

SINGAPORE WEB3 ECOSYSTEM OVERVIEW

September 2022



**CRYPTOMERIA
CAPITAL**

In corporate partnership with AXON

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We're excited to share this deep dive into the Singapore Web3 ecosystem.

As cryptocurrencies and blockchain technologies are seeing broader adoption, nowhere is it more prevalent than in Singapore. Singapore is ranked as the most cryptocurrency-friendly country in the world, and for a good reason. It has become a hub for fintech and payment solutions, with blockchain technologies garnering a particular interest from legislators, investors, and the general public alike. With a clear crypto regulatory framework and a large percentage of the population being crypto holders, cryptocurrencies have a chance to get more use cases than anywhere else.

Digital assets and fintech are great tools, and they're not going anywhere. Singapore legislators have accepted that and are working towards creating a diverse ecosystem of strong blockchain businesses.



VADIM KREKOTIN

Founding Partner at
Cryptomeria Capital



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KEY TAKEAWAYS

- While the main areas of investment in Singapore are fintech and payment technologies, the cryptocurrency sphere has become increasingly influential since 2016. That's why a large global ecosystem of crypto and blockchain companies has been formed in the country.
- In 2021, investments in Singaporean cryptocurrency and blockchain companies grew almost 15 times and amounted to about \$1.48 billion.
- Funding for the crypto industry in the first half of 2022 amounted to \$539.1 million.
- In 2020, Singapore produced the most research publications in the field of blockchain technologies among members of the Association of Southeast Asian Nations and ranked third worldwide.
- The end of 2021 saw Singapore rank first among the world's crypto economies due to its clearly articulated crypto regulation and legal framework, as well as the largest percentage of the population owning crypto and many active crypto companies in the region.
- Government initiatives, as well as foreign direct investment (FDI) from venture capitalists and private investors, are helping to sustain and grow Singapore's Web3 ecosystem.
- The country has the Cryptocurrency and Blockchain Industry Association (CBIA), which facilitates the development of small and medium-sized enterprises in this industry.
- The Monetary Authority of Singapore (MAS) has collaborated with private blockchain companies in Singapore and abroad on international crypto payment services, such as Project Guardian, Project Ubin, and Dunbar.
- There are usually two paths for cryptocurrencies in Singapore: either to be governed by the Singapore Payment Services Act 2019 ("PSA") or subject to the Singapore Securities and Futures Act ("SFA").
- There are two types of licenses applicable to cryptocurrency transactions under the PSA: a standard payment institution license and a major payment institution license.
- The Monetary Authority of Singapore has implemented a sandbox regulatory program to provide a favorable regulatory environment for Web3 businesses.
- The Metaverse is actively developing in Singapore through numerous forums and events. The governmental institutions support the idea of conducting legal transactions in the Metaverse as well as marriages. The entrance of art and culture into the Metaverse, and Web3 in general, are also encouraged.
- Most crypto and blockchain deals for Singapore in 2021 were in software and underlying infrastructure, not services.
- In terms of registration, among all crypto funds, 6% of the total are registered in Singapore. Hong Kong and Switzerland have the same coverage rate.
- Many large hedge funds operating in this region are actively involved in the development of blockchain technologies and acceleration programs for crypto startups. Many also cooperate with government representatives, such as GIC Private Limited (Government Of Singapore Investment Corporation), Temasek Holdings Limited, and DBS Group.
- Google Cloud Singapore actively contributes to the crypto ecosystem of Singapore, collaborating with companies that build their projects based on the Google Cloud Platform (GCP). Google has shared initiatives with Sky Mavis and the Ronin network, Animoca Brands, DappRadar, Nansen, and others.
- An influential ecosystem of crypto funds has formed in the country: investors in the largest infrastructure solutions and blockchain protocols. Singapore has a very concentrated representation of Algorand, Litecoin, Avalanche, Tron, NEO, and many projects of the Polkadot ecosystem.



OVERVIEW

Although the city-state of Singapore has a population of just over 5 million, the country's greatest asset is perhaps its relationship with the rest of the world. The city-state has few natural resources, making it more dependent on financial services. According to the World Bank Group, it is considered one of the best places to do business, and it clearly shows: There are more multinational corporations in Singapore than in any other city in Southeast Asia.

Thus, Singapore is an innovative country that embraces technology and has created a favorable environment for start-ups, especially in the fintech sector. It is already home to 19 unicorn companies, nine of which were launched in 2021. It's no surprise that this tiny island nation is considered part of Southeast Asia's golden startup triangle [1], with the other two countries being Vietnam and Indonesia.

In recent years, the Internet has received a powerful impetus for development, and new types of communications and interactions are becoming a reality. So Singapore and Web3 go hand in hand as the country prepares for another boom in digitalization and technological growth.

Web3 Singapore trends in 2022 are expected to further shake up the business and technology landscape, with several new disruptive business applications and processes emerging.

Government initiatives and foreign direct investment (FDI) from venture capitalists and private investors are helping to support an already thriving startup ecosystem. Web3 is expected to leverage these resources as it opens up unlimited potential in many areas of business, finance, and technology.



SINGAPORE AND BLOCKCHAIN TECHNOLOGY

At the end of 2021, Singapore was ranked as the most cryptocurrency-friendly country in the world due to its robust economy, favorable and defined regulatory environment, and high level of cryptocurrency requirements and acceptance. By taking measures to tighten crypto regulation in 2022, Singapore has chosen to focus on the quality of crypto companies rather than the quantity.

Singapore remains one of the leading countries among the crypto economies of the world. The country's government is enthusiastic about blockchain technology and its potential but is sober and responsible about market volatility and investor risks [2][3].

To make the functioning of crypto companies easier, there is The Cryptocurrency and Blockchain Industry Association (CBIA), which helps small and medium-sized enterprises develop in this industry. However, even more importantly, Singapore also has a modern regulatory framework that covers various activities related to the financial system. With a solid regulatory framework, Singapore is poised to become a leading hub for innovation and the adoption of cryptocurrencies.

Singapore's well-developed banking and financial infrastructure provides crypto companies with easier access to liquidity. The country has a long history as a capital market hub, and its environment is conducive to developing innovative financial products and services. Since the region is becoming increasingly important in the global economy, it gives the crypto business a significant competitive advantage.

Singapore is an excellent example of a government looking to streamline the sector and encourage crypto development within the realm of the requirements for utility and reliability. For example, the Monetary Authority of Singapore (MAS) has partnered with private blockchain companies that aim to use blockchain for payments, tokenization of securities, and cross-border trade financing, such as Project Guardian, Project Ubin, and Project Dunbar.

PROJECT DUNBAR

The BIS Innovation Center leads project Dunbar in partnership with the Reserve Bank of Australia, the Central Bank of Malaysia, the Monetary Authority of Singapore, and the South African Reserve Bank.

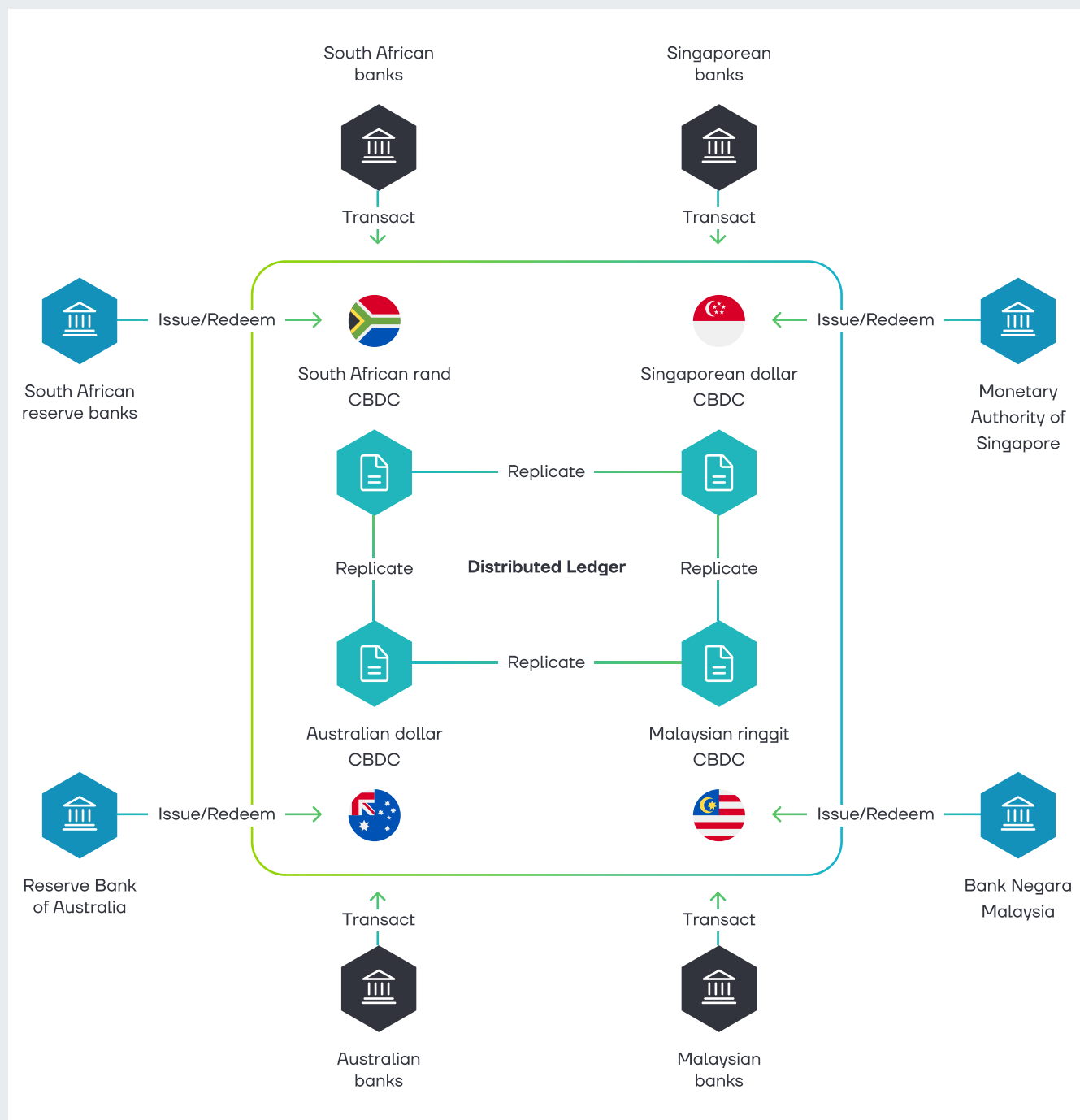


Figure 1: multi-CBDC platform. Source: "Project Dunbar – International settlements using multi-CBDCs" BIS Innovation Hub



Phase 1:
Digitalising the SGD



Phase 2:
Domestic interbank transfer



Phase 3:
Delivery versus Payment on DLT



Phase 4:
Payment versus Payment for cross-border settlement



Phase 5:
Target operating model



Phase 6:
Cross-border DVP and Payment versus Payment

Phase 1: Digitalising the SGD

In this phase, MAS and R3 explored the use of a central bank digital currency – a tokenised version of the SGD – for interbank payments.

Phase 2: Domestic interbank transfer

In this phase, MAS and ABS explored DLT-enabled interbank transfers and examined specific RTGS functionalities, such as queue handling and payment gridlock resolution.

Phase 3: Delivery versus Payment on DLT (DvP-on-DLT)

In this phase, MAS and SGX collaborated to realise domestic DvP settlement on two separate blockchain platforms, which is the focus of this report.

Phase 4: Payment versus Payment for cross-border settlement

In this future phase, the objective is to assess the feasibility of cross-border DVP.

Phase 5: Target operating model

In this future phase, the objective is to evaluate the impact of DLT on existing regulatory framework and market processes.

Phase 6: Cross-border DvP and Payment versus Payment

In this future phase, the objective is to apply the learnings garnered to execute cross-border settlement of both payments and securities.

Figure 2: Project Ubin's distinct phases. Source: "Project Ubin Phase 5: Enabling Broad Ecosystem Opportunities" MAS and Temasek.

1. On November 16, 2016, MAS announced that it would partner with R3, a DLT company, and a consortium of financial institutions on a pilot project to conduct interbank payments using Blockchain technology [7].

It identified the challenges of implementing a multi-CBDC platform shared by central banks and proposed practical approaches to address them. These design approaches have been validated by the successful development of technical prototypes on Corda and Partior, proving that the multi-CBDC concept is technically viable.

PROJECT UBIN

Project Ubin, on the other hand, is a collaborative project with industry representatives that aims to study the use of blockchain and distributed ledger technology (DLT) for clearing and settling payments and securities [5].

The project aims to help MAS and industry better understand the technology and the potential benefits it can bring through hands-on experimentation. This is done to develop easier-to-use and more efficient alternatives to today's central bank-issued digital token systems.



Project Ubin is a great example of what can be achieved when central banks are open to blockchain technologies and collaboration with other central banks and the private sector. The Monetary Authority of Singapore sees blockchain's potential, and instead of clinging to the old, it's open to exploring the new opportunities the technology offers.

Blockchain payments could vastly improve cross-border payments and settlements, facilitating international collaboration, reducing risks, and improving overall efficiencies.



IVAN SEMENOV

Managing Partner at Cryptomeria Capital

The Singapore network was built using Quorum, a blockchain platform developed by JP Morgan for the financial services sector [6]. This open-source blockchain protocol was specifically designed for use in a private blockchain network where only one participant owns all the nodes or in a consortium blockchain network where several participants own part of the network. Quorum is derived from Ethereum by modifying the Geth client. Project Ubin is now in its fifth phase, and six project reports have already been published.

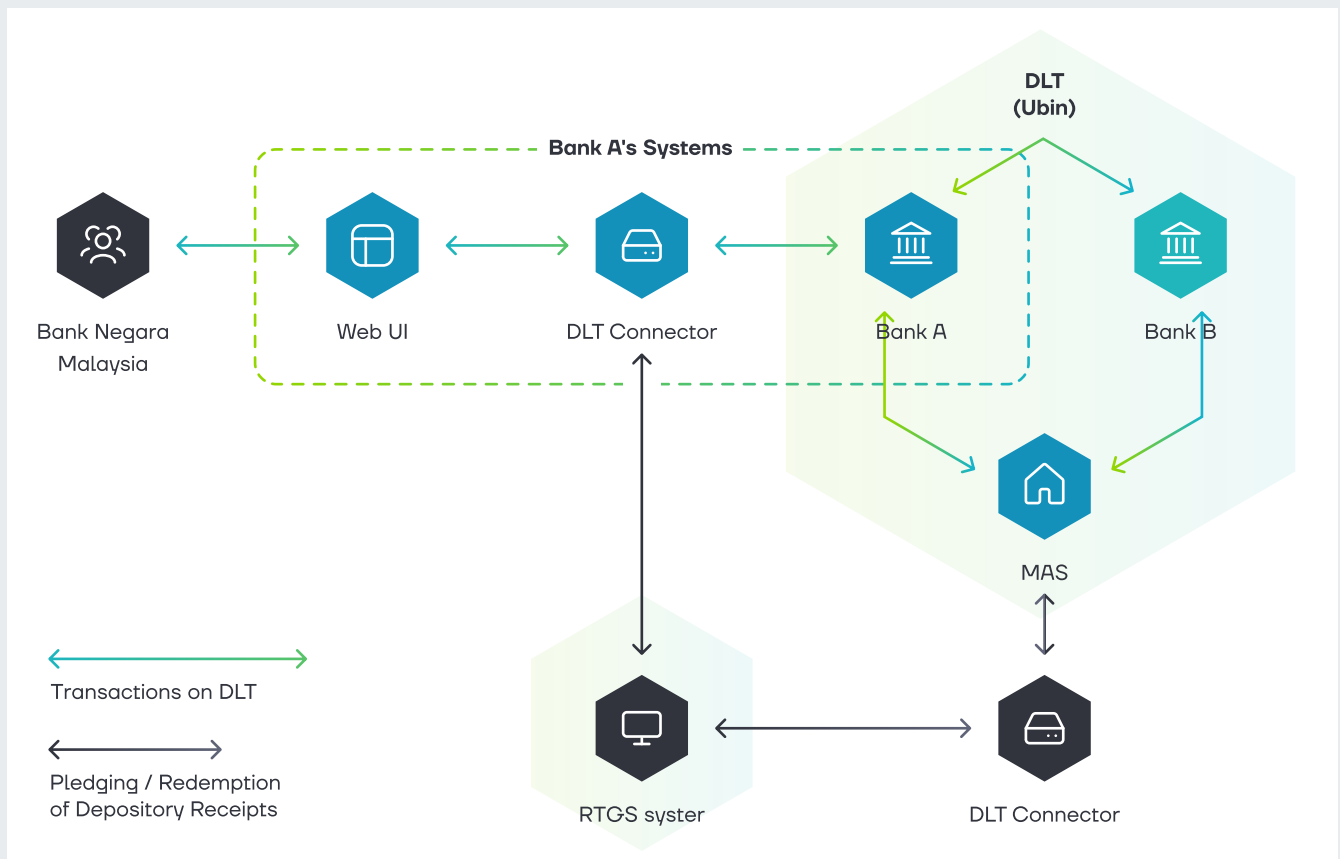


Figure 3: High-level architecture of Project Ubin. Source: "The future is here; Project Ubin: SGD on Distributed Ledger" Bank of America Merrill Lynch, BCS Information Systems, Credit Suisse, DBS Bank, HSBC, J.P. Morgan, Mitsubishi UFJ Financial Group, OCBC Bank, R3, Singapore Exchange and UOB Bank.

- On November 16, 2016, MAS announced that it would partner with R3, a DLT company, and a consortium of financial institutions on a pilot project to conduct interbank payments using Blockchain technology [7].
- On August 24, 2018, MAS and the Singapore Exchange (SGX) announced that they were working on the development of delivery versus payment (DvP) capabilities for the settlement of tokenized assets on different blockchain platforms [9].

RMO PLATFORM CUT ARBITRATOR

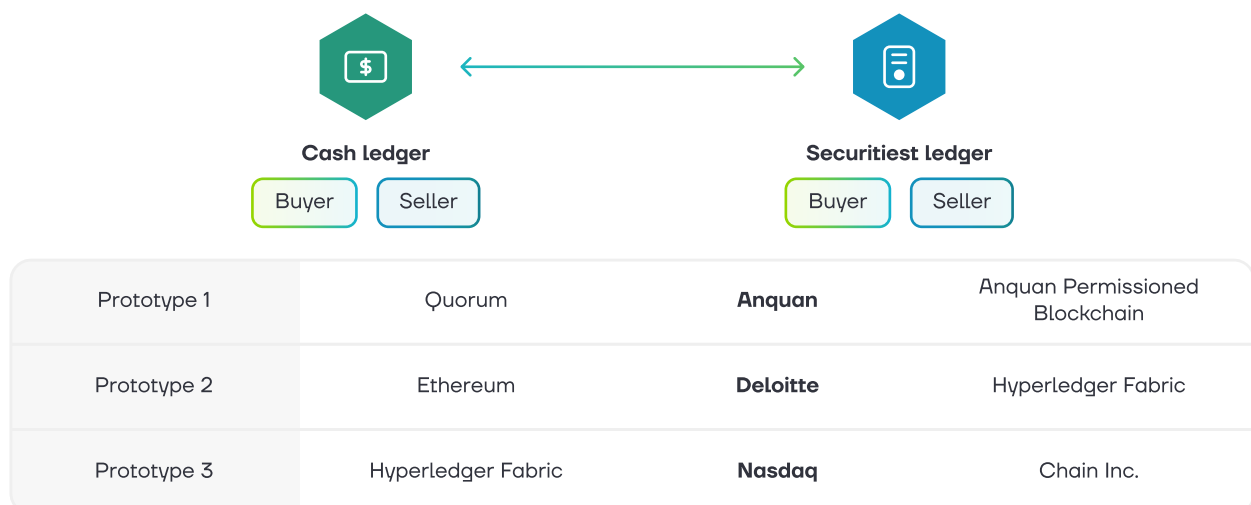


Figure 4: High-level overview of solution architecture. Source: "Delivery versus Payment on Distributed Ledger Technologies: Project Ubin" MAS, SGX, Anquan Capital, Deloitte and Nasdaq.

This would allow financial institutions and corporate investors to exchange and final settlement of tokenized digital currencies and securities while improving operational efficiency and reducing settlement risks. Three companies, Anquan, Deloitte, and Nasdaq, were designated technology partners for this project.

4. On November 15, 2018, the Bank of Canada (BoC), Bank of England (BoE), and MAS jointly published a report that assessed alternative models that could improve cross-border payments and settlements. The report explored existing challenges and alternative models that could lead to faster, more costly, and more transparent user experiences over time.

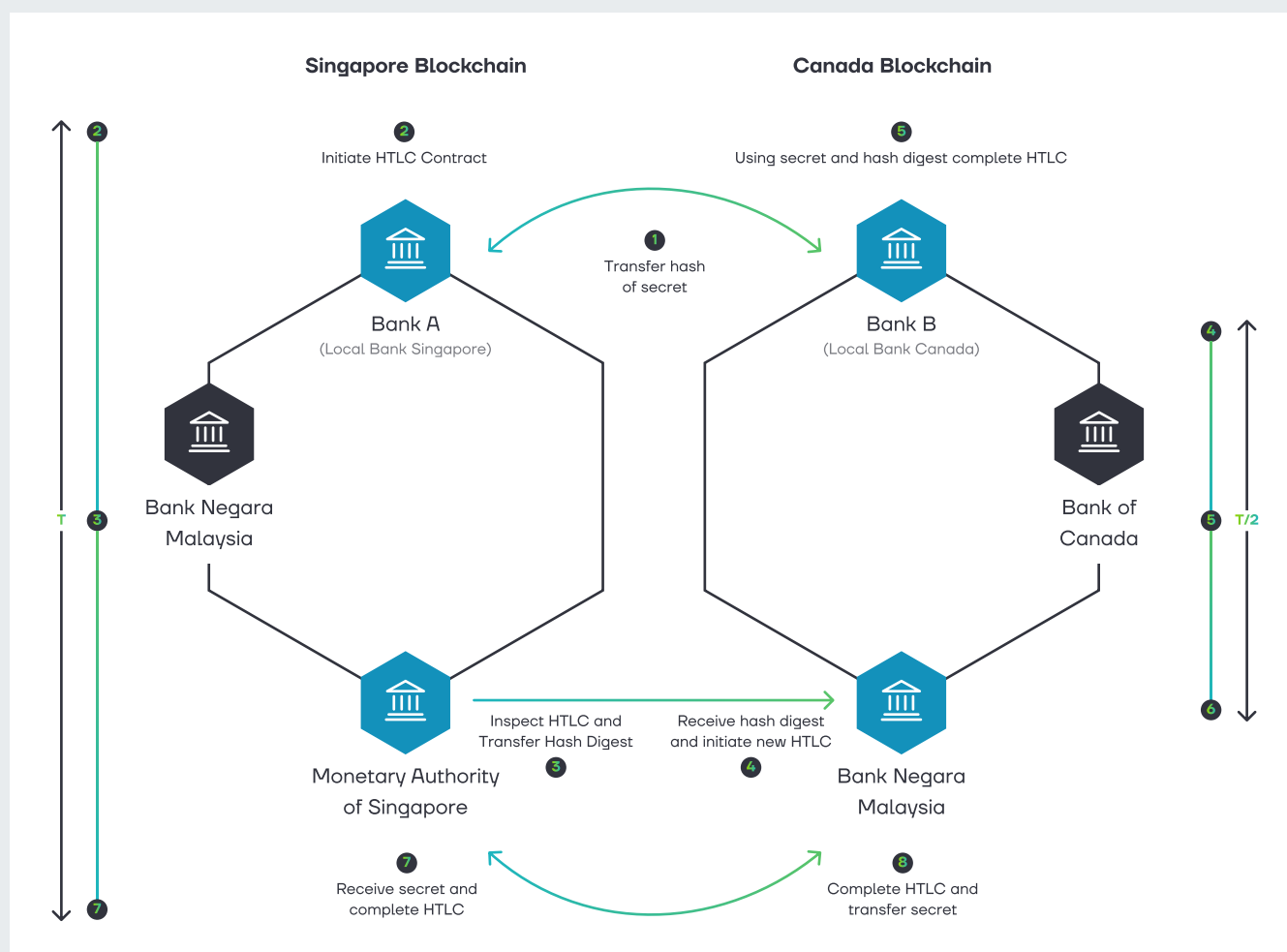


Figure 5: Overview of an HTLC. Source: “Jasper-Ubin Design Paper: Enabling Cross-Border High Value Transfer Using Distributed Ledger Technologies” BOC and MAS.

Subsequently, MAS and BoC connected their respective experimental domestic payment networks, namely Project Jasper and Project Ubin. On May 2, 2019, they announced a successful pilot of cross-border and cross-currency payments using central bank digital currencies [10].

MAS and BoC jointly published the Jasper-Ubin Design Paper: Ensuring Large Value Cross-border Transfers Using DLT, which proposes various design options for cross-border settlement systems [11].

5. On July 13, 2020, MAS and Temasek released a joint report to mark the successful completion of the fifth and final phase of the Ubin project [12].

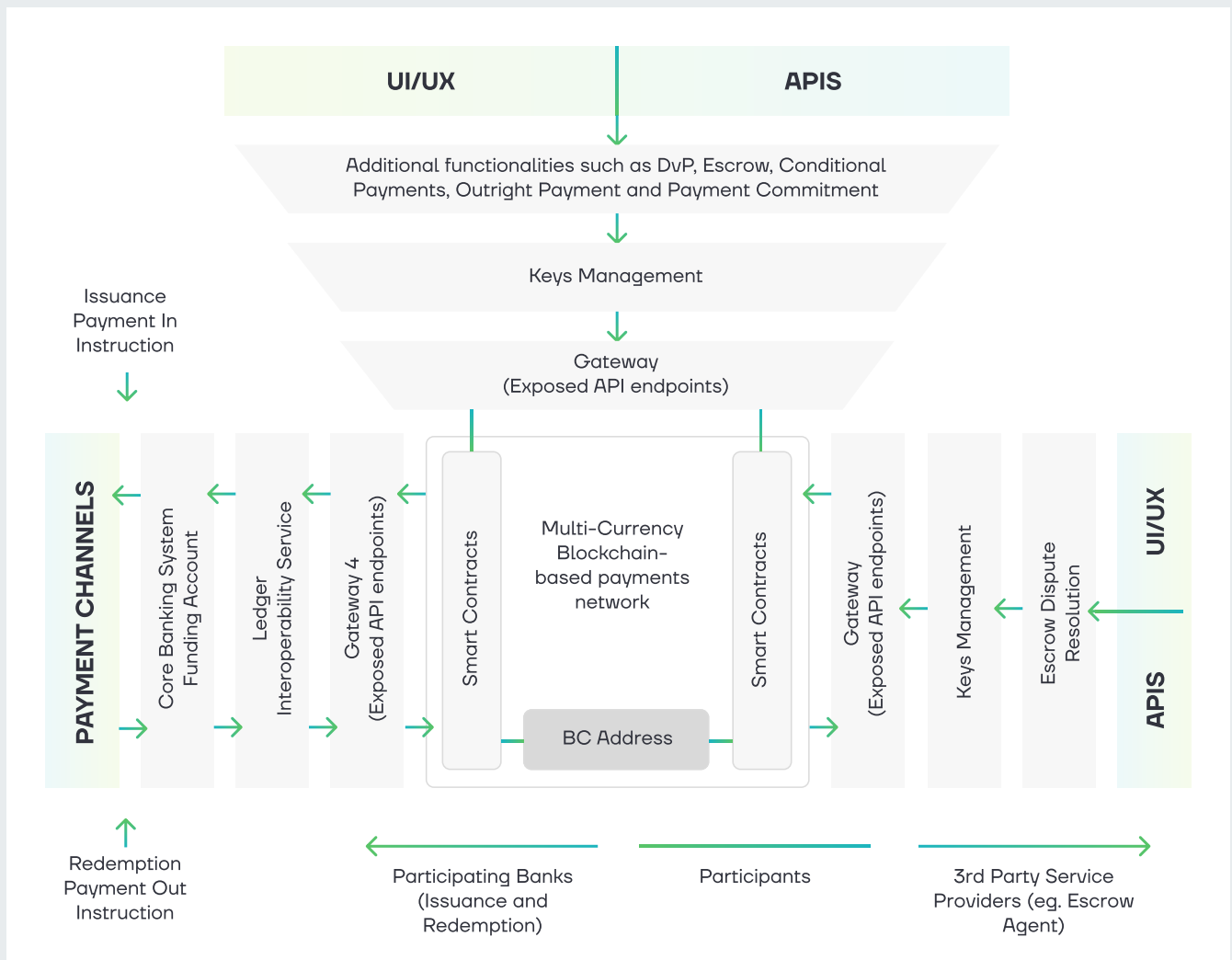


Figure 6: Technical Architecture Diagram. Source: “Project Ubin Phase 5: Enabling Broad Ecosystem Opportunities” MAS and Temasek.

The report “Project Ubin Phase 5: Enabling Broad Ecosystem Opportunities” provides technical information on the blockchain-based multi-currency payment network prototype and describes how the network can benefit the financial industry and the blockchain ecosystem. The successful development of a network prototype developed in collaboration with J.P. Morgan and Temasek was first announced on November 11, 2019 [13].

The Phase 5 network explores potential efficiency gains from other blockchain networks integrating with Project Ubin. It also looks into various blockchain use cases, such as delivery versus payment with private exchanges, escrow and escrow for trading, and payment obligations for trading.

In addition to technical experimentation, this phase also focused on exploring and proving the commercial value of the blockchain-based payment network, for example, in providing business opportunities beneficial to companies due to greater cost efficiency. Together with its partners, MAS has held workshops and discussions with more than 40 financial and non-financial firms to assess the potential benefits.

The findings are reflected in the Phase 5 report, which looks at the use of blockchain technology in commercial applications in various industries, and how these applications can benefit from integration with the developed blockchain-based payment network prototype [14][15].

INDUSTRY	AREA	DESCRIPTION	USE CASE
Capital Markets	Private Equities	Private exchange to facilitate trading of equities in privately held companies	1exchange
	Private Equities	Platform for issuance, custody and trading of digital securities	iSTOX
	Bonds	Trading and settlement platform for issuance and lifecycle management of digital securities	STACS
	Syndicated Loans	Primary syndication and secondary trading of syndicated loans	iLex + IHS Markit
	Multi-Stage Investments and Disbursements	Infrastructure assets funding, In a low-cost and secure manner	Allinfra
	Cross-border Settlement	Cross-border securities settlement and dividend payments using digital currencies	Sygnum
Trade and Supply Chain Finance	Supply Chain Digitalisation	Procure-to-Pay platform for exchanges of trade documents, with automated document verification and payment processing	Digital Ventures
	Supply Chain Digitalisation	Unified platform to connect buyers and sellers for orders, logistics and payments	Invictus
	Supply Chain Digitalisation	Exchange, verification and automatic matching of trade data to obtain digital payment obligations	Marco Polo
	Supply Chain Digitalisation	Electronic matching of trade data for bank payment obligation transactions	essDOCS
	Supply Chain Financing	Supply chain financing for SMEs with non-bank institutional capital	Crediti
Insurance	Healthcare Insurance	Lifecycle management of healthcare insurance claims	Digital Asset
	Automobile Insurance	Sharing and recording of information across participants for automobile insurance claims	Immediate
Beyond Financial Services	Media e-Advertising	Streamlining digital supply chain of programmatic advertising	Aqilliz
	Salary Payments	HR payments solution for real-time, accurate salary payments for gig workers and organisations	Octomate + Adecco

Figure 7: Summary of Use Cases. Source: “Project Ubin Phase 5: Enabling Broad Ecosystem Opportunities” MAS and Temasek.

GENERAL POSITION

Singapore's government is taking a very subtle and practical approach to regulating and doing business with cryptocurrencies and blockchain in general. As the government recognizes the economic, social, scientific, and technical potential of cryptocurrencies, it seeks to create a favorable regulatory environment for its adoption within the "Singapore financial landscape." However, at the same time, the government remains cautious, trying to identify the risks associated with such a young and, therefore, unstable asset as cryptocurrency.

While it may be seen as limiting cryptocurrencies' capabilities, the decisions are related to consumer protection, the fight against money laundering, and the financing of terrorism. Singapore strives to manage these risks proportionately through licensing (where applicable) to maximize the utility of crypto while assuring customer protection. As a result of this policy, cryptocurrencies are not considered equivalent to money in Singapore: Depending on its characteristics, a cryptocurrency may be regarded as a regulated product, such as a capital market product (including securities), electronic money, or a digital payment token (DPT), or as an unregulated digital token that is used exclusively for official purposes.

“

By providing clear regulations, Singapore is creating a very welcoming cryptocurrency ecosystem. Last year's investments in the sector clearly prove this is working, with \$1.48 billion put into the crypto and blockchain industry, nearly 15 times more than the year prior.

While Singapore's central bank, The Monetary Authority of Singapore, does not recognize cryptocurrencies as regular money, there is still a very straightforward regulatory framework, so businesses operating there are not plagued by uncertainty about their future. They can obtain MAS licenses or, in some cases, operate unregulated.

To further support new businesses delving into cryptocurrencies and promote innovation, a regulatory sandbox program also operates in Singapore. Web3 businesses can start operations in a favorable regulatory environment to launch a more developed and fully functioning product without having to worry about all the regulatory requirements from the very start.

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ALEX MUKHIN

Co-Founder and Managing Partner
at Cryptomeria Capital

Although the Monetary Authority of Singapore ("MAS"), the central bank of Singapore, has not issued or supported any cryptocurrencies for retail or other use, it has partnered with industry participants to implement Project Ubin to explore the use of blockchain and distributed ledger technology for clearing and settling payments and securities. The development of the infrastructure of cross-border payments, as well as client applications, will be facilitated by the prototype of the payment network, which was developed as part of this project. Moreover, MAS is collaborating with the Bank for International Settlements Innovation Center on the Dunbar Project to develop, design, and test new digital currency models with multiple central banks for cross-border payments [16].



How are institutions and regulators making reliable crypto environments in Singapore?



SANKALP SHANGARI

Managing Director of Rising Capital



Crypto adoption worldwide has been growing steadily, fueled by the advancement of crypto technologies and the recent bull market. South East Asia, specifically, has been the leading force for the adoption, with Singapore being central to it all. We have seen unprecedented interest in cryptocurrency among individuals in Singapore, and the country's crypto landscape has been evolving significantly in recent years. More specifically, there has been a surge in participation in particular sectors of the space, including NFTs and DeFi, among the Gen Z's and Millennials in the country.

Large institutions have also been adopting crypto and transitioning to Web3. Development Bank of Singapore (DBS), the island city's biggest bank, has been one of the largest institutions to embrace cryptocurrency. DBS became the first bank in Asia to offer crypto trading facilities for institutional investors and has maintained its position of backing crypto despite the slump in recent months. We continue to believe that this is the right approach for institutions of that size and further amplifies our confidence.

In recent times, there has also been much chatter about the regulating authority, MAS, tightening rules for operations after the recent large-scale shakeout in markets. While these measures have indeed been predatory for certain companies building crypto applications, this is certainly required, in our opinion. We believe strong regulatory frameworks will enable the country to maintain its dominance as a digital assets hub and benefits firms operating in the country in the long term. Our asset management firm is also positioned well by establishing our headquarters in Singapore while maintaining an international team. We also continue to look out for the best entrepreneurs and talent building in the sector in Singapore and look forward to backing them in the future.

Rising Capital is a Singapore-head-quarter digital Assets Management firm focused on early-stage blockchain investments (Rising Funds) and venture building studio (Rising Studios) in South & South East Asia. Rising Capital is a macro investor driven by narratives that shape the world, and in turn, what shapes crypto. Currently, we are focused on Infrastructure as we are back in the build phase.

Among portfolio:



“PSA” AND “SFA” – THE TWO MAIN LAWS

There are usually two paths for cryptocurrencies in Singapore. A cryptocurrency can either be regulated by the Singapore Payment Services Act 2019 (“PSA”) or not regulated. However, cryptocurrencies' wide range of features and functions may go beyond PSA. In rare cases, crypto assets may be subject to the Singapore Securities and Futures Act (“SFA”) if they can be classified as products in the classical capital market [17].

Before developing any cryptocurrency-related activities in Singapore, it is necessary to obtain a legal opinion from a Singaporean law firm to determine how and whether the company would be regulated under the existing Singaporean law.

Per PSA, a person who oversees payment services has payment responsibility; this includes services like e-money issuance, cross-border money transfer, domestic money transfers, merchant acquisition, DPT, and money exchange.

"Digital payment token" is any digital representation of value expressed as a unit not expressed in any currency and not linked by its issuer to any currency. It may be intended as a medium of exchange accepted by the public or a part of it as payment for goods or services or debt repayment and may be transferred, stored, or sold electronically. It needs to satisfy any characteristics MAS may prescribe.

Cryptocurrency can also fall under the definition of "electronic money" or "digital payment tokens," so a person who plans to deal in such



cryptocurrencies must obtain a license in accordance with the PSA.

If a person issues electronic money for mass payment transactions, they will provide services for issuing electronic money.

The DPT service may be a DPT service or a DPT exchange service. “Digital Payment Token Transaction” refers to the purchase or sale of this DPT in exchange for any or any other DPT money, excluding the facilitation of the exchange of DPT and the introduction or use of any DPT as a means of payment for the provision of goods or services [18].

LICENSE TYPES AND OTHER REQUIRED FEATURES AND PROPERTIES

In total, two types of licenses are applicable to transactions with cryptocurrencies in accordance with the PSA: a standard payment institution license and a major payment institution license. An individual who wishes to obtain a payment services license under the PSA will be required to receive a large payment if, on a calendar year average, the total value of all payment transactions accepted, processed, or performed by the licensee in a single month exceeds S\$3 million or its foreign currency equivalent, or S\$6 million or its foreign currency equivalent for two or more of these payment services.

The PSA sets out the eligibility requirements for individuals seeking licenses, as well as current eligibility requirements for licensees. The qualification requirements are:

- Minimum base capital of SGD 100,000 for Standard Payment Institution License.
- Minimum basic capital of SGD 250,000 for a Large Payment Institution License.

The license applicant is also required to have at least one executive director who is a Singapore citizen or Permanent Resident, or at least one non-executive director who is a Singapore citizen

or Permanent Resident, and at least one executive director who is a Singapore employment pass holder [19]. The licensee must also have a fixed place of business or a registered office in Singapore, where it must keep records of all its transactions related to the payment services provided.

TAXES

Depending on what kind of activity you carry out with cryptocurrency, you may be subjected to different taxes or not taxed at all [20]:

- if cryptocurrency trading is carried out in the course of ordinary trading activities, the profits received from this activity will be subject to income tax.
- if cryptocurrencies are purchased as a long-term investment, their capital gains will not be taxed since Singapore does not impose taxes on capital gains.
- if cryptocurrencies are used to pay for goods or services, the business that provides them will be taxed on the value of said goods or services since cryptocurrencies are not fixed currencies and are not legal tender.

In addition, cryptocurrencies will be treated as intangible property. Therefore, transactions with cryptocurrencies used as payment will be considered barter trade.

CURRENT SINGAPORE CRYPTO TAX TREATMENT

TAXATION	DEDUCTION
Payment tokens	
Businesses are subject to normal taxation rules, regardless of payment in the form of payment tokens or cash. The tax treatment of the gain or loss on disposal of digital tokens will depend on whether it is capital or revenue in nature.	Businesses claim tax deduction when it uses payment tokens to pay for goods or services. The value is based on the underlying goods or services received.
Utility tokens	
Proceeds from the issuance of a utility token is regarded as deferred revenue. Issuers are subject to income tax when the goods or services are provided or performed.	Businesses claim tax deduction on the amount incurred when a token is used in exchange for goods or services.
Security tokens/ICOs	
Generally, proceeds from the issuance of security tokens may be capital in nature and not taxable. Tax treatment of the disposal gain or loss will depend on whether the security token and its gain or loss is capital or revenue in nature.	Issuers who incur interest, dividends or other distributions may claim tax deduction on such payments. Withholding tax obligations apply to interest, dividends, and other distributions made to non-tax residents. It should be noted that Singapore does not have an income tax treaty with the U.S. to lower the applicable withholding tax rate of 15%.

Figure 8: Current Singapore Crypto tax treatment. Source: "Why Singapore is one of the most crypto-friendly countries" Cointelegraph

WHAT WILL THESE LAWS AND RESTRICTIONS PROTECT AGAINST?

And now, let's talk about how the Singapore authorities protect ordinary market users and future users of cryptocurrencies from money laundering and terrorism. In connection with these general laws, according to the question, they relate to the crypto and act on it directly:

The Corruption, Drug Trafficking, and Other Serious Crimes (Forfeiture of Proceeds) Act ("CDSA") states that a person dealing in cryptocurrencies must report suspicious transactions to the Singapore Police Force's Suspicious Transaction Reporting Office as soon as practicable. Failure to file a suspicious transaction report is a criminal offense under the CDSA [21].

The Anti-Terrorism (Suppression of Financing) Act ("TSFA") states that a person must report to the police any possession or control of any property belonging to a terrorist or a terrorist organization, including digital property and assets, such as a cryptocurrency, as well as any information about any transaction or proposed transaction in relation to any property belonging to any terrorist or terrorist organization, in accordance with the First Schedule of the TSFA [22].

However, a person whose activity is related to crypto-assets must also ensure that they comply with the requirements for financial sanctions against certain individuals and entities in accordance with the TSFA and the UN.

SANDBOX PROGRAM

MAS has implemented a regulatory sandbox program to provide financial institutions and startups interested in crypto assets with a supportive regulatory environment. This is done to promote technological innovation in the booming fintech space.

This "sandbox" has been created to protect companies from the consequences of failure for the entire financial system [23], which is individualized. As determined by the MAS, specific legal and regulatory requirements will be relaxed for the member while the sandbox is in effect. Once they leave the sandbox systems, members must fully comply with their legal and regulatory requirements.

MAS indicated in its Sandbox Financial Technology Regulation Guidance released in November 2016 that some examples of legal and regulatory requirements it is willing to consider for sandbox mitigation include asset maintenance, board composition, cash balances, credit rating, financial strength, solvency, and capital adequacy, license fees, management experience, MAS recommendations on technology risk management and outsourcing, other MAS recommendations, minimum liquid assets, minimum paid-up capital, relative size, reputation and track record [24].

LOOKING INTO THE FUTURE

The Singapore government plans to expand cryptocurrency regulations to cover more of its activities, joining a worldwide campaign to reduce risk following a series of major Web3 shocks (blocking billions of dollars from the collapsed hedge fund Three Arrows Capital and the collapse of the TerraUSD stablecoin from the assumed dollar peg) [25].

MAS plans to hold consultations on these measures in September or October, said managing director Ravi Menon. He explained that the revised rules could further tighten retail investors' access to cryptocurrencies. "In the future, in line with international regulators, we are also going to expand the scope of regulation to cover more activities," Menon said. "So, players who are doing some of these activities but are not currently caught may very well be caught" [26].

Ravi Menon also added that none of them had permits under its licensing system for virtual asset service providers. For example, Singapore has a strict process for reviewing applications for such licenses: only 14 of the nearly 200 companies that applied for such licenses obtained them. Despite this, Menon said, "MAS' facilitative posture on digital asset activities and restrictive stance on cryptocurrency speculation are not contradictory" [27].

In addition, as MAS joins global regulators in developing regulations for managing digital assets, it is considering limiting the use of leverage by retail investors for trading cryptocurrencies. Menon said that regulators worldwide are looking to introduce requirements like reliable reserve collateral and timely redemption at par for stablecoins [28].

METaverse AND CRYPTO-ECOSYSTEM OF SINGAPORE

Mr. Edwin Tong (Minister of Culture, Community and Youth and Second Minister of Justice) spoke to participants from more than 100 countries at the TechLaw Fest 2022: Up Your Game conference. He emphasized that as a consequence of the pandemic, we saw the emergence of new online norms as the popularity of virtual meetings skyrocketed and still remained

high despite life returning to relatively normal [29].

“Even dispute resolution—once seen to be a physical, high-touch process—can also be held almost entirely online. Cross-examination is a particular skill that used to be very much in-person,” added Edwin Tong [30].

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KELVIN CHUA

Co-Founder
of SkyArk Studio



How does the global position of Singapore look to the founders?

Singapore is well-poised to become the next crypto hub as blockchain tech catalyzes the next wave of digital advancement in global businesses.

Singapore has all the key ingredients to become a key Asia crypto hub. Many founders, investors, and exchanges continue to setup headquarters here on this sunny island. Singapore maintains its unique melting pot of mixed culture and talents as it strives to incubate the next wave of unicorn blockchain projects. SkyArk is building the largest blockchain incubator hub in Singapore and are backed by prominent institutions and listed companies. These will give credibility and assurance to retail investors that have become wary of investing in fraudulent crypto projects.

What is the SkyArk vision on the future of the metaverse?

The future of metaverse will usher in a new concept of ‘multiverse’ where multiple metaverses are able to cross-interact or consolidate, thereby adding utilities to NFTs. NFTs should be editable, evolvable and interoperable across chains and titles.

SkyArk Studio is Singapore's leading blockchain game studio and envisions building a platform that supports multiple game titles and offers NFT interoperability across titles. Enabling traditional studios to launch web3 projects. Providing Gamefi-as-a-service and becoming a partner to every chain.

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Following the COVID pandemic, the Singapore International Arbitration Center (SIAC) and the Singapore International Mediation Center (SIMC) hold arbitration hearings and mediation sessions remotely.

“The question for us is, can this be taken one step further? Beyond just having the hearing or cross-examination done virtually, with end-to-end dispute resolution services offered on a single virtual platform, or even in the Metaverse?” Edwin Tong said in his speech [31].

Singapore, with its strong legal system, the rule of law, first-class judiciary, accessibility, connectivity, and strong legal infrastructure, is a sound choice for international parties for a comprehensive dispute resolution service. These qualities remain available in virtual spaces and can be reproduced in Web3. These theses were emphasized by the Minister of Culture, Community and Youth as well as the second Minister of Justice. In this regard, Singapore has seriously considered using metasettlement in jurisprudence [32].

"I believe such an integrated platform will make the whole dispute resolution process more convenient and efficient, and it keeps pace with how the rest of the world is developing. Even if users prefer and choose to do part of it online, like hearings, there can always be a hybrid element," the minister said [33].

"There are international efforts underway to try to address some of these growing problems. Two months ago, the World Economic Forum (WEF) announced its "Define and Build the Metaverse" initiative. It brought together over 60 leading technology and other industry companies, as well as experts and scientists, to develop the foundations of governance and policy in the Metaverse." [34]

In addition, the development of the Metaverse does not have to be in terms of business; it can also develop in relation to institutions like marriage. In this regard, the Singapore MP signals

the Metaverse as a potential site for marriages: "It is possible that, in addition to registering marriages, other government services will soon be available through Metaverse," said Mr. Edwin Tong at TechLaw Fest 2022 [35].

The TZ APAC Exhibition, which took place during the Singapore Art Week in January, was dedicated to the first non-fungible token (NFT) digital artists in Asia (at the SEA Focus exhibition). The ArtScience Museum Singapore is the first museum in Asia to bring together art, science, culture, and technology in major exhibitions. In conjunction with the final weekend of Singapore Art Week, the newest exhibition was opened, Radical Curiosity: Orbiting Buckminster Fuller. Richard Buckminster Fuller, known as the "grandfather of the future," was a former American architect, systems theorist, inventor, and author who predicted the blockchain-like technology on which cryptocurrency is based [36].

“

What kind of Web3 driver does Singapore have?



ITAI ELIZUR

COO at MarketAcross

Singapore has been spearheading the tech industry for a while now. It inevitably became a powerhouse where innovative Web3 and Crypto companies can thrive. There's a 'Silicon Valley' vibe where everyone is working hard to push the envelope every day. We've seen over time that sharing knowledge pushes society forward, and Singapore is a global attraction for entrepreneurs to do exactly that.

Singapore's success in the blockchain space is likely a combination of things. The main one, in my opinion, is the location - right at the heart of Asia, which is home to over 50% of the world's population. This puts Singapore right between South Korea, China and other major crypto powerhouses.



MarketAcross is the leading PR & content marketing firm for fintech and blockchain companies. We proudly offer comprehensive marketing strategies, seasoned crypto-native employees, and guaranteed results. Our experience has led us to work with clients such as **BINANCE** **crypto.com** **Polkadot** **SOLANA** and many others. We've worked with few Metaverse clients such as **Decentraland** **Monkey Kingdom** **Decentral Games** **AAG** **SiCountry** **DOGAMI** and many others

”

CRYPTO AND WEB3 EVENTS

As we have already identified, Singapore is a catalyst city for the crypto industry and web3. In this regard, the city-state hosts many events related to the blockchain and not only [37]:

Singapore Fintech Festival [38]

The 7th Singapore Financial Technology Festival (SFF) will occur between November 2 and 4, 2022, at the Singapore EXPO. It will bring together the global FinTech community to collaborate to advance financial services, public policy, and technology. Last year's largest FinTech festival gathered more than 60,000 participants from 160 countries. The SFF was organized by the Monetary Authority of Singapore, Elevandi, and Constellar in cooperation with the Banking Association of Singapore.

ABGA BLOCKCHAIN GAMING 2022 [39]

Blockchain Gaming 2022 is a gathering of the most established companies and representatives of the blockchain and technology industry. It brings together fast-growing industries in the technology sector in one event and will be held on September 26–27, 2022. Blockchain Gaming 2022 is trying to unleash the potential beyond the world of games, NFTs, and the Metaverse.

Global Digital Assets Investment Summit [40]

The Global Digital Assets Investment Summit is a forum held from September 30 to October 1, 2022, hosted by Falcon Business Research. It is where industry leaders and investors discuss the future of investing in digital and crypto assets. Main sponsors: Redlight Finance and Midas Investments

Crypto and Digital Assets Summit [44]

Crypto and Digital Assets Summit invite key market players, including regulators, policymakers, senior bank executives, DeFi leaders and pioneers, institutional investors, and hedge funds, to share their views on the market and consider ways to build resilience in the face of volatility. Held in Singapore on April 26–27, 2022, the main speaker (interviewer) was Mr. Ravi Menon.

Token2049 [41]

Token2049 is an annual crypto event taking place September 28–29, 2022, in Singapore, although the event is also held in London. The founders and CEOs of leading Web3 companies can share their views on the market. Using a unique and expanding view of the ecosystem and its vast possibilities, they seek to shed light on global events. Main partners: Crypto.com, Amber, Matrixport, and Bitmex.

Tech in Asia Conference 2022 [42]

The Tech in Asia Conference is a platform for founders, investors, executives, and tech talent to gain the insight, connections, opportunities, and tools they need to transcend the macroeconomy, taking place September 21–22, 2022. Main sponsors: JobStreet, AWS, Braze.

Digital Assets Week Singapore [43]

Digital Assets Week Singapore – September 27–28, 2022 – will bring together traditional players in the field of financing and listing with new digital exchanges, neobanks, and platform opportunities. It will include a discussion of both listed securities and private tokenization of securities, as well as informing investors about opportunities. Main partners: Inveniam, Tokeni, and Bitgo.

SINGAPORE BLOCKCHAIN WEEK 2022 [45]

SINGAPORE BLOCKCHAIN WEEK 2022 is a conference that took place on July 26–27 and aims to develop Singapore as the central hub of the blockchain and create a clear vision of digital evolution. Through their summit, they plan to contribute to strengthening the brand of Singapore as the best place to host Blockchain companies, encourage global regulators, technology, and the business community to come together, develop an agenda that highlights Singapore's central position in Blockchain and finance in Asia, and they plan to attract delegations from blockchain organizations around the world.

A CLOSER LOOK AT SINGAPORE'S WEB3 LANDSCAPE BY **TRIBE**

Singapore is currently a hotspot of Web3 companies, ideas and conversations. From empowering the arts scene to elevating financial services, Web3's impact can be felt strongly.

The Singapore government has endorsed blockchain technologies as promising and point out that there is great potential to improve financial services, but the only way to find out what works is through experimentation and exploration – “learning by doing”. As they seek to anchor in Singapore crypto players who can add value to the digital asset ecosystem and have strong risk management capabilities, at the same time, they maintain that innovation and regulation have to go hand-in-hand.

Over the last 5 years, there has been a gradual perception shift wherein people understand that blockchain is much more than just crypto. We've seen blockchain's role more often in our day-to-day workplaces and landscapes, influencing everything from DeFi and GameFi, to NFTs and DAOs. There has been a rise in the popularity of NFTs in Singapore as they become disruptors across creative industries - for instance, this year's Singapore Art Week had its own dose of NFTs - that have broadly led to a shift in people's understanding of value in digital art. In Asia, various Web3 segments are gaining in popularity, and GameFi, or 'Play to Earn', is growing fast in the region. While there is not necessarily a straight-line correlation between tech popularity and the growth in the number of developers in any particular country, we can expect more developers in these countries to take on the technology, especially as governments push the adoption of Blockchain.

THE GLOBAL CHALLENGE - LACK OF WEB3 TALENTS

For Web3 in particular, while there are only an estimated 18,000 on chain developers there are many more who work on Web3 as a hobby, self-teaching themselves in their free time and getting themselves involved in the ecosystem simply because they love the technology. There is clearly a huge talent and skills gap when it comes to Web3, which will only grow as we move forward, if we do not work towards eliminating it.

“ Covid brought about a rapid digital shift in the way businesses function alongside people's behaviours and habits. Suddenly digital currencies were a household conversation, owning digital assets like cryptocurrencies and NFTs was no longer a foreign concept and businesses were talking about the third generation of the internet. This has put pressure on the ecosystem where companies are looking to innovate and build at a lightning speed. So many corporate partners and startups within our wing are finding it challenging to find Web3 talents. Because of this, I believe that to support the ecosystem's long term growth we need to solve the talent and infrastructural issues.

In the last few years I have seen Singapore moving forward in its vision of being a global blockchain hub. The country has started to set foundational regulatory standards which is honestly a learning journey for most countries and is expected to be an iterative process. Singapore is a prominent hub for tech talents to converge and companies including blockchain protocols are looking at it to deliver advanced Web3 developers in the time to come. It is imperative for various industry stakeholders to come together as a collective to drive the next wave of Web3 talents and innovation.



YI MING NG
CEO of Tribe

BEHIND THE SCENES AT TRIBE, A GLOBAL WEB3 ECOSYSTEM BUILDER

In an industry that rapidly evolves and thrives on collaboration, there is a need for various blockchain organisations to work collectively to foster rapid growth in the blockchain landscape. A company that has played an instrumental role in laying the foundation of this nascent industry in Singapore is Tribe – Singapore's first government-supported blockchain ecosystem builder that has expanded its footprint globally since its inception in 2018.

With the aim to power the next wave of talents and companies' leap from Web2 to Web3, Tribe has been working with various organisations to build the fundamental blocks of Web3 – mainly education, talent and innovation. These organisations include blockchain protocols, corporates, government agencies, startups and developer communities.

Tribe has collaborated with Web3 giants such as Algorand, Avalanche, Celo, Ethereum, Polkadot, Zilliqa and others to further build their ecosystems by providing programs and resources that support the developer's end-to-end journey. This includes equipping them with the necessary technical skills, training them to build innovative solutions, and bridging them with global career opportunities. From industry-focused curriculums to hackathons to incubator and accelerator programs, Tribe has been running a slew of initiatives.

Tribe has helped train over 950 talents for tech roles since last year. It has powered over 40 startups with diverse blockchain use-cases that have raised over US\$125 million in follow-up funding post joining their accelerator program.

As the Web3 space continues to evolve rapidly, Tribe strives to be a neutral platform that brings together multiple organisations and communities to fuel the growth of the landscape.



7 INFRASTRUCTURE

At the end of 2020, Enterprise Singapore (ESG), Infocomm Media Development Authority (IMDA), and National Research Foundation of Singapore (NRF), with the support of the Monetary Authority of Singapore (MAS), launched [46] the Singapore Blockchain Innovation Program (SBIP) [47], a national program valued at S\$12 million.

In 2020, OpenNodes, Temasek, IBM, PwC Singapore, EY, and SGTech, with the support of Infocomm Media Development Authority [48] and Monetary Authority of Singapore [49], produced the most research publications in the field of blockchain technology among members of the Association of Southeast Asian Nations. It ranked third in the world [50].

Investments in Singaporean cryptocurrency and blockchain companies in 2021 increased by almost 15 times and amounted to about \$1.48 billion [51].



How does Singapore observe and land crypto and Web3?



JUPITER ZHENG

Head of Research at
HashKey Capital



The development of the digital economy is generally supported in Singapore, which has made significant financial investments and conducted extensive research into the Blockchain space. In 2021, it initiated the Singapore Blockchain Innovation Programme to conduct Blockchain research. From just \$110 million in 2020, blockchain funding and investment in Singapore reached \$1.48 billion in 2021. The Monetary Authority of Singapore has an impeccable system and strict classification for cryptocurrency assets, and it has also issued The Payment Service Act to regulate these new businesses. Currently, the main crypto project type in Singapore is crypto finance, and some large crypto institutions have set up their Asian headquarters there. Chinese overseas projects generally choose Singapore as their first destination, which also attracts a wide range of capital. Thus Singapore's international competitiveness is gradually improving. Talent and wealth keep coming in. It makes friendly crypto asset and blockchain regulation policies to continually attract projects, capital, and talent to the digital economy.

HashKey Capital is an institutional asset manager investing exclusively in blockchain technology and digital assets and has managed over US\$1 billion in client assets since inception.

As one of the largest crypto funds based in Asia and known for being Ethereum's earliest corporate investor in the region, our mission is to bridge crypto to the mainstream while connecting Web2 and Web3.

HashKey Capital operates in Hong Kong, Singapore, Japan and the U.S, and has invested in over 500+ projects since 2015.

With profound knowledge of the blockchain ecosystem in the region, the team has built a network connecting entrepreneurs, investors, developers, community participants, and regulators.

Among portfolio:



FTX



animoca
BRANDS



dYdX



linch
NETWORK



COINLIST



COINLIST



THE BLOCK



THE BLOCK

According to these indicators, Singapore outstripped the rest of the Asia-Pacific region by almost two times. Most crypto and blockchain deals for Singapore in 2021 were in software and underlying infrastructure, not services. With 82 transactions completed in the past year, Singapore's fintech financing of crypto companies moved the usually most popular payments industry from the top spot in terms of volume.

TOTAL GLOBAL INVESTMENT ACTIVITY (VC, PE AND M&A) IN BLOCKCHAIN & CRYPTOCURRENCY 2018-2021

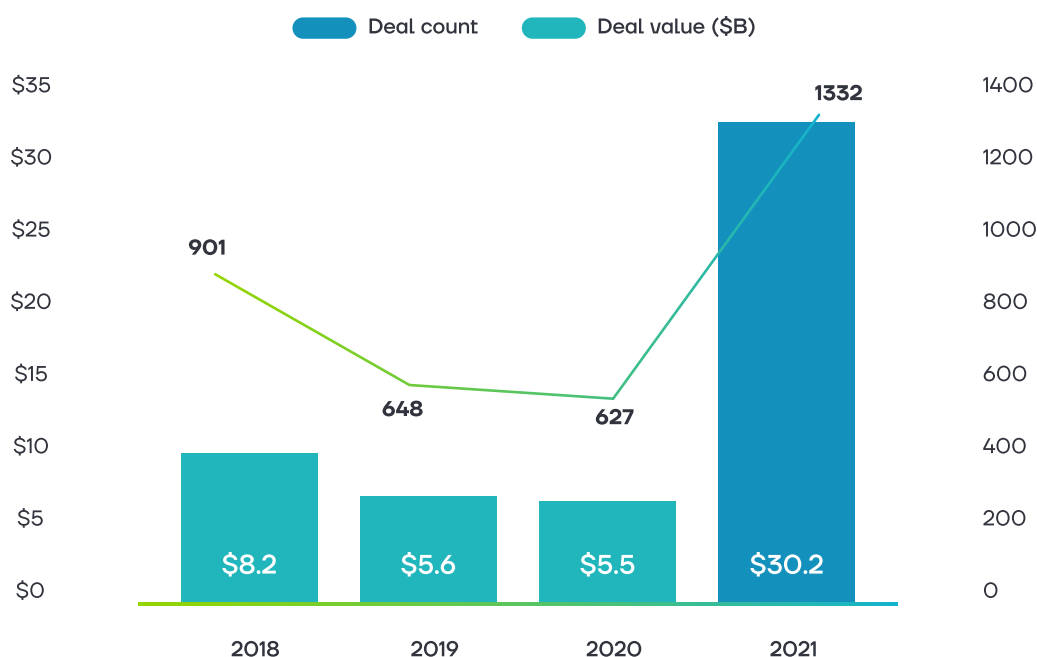


Figure 9: Total global investment activity (VC, PE and M&A) in blockchain & cryptocurrency 2018–2021. Source: "Pulse of fintech H2'22" KPMG International

According to some reports, for the first half of 2022 [52], funding for the crypto industry amounted to \$539.1 million. The reason for this was the increased caution of investors everywhere.

It is worth noting that in the first half of 2022, unlike in 2021, there was more interest in transactions in the field of financial technologies using cryptocurrencies, insurance technologies, wealthtech, and cybersecurity.

FINTECH AREA	H1'22		H2'21	
	No. of deals	Cumulative Deal Value (millions)	No. of deals	Cumulative Deal Value (millions)
Reg Tech	4	US\$ 23.34	10	US\$ 66.63
Insur Tech	4	US\$ 34	3	US\$ 1.20
Wealth Tech	2	US\$ 200	1	US\$ 29.60
Prop Tech	3	US\$ 4	3	US\$ 8.20
Cybersecurity	2	US\$ 13.20	0	US\$ 0.00
Payments	13	US\$ 946.61	10	US\$ 263
Cryptocurrency	59	US\$ 539.10	50	US\$ 1,300.40

Figure 10: Singapore's fintech deals in H1'22 and H2'21. Source: "Singapore hits three-year-high for H1'22 fintech funding at US\$2.14 billion" KPMG

Numerous major banks, including Barclays, BNP Paribas, BNY Mellon, Citi, Deutsche Bank, HSBC, Orient Securities, Standard Chartered, Societe Generale, and United Overseas Bank, have joined [53] **Marketnode**, SGX Group-Temasek joint venture. The goal of the enterprise is to explore the use of blockchain technology [54], focused on capital markets workflows, through smart contracts, ledgers, and tokenization technologies.

Marketnode is also partnering with Singapore-based fintech company RootAnt Global and United Kingdom-based blockchain platform SETL to focus on developing end-to-end fixed income multi-asset infrastructure.

Grab, a Singapore-Indonesia-headquartered mobile app company for transportation, food delivery, and cryptocurrency payments, acquired [55] a 16.3% stake in PT Bank Fama International together with Singapore Telecommunications in an attempt to leverage Indonesia's digital banking opportunities. The two jointly obtained a digital banking license in Singapore.

ABOUT THE PACE OF COMPANY REGISTRATION AT THE TIME OF 2021:

About 170 companies have applied for a MAS license. However, only three crypto firms have received the coveted licenses since then, while two have been denied.

About 30 withdrew their applications after interacting with the regulator. Among the approved companies, there is the brokerage arm of DBS Group Holdings Ltd., Singapore's largest bank [56]. It is also a pioneer in building a digital token trading platform by offering tokenization services.

According to the Managing Director of the MAS, Ravi Menon, the regulator takes the time to evaluate applicants to make sure they meet its high standards. He said that MAS has also increased resources to deal with the high volumes of potential service operators.

"We don't need 160 of them to open a store here. Half of them can do it, but with very high standards, which, in my opinion, is the best result," he said [57].



INFRASTRUCTURE PROJECTS

• GOOGLE

Google is an American multinational corporation under the Alphabet holding, investing in Internet search, cloud computing, and advertising technology. It has expanded in terms of technology, capabilities, and geographically, so it was only a matter of time before it came to Singapore.

In 2007, Google opened its first office in Southeast Asia, on Collyer Quay in Singapore. Opening a branch in the city-state was a natural choice for a company that was created to bring the benefits of technology to every consumer around the world. Fifteen years later, Singapore is home to Google's Asia Pacific headquarters, which has grown to over 3,000 people and is leading Google's efforts to support 2.5 billion people online across the region [58].

On August 23, 2022, Google hosted an event for Singapore that brought together influential industry and government leaders and other Singapore influencers [59]. This event marked the fifteenth anniversary of Google in Singapore; the company presented an overview of the aspirations in the region. The event was attended by Deputy Prime Minister and Finance Minister Lawrence Wong and Google CEO Sundara Pichai, and it was also announced that new initiatives will be implemented in four areas: “Investing in our home in Asia,” “Internet safety for the vulnerable,” “Economic Opportunities for All,” and “Sustainable Future of Tomorrow.”

Also significant is the development of Google Singapore in the field of Web3. Indeed, Google puts a lot of effort into this; only on their official website can you find many requests for jobs in the Web3 industry, such as Web3 Specialist Lead, Web3 Ecosystem Initiatives Lead, Google Cloud, Blockchain and Decentralized Application Developer, Web3, and Google Cloud [60].

Earlier this year, Google hosted the Google Cloud Blockchain Forum for Southeast Asia (SEA). It discussed which blockchain companies are building on the Google Cloud Platform (GCP) and why such companies should consider running permissionless protocols or existing applications with distributed ledger technologies (DLT) on GCP [61].

Google Singapore has also recently announced in a tweet its collaboration with Sky Mavis to become a validator of its blockchain gaming network and ensure it is secure and sustainable scaling. Sky Mavis, the company that operates the popular blockchain game Axie Infinity, stated that it would work with Google Cloud for many years to strengthen the security of the Ronin Network (which supports Axie Infinity). More specifically, Google Cloud will become an independent enterprise validator for the Ronin network. Google is joining a pool of validator nodes that already includes Animoca Brands, DappRadar, Nansen, and other big companies. Google Cloud will contribute to the collective security and governance of the Ronin Network by monitoring validator uptime by running and monitoring a validator node on the network [62].

• BLOOMBERG

Bloomberg L.P. is one of the two leading American financial information providers for professional participants in the financial markets. Their main product is Bloomberg Terminal, which provides current and historical prices on almost all world exchanges and many over-the-counter markets, Bloomberg news feed as well as other leading media, and an electronic trading system for bonds and other securities.

Like Google, Bloomberg does not stop in its development and is always looking for new partners with great potential, and they have chosen Singapore. Back in 2012, Ray Tierney, President and CEO of Bloomberg Tradebook, said, "Bloomberg Tradebook sees growth opportunities in the Asia Pacific, and we have reinforced our commitment to expanding customer service in the region by relocating Tom Kingsley to Singapore."

Bloomberg is an active pool of quality information on cryptocurrencies, blockchain, and Web3 in general. They have a separate Crypto news column, which is an assistant for both traders and ordinary readers. Bloomberg has connections with industry leaders and keeps in touch with the majority of industry players.

• ISTOX

Founded in 2017, iSTOX is fully regulated by the Monetary Authority of Singapore as a multi-asset digital securities platform for the issuance, holding, and secondary trading of private market products such as hedge funds, wholesale bonds, and private equity.

iSTOX is backed by the Singapore Exchange, a subsidiary of Temasek Heliconia Capital, and Japanese government investors JIC Venture Growth Investments (JIC-VGI) and the Japan Development Bank (DBJ). Today, accredited investors using the iSTOX platform come from 24 countries in Asia, Europe, the Americas (excluding the US), Australia, and New Zealand.

• PAXOS

The company, launched in 2012 in both New York and Singapore, provides crypto-brokerage services, including the Paxos Standard (PAX) stablecoin and PAX Gold, the first regulated gold-backed digital token. In 2015, Paxos became the first company in the US to receive permission and regulation to offer cryptocurrency products and services [63]. In March 2022, Paxos received approval in principle from the MAS to conduct digital payments. With this license, Paxos became one of the first blockchain service providers to meet the highest regulatory standards in both New York and Singapore.

• LUNO

Luno is one of the first cryptocurrency buying and trading platforms to introduce direct deposits from local Singapore bank accounts in SGD to cryptocurrency wallets. In 2021, the company applied for a license from MAS to provide its services in Singapore [64], and permission was granted in April 2022 [65].

REDEFINING WEB3.0 BY ByteTrade

ON-CHAIN AND OFF-CHAIN DATA IN WEB 3.0

At ByteTrade, we believe that the fundamental value of Web 3.0 lies in returning data ownership back to its users resulting in a paradigm shift of how services are provided. In our opinion, user data can be broadly divided into two categories – on-chain and off-chain data. While off-chain data consists of various kinds of information from internet application service providers and are hosted in centralized servers, on-chain data are mostly financial transactions and stored in a decentralized manner on blockchain.

L1 CHAINS	LATEST SIZE PER BLOCK	BLOCK HEIGHT	ESTIMATED FULL SYNC DATA SIZE (GB)*
BTC	1MB	427.87	15
ETH 1.0	83.5 kB	15,580,181	913
BSC	30.7 kB	21,518,745	660

Source(s): Respective L1 Scanners, YCharts as of 21 September 2022

Estimated Full Sync Data Size is either sourced from YCharts or calculated by the latest size per block multiplied by block height)

HOW CAN WE RETURN DATA OWNERSHIP TO USERS?

As L1s along with L2 or even L3 become more scalable (quantified by higher TPS) and user-friendly, naturally more users will interact with blockchains. Such organic growth will allow users to naturally reclaim ownership of their data.

However, we need to acknowledge that the current scalability of blockchains is unable to accommodate the popular Web 2.0 services that require significant computing power (social media platforms like Twitter, video streaming services like YouTube & Zoom and cloud storage platforms like DropBox). We believe such services are indispensable to the overall user experience and are essential to both user engagement retention and growth. Without such services, Web 3.0 will be stagnant as it lacks the necessary user retention mechanisms and therefore applications will remain heavily finance oriented.

L1 CHAINS	DAILY ACTIVE ADDRESSES	VS	WEB 2.0 SERVICE PROVIDERS	DAILY ACTIVE USERS
ETH 1.0	458K		Telegram	≈55M
BSC	922K		Twitter	≈200M
AVAX	31K		Instagram	2,000M

Source(s): Respective L1 Scanners, HubSpot, World Data Review as of 21 September 2022

REDEFINING WEB 3.0

In the end, Web 3.0 should not be viewed as a parallel network to Web 2.0. The two versions of the internet have their pros and cons. In Web 3.0, blockchains can solve the issue of data ownership and possession of value. While the strong servers of Web 2.0 can be used to facilitate the fast flow of information and social interaction.

“

A major feature of traditional finance markets is regulation and our continued success can be attributed to our strict adherence to the regulatory frameworks that are in place. However, many self-regulated Web 3.0 projects have been behaving unethically under the guise of decentralization.

By providing both technical and financial tools to return data ownership to users and allowing information to be distributed in a decentralized way, we believe the future regulatory framework in Web 3.0 will be governed by code and ultimately code is the law.

”



TIM GONG

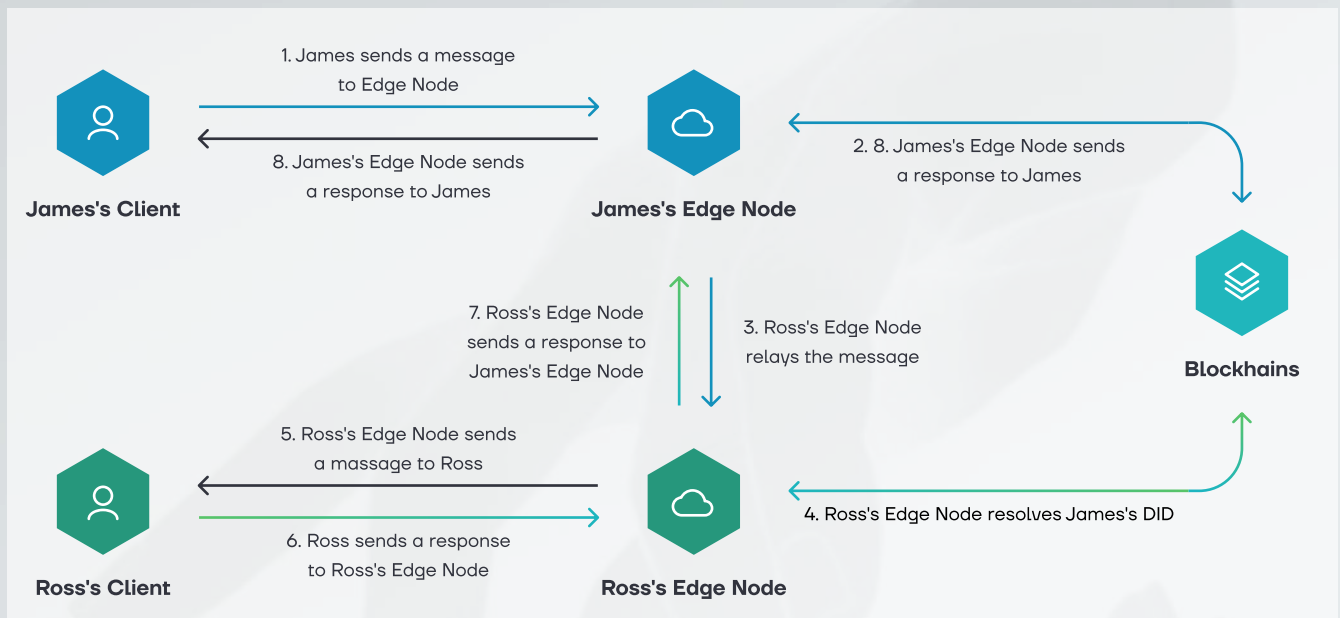
Managing Partner of SIG China
Chairman of ByteTrade Lab

Hence, our vision of Web 3.0 is two pronged. Web 3.0 should be designed for users to own and monetize their data and content. At the same time, Web 3.0 should also incorporate the same services that users currently enjoy.

At ByteTrade, we are working towards this vision through developing an architecture of Blockchain-Edge-Client (BEC). BEC will be developed upon edge nodes between blockchains and user clients (mobile phone/personal computer). This personal node will be completely user deployed and owned by the owner of a private key. Additionally, this node will fulfill several functions including but not limited to:

1. Storing crucial personal data (financial assets/personal credentials) and interacting with applications via a Decentralized Identifier (DID), allowing users to interact with other nodes/applications in a secure manner.
2. Acting as a personal computing node for users to launch their own products and software. Users can interact with other users' nodes within the peer-to-peer network without a centralized service provider.
3. Each node will exist as part of a wider network that allows nodes to communicate with each other.

By doing so, we envision BEC to be a paradigm shifting platform and create decentralized Web 2.0 applications like Social Networking and Instant Messaging Services. As more services are conducted at a peer-to-peer level, we hope for data ownership to be reclaimed by users and a new Web 3.0 ecosystem can be built.



“As means of a brief introduction, ByteTrade is an investee of SIG Asia Venture Capital Fund and other leading institutional investors including INCE Capital, BAI Capital, Sky9 Capital and NGC Ventures. ByteTrade just completed its A Round financing of 40 Million USD in total from a group of investors mentioned above in June 2022. At ByteTrade, we are actively involved in early stage investing and incubating of Web 3.0 projects to build up BEC Ecosystem. We aim to enable the builders of Web 3.0 by providing a variety of resources to them including but not limited to: fundraising, business plannings, GTM strategies and technology expertise.”



LUCAS LU
CEO of ByteTrade Lab

ECOSYSTEM PARTNERS & DEVELOPERS





PAYMENT SERVICES

FOMO Pay, founded in 2015, is a fintech company specializing in providing integrated payment solutions for merchants and retailers. One of their many accomplishments is also being a founding member of the SGQR working group that worked on a common QR code standard for electronic payments. FOMO Pay allows retailers to accept cryptocurrencies, Bitcoin, Ethereum, USDT, and USDC, as payments [66]. Three flagship products are offered for work:

- FOMO Payment is a one-stop digital payment solution for merchants, corporations, and financial institutions.
- FOMO iBank facilitates the daily needs of businesses in transactional banking.
- FOMO Crypto is Asia's first licensed gateway connecting cryptocurrency and fiat.

FOMO Pay received an IPA from MAS in August 2021 and an MPI license in September 2021. The company was the first one to obtain this license.



Silot provides a merchant banking platform. The solution consists of a banking platform and a knowledge graph. Silot banking platform offers a QR module, payment switch and payment API/SDKs, merchant management and onboarding module, consumer management and consumer onboarding module, AF/AML portal, and KYC solution. Silot knowledge graph enables the connection of data within organizations and offers an overview of the opportunities and risks for a bank [67].



Triple A is a company founded in 2017 that provides solutions for integrating the acceptance of cryptocurrency payments for retail POS, e-commerce, payment for various services, and settlements with PSPs. Triple A was licensed by MAS in November 2021 [68].



Pundi X is a project launched in 2017 to create a blockchain-based open-source environment that consists of three main components: a mobile wallet, a smart card, and the Pundi X platform. The Pundi X platform is an integration panel where merchants can connect to POS terminals and allow payments based on cryptocurrencies.



Alchemy Pay is a payment gateway provider that connects cryptocurrency and traditional fiat currency for consumers, businesses, and developers. It makes crypto exchanges and Web3 services highly accessible for users with fiat funds. Alchemy Pay's ramp solution is integrated with crypto platforms and dApps via a widget or API. Alchemy Pay's network includes 300+ fiat payment channels, including many popular e-wallets in emerging markets. ACH is the network's utility token, available as an ERC20 or BEP20.



StraitsX is a digital asset platform developed by Xfers that offers personal and business accounts for transferring and holding funds, working with digital assets across platforms, and accessing payment platforms with B2B API support. StraitsX has its own stakecoin, StraitsX Singapore dollar (XSGD), available on the Ethereum and Zilliqa blockchain. Xfers got an MPI license approved by MAS in 2019 [69].

“What is the role of payment systems in global crypto accessibility?”



JOHN TAN
CEO of Alchemy Pay



When we have spoken with Web3 developers and token issuers, the issue has always been the same. They want their networks, their tokens, or their applications to be much more accessible, to many more people. A key aspect to accessibility, is entry for newcomers with fiat funds.

As a Singapore-based provider offering crypto-fiat payments and exchanges, we saw the e-wallet trend emerge. We focus on securing payment channels with the most popular local mobile wallets. Popular Southeast Asia (SEA) wallets GCash, MoMo, Dana, and OVO alone, have 250 million users between them. Understandably, we serve this rapidly growing SEA population that is adopting these e-wallets and other so called APMs (Alternative payment Methods). We see SEA being ahead of the game on this and expect LATAM and the Middle East to follow the trend.

There are nearly 700 million emerging consumers, massive smartphone penetration and yet there are still infrastructure problems with financial access. E-wallets are the payment method that's consistently gaining share across all markets in Southeast Asia, driven by tailwinds from e-commerce and COVID-19. Southeast Asia, in fact, is a wallet-first region, and we think this trend will continue

Alchemy Pay's mission to drive crypto adoption in the payments sector is now succeeding in over 70 countries, through 300+ local and global payment channels, backed by its ACH utility token which is listed on top exchanges including

◆ **BINANCE** **coinbase** **BYBIT** **Huobi Global** and more.

- **Tribe Accelerator** is a global, product-focused blockchain accelerator supported by the Singapore Government. It selects promising startups who utilise blockchain technology to tackle real-world problems, supercharging their go-to-market strategies through their global network of Fortune 500 companies, government agencies and Web3 companies. Since its inception in 2018, it has powered over 40 portfolio companies with diverse blockchain use-cases from verticals such as Mobility, Supply Chain, Data, Cybersecurity, FinTech and Sustainability, amongst others. These portfolio companies have also raised over US\$125 million in follow-up funding post-accelerator program. Through ongoing co-innovation and ecosystem-building efforts, Tribe Accelerator continues to provide its portfolio companies with unparalleled access to industry opportunities, as well as a steady pipeline of potential capital from the ecosystem [70].
- **Antler** is an accelerator and incubator based and founded in 2017 in Singapore. This startup generator seeks to invest in the technology sector and has invested in and helped build over 200 companies. Some of these early-stage startups have since secured follow-up investments.
- **LongHash Hatch** is a global blockchain incubator powered by the Singapore Government. Its program aims to provide blockchain startups with seed funding and venture-building support, with its first batch of blockchain startups raising a total of \$9.7 million after a 12-week program from January to March. According to the announcement, the first launch ended with a demo tour of Singapore, Shanghai, and Berlin.
- **Blockchain For Good (BFG)** is a corporate social responsibility (CSR) initiative of the Blockchain Association of Singapore (BAS). In 2021, they expanded their CSR to host an NFT Charity Auction with the NTUC-U Care Fund and raised around S\$400,000 to support various relief programs, including helping families cover their children's living costs and school expenses and caring for the elderly. This year they held a charity event from June 26, 2022, to July 25, 2022.
- **IceTea Labs** is an accelerator launched jointly with Polygon Labs and Alpha Venture DAO. It aims to develop and incubate Web3 startups that open new opportunities for gamers and blockchain games. In many ways, this initiative started in the SEA region due to the great success of Axie Infinity from Singapore-based studio Sky Mavis. In addition to the accelerator and launch pads for GameFi.org and Red Kite, IceTea Labs has its own development studio, Mirai Studio, based in Vietnam [71][72].

• SINGAPORE VENTURE CAPITAL FUNDS INVESTING IN CRYPTO STARTUPS

Singapore investment companies are among the most advanced blockchain startups in the world.

The main focus in this region is on payment services and infrastructure projects that can create a new ecosystem of services and applications. In terms of registration, 6% of all crypto funds are registered in Singapore. Hong Kong and Switzerland have the same coverage rate.

No. of deals		Cumulative Deal Value (millions)	
Cayman Islands	49%	United States (US)	30%
British Virgin Islands (BVI)	13%	United Kingdom (UK)	10%
Gibraltar	12%	Hong Kong	6%
United States (US)	10%	Singapore	6%
Canada	3%	Switzerland	6%
Germany, United Kingdom, Luxembourg, Liechtenstein, Belgium, Singapore, Australia	13%	BVI, Canada, Germany, Gibraltar, Brazil, Israel, Luxembourg, Netherlands, Portugal, Malta, United Arab Emirates, Ukraine, Liechtenstein, Argentina, Mauritius, Spain, The Bahamas, Belgium, Slovenia, Australia, Cayman Islands, South Korea	42%

Figure 11: Top Crypto Hedge Fund Domiciles and manager locations. Source: "4th Annual Global Crypto Hedge Fund Report 2022" PWC

• Government Of Singapore Investment Corporation (GIC)

It is a state-owned company managing Singapore's sovereign wealth fund [73]. Now, the fund is officially called: GIC Private Limited. The GIC was created in 1981 to invest the sovereign wealth fund more aggressively in high-yield asset classes over a longer investment horizon. The fund is ranked 9th (August 2022) among the largest sovereign wealth funds in the world, according to Global SWF [74].

The GIC is one of the three reserve management bodies in Singapore, along with the Monetary Authority of Singapore (MAS) and Temasek Holdings [75]. The Singapore Government Investment Corporation (GIC) manages funds on behalf of two clients: the Government of Singapore and the Monetary Authority of Singapore. Certain actions, such as appointing and dismissing directors and key managers, are subject to the approval of the President of Singapore. The Singapore Government's Auditor General audits GIC's financial statements.

A number of directors and key officers of GIC are prominent current or former members of the Singapore government, while others are independent directors appointed from the private sector.

"In 2017, the fund created a dedicated technology-focused investment group in which it "continues to expand and invest," said GIC chief executive Lim Chow Kiat.

In terms of fund investments in the crypto industry, GIC is committed to investing in core blockchain technologies [76], especially those that make financial transactions more reliable and secure. GICS currently controls the world's 9th largest sovereign wealth fund, with \$690 billion in assets under management as of mid-2022 [77].

GIC Crypto Investments:

In 2018, GIC was among the investors who raised \$300 million (Series E) for the American crypto exchange Coinbase [78].

In 2021, GIS invested in projects like Nansen [79], Chainalysis (\$100 million Series E), and American digital asset bank Anchorage.

Also, GIC, together with Google Capital G, Ribbit Capital, GIC, and Tribe Capita, invested in Digital Currency Group (the parent company of the Luno crypto exchange [80]) and acquired a \$70 million stake in fintech firm BC Group, the parent company of the regulated crypto exchange OSL.

On 12 May 2022, Chainalysis, which provides access to blockchain data to government and institutional institutions, raised \$170 million in a Series F round. GIC led the round, joined by existing backers Accel and Blackstone. According to the announcement, the Series F round doubled the valuation of the American company to \$8.6 billion [81].

• Temasek Holdings Limited

Temasek is a state-owned holding company and a major investor and shareholder headquartered in Singapore that employs over 900 people. The company owns and manages a net portfolio of S\$403 billion as of 2022.

No. of deals		Cumulative Deal Value (millions)	
Cayman Islands	49%	United States (US)	30%
British Virgin Islands (BVI)	13%	United Kingdom (UK)	10%
Gibraltar	12%	Hong Kong	6%
United States (US)	10%	Singapore	6%
Canada	3%	Switzerland	6%
Germany, United Kingdom, Luxembourg, Liechtenstein, Belgium, Singapore, Australia	13%	BVI, Canada, Germany, Gibraltar, Brazil, Israel, Luxembourg, Netherlands, Portugal, Malta, United Arab Emirates, Ukraine, Liechtenstein, Argentina, Mauritius, Spain, The Bahamas, Belgium, Slovenia, Australia, Cayman Islands, South Korea	42%

Figure 12: Temasek current investments geography. Source: "Our portfolio" temasek.com.sg

Back in 2018, Vertex Ventures, with the support of the Singaporean government fund Temasek, invested in Binance.

In 2021, the fund and DBS, and JPMorgan organized the payment blockchain company for international payments Partior. The same year, Temasek led a \$420 million Series B round for FTX Trading [82] and has actively supported the exchange since. This includes joining SoftBank in a January 2022 funding round.

The fund has also invested in Immutable X, a Layer 2 network focused on NFT and Coinomo.

In February 2022, the state fund joined \$200 million [83] in funding for crypto lender Amber Group at a \$3 billion valuation, while in August 2022, Temasek led a \$100 million round [84] for their Hong Kong partner Animoca Brands Corp [85].

Temasek stated that it does not invest directly in cryptocurrencies and prefers to support service providers in this industry [86].

• DBS Group

Another large financial institution in Singapore is DBS. Crypto exchange DBS Digital Exchange [87] is supported by the leading Asian financial services group, DBS Bank (Singapore, Hong Kong, Indonesia, India, China, and Taiwan). In 2021, DBS Group achieved a net profit of SGD 6.80 billion [88], up by 44% since 2020.

The brokerage arm of DBS Vickers [89] received a license from the Financial Regulator of Singapore (MAS) in October 2021 under the Singapore Payment Services Act (PSA), giving it the right to conduct business in Singapore as a provider of services in the field of virtual assets (VASP) [90].

DDEx provides access to digital assets only to accredited investors, financial institutions, family offices, and professional market makers. Individual investors can only access the exchange through a participant such as DBS Private Bank. Over the past decade, Piyush Gupta, the CEO of DBS Group, has proven the need to invest billions of dollars in technology infrastructure upgrades. Gupta focuses on cloud computing and service digitization [91].

In the summer of 2021, DBS and Temasek announced the \$500 million joint debt financing platform EvolutionX Debt Capital, known simply as EvolutionX, focused on China, India, and Southeast Asia [92]. EvolutionX will invest in the digital economy, financial services, consumer products, healthcare, education, and industrial development to accelerate growth and create the next generation of technology leaders.

Rohit Sipahimalani, Chief Investment Strategist, Temasek, said: "Technology and digitalization will have a profound impact on many sectors and will continue to transform our economy and society. Temasek believes in the purposeful use of our capital to create and accelerate solutions to the current gaps to drive innovation and growth for long-term and sustainable value" [93].

DBS, J.P. Morgan and Temasek are also working on Partior, an interbank payment platform powered by blockchain and Project Ubin technologies. Once live, Partior should provide instant settlement of payments for various types of financial transactions [94].

Besides building the financial infrastructure, Temasek is working with DBS Bank, SGX and Standard Chartered to create a blockchain-based Climate Impact X exchange for trading carbon credits [95].

• **Vertex Growth Fund**

The fund was set up in 2019 as an investment vehicle of Temasek Holdings Pte, and it now has over \$750M under management. The firm is committed to global investment in high-growth technology startups. It uses the Vertex Venture Holdings network to invest in startups in China, Israel, Southeast Asia, India, and the US.

According to a 2019 filing, the company invested between \$10 million and \$15 million per company in the third or fourth funding rounds.

The company closed its original fund in September 2019 after raising \$290 million in assets.

Among the investments of Vertex Ventures themselves, there are companies like Binance, Grab, Docker, Verbit, Geek+, and many other tech companies [96].

• **Mapletree Investments Pte Ltd**

A real estate development, investment, capital, and property management company headquartered in Singapore. It is owned by Temasek Holdings Pte [97] and works with DBS Group Holdings Ltd. [98], HSBC Holdings Plc [99], Oversea-Chinese Banking Corp. [100], and UBS Group AG [101]. Mapletree has offices in 13 markets, including Asia Pacific, Europe, the UK, and the US.

As of March 2022, the company has S\$78.7 billion in assets under management, with the revenue reaching S\$2.86 billion.

The Mapletree MERIT Foundation invests in European Class A office real estate. Part of the fund was made available in 2021 to selected accredited investors in the tokenized form [102] through Prometheus-2 Pte. Ltd.

- **NGC Ventures**

NGC Ventures (NEO Global Capital Ventures) is a Singapore-based investment company founded in 2017. The company actively invests in blockchain infrastructure, Metaverse, DeFi, and CeFi protocols and has offices in Singapore, Shanghai, and San Francisco.

The company's portfolio mainly consists of infrastructure projects around which many applications and protocols are already concentrated. Among them are ConsenSys, EveryRealm, Solana, Ankr, Algorand, Kusama, Avalanche, Elrond, Oasis Network, as well as Mina, Curve, the KuCoin crypto exchange, and many other popular products from various crypto ecosystems and fields of activity [103].

- **Spartan Group**

Spartan is a digital asset management company with over 20 years of experience in investment research and wealth management for leading companies, such as Goldman Sachs and Indus Capital. It is engaged in the technical and code part of the projects and is an advisor in the design of tokenomics, analytics, and business management.

Portfolio: ConsenSys, Polkadot, dYdX, Agoric, The Graph, 1inch, Synthetix, Arbitrum, Merit Circle, Horizon, Fuel Labs, Maker DAO, Layer Zero, and many more [104].

Spartan Advisory is a financial advisory firm specializing in blockchain projects with clients like IBM, Dapper, Blockfolio, and Deribit [105].

- **Play Ventures**

This venture capital fund, set up in 2018, is focused on the gaming industry, NFT, and the Metaverse. It invests in game studios,

games, and gaming services. Among them are Fractal, GuildFi [106], IndiGG, Ancient8, Battlebound, SkateX, and Real Player Dao [107].

In Singapore, the fund is licensed by the MAS as Venture Capital Fund Management [108] [109].

- **Mgnr**

A privately held trading firm and hedge fund that supports early-stage investors. The investments include dYdX, DAO Maker, Connex Network, Impossible Finance, and Firefly Trading [110].

- **HashKey Capital**

HashKey was established in 2015 and received a full package of licenses in 2022 [111]. As a Hong Kong tech conglomerate HashKey Group subsidiary, HashKey Capital operates a diverse portfolio of innovative blockchain and fintech companies.

HashKey Group is a prominent figure in the technology industry and a strategic partner of Wanxiang Blockchain Labs, a non-profit organization supporting entrepreneurs in the crypto industry. HashKey portfolio investments include Alchemy, CoinMetrics, Polkadot, Moonbeam, dYdX, Harmony [112], Nym, Enjin, Animoca Brands, FTX US, and many other companies and protocols [113].

- **LongHash Ventures**

A venture fund and accelerator targeting the Asian Web3 ecosystem obtained a license from MAS as Venture Capital Fund Management. Global blockchain incubator LongHash [114] is backed by the Singapore government. The portfolio includes Polkadot, Zapper, Acala, Filecoin, Ox, Balancer, Idle, Lithium Finance, and YGG SEA [115][116].

- **Signum Capital**

The fund is registered in Singapore and is licensed by the MAS as a Registered Fund Management Company [117]. It focuses on blockchain protocols, exchanges and interoperability, data management, cloud services, games, media, social networks, financial technologies, and enterprise applications.

In its portfolio, there are companies like Polkadot, Kusama, Moonbeam, Ren (REN) [118], CertiK, Arweave, Kyber Network, Fantom, Transak, and Gnosis Safe [119].

- **ArkStream Capital**

ArkStream has offices in Singapore and San Francisco, and team members have previously worked at Google, Tencent, UBS, BlackRock, and Accenture. It is one of the first investors in AAVE, Polkadot, Efinity, Republic, and PortalDefi. The company supports portfolio companies by providing product market advice and advisory services.

The company has also invested in FTX Trading Ltd. [120], Ankr, Oasis Foundation, Republic, and Footprint [121].

- **QCP Capital**

QCP Capital is a company focused on investing in crypto startups, providing liquidity to trading pairs, and trading cryptocurrencies in Asia. The company invests in infrastructure projects and maintains its own branch of market analytics. It has invested in HaloDAO, MetaStreet [122], Nansen [123], Deribit [124], WOO Network, dYdX, and Injective Protocol [125].

- **Astronaut Capital**

Astronaut Capital, founded in 2017, is an asset management company based in Singapore. The firm makes venture capital investments in cryptocurrencies, blockchain technology, finance, DeFi, and digital assets. The firm also manages a hedge fund and employs fundamental and long/short stock investment strategies.

Astronaut Capital operates two investment due diligence research centers, Picolo Research and Crush Crypto. Basically, the company invests in large infrastructure and ecosystem projects, with investments spanning projects like FTX Trading Ltd. [126], Solana, Aave, Uniswap, SushiSwap [127], and Curve [128].

- **PetRock Capital**

PetRock Capital is a venture capital firm founded in 2021 that invests in Web3 infrastructure and ambitious Asia Pacific region concepts. Its investments include Raydium, Star Atlas (game) [129], BlockchainSpace, Metaplex, and Flowdesk [130] [131].

- **Rising Capital**

Diversified Crypto fund backing outstanding crypto founders in India & SEAsia.

Investments: Gemini, Metaengine, Yesports, Alpha District, Metastudios.

A lot of crypto startups choose Singapore due to the favorable conditions for registering companies and doing business in this area. This atmosphere brings in a large number of projects in one location, so there are many opportunities for networking, partnerships, and various collaborations.

In particular, according to Crunchbase [132], 501 companies from the “Blockchain” category are registered in Singapore, while Golden.com [133] shows that 640 companies from the Cryptocurrency category [134] are registered in Singapore. Therefore, there is a varied selection of blockchain companies. For comparison, according to Messari, 1,025 companies are registered in the USA, 82 in Hong Kong, and 68 in China.

BLOCKCHAIN ECOSYSTEMS

Several major blockchain ecosystem companies are based in Singapore:

- **Klaytn** is an ecosystem focused on working with metaverses, games, and the creator economy. Klaytn is an EVM-enabled BFT blockchain with two layers—L1 and native L2 for better scaling with custom solutions in the form of explorers, wallets, bridges, oracles, a supporting ecosystem in the form of marketplaces, integration with stablecoins, and many other things that make it an ideal choice for those who want to launch a metaverse or P2E game. Even though the project was launched in South Korea, most of the team and the company itself are based in Singapore [135].
- **Zilliqa** is one of the first L1 solutions for running DApps, built on top of sharding for better scaling. Smart contracts are created in the native Scilla language. In March 2022, the launch of the first metaverse in the Zilliqa network, Metapolis [136], was announced.
- **Celer Network** is an L2 interoperability and infrastructure support solution on top of Ethereum and Polkadot to provide cross-chain and multi-chain support for decentralized applications with fast, secure, and cost-effective transactions [137].
- **Fusion** is an open-source blockchain network built to run DeFi infrastructure, financial applications, and digital assets. The Fusion protocol was developed and deployed by the Fusion Foundation in June 2019 [138].
- **Qtum** is a hybrid modular platform that has existed since 2016 and was created as and was created as a fork of the Bitcoin core in combination with the Ethereum Virtual Machine (EVM). The platform can create small smart contracts running on the UTXO accounting system for use on most major blockchains [139].
- **Bluzelle** is a decentralized application network that has recently focused on positioning its product as a blockchain platform for GameFi, promising about 10,000 TPS. It launched on the main net on February 2, 2021 [140].

It is also worth noting that some projects located and registered in other countries choose to register their organizations in Singapore due to their loyal and understandable attitude towards funds in crypto. Such companies include Algorand Foundation, Litecoin Foundation, Avalanche Foundation, Tron Foundation, NEO Foundation, and others. In addition, several projects based on Polkadot are registered in Singapore, including Phala, Acala, Moonbeam, and Hedge Trade.



What is the current growing status of the Singaporean crypto industry?



ALVIN LEONG
Investment Manager
of NGC

Singapore's blockchain industry is still expanding rapidly on the investor front; we see several new family offices launching their crypto-focused funds in recent months, as well as crypto VCs raising new rounds.

On the project side, we see quite a few founders relocating to Singapore from around the world as well as well-funded companies opening offices in Singapore. This is likely due to the investor presence in Singapore.



NGC Ventures is a crypto native venture fund established in 2018 as one of the first institutional investors in crypto. In 2021, we launched one of the first Web3 metaverse funds focusing on NFT infrastructure, gamefi, and metaverse platforms.

Among portfolio:



CRYPTO EXCHANGES

In 2021, some of the world's largest cryptocurrency exchanges [141], including Binance, Gemini, Coinbase, and Crypto.com, applied for operating licenses, attracted by low taxes and a favorable regulatory environment.

Some exchanges withdrew their applications following the complete ban on cryptocurrencies in China; others had different reasons. For instance, in the case of Huobi, this was done so that a separate Huobi Singapore could be created, which is currently awaiting approval from the MAS under the name FEI Singapore [142]. Binance has withdrawn its bid in connection with its acquisition of Singapore-based private equity exchange Hg Exchange (HGX) [143] since it is already licensed by MAS.

Crypto.com is one of the largest blockchain companies, founded in 2016, and provides more than 50 million users with various services from consulting to trading, storage of funds, and issuance of cryptocurrency plastic cards. Crypto.com received MAS approval for an MPI license for DPT in June 2022 [144].

Coinhako, a Singapore-based exchange founded in 2014 with a base of over 400,000 registered users in Singapore, has been approved by the MAS for a major payment institution (MPI) license to provide digital payment token DPT services. [145].

Sparrow Exchange is a cryptocurrency exchange that offers services for institutional clients and has a platform for trading European options on bitcoin and ethereum, settled using smart contracts on the Nidus network. In 2020, the company raised a \$3.5M Series A led by HDR Group, the owner and operator of BitMEX. Sparrow received MPI license approval for DPT in June 2022 [146].

A few more exchanges are registered in Singapore and other jurisdictions: ByBit, Bibox, AscendEX (Bitmax), MEXC, Bitmex, Independent Reserve, and Genesis. Cobo, a crypto asset management and storage platform moved to Singapore from Beijing in 2021.



DEFI AND WEB3 PROJECTS

Several major blockchain ecosystem companies are based in Singapore, such as:

- **Kyber Network**, a protocol founded by a group of Singaporean developers in 2017, is a decentralized finance (DeFi) ecosystem focused on interoperability with multiple blockchains. Their main product, a decentralized exchange called **KyberSwap**, is deployed on 11 blockchains, including Ethereum (Kyber Network's native KNC token blockchain), BNB Chain, Avalanche, Polygon, and Cronos. The last integration was with the BitTorrent chain in April 2022 [147].
- **Ocean Protocol** is a service that represents decentralized data as an asset. It connects data providers and data consumers in a blockchain-based marketplace. Its innovative model is based on tokenizing datasets and data services so that data providers can easily and efficiently monetize their data while consumers have access to information in one convenient place [148].
- **Ren Project** is a multi-chain liquidity protocol, formerly Republic Protocol. Ren allows for the decentralized and trustless exchange of cryptocurrency assets between blockchains using the Ren Virtual Machine central platform in its Darknodes network [149].
- **Enjin** is a platform that has allowed users and other projects to create their own NFTs (and FTs) since 2017. Registered in Singapore, the core team is also based in Singapore, with the majority of the team scattered all over the world, from Tokyo to New York [150].

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- Switchero is creating an L2 cross-chain protocol for DeFi that allows anyone to run open financial markets for any type of asset on any blockchain. It supports networks like Ethereum, BSC, Neo, and Zilliqa and is registered and based in Singapore [151].
- Nansen is an analytics platform that provides on-chain data on millions of wallets and transactions across networks, spanning over 40 networks and 470 protocols. The headquarters and team are registered and based in Singapore [152].
- CoinGecko is a data platform that offers digital currency prices and fundamental cryptocurrency market analysis. A small part of the team is located in Singapore [153].
- CyberHash is a Singapore-based startup specializing in developing a distributed storage solution similar to Filecoin and IPFS. 90% of the technical staff comprises engineers and senior consultants with AWS experience who are primarily responsible for building the cluster side [154].
- RockX is a platform for joint staking in validators of various POS networks, such as Polkadot, Kusama, Solana, and Oasis, allowing users to receive passive income from their funds [155].
- Persistence is a specialized Layer-1 based on Tendermint supporting the DeFi dApp ecosystem to create an economy around PoS assets. The protocol allows you to maintain user liquidity on the PStake platform through synthetic assets stkAssets that can be used in various DeFi strategies of the Persistence ecosystem [156].
- Phala Network is a member of the Polkadot cross-chain ecosystem parachain, a cloud computing platform with TEE (Trusted Environment Execution) technology [157].

GAMING AND GAME-FI PROJECTS:



Sky Mavis is the game studio behind the Axie Infinity game. The company was founded in 2019 and is based in Singapore. In addition to the popular game, Sky Mavis has created its own ecosystem with the Ronin sidechain that includes the Ronin mobile wallet and the Katana native DEX [158].



SkyArk Studio is a Singapore-based blockchain gaming studio backed by cryptocurrency exchange Binance. It currently has over 36 people currently working on its upcoming project, SkyArk Chronicles. The team has previously worked on AAA mobile games from companies such as XII Braves, Garena, Gameloft, and Gumi.

The company has created SkyArkVerse for the operation of its gaming ecosystem. SkyArkVerse is a multi-metaverse created by the "god Satoshi Nakamoto," consisting of monsters and heroes in both fantasy and urban worlds. The game SkyArk Chronicles implements the concept of Play-and-Own instead of Play-to-Earn. SkyArk Chronicles is a trilogy of games, the first two of which, House of Heroes and Legends Arise, will be GameFi JRPGs, while the third game, RE: SkyArkVerse, will be SocialFi Open World [160].



Yield Guild Games SEA is the first regional SubDAO of the YGG ecosystem, the largest blockchain gaming organization today. YGG SEA aims to create a decentralized autonomous organization (DAO) for the Southeast Asian market. It is developing a platform that allows people to play, build the metaverse, and earn income. YGG SEA's mission is to create the biggest and most sustainable play-to-earn (P2E) virtual economy focused on Southeast Asia [159].



Tatsu Works is a game studio registered and based in Singapore. The team consists of experienced developers who have worked on titles like Final Fantasy, Wakfu, and Sword of the stars. Currently, they are working on creating Tatsumeeeko—a pixel MMO RPG in the fantasy world of Ielia with P2E and NFT in the Solana and Ethereum networks [161].



Ampverse is an esports startup with a portfolio that includes some of the world's best esports teams, influential gaming talent, Play-to-Earn (P2E) guilds, and a range of experimental products and gaming collectibles. Partners include such companies as EA, Wargaming, Riot Games, Samsung, Disney, Ubisoft, and others [164].



Mighty Bear Games is a game studio that has previously developed projects such as Butter Royale, World of Legends, and Melee Mania for Apple Arcade. At the moment, it switched to creating games with a blockchain component, such as Mighty Action Heroes with the MIGHTY ecosystem token that the company intends to use in future games [162].



Ethlas is a GameFi startup working on a portal launched on the Polygon network for simple casual P2E NFT games. As mentioned earlier, YGG SEA is among the company's partners [163].

Singapore is seen as a confident maturing region for crypto-related activities. The government has repeatedly proven its commitment to blockchain technology and tokenization by engaging international companies in joint research and entrepreneurial activities.

From the point of view of a crypto startup, exchange, or investment fund, Singapore seems to be a strict curator who will be able to provide guarantees to the business, users, and investors, which in our opinion, is fair. When establishing your company in this region, you should ensure that you comply with the necessary legal and MAS requirements for doing business in the region.

The initial interest of the government and Singaporean fintech in the field of payment services was reflected in the large range of programs developed to combine international bank transfers with blockchain and DLT systems. In this matter, Singapore looks like an undisputed leader.

The government of Singapore, since 2021, has taken a clear course towards building a better crypto economy instead of simply increasing the number of crypto companies and venture capital funds in the country. In order to achieve this, clear regulatory legislation and local authorities, particularly MAS, are being formed, which responsibly monitor the fulfillment of all requirements by already registered companies and new candidates for local licenses.

The concentration of projects, funds, and blockchain infrastructure in small Singapore inspires confidence in the excellent prospects of this region, which is already leading in matters of cryptocurrencies not only in Asia but also in the world as a whole.

It is already difficult to imagine the development vector of Singapore without blockchain, so in the coming years, we will be able to observe not only the development of an already formed ecosystem but, perhaps, we will see new world-class crypto projects located in Singapore.

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ABOUT CRYPTOMERIA CAPITAL

Cryptomeria Capital is a crypto fund backed by blockchain industry experts. The firm believes decentralized projects, cryptocurrencies, and Web 3.0 will dramatically reshape economic relations and focuses on ventures, tokens, and projects related to blockchain technology and crypto assets. Cryptomeria Capital supports transformation by providing early-stage financing for ambitious projects in a rapidly developing industry.

ABOUT AXON PARTNERS, BME:APG

With international presence and global reach, Axon has 2 different business units: alternative investment and strategic consulting that offer their services in more than 70 countries, with high exposure to the Americas, Europe, Middle East and Southeast Asia.

2006

Year founded

>50

Companies backed

€780M

AUM

12

Funds

+100

Years of accumulated
experience of the partners

+85

Employees

1. Golden Gate Ventures, Southeast Asia 'Startup Golden Triangle' of Vietnam-Singapore-Indonesia Sparks Region's Next Wave of Growth; Golden Gate Ventures Doubles Down on Vietnam with Two Offices, www.prnewswire.com, 30.05.2022.
2. Jon Lea, Q4 2021 Global Crypto Ranking: See where your country is at the end of 2021, coincub.com, January 2022.
3. Jon Lea, Q2 2022 Global Crypto Ranking: Germany goes head to head with the USA, coincub.com, July 2022.
4. BIS Innovation Hub, Project Dunbar – International settlements using multi-CBDCs, www.bis.org, 22.03.2022.
5. Accenture, Jasper-Ubin Design Paper, Enabling Cross-Border High Value Transfer Using Distributed Ledger Technologies, www.accenture.com, 02.05.2019.
6. Kaleido about Quorum, <https://www.kaleido.io/blockchain-platform/quorum>.
7. MAS, R3 and Financial Institutions experimenting with Blockchain Technology, www.mas.gov.sg, 16.11.2016.
8. Source-codes of successful distributed ledger prototypes publicly released to encourage innovation in inter-bank payments, www.mas.gov.sg, 14.11.2017.
9. MAS and SGX partner Anquan, Deloitte and Nasdaq to harness blockchain technology for settlement of tokenised assets, www.mas.gov.sg, 24.08.2018.
10. Central Banks of Canada and Singapore conduct successful experiment for cross-border payments using Distributed Ledger Technology, www.mas.gov.sg, 02.05.2019.
11. Accenture, Jasper-Ubin Design Paper, Enabling Cross-Border High Value Transfer Using Distributed Ledger Technologies, www.accenture.com, 02.05.2019.
12. MAS, Project Ubin's Fifth and Final Phase highlights commercial potential, paving way towards live adoption, www.mas.gov.sg, 13.06.2020.
13. Temasek & MAS, PROJECT UBIN PHASE 5 – Enabling Broad Ecosystem Opportunities, www.mas.gov.sg, 20.08.2020.
14. Temasek & MAS, PROJECT UBIN PHASE 5 – Enabling Broad Ecosystem Opportunities, www.mas.gov.sg, 20.08.2020.
15. Accenture, Jasper-Ubin Design Paper, Enabling Cross-Border High Value Transfer Using Distributed Ledger Technologies, www.accenture.com, 02.05.2019.
16. Kenneth Pereire & Lin YingXin, Blockchain & Cryptocurrency Laws and Regulations 2022, www.globallegalinsights.com, 21.10.2021.
17. Kay Yong, Crypto regulation in Singapore and Thailand, law.asia, 13.05.2021.
18. Kenneth Pereire & Lin YingXin, Blockchain & Cryptocurrency Laws and Regulations 2022, www.globallegalinsights.com, 21.10.2021.
19. Kenneth Pereire & Lin YingXin, Blockchain & Cryptocurrency Laws and Regulations 2022, www.globallegalinsights.com, 21.10.2021.
20. Selva Ozelli, Why Singapore is one of the most crypto-friendly countries, cointelegraph.com, 12.02.2022.
21. Kenneth Pereire & Lin YingXin, Blockchain & Cryptocurrency Laws and Regulations 2022, www.globallegalinsights.com, 21.10.2021.
22. MAS, "MAS' Approach to the Crypto Ecosystem" – Summary of Keynote Interview by Mr Ravi Menon, Managing Director, Monetary Authority of Singapore, at the Financial Times' Crypto & Digital Assets Summit on 27 April 2022, www.mas.gov.sg, 27.04.2022.
23. MAS, FinTech Regulatory Sandbox Guidelines, www.mas.gov.sg, November 2016 (updated January 2022).
24. Kenneth Pereire & Lin YingXin, Blockchain & Cryptocurrency Laws and Regulations 2022, www.globallegalinsights.com, 21.10.2021.
25. Suvashree Ghosh & Joanna Ossinger, Singapore Mulls Making It Harder for People to Trade Crypto, www.bloomberg.com, 29.08.2022.
26. Suvashree Ghosh & Faris Mokhtar, Singapore Plans to Broaden Crypto Regulations After Shakeout, www.bloomberg.com, 19.07.2022.
27. Singapore considers tightening cryptocurrency trading by retail investors, www.cnbc.com, 29.08.2022.
28. Suvashree Ghosh & Faris Mokhtar, Singapore Plans to Broaden Crypto Regulations After Shakeout, www.bloomberg.com, 19.07.2022.
29. Alfeyah Abdullah, Minister Edwin Tong on the metaverse landscape and how S'pore gov't will legally regulate it, vulcanpost.com, 21.07.2022.
30. Opening Speech by Mr Edwin Tong SC, Minister for Culture Community and Youth and Second Minister for Law at TechLaw.Fest 2022 Up Your Game, www.mlaw.gov.sg, 20.07.2022.
31. Opening Speech by Mr Edwin Tong SC, Minister for Culture Community and Youth and Second Minister for Law at TechLaw.Fest 2022 Up Your Game, www.mlaw.gov.sg, 20.07.2022.
32. Wahid Pessarlay, Singapore: Legal services can be offered in the metaverse, law ministry official says, coingeek.com, 03.08.2022.
33. Alfeyah Abdullah, Minister Edwin Tong on the metaverse landscape and how S'pore gov't will legally regulate it, vulcanpost.com, 21.07.2022.
34. Opening Speech by Mr Edwin Tong SC, Minister for Culture Community and Youth and Second Minister for Law at TechLaw.Fest 2022 Up Your Game, www.mlaw.gov.sg, 20.07.2022.

35. Richa Bhagat, Metaverse may be the new venue for Singapore's Marriages & Court Cases, www.cryptotimes.io, 29.07.2022.
36. Selva Ozelli, Why Singapore is one of the most crypto-friendly countries, cointelegraph.com, 12.02.2022.
37. Metaverse events in Singapore, www.eventbrite.sg.
38. Singapore Fintech Festival, www.fintechfestival.sg
39. ABGA BLOCKCHAIN GAMING 2022, www.abga.asia
40. Global Digital Assets Investment Summit, globaldigitalassetssummit.com
41. Token2049, www.token2049.com
42. Tech in Asia Conference 2022, conference.techinasia.com
43. Singapore event: Digital Assets Week Singapore, daweek.org
44. Singapore event: SINGAPORE BLOCKCHAIN WEEK 2022, blockchainweek.com.sg/
45. Enterprise Singapore, Singapore invests \$12 million in first national effort to expand blockchain technology research, www.enterprisesg.gov.sg, 07.12.2020.
46. The Singapore Blockchain Innovation Program (SBIP), sbip.sg
47. Infocomm Media Development Authority, <https://fintechnews.sg/tag/Infocomm-Media-Development-Authority/>
48. Monetary Authority of Singapore, <https://fintechnews.sg/tag/Monetary-Authority-of-Singapore/>
49. OpenNodes, Singapore Blockchain Report 2020, opennodes.com, 07.12.2020.
50. KPMG Pulse of Fintech H2'21 - Singapore's fintech industry hits a five-year high at 191 deals transacted in 2021, <https://home.kpmg>, 08.02.2022.
51. Singapore hits three-year-high for H1'22 fintech funding at US\$2.14 billion, <https://home.kpmg>, 06.09.2022.
52. Big banks join post-trade DLT joint venture Marketnode, www.finextra.com, 27.09.2021.
53. Jack Martin, Singapore Exchange to streamline trading processes with blockchain tech, cointelegraph.com, 22.01.2021.
54. Singtel, Grab acquire minority stakes in Indonesian bank, www.reuters.com, 21.01.2022.
55. Joanna Ossinger, Chanyaporn Chanjaroen Singapore Gives Crypto License to DBS Unit, Aussie Exchange. bloomberg.com, 01.10.2021.
56. Joanna Ossinger, Chanyaporn Chanjaroen, Haslinda Amin Singapore Has Grand Ambitions to Become a Global Crypto Hub. bloomberg.com, 02.10.2021.
57. Ben King Google for Singapore: New commitments to our home in Asia. bloomberg.com, 23.08.2022.
58. Google Singapore Google for Singapore. www.youtube.com, 22.08.2022.
59. Google Careers Blockchain and Decentralised Application Developer, Web3, Google Cloud. careers.google.com.
60. Google Cloud Google Cloud SEA Blockchain Forum. cloudonair.withgoogle.com, 27.01.2022.
61. Dean Takahashi Sky Mavis teams with Google Cloud to secure blockchain network. venturebeat.com, 09.09.2022.
62. MaryGaulke Paxos Trust Company. en.wikipedia.org, 21.05.2020.
63. Fintechnews Singapore Crypto Firm Luno Now Offers Direct SGD Bank Deposits. fintechnews.sg, 26.10.2021.
64. Team Luno Global retail cryptocurrency platform Luno receives in-principle approval from the Monetary Authority of Singapore (MAS). discover.luno.com, 27.04.2022.
65. Zafirah Salim FOMO Pay becomes first DPT licensee to offer crypto payment solution for S'pore retailers. vulcanpost.com, 13.04.2022. <https://vulcanpost.com/784845/fomo-pay-crypto-payment-solution-retailers-singapore/>
66. Tracxn Blockchain Startups in Singapore. tracxn.com, 16.04.2020.
67. TripleA TripleA, the First Crypto Payment Company to Be Licenced by MAS. triple-a.io, 30.11.2021.
68. Jaclyn Tiu Xfers gets approval from Singapore gov't to widen its e-wallet business. www.techinasia.com, 14.03.2019.
69. Jonathan Ho Technopreneur Ryan Chew On Using Blockchain To Solve Global Issues. www.augustman.com, 07.04.2021.
70. Joseph Young Polygon-Backed Crypto Accelerator Targets SEA, As Talents Flock To Web3. www.forbes.com, 16.08.2022.
71. Icetea Labs Hashed And Icetea Labs Join Forces Towards A Common Goal In GameFi And Metaverse. www.globenewswire.com, 21.01.2022.
72. Investopedia Team, Eric Estevez Sovereign Wealth Fund (SWF). www.investopedia.com, 15.11.2020.
73. Global SWF Ranking. globalswf.com, 01.09.2022.
74. Troy Segal Temasek Holdings. www.investopedia.com, 28.09.2021.
75. Tsubasa Suruga Singapore's GIC: downturn in tech, crypto funding 'a good thing'. asia.nikkei.com, 27.07.2022.
76. Wikipedia Authors GIC (Singaporean sovereign wealth fund). en.wikipedia.org, 19.03.2021.
77. SG Crypto Investor Coinbase Review, Usage Tips and Referral Benefits. www.sgcryptoinvestor.com.
78. Crunchbase Nansen Investor Profile & Investments. www.crunchbase.com.
79. SG Crypto Investor Luno Exchange Review, Usage Tips and Referral Benefits. www.sgcryptoinvestor.com.
80. Miguel Cordon Singapore's GIC leads \$170m round of blockchain data major Chainalysis. www.techinasia.com, 13.05.2022.
81. SG Crypto Investor FTX.com Overview and Referral Benefits. www.sgcryptoinvestor.com.
82. Alfred Cang, Sarah Zheng Crypto Firm Amber Gets Temasek Funding at \$3 Billion Value. www.bloomberg.com, 22.02.2022.

83. Hannah Miller, Zheping Huang Temasek to Lead \$100 Million Funding for Crypto Landlord Animoca. www.bloomberg.com, 30.08.2022.
84. David Ramli Temasek Says It Does Not 'Directly Invest in Crypto'. news.bloombergtax.com, 12.07.2022.
85. DBS. <https://www.dbs.com.sg/>.
86. DBS, DBS full-year 2021 net profit rises 44% to record SGD 6.80 billion. www.dbs.com/newsroom.
87. DBS Vickers Securities (Singapore) Pte Ltd General Trading Agreement. DBS Vickers Securities (Singapore) Pte Ltd, 02.09.2021.
88. Republic of Singapore Halimah Yacob Acts supplement Payment services act 2019. Government gazette sso.agc.gov.sg, 22.02.2019.
89. Anshuman Daga REUTERS NEXT-DBS CEO says tough for digital banks to muscle into Singapore. www.reuters.com, 03.12.2021.
90. Temasek DBS and Temasek jointly establish growth debt financing platform for Asia's growth stage technology-enabled companies. www.temasek.com.sg, 30.07.2021.
91. Temasek DBS, J.P. Morgan and Temasek to establish platform to transform interbank value movements in a new digital era. www.temasek.com.sg, 28.03.2021.
92. Ledger Insights DBS, SGX, StanChart, Temasek plan global carbon exchange using blockchain. www.ledgerinsights.com, 21.05.2021.
93. Vertex Growth, Portfolio, <https://www.vertexgrowth.com/>.
94. Bloomberg Temasek Holdings Pte Ltd Company info <https://www.bloomberg.com/profile/company/TMSK:SP>. www.bloomberg.com
95. Bloomberg DBS Group Holdings Ltd Company info <https://www.bloomberg.com/quote/DBS:SP>. www.bloomberg.com
96. Bloomberg HSBC Holdings PLC ****Company info <https://www.bloomberg.com/quote/HSBA:LN>. www.bloomberg.com
97. Bloomberg Oversea-Chinese Banking Corp Ltd ****Company info <https://www.bloomberg.com/quote/OCBC:SP>. www.bloomberg.com
98. Bloomberg UBS Group AG ****Company info <https://www.bloomberg.com/quote/UBSG:SW>. www.bloomberg.com
99. Fintech Investors on iSTOX acquire stake in Mapletree MERIT fund as digital securities for the first time. www.fintechnews.org, 14.04.2021.
100. NGC Ventures, Portfolio, <https://ngc.fund/>.
101. Spartan Group. <http://www.spartangroup.io/>
102. Monetary Authority of Singapore <https://eservices.mas.gov.sg/fid/institution/detail/219910-PLAY-VENTURES-PTE-LTD>. eservices.mas.gov.sg
103. Play Ventures, Portfolio, <https://www.playventures.vc/>.
104. Golden.com, <https://golden.com/wiki/>.
105. Hashkey Capital, Portfolio, <https://capital.hashkey.com/en/>.
106. LongHash, Investments, <https://longhash.vc/>.
107. Monetary Authority of Singapore, LONGHASH VENTURES PTE. LTD., <https://eservices.mas.gov.sg/>.
108. Monetary Authority of Singapore, SIGNUM CAPITAL MANAGEMENT PTE. LTD., <https://eservices.mas.gov.sg/>.
109. Signum Capital, Portfolio, <https://www.signum.capital/>.
110. ArkStream Capital, Portfolio, <https://arkstream.capital/>.
111. MetaStreet Labs, MetaStreet Raises \$14 Million in Seed & Initial Liquidity Capital to Help NFT Debt Scale, <https://mirror.xyz/>, 08.02.2022.
112. Lucas Matney, Nansen raises \$12M from a16z to help investors make sense of crypto markets, <https://techcrunch.com/>, 29.06.2021.
113. Astronaut Capital, Portfolio, <https://astronaut.capital/>.
114. Petrock Capital, Portfolio, <https://www.petrock.capital/>.
115. Crunchbase, Singapore Blockchain Companies, <https://www.crunchbase.com/hub/singapore-blockchain-companies>.
116. Golden.com, Cryptocurrency companies in Singapore, <https://golden.com/>.
117. Klaytn Foundation, Klaytn Overview, <https://docs.klaytn.foundation/>.
118. Zilliqa, <https://blog.zilliqa.com/>.
119. Celer Network, <https://blog.celer.network/>.
120. Messari, Fusion Overview, <https://messari.io/>.
121. Bitcoin Wiki, Qtum, <https://en.bitcoinwiki.org/>.
122. Bluzelle, <https://bluzelle.medium.com/>
123. Financial Times, Singapore to tighten retail access to cryptocurrencies, <https://www.ft.com/>.
124. The Business Time, Crypto exchange Huobi Global to close Singapore accounts by end-March 2022, <https://www.businesstimes.com.sg/>, 10.11.2021.
125. PRNewswire, Binance Asia Services Takes Strategic Stake in Singapore-Based HG Exchange, <https://www.prnewswire.com/>, 07.12.2021.
126. Crypto.com, Crypto.com Receives In-Principle Approval from the Monetary Authority of Singapore, <https://crypto.com/>, 22.06.2022.
127. Businesses Time, Coinhako receives MAS licence to offer crypto payment services, <https://www.businesstimes.com.sg/>, 06.05.2022.
128. Fintechnews Singapore, MAS Grants In-Principle Approval to Sparrow for Digital Payment Token Services, <https://fintechnews.sg/>, 24.06.2022.
129. Currency.Com, What is Kyber Network (KNC): DeFi aggregator is on a roll, <https://currency.com/>, 03.05.2022.
130. Cryptopedia Staff, Ocean Protocol (OCEAN): Decentralized Data as an Asset, [<https://www.gemini.com/>,] (<https://www.gemini.com/cryptopedia/ocean-protocol-web-3-0-ocean-market-ocean-token>) 23.02.2022.
131. Technode Global, Singapore cloud storage firm CyberHash raises \$20M in Lemon-led round, <https://technode.global/>, 31.12.2021.

132. Daniel Levi, Singapore-based crypto staking provider RockX hits \$30 million valuation after raising \$6 million in Series A funding, <https://techstartups.com/>, 06.04.2022.
133. Persistence, <https://medium.com/persistence-blog>
134. Phala Network, <https://medium.com/phala-network>
135. SkyMavis, <https://www.skymavis.com/>
136. Yield Guild Games, Introducing YGG's First Regional SubDAO: YGG SEA // <https://medium.com/>, 24.01.2022.
137. SkyArk, <https://www.skyarkchronicles.com/>
138. Tatsu, <https://community.tatsu.gg/blog/>
139. Mighty Bear Games, <https://mightybeargames.com/blog/>
140. Cointelegraph, Three-month-old stealth Singapore GameFi startup raises seed funding of \$2.7 million, <https://cointelegraph.com/>, 16.02.2022.
141. Catherine Shu, Singapore-based esports startup Ampverse lands \$12M, <https://techcrunch.com/>, 29.03.2022.

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