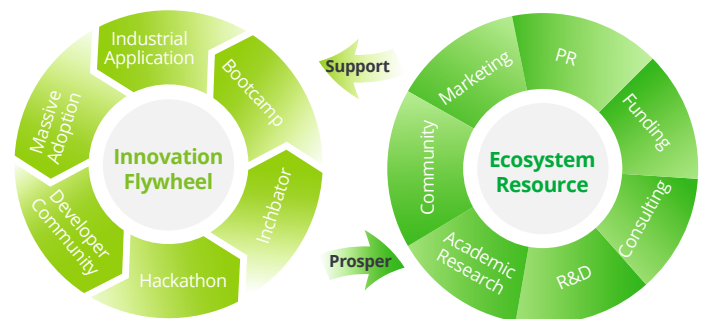
Currently, Layer1 public chains have matured significantly, creating an industry pattern dominated by Ethereum and multiple EVM-compatible alternative chains. To address the technical challenges posed by the impossible triangle, Layer2 has emerged as the optimal solution for ensuring public chain security while improving scalability. Consequently, Layer2 has become the most critical theme in the latter half of the public chain competition.

Public chain technology is still undergoing optimization, with several technical challenges requiring further research. These challenges include the compatibility of privacy and efficiency, where Zero-Knowledge Proofs (ZKPs) may provide a viable solution but entail high developmental difficulty. Furthermore, industry core developers are focusing on issues such as validator centralization and front-running transactions (Maximal extractable value, MEV), proposing numerous performance and experience optimization solutions like data sharding, separating block proposers and builders (Proposer/builder separation, PBS), and account abstraction (AA).

Hong Kong should closely follow the latest technology trends in the industry and encourage ecological developers to conduct research and development around innovative technologies and ecosystems such as Layer2, ZKP, and Decentralized Identity (DID). By combining Hong Kong's fintech industry advantages with research on DeFi algorithms and mechanical innovations, more compliant and secure DeFi applications can be explored. Promoting NFT and metaverse concepts and increasing efforts to break through Web3 boundaries will attract more users to join the ecosystem.

Fostering a Thriving Blockchain Technology Ecosystem in Hong Kong

The core of building a blockchain technology ecosystem in Hong Kong centers around developers and exceptional projects. Our aim is to establish a comprehensive mechanism for project discovery and cultivation, providing all-around industry guidance, resources, and funding support. The goal is to nurture top-tier Web3 projects that will lead the industry to prosperity.



Our approach begins with constructing an active developer community, facilitated through organizing industry exchange activities such as online and offline summits and salons. These initiatives attract users and developers to join the community. Additionally, collaborating with Hong Kong universities, industry associations, and other organizations can further connect innovative talents, building a developer community with significant potential.

Based on the developer community, we will regularly hold hackathons to discover startups with genuine innovative potential and select business plans and products that exhibit practicality, unique advantages, or innovative ideas. These teams will gain community attention at the earliest stages, forming the first group of users, receiving grants, and becoming prototypes of future outstanding companies.

The next step is to establish an incubator and organize a bootcamp. The incubator will provide early-stage resources and guidance for selected projects from the hackathon, including shared office space, backend services, technical guidance, and strategy support. Through this support, startups can successfully navigate the challenges of early-stage entrepreneurship, remedy shortcomings, and transform ideas and plans into tangible products.

The bootcamp targets more mature projects, providing comprehensive resource support through three months of intensive training, including financing guidance, go-to-market, and brand-building strategies. Our aim is to help project teams build a traffic-rich and vibrant community ecosystem.

Finally, through multiple rounds of funding and project advocacy, excellent projects will emerge, effectively aiding

technology application and forming a brand effect. This will strengthen Hong Kong's industry ecosystem's influence, attracting more developers to enter the ecosystem and promoting Web3's massive adoption.

The blockchain technology ecosystem promotes the development of the Web3 industry.

Through developer communities, hackathons, incubators, bootcamps, resources, and financial support, we anticipate the emergence of numerous outstanding projects with strong brand impact and competitiveness, driving the growth of Hong Kong's overall Web3 ecosystem.

Firstly, these top-tier projects can attract more talent to Hong Kong for employment and collaboration, encouraging additional entrepreneurs to join the ecosystem. This allows innovative individuals to come together, creating a larger and more active developer community that inspires further innovation and inspiration. Moreover, the popularity of leading projects can bolster the branding of incubator and investment companies, drawing more funds to Hong Kong, and consequently enhancing support for local entrepreneurs and generating more successful projects. Finally, a group of forward-looking influencers and investment companies will emerge, consistently excelling in the creation and investment of top projects. They will guide the views of the entire industry, enabling Hong Kong projects to capture the attention of more users and capital, and strengthening brand influence.

Through the ongoing convergence of talents, projects, funds, and brands, Hong Kong's Web3 industrial ecosystem will establish a positive flywheel effect, continually prospering and evolving into a highly competitive global ecosystem.



#5

Blockchain infrastructure
projects that Venture Capital
should focus on



Zheng Jialiang
Research Director
HashKey Capital

HASHKEY
▶ **Capital**

Cryptocurrencies and blockchain have grown rapidly and become fields of opportunities and potential. Networks, protocols, data storage, and security are all essential components of infrastructure projects in this field. Blockchain infrastructure projects are one of HashKey Capital's top priorities as one of the earliest investors in Ethereum. We therefore have a large proportion of infrastructure projects in our portfolio, such as public chains, decentralized cloud services, node infrastructure, modular blockchains, etc. The following is how we see infrastructure vertical opportunities.

Decentralised cloud service

Blockchain decentralized cloud services provide highly reliable and secure storage, computing, and indexing. Users' data and privacy are highly vulnerable to leakage in centralized data storage, and centralized storage in different companies' databases is highly vulnerable to attack. The current decentralized storage project Arweave is cheaper than AWS when it comes to long-term storage. Decentralized ecosystems even have communities dedicated to querying data, such as MetricsDAO, which rewards data tasks.

- Decentralized storage: Data is distributed on different nodes to improve reliability and security. Some services may use distributed file systems, such as IPFS or Swarm.
- Decentralized computing: Computational tasks perform on different nodes, and if a node fails, other nodes can still operate with high fault tolerance.
- Decentralized Indexing: Search and query data stored in the blockchain. Since data on the blockchain is distributed, querying data becomes more complex. The indexing protocol, for example, The Graph, makes blockchain data more standardized and easy to query.

Node Infrastructure

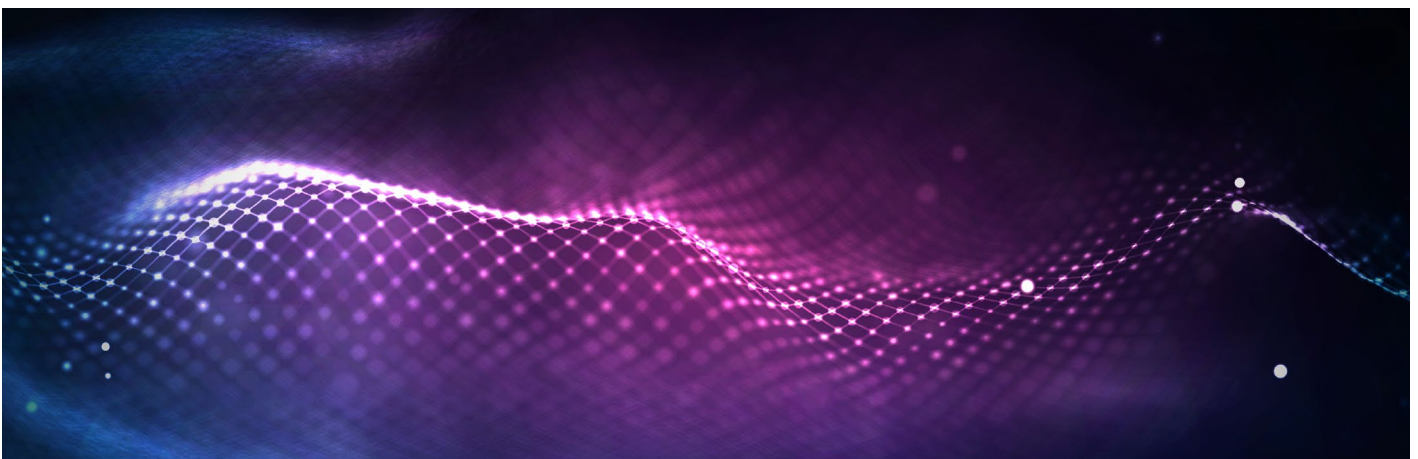
The blockchain network records all transaction information through its nodes. As a result, any application that interacts with the blockchain or performs new transactions must communicate with the nodes and update the data. For communication with the nodes, RPC (remote call) is usually used.

RPC is a client-server communication protocol that allows clients (such as other applications) to call functions on remote servers (i.e., nodes) over the network. For example, as shown in the diagram below, if any transaction is initiated by an application such as OpenSea, or AAVE, the transaction information needs to be sent to a node on the blockchain via an RPC protocol such as Alchemy, which currently supports Ethereum, Solana, Polygon, Arbitrum, and Optimism.

On-chain and off-chain data interoperability

Blockchain data types include transactions, blocks, metadata, states, and contracts. Due to the fact that these on-chain data cannot interact with real-world off-chain data, the role of the oracle is crucial. A classic example is the DeFi protocol, which requires access to real-time prices of transaction pairs.

The data source, accuracy, and speed of the data, as well as the data aggregation methods, are most important for the data provided by the oracles. Here is a detailed comparison of some of these designs from different projects. There have also been several NFT oracles emerging since the NFT has captured the public's attention.







Node Operations	 Chainlink	 Band Protocol	 PYTH	 API3
Who Runs Oracle Nodes?	3rd Parties	3rd Parties	Data Providers	Data Providers
Do They Operate A Distinct Chain?	No, but theoretically possible (V2)	Yes, BandChain	No	No
Do They Run An Off-Chain Network?	Yes, Modular P2P Networks("DONs")	No	No	No
Aggregation Methods				
Where is Price Aggregated?	On-Chain (Destination L1)& Off-Chain	On-Chain (BandChain)	On-Chain (Solana)	On-Chain (Destination L1)
How is Price Aggregated /Reported	Median	Customizable	Confidence Intervals	TBD

Figure 2. Oracle Economic Comparison, Source: Delphi Digital

Related projects: Pyth network, Chainlink

Public chains and data availability

There are several different dimensions to public chains: no permission required/permission required, public transactions/private transactions, and decentralized block-producing/centralized block-producing. Blockchains such as Bitcoin and Ether 2.0 do not require permission and produce blocks in a decentralized way. On the other hand, the recent tokenized green bonds issued by the Hong Kong Government were developed on the Canton blockchain of Goldman Sachs. A centralized block-producing system is required for this enterprise blockchain.

Although computation and validation have been moved to Layer2, Layer1 storage continues to face serious scalability challenges. The modular blockchain is now a new trend, splitting the execution, settlement, consensus, and data availability layers into different modules and combining them to create a blockchain suitable for different scenarios.

The modular design allows blockchains to be applied to a wide range of domains more flexibly, efficiently, and cost-effectively. Celestia and Polygon Avail are examples of data availability projects. We believe modular blockchain has great potential and are bullish on it at HashKey Capital. We published a landscape article last year on modular blockchain and will pay more attention to the Cosmos ecosystem this year.

In general, blockchain infrastructure projects provide critical support and infrastructure for the application and development of blockchain technology. As a result, institutions should pay attention to the trends and innovative directions of these projects to identify those with potential and promising prospects and provide them with support and funding, thus promoting the development of the blockchain industry.

#6

Bridging digital assets and traditional financial infrastructure



Junfei Ren
Chief Executive Officer
Pando Finance



PANDOFINANCE

Crypto Financial Services Infrastructures and Trend

Blockchain as a new technology has led an innovative leap in applications recent years. This technology-associated tokenomics, i.e. crypto tokens, has gained a lot of attentions, especially in the investment community. As an emerging asset class, crypto is being accepted by more and more investors, and the trend of becoming an important asset class is very clear.

However, current financial services infrastructures are not ready to offer investors the kind of traditional financial services experiences in crypto arena, no matter KYC processes, ecosystems of service providers, or offerings to establish relevant exposures, etc.

The trend of increasing public interests and needs of crypto-related financial services is obvious, however, to let the trend grow healthier, there're a lot more efforts needed on the ground. A financial services infrastructure with crypto being widely included is really in need, so that a gateway can be built to seamlessly leverage clients' experiences in traditional financial services. More and more traditional financial institutions will step into crypto businesses, and more and more crypto-native players will take lessons and pros from traditional financial institutions as well.

To Help Allocators Establish Liquid Crypto-native Exposures

More and more VA uplift licenses will be granted by SFC so that a wider range of options can be offered to allocators (i.e. professional investors or accredited investors) to allocate their fiat capital directly to crypto assets, establishing their intended crypto-native exposures, either for capital appreciation purposes or for diversification purposes. Products offered under this license theoretically can give professional investors or accredited investors almost the same allocation experience as traditional hedge fund strategies or products.

The whole operational procedures is also almost the same as traditional hedge funds under this uplifted license, as only reputable and approved service providers are allowed to engage in the operational chain, from custodian, exchanges to fund administration and accounting, etc.

In terms of fund strategies offered, the industry will intentionally start from simple, lower-risk, allocation-oriented strategies, like BTC and ETH performance trackers, active management in large cap cryptos only, etc. So that allocators' original intentions and needs are met, and in the same time, allocators are protected from suffering extreme risks, as too much information flow and fast innovation paces in this asset class can change a lot of things suddenly in an unpredictable way.

As the crypto asset management industry matures in HK, and the regulatory framework becomes more robust here, the participating institutions will step further to richen strategy offerings and increase product diversities to serve allocators better.

Won't Leave the Public Behind

The overall industry's prosperity needs a wider range of inclusiveness. Normal individuals and families count, and they're so important for the ecosystem's developments in this era of blockchain innovative leaps.

To promote the understanding of blockchain evolution for the mass, more and more retail-facing investment products will be launched. For example, we will see more and more low-cost ETFs targeted specifically to blockchain themes or extensional themes from blockchains. These products effectively enable the mass to access the opportunities of blockchain related growths and also help educate the public about the situations and progresses made in blockchain technology and applications.



A Call to Close the Understanding Gap between Crypto Asset and “Traditional” Financial Market

It's pleased to see that SFC is actually regulating Crypto related financial activities from an “asset” perspective, recognizing it as a legitimate asset class, establishing a comprehensive framework to regulate it.

Either the two 100% VA investable products offered to accredited allocators or the two existing ETFs targeting the mass public, Pando is trying the best to seamlessly bridge the investor experiences between crypto asset and traditional financial market under the guidance of SFC in a very prudent way. Although it's worth the efforts, the work itself is not easy. For example, the Pando VA products' launches engage various counterparties, and it's indeed an industry-wide issue. All stakeholders from regulators, banks to other professional service providers, etc need to work together hand by hand to make the process more streamlined and friendly.

From Pando's experience and perspective, the first suggestion would be to seek the unity of understanding amongst the ecosystem stakeholders. For example, although crypto is a relatively new asset class, but in the end of the day it's an asset class recognized by regulators like HK SFC. It would probably be better to treat this asset class without distinction from other “traditional” asset classes

at least from the strategic embracement and regulatory actions levels so that a holistic regulatory and business dealing framework to cover Crypto, Equities, Fixed Income, Commodities, etc. can be more efficiently formed.

Based on Pando's understanding, the other important initiative the industry should execute as quickly as possible would be to leverage the existing innovative technology emerged in the space. For example, although there're a lot of issues in centralized crypto exchanges (most issues are probably “moral” issues), admittedly speaking, the trading technology and infrastructure is far more leading the traditional exchanges in terms of 24*7 dealing, liquidity, margin tracking and position liquidating, order matching, centralized order book management, etc. Without embracing more advanced technology in a relatively quicker pace, the cost of doing crypto-related business no matter for the public mass or accredited institutions is relatively high, which feeds back into the issue of relatively-thin market liquidity under a regulated dealing framework. Without liquidity, the market risk management is actually more difficult.

So the regulatory bodies and the industry overall should consider this balance between market risk management and operational or process or moral risk management. There will be tradeoffs here.



#7

Legal Framework for a Web3 Hub



Joy Lam
Partner (Registered Foreign Lawyer)
Baker McKenzie

**Baker
McKenzie.**

A clear and enabling legal framework is essential for the development of a Web3 hub as it can promote engagement and attract investment, which are integral to the growth and sustainability of a Web3 ecosystem.

In order to facilitate the growth and adoption of Web3 technologies, a legal framework must consider both the economic and technological aspects of Web3, it must be agile enough to respond quickly to emerging technology trends and evolving industry practices and it must be supported by laws and policies that promote innovation and are tailored to recognize and understand the potential benefits of blockchain technology.

There are several key aspects that a legal framework for a Web3 hub must address, which are essential to ensuring a secure, transparent and compliant ecosystem of decentralized applications, protocols, and services built on blockchain technology.

Technology and the Law

A critical component of a facilitative regulatory framework is legal clarity, which can help businesses and users to understand their rights, obligations and potential liabilities. By providing legal certainty, clear rules and a stable operating environment, a regulatory framework can help to reduce risks, which can be a powerful incentive for businesses and users to enter the Web3 space spurring increased investment in the Web3 ecosystem and catalysing its growth and evolution.

In particular, the use of blockchain technology as a valid means of executing transactions, storing data and keeping records should be legally recognized. Legal recognition and acceptance of blockchain technology can ensure that

it is used properly and safely, enabling participants in the Web3 ecosystem to take full advantage of its potential and assuring potential investors of the legitimacy of the technology underpinning their investments.

Guidelines should be provided on the use and enforcement of smart contracts. Currently there is no unified global legal recognition of smart contracts, although some jurisdictions have taken steps to recognize and regulate smart contracts. Existing regulatory frameworks may not deal with some of the more nuanced and complex issues related to the recognition and regulation of smart contracts, particularly in relation to liability, enforcement, dispute resolution and contract interpretation, which will be critical for more institutional investors and organizations.

Bridging Digital and Traditional

Clear guidelines should also be provided on the legal characterization of digital assets. This is crucial in determining the legal standing, taxation implications and application of other rules that govern the issuance and use of digital assets. Similarly, the taxation implications of digital asset transactions and other activities within the Web3 hub such as mining and staking should be clearly set out, with specific guidelines for activities that are unique to the world of digital assets.

A key challenge for many businesses, users and developers operating in the Web3 space has been finding a bridge between the traditional financial system and the world of digital assets. In particular, access to banking services and fiat on/off ramps has been a significant hurdle. To develop a Web3 hub, it will be critical for the regulatory framework to facilitate predictable, seamless and effective financial integration between these two distinct networks.



Consumer Protection

Consumer protection is another critical issue in the world of digital assets and dApps. Regulations play a key role in providing consumers with peace of mind when engaging in activities within a Web3 hub. A regulatory framework must provide safeguards for users from fraudulent, deceptive or malicious practices while also being appropriately tailored to the unique technological environment in which such products and services exist, to create a safe and secure ecosystem where consumers can access innovative applications with confidence. Creating a framework that allows consumers to make educated decisions and enhances consumer protection will increase consumer confidence, leading to greater adoption and usage of dApps, digital assets and distributed ledger technology.

The regulatory framework must also address key consumer issues such as data privacy and security. Clear measures should be included for decentralized data storage, identity management solutions, privacy protection protocols and the enforcement of transparency policies to ensure fulsome disclosure of how data is handled.

Licensing and Regulation

The implementation of anti-money laundering regulations and regulations to counter the financing of terrorism by digital asset exchanges, wallets and other intermediaries involved in the Web3 hub are important measures to help prevent illicit financial activity. Such intermediaries must have adequate processes and controls in place to manage customer risk and to monitor for and report suspicious activities.

Digital asset service providers and other businesses operating within the Web3 hub should be subject to clear licensing and registration requirements. The scope of activities and services that trigger licensing or registration requirements should be clearly defined and the applicable licensing or registration requirements must be tailored to reflect the unique nature of Web3 and digital assets. The licensing and registration regime must also be updated periodically to reflect emerging trends, changes in technology and evolving risk.

In particular, it will be important for an effective regulatory framework to have clear guidance on how DeFi protocols and services are regulated including in respect of lending, borrowing, staking, derivatives, insurance and stablecoins. Given the rapid growth of DeFi in recent years which is

expected to accelerate, it will be important to have clear and specific regulations that address the key aspects of DeFi protocols and services as the sector evolves to promote transparency, establish fair market practices, protect investors and prevent manipulation.

A Web3 focused legal framework should also provide structures for, and recognize the operation of, DAOs and similar governance mechanisms which have become common features of the Web3 ecosystem. DAOs provide a framework to help ensure that all stakeholders in the network are operating according to agreed upon rules and standards, while still allowing for flexibility and innovation. DAOs may also provide additional legal protections for their members by providing clear and consistent guidance on how disputes should be handled and what remedies are available. Creating a well-defined environment for the formation and operation of DAOs will help ensure that these organizations can continue to thrive in the new digital economy of Web3.

Regulatory Approach

Given the rapid rate at which emerging technology develops and industry practice evolves, it will be critical for the regulatory framework of a Web3 hub to be flexible and agile. One way to support the currency of the regulatory framework is to utilize regulatory sandboxes, in which innovators can test new products and services in a controlled environment under the supervision of regulators but without being subject to the full requirements of the regulatory regime. Regulatory sandboxes aim to strike a careful balance between enabling innovation and maintaining regulation. Importantly, regulatory sandboxes are a valuable means for regulators to stay up to date with emerging trends in financial technology and assess potential risks.

Policymakers can create an effective legal and regulatory framework for Web3 that addresses the fundamental factors which may present risks or issues by taking a proactive approach and collaborating with industry stakeholders and developers. Implementing a nuanced and tailored regulatory framework that addresses these key aspects of Web3 will help to create a safe and secure environment for businesses, users and developers to thrive. This will encourage innovation while providing necessary protections for users and will also enable regulators to keep abreast of emerging technologies and trends.

#8

Independent professional services to empower the Web3.0 venture capital & private equity investments



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Building trusted decentralized architectures and ecosystems

Web 3.0 set to attract to venture capital & private equity investors

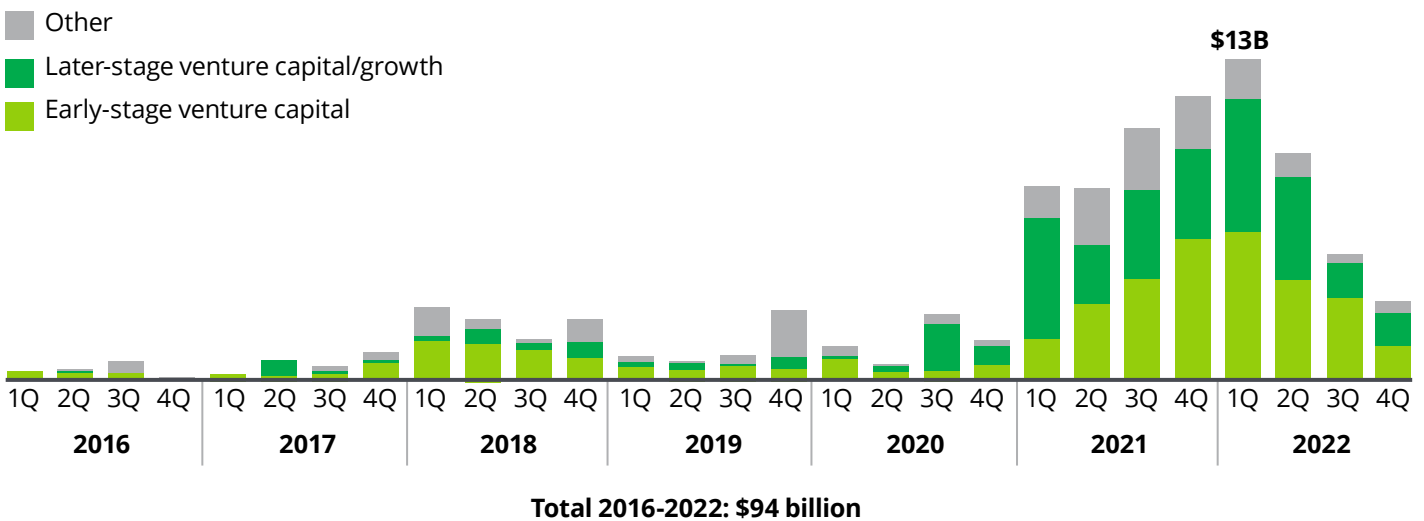
From the very beginning, building stakeholder trust has been one of blockchain technology's primary benefits. Blockchain-enabled "trust-less" systems—so-called because trust is not placed in a single person or organization but in the community of users—were seen as an antidote to diminishing faith in government, media, money, business, and other public and private institutions. However, the collapses of FTX and

Silvergate have shaken investor confidence in digital assets. Market players are seeking to gauge the extent of damage these failures have caused—and how this will shape the Web 3.0 industry in the years to come.

There are some clear parallels between the recent crypto rout and the dot-com crash of the early 2000s, including irrational exuberance and a lack of investment discipline. But just as internet technologies have become indispensable to life and work over the past two decades, Web 3.0's vast transformative potential will continue to attract venture capital and private equity (VC/PE) investors.

Figure: Investors have poured approximately USD94 billion into Web 3.0 companies in recent years, most of it since 2021

Capital invested in web3-related companies globally (\$B)



Notes: Equity investments only; does not include investments in crypto tokens; includes all deals classified in the Crypto/Blockchain vertical on PitchBook; Coinbase's 2021 direct listing excluded
Sources: PitchBook; Crunchbase; The Block; CoinDesk; Bain analysis [13]

In an environment of ever-increasing mistrust, independent professional audit & consulting firms can empower "trust-less" blockchain and Web 3.0 systems to rebuild trust. Some publications have suggested blockchain technology could eliminate the need for financial statement audits by auditors altogether. If all transactions are captured on an immutable blockchain, then what is left for an auditor to audit? But this kind of proposition over-simplifies the trust issue.

Auditors practice under strict regulations, professional codes of conduct, and auditing standards, and are independent of the entities they audit. They apply objectivity and professional skepticism to provide reasonable assurance as to whether an entity's financial statements are free of material misstatement and, depending on the engagement, whether a company's internal controls for financial reporting are operating effectively. The public recognizes that auditors generally enhance trust in the information issued by companies and enhance confidence in capital markets.

Our view is more pragmatic. In addition to Web 3.0 industry players, we see established enterprises, institutions, regulators, government, and professional audit & consulting firms having a major role in adoption, evolution, and trust building in Web 3.0. In Web 3.0, audit & consulting firms will retain an important role and can help to build trust in the Web 3.0 VC/PE investment ecosystem.

Regulation

Learning lesson from the failure of FTX, deficiencies or absence in internal controls around key management and poor governance structure are common factors contributing to the failure of several exchanges. Regulation is essential to assure investors' trust, to provide transparency and legal certainty, and to protect the integrity of the Web 3.0 ecosystem. Web 3.0 industry participants have started to draw more attention from the government over the years and new regulatory framework and rules have been introduced on distributed ledger technology and its application. The primary goal of setting standards and rules is to ensure the governance, internal control, operation, and supporting functions of these platforms and application fulfil the requirements set out by the regulators to protect the interest of the investors.

Under the proposed Virtual Asset Service Provider (VASP) Guideline issued by Hong Kong Securities & Futures Commission, applicants or any platform that operates or intends to operate in Hong Kong must submit an external assessment report covering their business model, governance, internal controls, cybersecurity, know your customer (KYC) and anti money laundering (AML) mechanisms, and submit two reports to the SFC, one on application for a license and the second after being granted approval in principle.

From an investor perspective, when one is deciding to use a Web 3.0 exchanges platform to trade his/her cryptocurrencies or put the digital assets with a custodian, the most common question is, "Are my assets safe?". This is often followed by a more difficult question, "How do you know?". SOC certification, which has become the industry benchmark, then comes into play.

SOC 1 and SOC 2 certification, each focusing on different aspects of a platform or custodian, provide an efficient, globally-recognized way of differentiating from other service providers. SOC 1 focuses on financial reporting controls while SOC 2 emphasizes controls' security, availability, integrity of processing, confidentiality, and privacy. The Association of International Certified Professional Accountants has provided the general criteria for effective design of controls under its Trust Principles, and it is the independent assessor's responsibility to identify what has been done by a firm that meets those criteria. Accordingly, a third-party assurance report helps investors build confidence in the service delivery processes and controls of Web 3.0 companies.

Cybersecurity

The large amount of money and digital assets handled by fast-growing Web 3.0 industry participants make them highly attractive to hackers. Over the past few years, hacking incidents have led to losses of investor funds that have caused huge setbacks to further adoption and trust. System unavailability or slow execution due to distributed denial of service attacks also damage trust in an exchange.

Adopting an effective cybersecurity program is crucial to preventing and detecting external attacks by malicious hackers. Having an adequate budget for cybersecurity is important—but how the program is organized and governed is even more crucial than the amount spent.

In conjunction with an effective, comprehensive cybersecurity program, professional services firms adopt different approaches. For example, a complementary "transaction monitoring" detection technique can reconcile transactions recorded in user wallets against an exchange's balances and the transactions recorded by a third-party node on the public blockchain ledger. In theory, transactions recorded on the exchange must equal those recorded in related wallets and the third-party node. Any discrepancies could indicate that someone has obtained unauthorized access to the exchange and might have performed malicious transactions. [11]

Key management

Numerous bloggers and correspondents have incorrectly claimed that blockchain is rife with security flaws. To date, all known incidents that have led to stakeholders losing their digital assets have not been related to deficiencies in blockchain technology but are more likely to have resulted from vulnerabilities in the software used to manage or store digital assets (i.e., exchange soft wallets) or to fraud originating from unauthorized access to private keys.

This suggests that trust relies on proper private key management and access management handling. As custodians of investors' assets, digital asset platforms must ensure the confidentiality, integrity, and availability of operational private keys.

Most parties recognize these risks but have not yet found suitable solutions that are effective and cost efficient. There are propositions that satisfy both these requirements, and build upon professional services firms' vast experience in key management for the payments industry. Secure key storage and escrow, fully managed services, and cryptographic consultancy to provide a second opinion before the launch of a next-gen platform are among the services certain independent professional service firms offer in this area. [11]

Due diligence

Although many Web 3.0 industry participants implement various degrees of KYC and AML, more due diligence is needed around the source of wealth or funds during on-boarding.

This can be achieved through agreed upon "proof of origin" procedure. For each provided wallet address, the procedure checks all transactions related to the acquisition of digital assets with fiat currency for consistency with evidence such as cash transfer or bank wire confirmation, account information, loan agreements or similar documents from shareholders, banks, exchanges, brokers, custodians, and other stakeholders.

If a digital asset platform is "named and shamed" for being used to launder money, the consequences are far reaching, and the institution will have little opportunity to regain its reputation. Consequently, adequate due diligence is vital to manage and mitigate the related reputation risk. [11]

Future role of auditors in the Web 3.0 ecosystem

Blockchain systems standardize transaction processing across multiple industries, and audit & consulting firm can provide assurance to investors and users of the Web 3.0 technology. Auditors' skill sets, independence, objectivity, and expertise will enable them to fill a future role. The following list of potential contributions for auditors is illustrative only; there might be substantial regulatory and professional hurdles before an audit & consulting firm can take on these roles. [12]

Auditor of smart contracts

As described above, smart contracts can be embedded in a blockchain to automate business processes. Contracting parties might want to engage an assurance provider to verify that smart contracts are implemented with the correct business logic. In addition, an auditor can verify the interface between smart contracts and external data sources that trigger business events. Without independent evaluation, users of blockchain technologies can risk unidentified errors or vulnerabilities. To take on this new role, an auditor will need a new skillset, including understanding technical programming language and the functions of a blockchain.

In a financial statement audit, management is responsible for establishing controls to verify whether smart contract source code is consistent with the intended business logic. An independent auditor of an entity with smart contracts on a blockchain is likely to consider management's controls over the underlying code. However, many companies might choose to reuse smart contracts built by other entities already active on a blockchain. Future audit standards and guidance will need to contemplate this technology, bringing clarity to the role of the auditor in those scenarios.

Service auditor of consortium blockchains

Prior to launching a new application on an existing blockchain platform or leveraging or subscribing to an existing blockchain product, users might desire independent assurance as to the stability and robustness of its architecture. Instead of each participant performing their own due diligence, it is more efficient to hire an auditor to achieve these objectives. In addition, critical blockchain elements (e.g., cryptographic key management) should be designed to include sophisticated general information technology controls (GITCs) that provide ongoing protection for sensitive information and processing controls over security, availability, processing integrity, privacy, and confidentiality. On an ongoing basis, a trusted, independent third party might be needed to assure the effectiveness of controls over a private blockchain.

Administration

Permissioned blockchain solutions would benefit from a trusted, independent, and unbiased third party to function as a central access-granting administrator. This function could be responsible for identity verification or a further vetting process to be completed by a participant before they are granted access to a blockchain. The central administrator could also validate the enforcement and monitoring of blockchain protocols. If this function is performed by a user or node of the blockchain, they might gain an undue advantage that weakens trust among consortium members. Since this role would be designed to create trust throughout the blockchain, due care will be needed when establishing its function and legal responsibilities.

As a trusted professional, an independent audit & consulting firm could carry out this responsibility.

Arbitration

Business arrangements can be complex and result in disputes between even the most well-intentioned parties. For a permissioned blockchain, arbitration might be needed to settle disputes among consortium participants. This function is analogous to the executor of an estate, a role typically filled by qualified professionals, including auditors. Participants on the blockchain would require this type of function to enforce contract terms where the spirit of a smart contract departs from a legal document, contractual agreement, or letter. Further considerations should be explored to determine if an arbitration function is necessary.

Conclusion

Despite the hype and turmoil in the crypto world, Web 3.0 technology will continue to evolve, this investment theme remains highly relevant to venture capital & private equity.

Whether for VC/PE funding the next generation of internet; investment managers performing due diligence on Web 3.0 companies or traditional companies exposed to Web 3.0; or strategists evaluating new types of funds and distribution channels, Web 3.0 will emerge as a critical theme over the next 10 years.

Although blockchain has been described as “the trust machine”, the control maturity of off-the-chain components and processes (such as wallets, due diligence, and cybersecurity) does not yet do justice to this definition. Trust is widely seen as vital to overturning pessimistic views of digital assets and exchanges. Typically, there is a lack of necessary resources to ascertain whether related risks are being managed adequately within a robust internal control framework. Third party independent professional audit & consulting firms are well positioned to bridge this gap and provide the necessary assurance services.

It might not be time yet to dive in head-first. However, to prepare for potential investments, VC/PE firms should start to build deep Web 3.0 partnerships with knowledgeable, experienced professional services firms as they seek to turn this technological trend into an advantage and opportunity.



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