InvestaX®
Digital Securities

PAVING THE WAY FOR A BLOCKCHAIN-NATIVE E-VCC REGIME

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01 | Executive Summary

1.1 Executive Summary

In January 2020, the Monetary Authority of Singapore (**MAS**) and the Accounting and Corporate Regulatory Authority (**ACRA**) launched the Variable Capital Companies (**VCC**) framework to encourage more investment funds to be domiciled in Singapore. The VCC is a new corporate entity structure under which multiple funds or collective investment schemes (whether open-end or closed-end) may be gathered under the umbrella of a single corporate entity and yet remain ring-fenced from each other. In order for this structure to meet the future needs of investment managers, investors and service providers and compete sustainably with similar legal structures in other popular fund jurisdictions, it needs to enable tokenization. Tokenization of fund interests not only provides a new distribution channel powered by distributed ledger technology (**DLT**), allowing for tradability of private market assets, but also offers increased efficiencies and cost savings for lifecycle management of securities.

It is here that we at InvestaX, a leading blockchain-based investment and trading platform licensed by the MAS, saw an opportunity to combine DLT with an internationally-competitive fund structure and bring the benefits of tokenization to the investment fund industry. This ultimately led to the emergence of **e-VCC Project**. This being a first of its kind blockchain-native VCC fund token issuance that has been envisioned in Singapore, collaboration and taking perspectives of different stakeholders (e.g. fund manager, fund administrator, lawyers, auditors, tax consultants, VCC fund experts, blockchain protocol providers) as well as benchmarking to regulatory guidance provided in other jurisdictions was necessary to evaluate viability of commercialisation of Project e-VCC. Led by InvestaX, the e-VCC Project participants include UBS, State Street, PwC Singapore and CMS **("Working Group")**. Tezos and Hashstacs Pte. Ltd. ("STACS") supported the e-VCC Project as project collaborators and shared technical knowledge about blockchain protocols.

This e-VCC Project explored tokenization of the Singapore VCC structure by issuing blockchain-native VCC fund shares directly on either a public (Tezos) or private (STACS) blockchain network. The objective of the e-VCC Project was to determine the benefits and challenges for fund managers in using an e-VCC structure as well as offer potential solutions to the identified challenges. This report is divided into the following three sections.

The first part of the report offers an overview of the funds market and the architecture for primary issuance of a blockchain-native security token.

The Working Group studied a blockchain-native issuance for the VCC sub-fund shares wherein shares are directly issued on the blockchain without any paper-based representation, thus,

removing the need for a nominee to aggregate investor interest and allowing for direct ownership of sub-fund security tokens (one-tier approach). This section evaluates the implications of a blockchain-native issuance on primary token issuance and discusses how key fund structuring activities such as cash management, data management on-chain vs. off-chain, valuation, reporting, governance and custodian roles will be impacted.

The second part of the report explores how DLT improves the efficiency of lifecycle management for digital securities and enables the functionalities for secondary market trading.

Project e-VCC was initiated to provide insights on how a VCC fund primary issuance can be tokenized, and what this would entail for the lifecycle management activities for these security tokens. However, one of the most substantial benefits brought about by DLT in the private markets is that it enables secondary trading of security tokens for previously illiquid assets. Some members of the Working Group including InvestaX, UBS and PwC Singapore (hereafter defined as "**Limited Working Group**"), further explored how DLT enables secondary trading of native VCC shares and creates efficiencies such as automatic matching of trades, near real-time settlement of trades on blockchain, recordkeeping of ownership on DLT based registers and real-time monitoring.

The final part of the report evaluates the technical considerations, regulatory landscape, and provides recommendations for enabling a blockchain-native fund management structure.

The final section provides further guidance and considerations for fund managers when selecting between public and private protocol networks, summarizes efficiencies created by a blockchain-native security token issuance, and discusses how the roles of the different stakeholders may change as a result of a blockchain-native issuance. A detailed analysis of the regulatory and legal landscape in the context of blockchain native securities for an e-VCC fund was also assessed as part of the project scope. Through this e-VCC Project, we concluded that blockchain-native VCC is a reality today as there is nothing explicit in existing regulations prohibiting issuance of such securities. E-VCC shares would come under the purview of digital tokens that constitute capital market products/shares/units in a collective investment scheme (**CIS**), and would be regulated under Securities and Futures Act (**SFA**).

Although blockchain native e-VCC securities can be legally issued today, some hurdles remain which make the trading of such securities impractical such as having a transfer instrument under the VCC Act and the resulting application of stamp duty electronic transfers of such securities. Although the newly launched VCC fund structure lends itself for tokenization, adopting certain amendments and/or enabling provisions (as more specifically discussed in the

"Regulatory Challenges and Recommendations" section) may provide the regulatory certainty needed before we can realise the full potential of the e-VCC.

Through Project e-VCC, we are able to see that tokenization and DLT can bring digitization and tremendous value to the funds management industry by addressing some of the existing challenges faced by closed-end private equity funds. DLT allows private market investments to be broken down into smaller fractions thereby giving investors with smaller minimum investment capacity access to alternative investment opportunities, and enables greater diversification and potentially improved risk-return.

Tokenization also has the potential to provide liquidity and tradability of security tokens on platforms such as InvestaX. Bringing tradability to previously illiquid private market assets is welcomed by investors who invest in this otherwise opaque market, with insufficient information and long lock-in periods, and almost always have to take a haircut when they need to liquidate exposures.

Now, with adequate infrastructure to support blockchain-native security tokens, many administrative activities can be automated, reducing paper-based transactions and recordkeeping, bringing efficiencies and cost savings to various processes as they are now performed on-chain. Changes of ownership and register of beneficial owners can be processed and captured on the blockchain on a real-time basis. Node operators such as auditors and regulators can be given relevant permissions to access these registries at any time directly without reliance on an intermediary providing increased transparency. With a clearer understanding of the benefits and the business value, there will be further commercial adoption and live implementation of the technology for viable use cases.

We would like to take this opportunity to thank the MAS Monetary Authority of Singapore for awarding the Proof-of-Concept **(PoC)** grant to InvestaX for this e-VCC Project. The PoC grant provides support for experimentation, development and dissemination of nascent innovative technologies in the financial services sector. The POC grant is part of the Financial Sector Technology and Innovation **(FSTI)** scheme under the Financial Sector Development Fund administered by MAS.

1.2 Project e-VCC Participants & Perspectives

InvestaX worked with the following industry leaders and consultants to examine the challenges of the existing VCC ecosystem and imagine its blockchain-native future:

Participant	Role
InvestaX	Project Lead InvestaX provides end to end digital securities issuance, trading and custody all on the one platform. Built with open architecture and currently integrated with multiple blockchains. We provide key infrastructure to digitize real assets so you can use them to buy, sell, trade and borrow or lend instantly, across the world, 24 x 7.
UBS (“Fund Manager”)	Global Asset and Wealth manager, guiding on fund management topics (i.e. structuring, issuance, and distribution) across both liquid and alternative asset classes.
State Street (“Fund Administrator”)	Fund Administrator, guiding on the fund administration practices in traditional & alternative fund management world for the primary market
CMS Holborn Asia	Legal Advisor, CMS is an International law firm that advises on legal issues relating to tokenization of the VCC, leveraging their experience of tokenization and blockchain native securities in other jurisdictions, including Luxembourg and Switzerland.
PwC Singapore	VCC Consultant & Tax Advisor, guiding on both domestic and cross border tax implications for a natively issued fund token

02 | Introduction

2.1 Background and Initiation of the e-VCC Proof-of-Concept

The Singapore VCC framework is on a par with the existing frameworks available in the more popular fund management hubs, such as Cayman Islands, Luxembourg, and Ireland, where cell companies or segregated portfolio company structures already exist. This new corporate entity structure gives funds an alternative to unit trusts, limited partnerships, limited liability partnership and companies, and is designed to provide more flexibility as compared to other traditional Singapore fund vehicles. Some of the features that make the VCC more attractive include:

- The umbrella-sub-fund structure gives fund managers greater flexibility to pursue multiple strategies and segregate investments between different pools of investors under a single legal entity. Sub-funds can easily be registered under ACRA without having to set up an entirely new fund, thus reducing costs and capital maintenance requirements.
- A VCC will be treated as a company and a single entity for tax filing purposes. This means that only one single set of income tax returns need to be filed with the Inland Revenue Authority of Singapore.
- Members can easily redeem their shares in order to realise their investments without having to be subject to stringent capital maintenance requirements of private limited companies such as shareholder approvals.
- The VCC fund is a separate legal entity from its members, unlike a Singapore Limited Partnership (LP). Its rights and obligations are separate from its shareholders and directors.
- There is no obligation to make shareholder lists publicly available. The VCC register of members is not available for public inspection, unlike that of a private limited company which would be publicly available.
- There is no limit on the maximum number of shareholders in a VCC, unlike a private limited company which is capped at 50 shareholders.
- The VCC fund has a board of directors, who can be “independent” thereby giving investors greater comfort in comparison to General Partners in a traditional private equity fund who are typically not “independent”.

At present, there is no formally endorsed framework for Singapore-domiciled blockchain-based private market funds.

It is worth noting that certain fund jurisdictions are beginning to attract a significant interest in tokenized investment funds due to the proactive approach taken by their regulators in regards to the development of the blockchain industry. Luxembourg passed Bill 7637 (referred to as the Blockchain II Act) on 21 January 2021 which amends the existing Dematerialisation Act of 2013 to provide for blockchain native issuance of shares[1]. Cayman Islands recently amended the definition of "equity interest" under its Mutual Fund Law to include "any other representation of an interest"[2] which is likely to cover issuance of equity interest in digital form. In Switzerland, with the adoption of the Swiss DLT-Law in September 2020, recognition has been granted to a new category of securities called Uncertificated Registered Securities **("URS")** which are essentially ledger-based securities represented on the blockchain. And in the US, the State of Delaware introduced a series of amendments to the general corporate law and related Acts in 2017 for the recognition of blockchain-native securities and registries.

With the support of a holistic cross-regulatory framework, Singapore has the opportunity to enhance its highly applauded VCC legislation, by enabling e-VCC funds. Digitization of the VCC fund structure could distinguish it from frameworks offered in competing jurisdictions, provide the global private markets industry and closed-ended funds with a highly practical solution to meet the future needs of investment managers, investors and service providers.

The VCC framework is particularly conducive for tokenization in that the register of members is not filed publicly but is maintained by the VCC itself. This means that VCC tokens can be issued and registered directly on a blockchain, with updates to the register occurring in an automatic and synchronized fashion across DLT networks. Hence, unlike other existing fund structures, the VCC structure is suited for a blockchain-native issuance which further enables secondary market trading of fund shares (the security tokens) and developing liquidity where the underlying assets may be entirely illiquid.

[1] Bill of Law 7363 was approved on 14 February 2019 – Luxembourg's confirmation that securities can be held through DLT-like technologies, including blockchains!

[2] "Equity interest" means a share, trust unit, partnership interest or any other representation of an interest that — (a) carries an entitlement to participate in the profits or gains of the company, unit trust or partnership; and (b) is redeemable or repurchasable at the option of the investor and, in respect of a company incorporated in accordance with the Companies Act (2021 Revision) (including an existing company as defined in that Act), in accordance with but subject to Section 37 of the Companies Act (2021 Revision) before the commencement of winding-up or the dissolution of the company, unit trust or partnership, but does not include debt, or alternative financial instruments as prescribed under the Banks and Trust Companies Act (2021 Revision)

2.2 Challenges Faced by Private Equity Fund Structures

Over the last twenty years, the compound annual growth rate of private assets has been four times that of publicly traded assets according to a recent report by Bain & Company[3]. According to a recent report by McKinsey & Company, private markets have added $4 trillion in assets in the past decade, an increase of 170 per cent[4].

Despite the impressive growth in assets under management that global private markets have experienced, alternative investments continue to face high barriers to entry, are expensive to fundraise, lack transparency and liquidity, and remain inaccessible to most investors. This is in part driven by the current market infrastructure, which operates across silos, and still relies on manual and paper-based processes. This results in practical limitations to scale up private markets to a wider group of investors, and often limits access to the asset class to larger investors who are able to bear these high costs.

By using DLT for the fund management industry, the core infrastructure underlying the fund value chain can be migrated from a sequential to a synchronized model – with data moved on-chain, and traditional processes automated via smart contracts. This e-VCC Project was designed to explore how blockchain technology, when introduced as a foundation, can bring process and cost efficiencies to address some of the challenges faced in the private markets industry.

2.3 Introduction to InvestaX: An End-to-End Digital Securities Platform

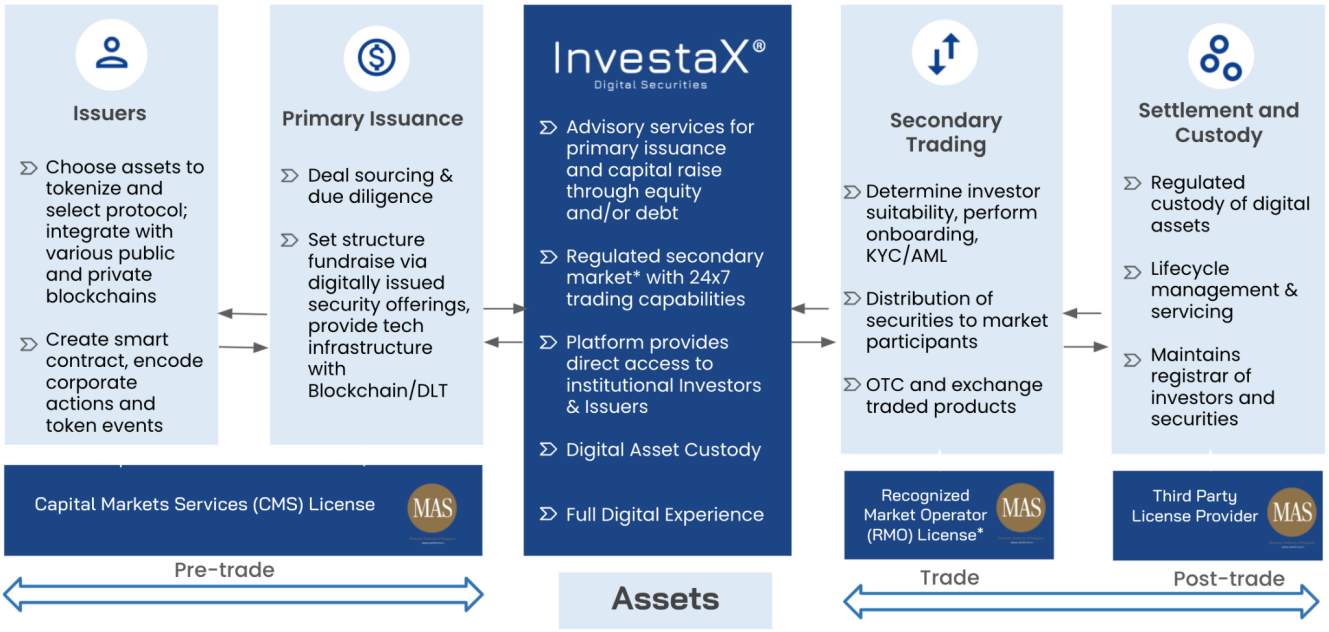
InvestaX is a Singapore-licensed digital securities online investment and trading platform that focuses on private market investments.
At present, InvestaX is regulated by MAS and holds the following licences/approvals:

1) **Capital Markets Services License (CMSL)** - which allows us to deal in capital market products
2) **Exempt Regulated Market Operator (RMO) in MAS Sandbox** - which allows us to operate an exchange for secondary trading of digital security tokens
3) **Exempt Financial Advisor** - Investax holds a regulatory exemption under the Financial Advisers Act (Cap. 110) which allows it to provide advice on units in collective investment schemes (broadly, pooled investments).

[3] For Digital Assets, Private Markets Offer the Greatest Opportunities
[4] McKinsey's Private Markets Annual Review

The Digital Securities Ecosystem

InvestaX is at the core of Issuance, Trading and Custody of Digital Security Offerings (DSOs)



*InvestaX has also been approved by the Monetary Authority of Singapore to the regulatory sandbox under the recognized market operator regime.

As a regulated entity, InvestaX is at the core of issuance, trading and post-trade technology services that can be provided for digital securities to private asset owners and fund managers, and this is how InvestaX fits into the digital securities ecosystem:

- **End-to-end infrastructure provider**: Regulated entity with institutional grade issuance, trading, settlement and custody solutions under the InvestaX platform to provide one-stop solution and access to all digital securities related services.
- **Technology provider**: Providing tokenization technological solutions and technical expertise on blockchain, access to multiple protocols for issuance and integrations with industry-leading DLT companies to improve interoperability, ensuring flexibility and openness of standards as industry evolves and participants grow.
- **Exchange platform**: Access to a digital securities exchange platform for both investors and issuers, providing lifecycle management services as well as liquidity solutions to facilitate trading in secondary markets. Building partnerships with global digital securities exchanges to provide wider distribution networks and enhance liquidity.

Most platforms in competing jurisdictions offer only fragmented services in this entire value chain, making it difficult for investment funds to find a one-stop solution to issuing and managing their digital assets. If successfully executed, the end-to-end lifecycle management will incentivize many investment managers to either re-domicile (or co-domicile) their funds from US/Europe to Singapore or set up new fund vehicles in Singapore, developing Singapore's stature as a futuristic, reliable global fund management hub.

2.4 Introduction to e-VCC: Objectives

The objective of e-VCC Project was to examine the existing challenges faced by the funds management industry and how DLT can enhance liquidity, accessibility, distribution and transparency for traditional, closed-end private equity funds. The e-VCC Project began with identifying a potential VCC use case and overall VCC structure, and the various areas in the fund management process that will change if the issuance of the VCC fund shares are completed directly on either a permissionless (public) or permissioned (private) blockchain network. Through this e-VCC Project, industry participants were able to highlight potential benefits and challenges of doing so, and offer potential solutions to the identified challenges.

The scope of this e-VCC Project was to:

(a) Design a detailed process flow showing the lifecycle of a e-VCC;
(b) Determine the stakeholders and their roles and responsibilities in relation to an e-VCC ;
(c) Detail the various on-chain vs off-chain, and platform vs service provider integration points required over the lifecycle of an e-VCC fund share token;,
(d) Assess the advantages and limitations of DLT particularly in the context of an e-VCC and enablement of fund share tokens to be integrated into new digital asset secondary markets;;
(e) Assess the benefits, limitations and viability of both public and private blockchain for an e-VCC and fund management activities;
(f) Assess the commercial viability of e-VCCs for the growth of the asset management industry in Singapore and the region;
(g) Assess the regulatory hurdles and the changes required in current law for making e-VCC a reality;
(h) Assess the design with the Limited Working Group required to enable the secondary market trading of VCC tokens issued on licensed platforms like InvestaX.

2.5 Methodology

The initial phase of the e-VCC Project was largely spent on understanding the VCC framework itself given that this was a newly enacted law in Singapore and our Working Group consisted of industry experts sitting in multiple jurisdictions.
Subsequently, operational journeys of current workflow processes were designed as a baseline, and the pain points of traditional closed-end private equity funds were identified to then enable us to develop a parallel e-VCC solution on DLT. Along the proposed e-VCC based on a DLT-enabled setup, roles and responsibilities of fund value chain stakeholders, including service providers, were mapped out.

To ensure the solution is viable and adopted by the wider ecosystem, we identified gaps towards commercialization and focused our exploration on resolving these through extensive deep-dives with the Working Group.

Finally, technological feasibility and regulatory considerations were evaluated for the e-VCC. Recommendations for a futuristic framework for e-VCC issuance were laid out for the fund management ecosystem.

2.6 Working Assumptions of e-VCC Project

The Working Group has made the following assumptions for the e-VCC Project :

(a) An umbrella VCC has been registered with ACRA off-chain i.e. in the same way as it is registered today.
(b) The e-VCC documents have been completed in full, and reflect the necessary language required to enable VCC tokenization.
(c) The VCC sub-fund(s) has been established, and the investment strategy for each of the sub-funds has been developed.
(d) Investor demand has been pre-sounded, book-building for initial offering has been completed and initial allocation to end investors has been determined off-chain.
(e) Each VCC sub-fund holds a single private asset (i.e. equity share of a private company) The investee company sees the sub-fund as the investor on their cap table.
(f) In this e-VCC Project, blockchain-native security tokens are issued for the VCC sub-fund(s). The blockchain-native security tokens represent shares of the sub-fund (holding underlying the private asset).
(g) The underlying private asset is in the 'traditional' (non-tokenized) format i.e. only shares of VCC sub-fund are tokenized.
(h) The fund manager has evaluated the choice of underlying protocols and different considerations for permissionless (public) and permissioned (private) blockchains.
(i) Fund shares token parameters have been agreed upon (e.g., number of shares issued, share classes etc).
(j) The fund tokens can be mapped to wallet addresses on the DLT (on-chain registry). .
(k) A digital asset custodian (**DAC**) manages private keys corresponding to fund tokens of the investors.
(l) Singapore law recognises a VCC fund which issues blockchain native shares and security tokens (*as discussed in Section 9.3)*.
(m) It is assumed that the VCC constitution provides that no share certificates will be issued and the register of members will be recorded on chain.

(n) Both investors and fund managers use only fiat currency and there is no digital currency (stablecoins, CBDCs etc.) in use, hence on-chain delivery versus payment mechanics were not a focus for this e-VCC Project.

03 | Blockchain-Native VCC Issuance

3.1 Focus of the PoC

For this e-VCC Project, the Working Group decided to pursue a blockchain-native issuance of the VCC sub-fund shares due to the various benefits that blockchain-native tokens/security tokens bring as further discussed below. Unlike a tokenized security, which is merely a digital representation of a paper-based security on DLT (two-tier structure), a blockchain-native issuance (one-tier structure) removes the need for a nominee structure to hold the shares on behalf of the beneficial owners, and also removes the need to issue paper-based shares. With a blockchain-native issuance, security tokens are issued and registered directly on either a permissioned or permissionless network. The fund share tokens represent direct ownership of investors as shown in Figure 3.2.1 below.

3.2 Benefits of Blockchain-Native Securities

A blockchain-native fund share (token) can bring efficiencies and benefits to the fund management industry, such as reduction of intermediaries and fixed costs, removal of redundant processes, increased transparency, and faster settlement.

The Working Group has highlighted favourable considerations when comparing a blockchain-native security token design (one-tier) as opposed to a tokenized security (two-tier) design:

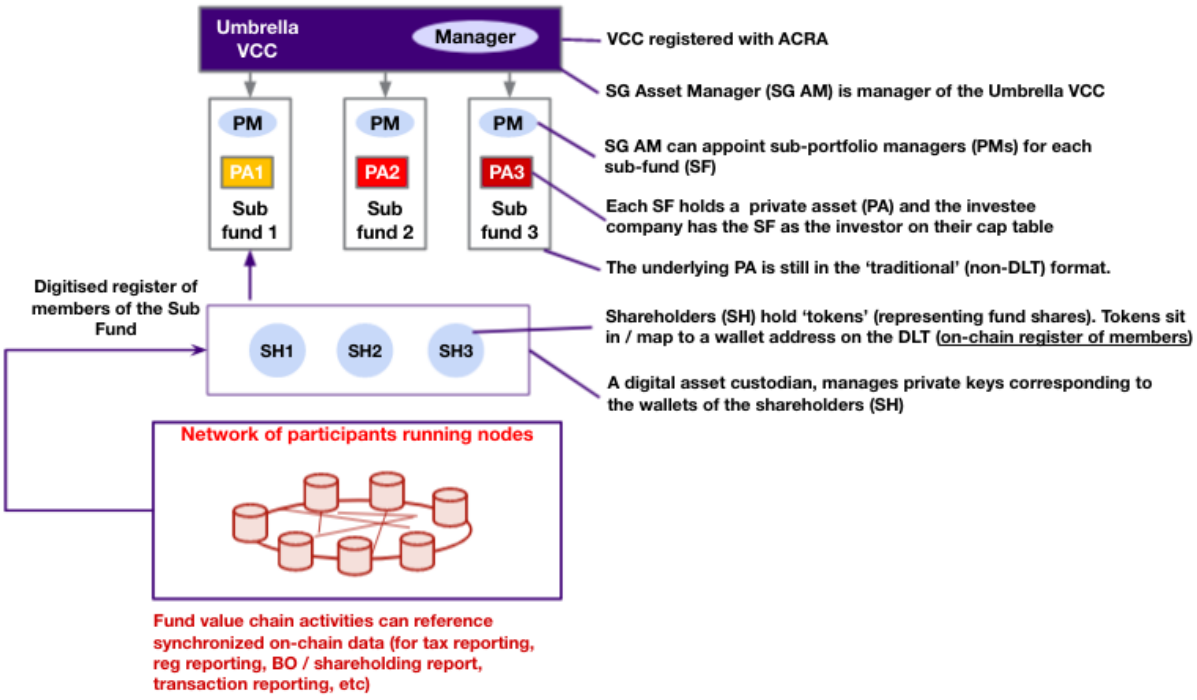
- A blockchain-native security token is a further advancement of the concept of dematerialised securities. DLT permits secured electronic registration mechanisms for holding and registering book-entry securities.
- A nominee structure is not strictly required from a structuring perspective. Distributors (e.g. InvestaX) do not have to set up a separate investment vehicle to aggregate investments from beneficial owners which then invests into the VCC sub-fund as a separate entity and the register of beneficial owners can be maintained and updated on-chain, providing automation and cost-savings.
- End investors can be matched directly to segregated wallets holding these tokens on-chain. Corresponding private keys (and associated identities) are managed / custodized by DACs.
- The existence of the nominee account operator between the issuer and shareholders may cause the breakdown of the communication chain making it quite challenging for an issuer to know its real shareholders, which is important in case of shareholders'

meeting, insolvency or any other major corporate events such as the distribution of shareholder rights and information.

- To prevent misuse on the part of the nominee account holder and to ensure that the assets of the nominee account operators are segregated from their clients, it is imperative that there should be proper identification and documentation to distinguish the ownership of assets. Combining accounts to obtain processing and cost efficiencies is a main factor driving the prevalence of omnibus accounts. With blockchain-native securities, an investor can hold its digital securities in segregated digital wallets without enormous labor and expense for reporting, reconciliation and data storage.
- The nominee account setup is more prone to trading malpractices which are not in the best interest of the clients, including “front-running”. On a blockchain based trading exchange using smart contracts, the digital securities can be held directly by the beneficial owners in their segregated wallets, and without an intermediary, there is less chance of misconduct in execution/settlement of trade. In a blockchain trading exchange, trades are matched automatically by a matching engine and settlement of trade is enabled by smart contract without any discretion exercised by a particular party.
- Under the nominee system, when a nominee account holder goes insolvent, beneficial owners cannot be readily identified. Furthermore, the nominee’s own securities may not be segregated from client assets, in which case, claims of creditors might clash with claims of clients.

Figure 3.2.1 and below is a visual illustration of both a blockchain-native security token (one-tier structure) versus a tokenized security (two-tier structure):

Stylized eVCC Fund Structure – 1 Tier



Stylized eVCC Fund Register of Member – 1 Tier

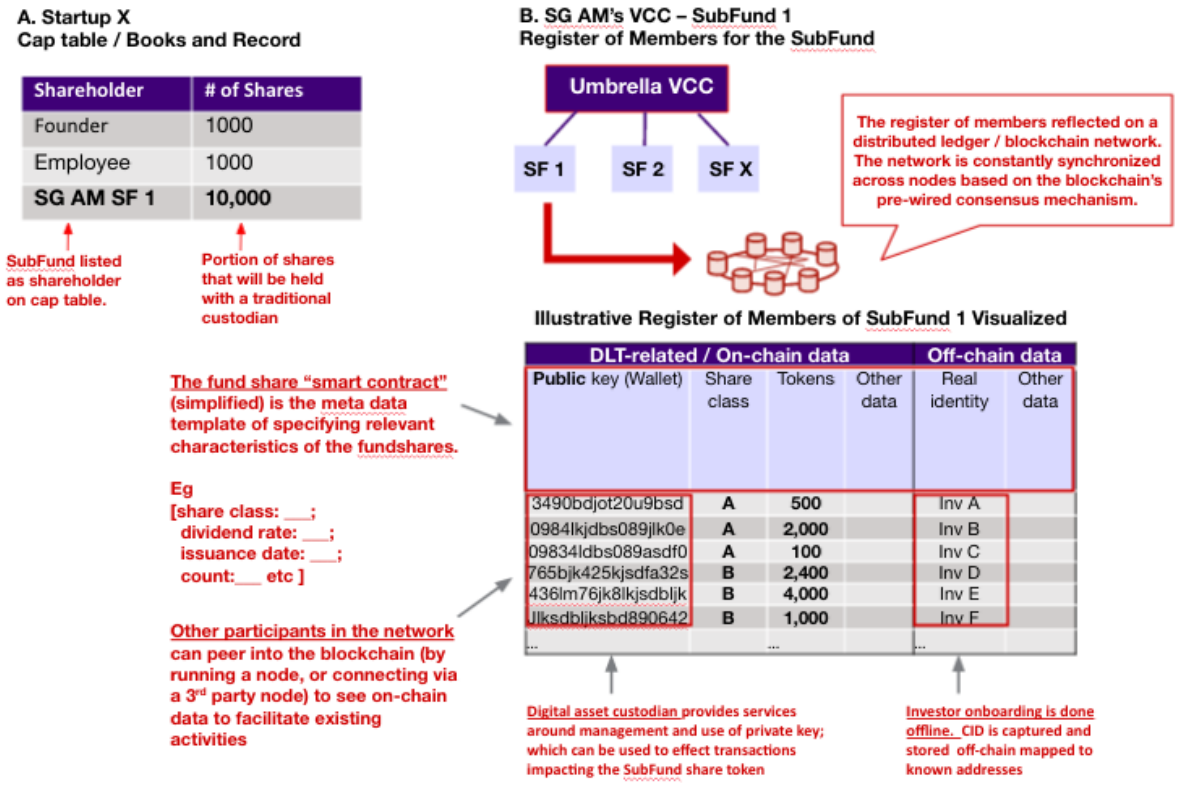
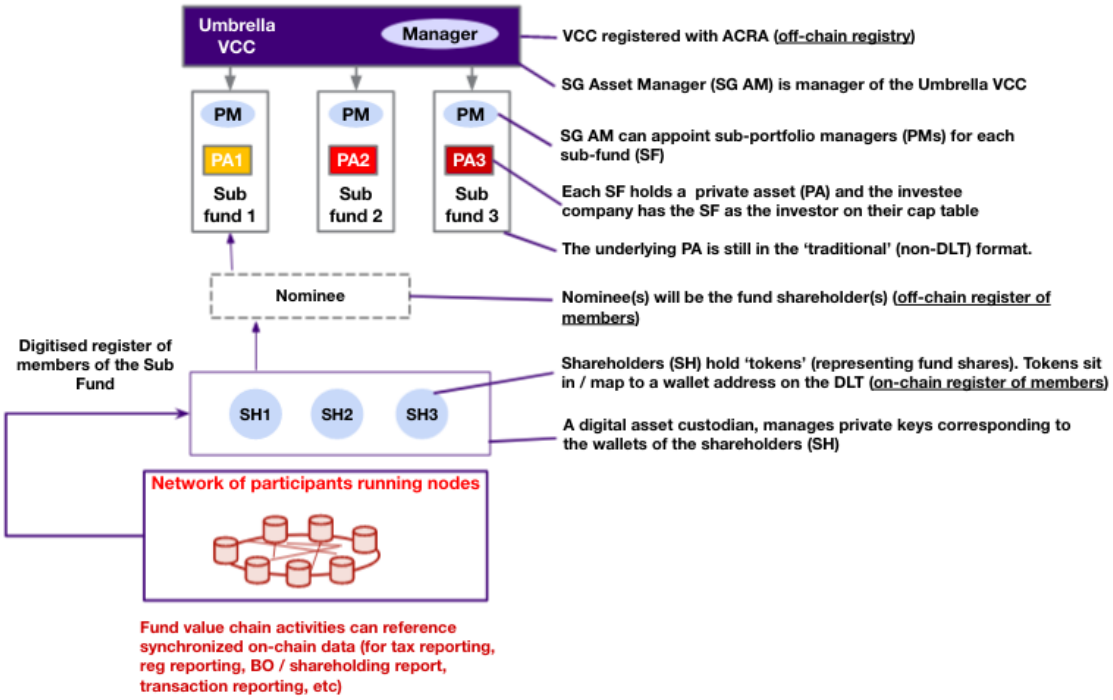


Figure 3.2.1 Blockchain-native fund token issuance (1 Tier) courtesy of UBS

Stylized eVCC Fund Structure – 2 Tier



Stylized eVCC Fund Register of Member – 2 Tier

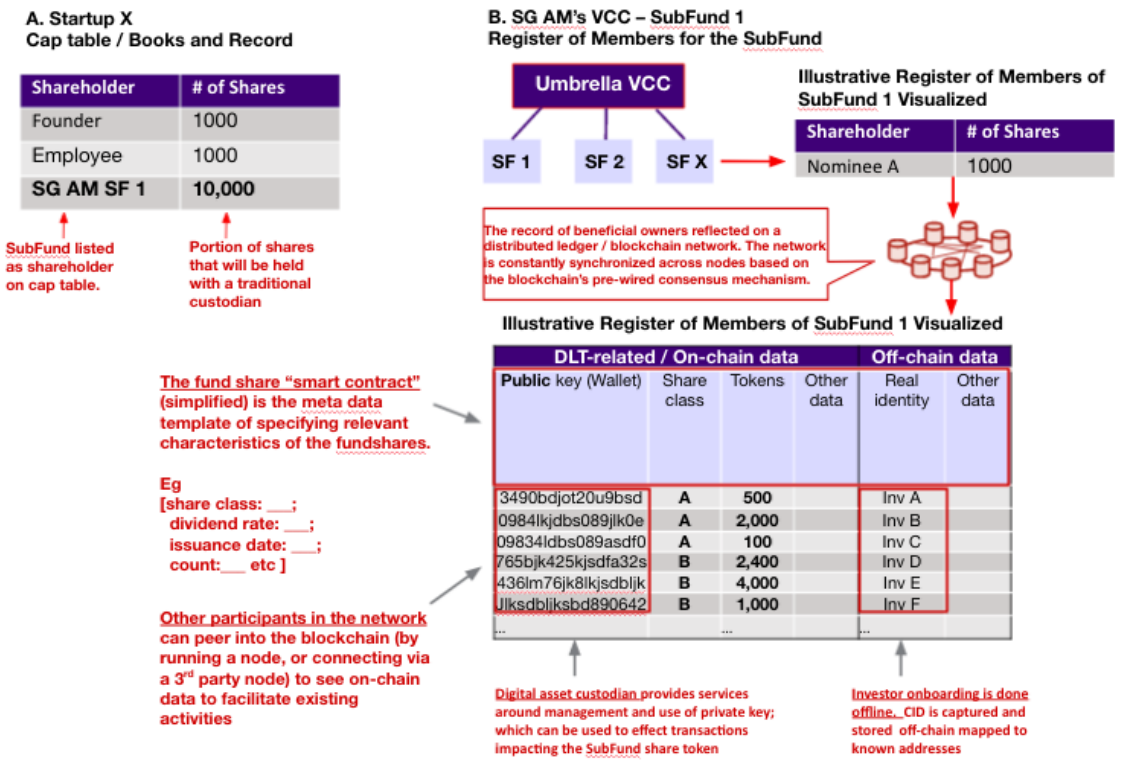


Figure 3.2.2: Tokenized paper-based fund shares with a nominee (2 Tier) courtesy of UBS

3.3 e-VCC Fund Structure

The VCC fund in this PoC is assumed to be an umbrella VCC, established in Singapore with several sub-funds as closed-ended private equity funds (**VCC Fund**). The VCC Fund and each sub-fund is managed by an MAS-licensed fund manager, with investors (shareholders) owning shares in the applicable sub-fund.

As a company with variable capital (i.e. does not require authorized capital), the VCC provides fund managers with a high degree of flexibility to issue and redeem shares. It has also improved operational and tax efficiency. This is already observed today in over three hundred VCCs established since the launch of the program. In Project e-VCC, the VCC Fund refers to the closed-end sub-fund that is expected to have a fixed investment horizon and the investment strategy of the fund is focused on private equity. The sub-fund holds a single private equity investment and accepts both accredited and institutional investors.

04 | Primary Issuance and Distribution of e-VCC Fund

For the e-VCC Project, the Working Group designed DLT-enabled / streamlined operational processes for onboarding (including KYC/AML), book building, and cash management, removing redundancies and physical handling of paper based records whenever possible.

The issuance and distribution process was evaluated in the context of using a DLT-based infrastructure for maintaining the fund share registry, and working with both the typical stakeholders and new digital asset platforms. In the subsequent process diagrams, the workflows shown reflects one potential operating model (of many others) where InvestaX plays a central role acting as the tokenization agent to the Fund Manager in a new e-VCC, and is also involved in the distribution and related KYC/AML verification of the entire e-VCC fundraise. In future iterations, further segregations of roles and responsibilities involving a wider set of service providers can be explored.

4.1 Customer Onboarding

Both the issuer and investor onboarding process is handled by InvestaX in compliance with KYC/AML requirements under Notice VCC N-01 Prevention of Money Laundering and Countering the Financing of Terrorism. Document sourcing and KYC/AML requirements remain the same as a traditional fund. Often, a fund manager works in parallel with a fund administrator to onboard investors. In an e-VCC model, InvestaX acts as the document sourcing party on behalf of the Fund Administrator appointed by the Fund Manager to create a seamless onboarding experience, rather than requiring investors to undergo duplicative KYC/AML screenings with both the Fund Manager and InvestaX. The e-VCC may rely on certain financial institutions regulated by the MAS to perform KYC/AML, however, it is

important to note that the e-VCC fund will remain legally responsible for upholding the relevant AML/CFT requirements.

4.2 Distribution on InvestaX Platform

Traditionally, after a fund is established and registered and the investment strategy is sounded, the fund manager works alongside investment bankers, private wealth managers and other marketing partners who would assist in gathering, capturing and recording investor demand for offline book building and determining initial allocation to end customers. In an e-VCC, once the umbrella VCC Fund and sub-funds are registered with ACRA, the Fund Manager creates an account on InvestaX. As an online distribution platform with integrations with multiple blockchain protocols as well as collaboration with other distributors, InvestaX can conduct fundraising activities for fund managers including the e-VCC Fund Manager and conduct online investor roadshows to its network of qualified investors (i.e. accredited and institutional investors). Below is the wireframes of fund manager's dashboard on the InvestaX platform:

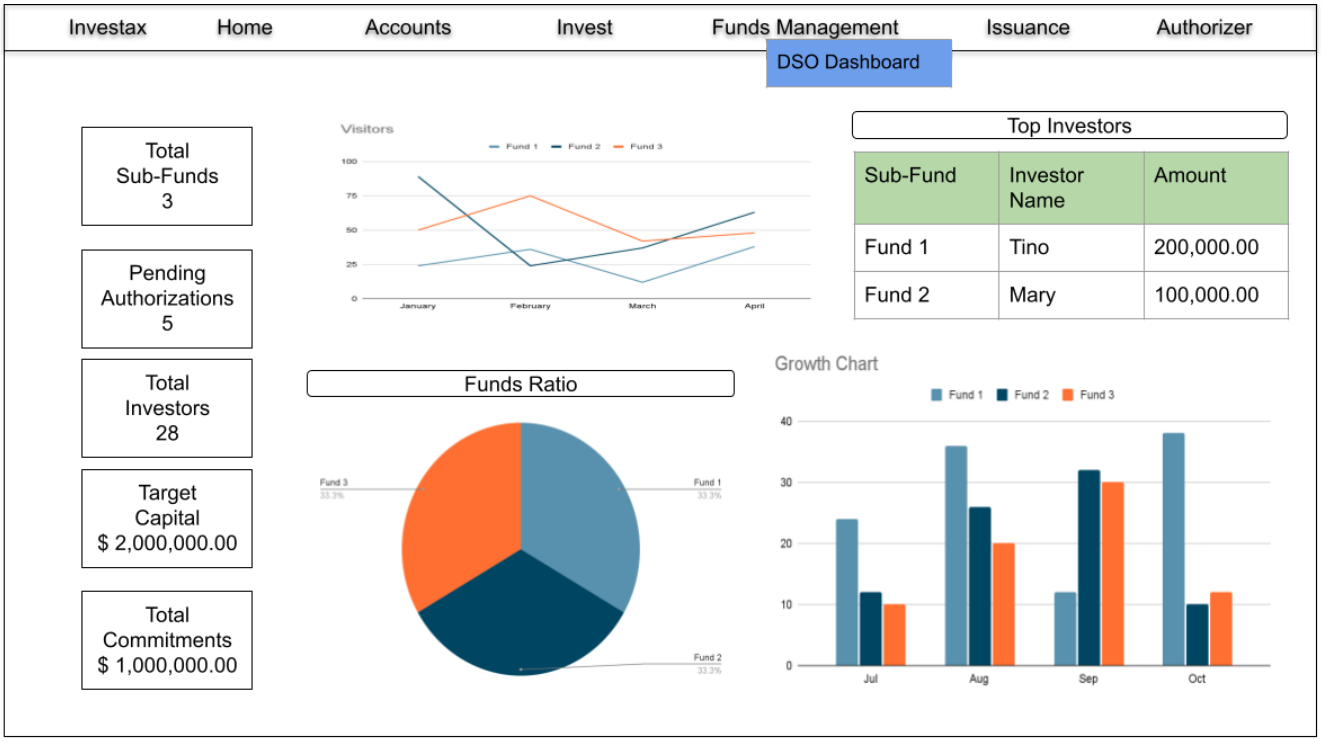
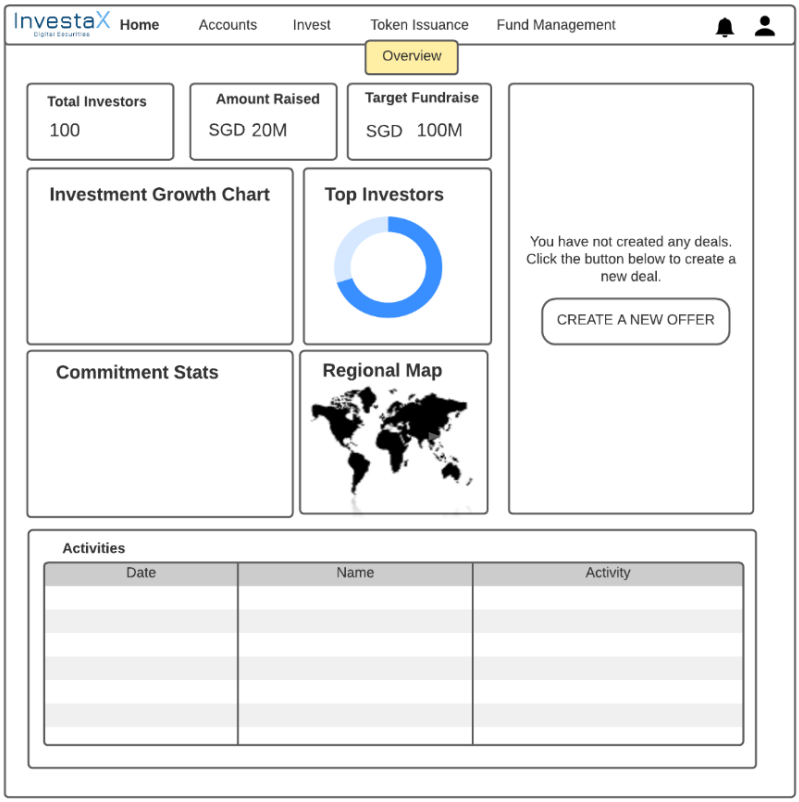


Figure 4.2.1: InvestaX Platform Wireframe for VCC Fund Manager Dashboard

Fund Manager - Token Issuance



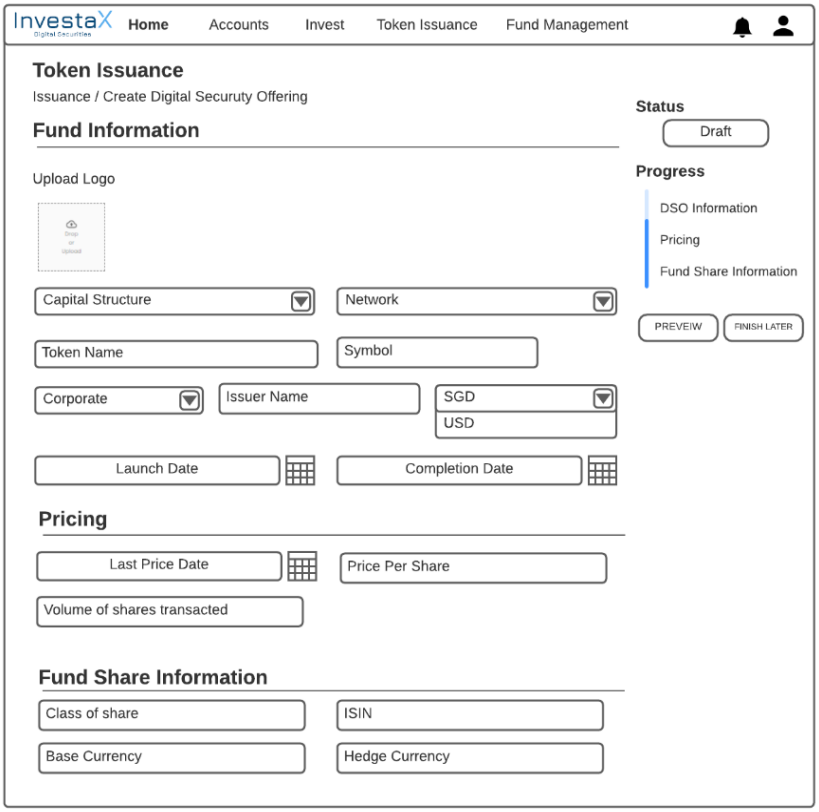


Figure 4.2.2: InvestaX Wireframe for Fund Manager Primary Issuance Dashboard

4.3 Cash Management Cycle for e-VCC Fund

For the purposes of this e-VCC Project it is important to note that all cash-management activities happen off-chain as it is assumed that the investments would be conducted in the form of fiat currency, and not digital currency (e.g. stablecoins or cryptocurrencies). A typical private equity fund lifecycle is defined by the periods as shown below:

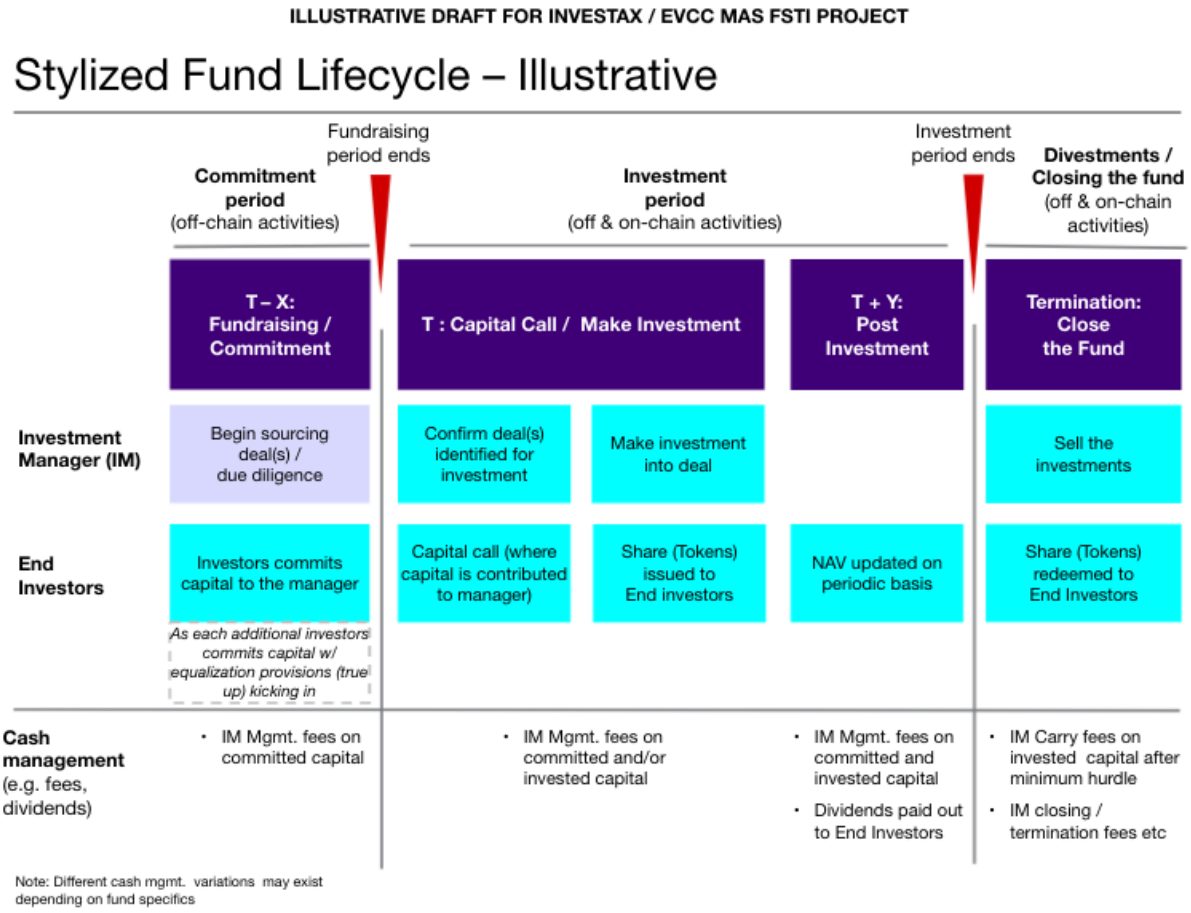


Figure 4.3.1: Stylized Fund Lifecycle Chart courtesy of UBS

4.3.1 Capital Commitment, Capital Call, Cash-in, Token Issuance for e-VCC Fund

For a typical private equity fund, it is important to note a distinction between cash-committed and cash-called. Investors commit cash during the fundraising period, however, cash is called/drawn down only when the fund begins to make investments or to manage its quarterly expenses. For an e-VCC Fund on InvestaX's platform, once the capital is committed in respect of a fund interest, InvestaX places a hold for an amount equivalent to the fund committed in the investors fiat currency account maintained with InvestaX. When the capital is called by the Fund Manager, InvestaX releases the hold and transfers funds directly to the e-VCC fund bank account, upon confirmation of the transfer by the Fund Administrator. InvestaX then issues e-VCC fund tokens with the predetermined parameters into investor's segregated wallets which are held by the Digital Asset Custodian **(DAC)**. Since the VCC allows for variable capital (i.e.,

does not require authorized capital), there is no need for a predetermined number of tokens to be issued at the outset.Tokens are only created and issued as capital contributions are made by investors and not upon a commitment of capital.

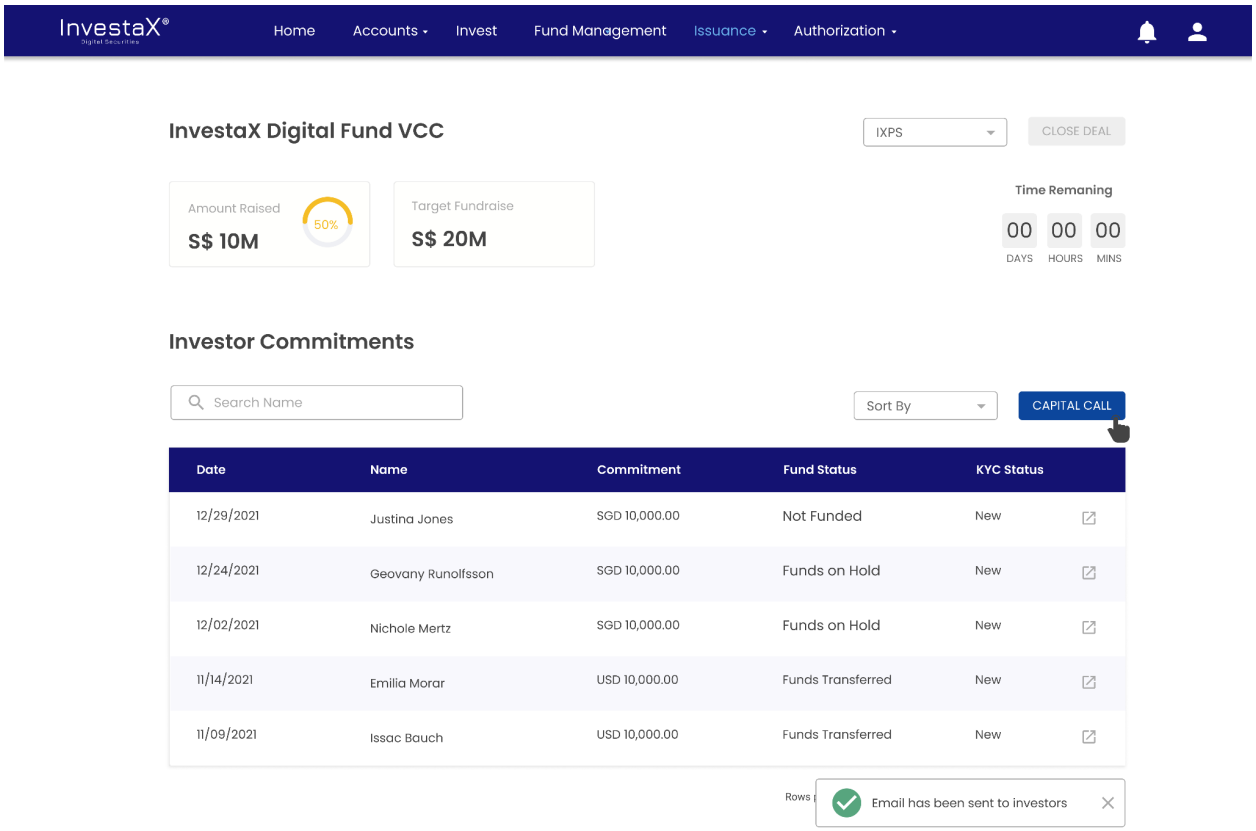


Figure 4.3.2 InvestaX Wireframe for Investor Commitment

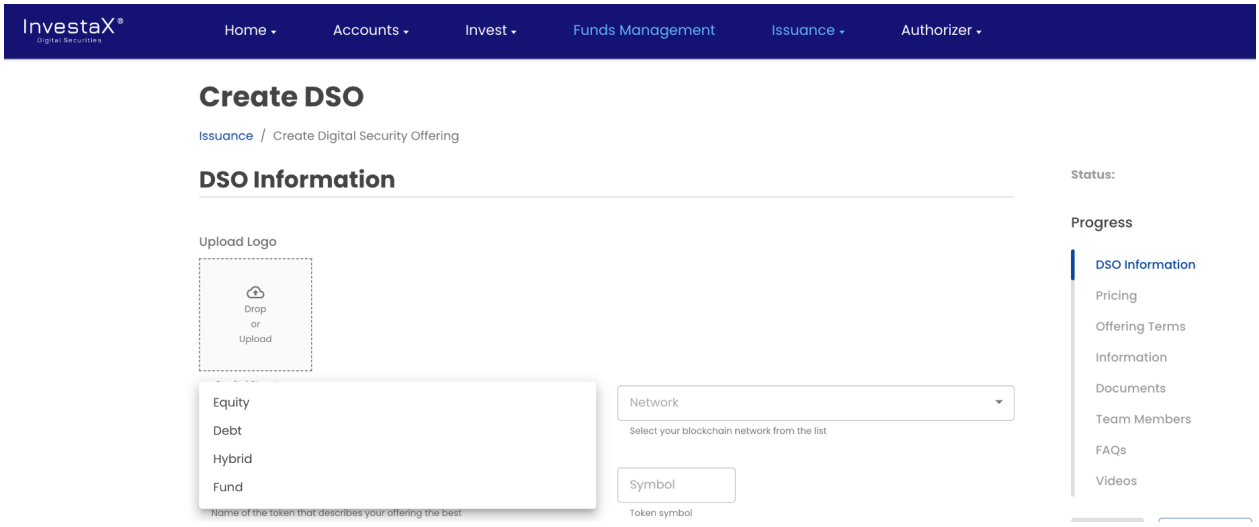


Figure 4.3.3 InvestaX Wireframe for Fund Security Offering

4.3.2 Fund Termination for e-VCC

At the time of fund termination, the Fund Administrator performs final fee and carry calculations, determines what amounts of the fund earnings to distribute to investors based on their initial investment, and notifies investors. Thereafter, the DAC is instructed to recall and/or burn the e-VCC Fund tokens depending on the blockchain protocol. The Fund Administrator initiates the cash repayment and the investors receive cash in their bank accounts registered with InvestaX platform. The below chart illustrates the e-VCC fund termination process:

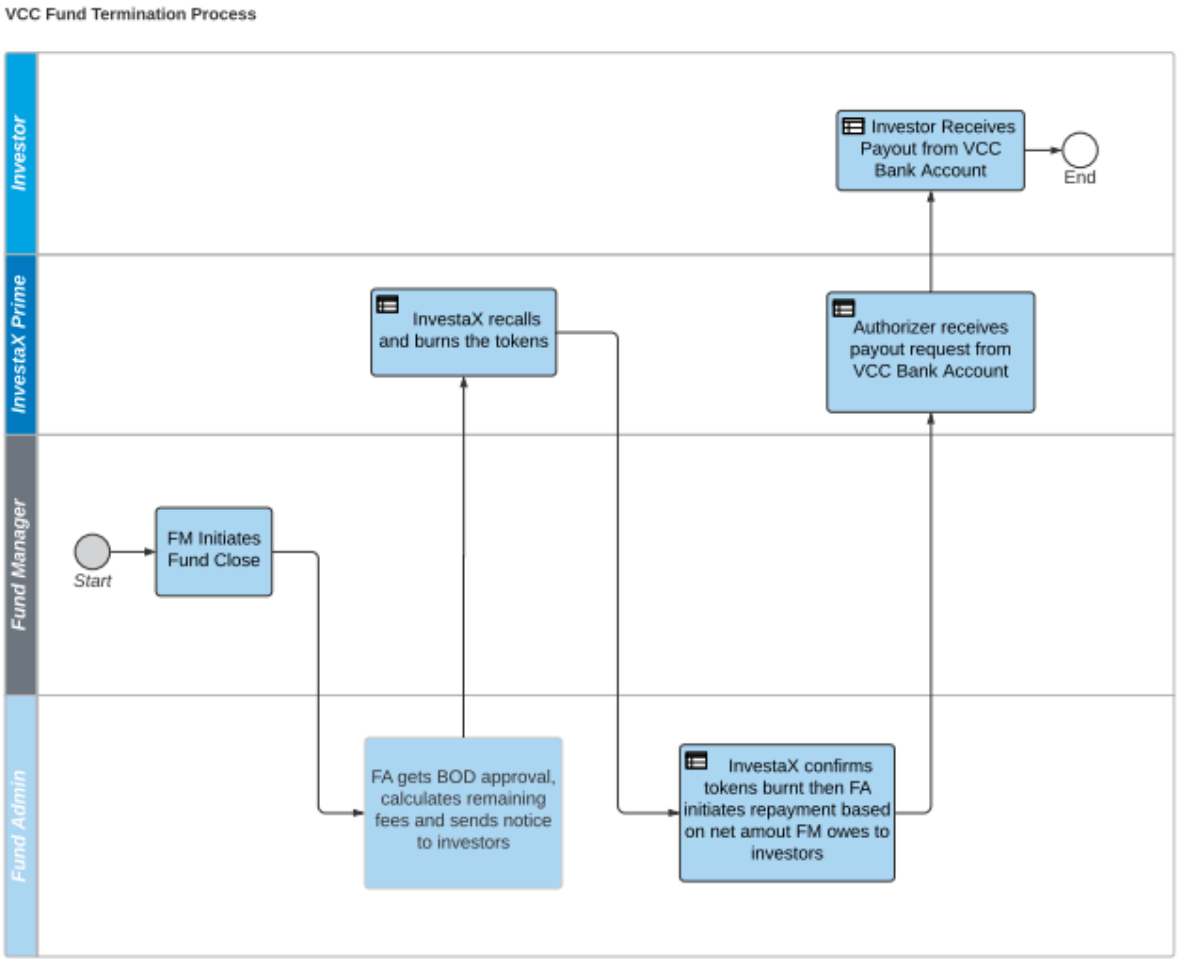


Figure 4.3.4: Fund Termination journey courtesy of State Street

4.4 Data Management for an e-VCC Fund

The decision to record information directly on-chain is made by the Fund Manager based on a number of factors, including but not limited to: information security, data governance, regulatory requirements, client privacy, and the features of the blockchain protocol itself (permissioned vs permissionless). When deciding which data points can potentially be encoded on-chain vs. remaining off-chain, a balance needs to be struck between the utility of sharing information which can have functional use (e.g. in a smart contract) versus the safeguarding of

data and data privacy (e.g. client information). Data eligible to be written on-chain has the benefit of being propagated across the DLT network in real-time, with participants across the fund value chain notified and updated simultaneously. On the flip side, on-chain data will also be immutably written and exposed to all members, creating a different set of considerations regarding data risk management.

As part of the PoC, a stylized set of functional data fields for funds were curated, with Working Group members discussing the usefulness of including various data points on-chain.

PRICING INFORMATION (DYNAMIC)	FUND INFORMATION (STATIC)	FUND SHARE INFORMATION (STATIC)
Last price date	Fund structure/type	Class of share
Price per share	Commercial register	ISIN
Volume of shares transacted	Fund manager	Base currency
	Fund strategy	Hedge currency
VALUATION INFORMATION (DYNAMIC)	Portfolio manager	Management fee
Initial valuation date	Base currency	Other fees
Net Asset Value per share	Sponsor commitment	Carried interest
Valuation frequency	Subscription start date	Issuance date
	Closing date	Minimum holding period
	Redemption date	Minimum investment amount
	Investment period start date	Investor restrictions
	Investment period end date	
	Fund term	**FUND SHARE INFORMATION (DYNAMIC)**
	Target fund size	Latest NAV
	Fund size	Latest price

Figure 4.4.1: Stylized Closed-End Fund Data Parameters courtesy of UBS

Given the scope of this project and design assumptions, other data attributes were also highlighted as of potential benefit to be included on-chain by the Working Group, but were not explored in detail at this stage and instead recommended for consideration in future steps:

- Investment or underlying deal data
- Data that could facilitate cash-management and payment actions
- Data that could facilitate capital-call calculations or notices information
- Data that could facilitate equalization calculations for new investors

4.5 Valuation for Primary Token Issuance

For the e-VCC Fund, valuation is most relevant at two stages:
1) the commitment period / initial offering period, where tokens are issued (as capital is called);
2) net asset value throughout the lifecycle of the fund.

When a Fund Manager issues a capital call on committed capital, investors will contribute capital. Tokens are issued when capital is contributed to the fund by investors. Tokens are equal to the number of shares. At any given point in time, tokens are issued such that the ratio of the share ownership by investors remains the same. According to the VCC Act, shares should be issued and redeemed at NAV. However, if shares are issued during the initial offering period, they do not have to be issued at NAV and will instead be issued at the “offering price”, a base price that is set by the Fund Manager.

Tokens represent a notional amount that corresponds to the capital contribution that has been made by the investor (token-holder). The number of tokens issued to the investor will mirror the number of shares that are typically issued to the VCC sub-fund investors. The notional amount that each token represents is typically fixed by the Fund Manager with the denomination of the tokens varying based on the fund specifications / Fund Manager.

Throughout the lifecycle of the fund, NAV calculations are performed by the fund administrator on a periodic basis. This remains the same for an e-VCC Fund, wherein the Fund Administrator distributes these valuation notices to investors via the InvestaX platform. The price at which tokens are issued to investors differs from the quarterly calculation and reporting of the NAV performed by the Fund Administrator on the underlying assets held by the fund.

4.6 Custody for Primary Token Issuance

Typically, the fund administrator or the VCC Fund’s company secretary will maintain the register of members. Depending on the nature of the underlying assets in a fund, the fund administrator is responsible for asset servicing. An independent custodian is not necessary where the managed assets are: a) not listed on an approved exchange, b) interests in a closed-end fund

where the closed end fund is to be used for private equity or venture capital investments, and c) offered only to accredited or institutional investors.

There are two types of structures adopted in the market with respect to digital securities custody:
1) omnibus/nominee/pooled account solution;
2) segregated wallet solution.

In the omnibus/nominee/pooled account structure, digital securities are held in a single wallet, which is identified in the name of a single legal investor/nominee as opposed to segregated account structure where wallets would correspond to individual beneficial owners. In the segregated account solution, the tokens are held in separate wallets, which can be mapped back to the individual beneficial owners as well as being segregated both from assets of other investors and assets of DAC.

For the purposes of Project e-VCC, InvestaX assumed the role of providing custody services and adopted a segregated account structure. A segregated account structure in a DLT-based infrastructure setup has the benefits of providing a clearer account structure that mirrors the underlying beneficial ownership, thus, simplifying custodian and asset servicing activities as activities can be conducted on-chain (e.g. token transfers, administration of voting rights etc).

On the primary issuance side, when a token representing a unit in the closed-end fund is issued to an investor, the DAC will custodize the token in a segregated wallet held in the name of the investor with private keys and other controls with the DAC, which will be governed by the InvestaX platform terms and conditions. Below are some wireframes of the fund manager's journey on the InvestaX platform:

05 | Secondary Trading on InvestaX Exchange

The scope of this e-VCC Project did not specifically cover the operational mechanics of secondary trading on a digital securities exchange like InvestaX Exchange**.** However, a more diverse , secondary market environment for tokens is seen as a key benefit to tokenization and use of DLT-based infrastructure as the underlying ownership register.

In particular, the newly established VCC legislation is structured in a way that could enable blockchain-native token issuance and facilitate secondary market trading of these on digital securities exchanges such as InvestaX. A unitised fund such as a VCC can be used to wrap underlying investments and subdivide them into smaller fractions – potentially expanding the pool of investors and expanding the secondary market activity. This is not possible with limited partnerships (**LP**). Investments in private funds can be transacted easier via unitised structures versus investments in limited partnerships. For example, ISIN numbers for LPs would be

available only at the partnership level - entity level rather than individual partner's interests. To allow for fiduciary oversight of secondary transactions, board of directors oversight, which can be "independent" would give the investor community further comfort than through "General Partners" which are typically not independent.

As such the Limited Working Group (including InvestaX, UBS, PwC Singapore) did touch upon how secondary market trading impacts various operational processes such as stakeholder onboarding, cash management, data management, valuation and custody. Potential considerations around the impact of DLT-based infrastructure for the e-VCC to attract different ecosystems of liquidity providers was not in scope for this project.

5.1 Issuer and Investor Onboarding Journey & Listing of Security Tokens

After closing of a primary fundraise and token issuance, fund managers may choose to provide liquidity to their existing investors by allowing investors who hold fund share tokens to exit their positions through a regulated secondary market platform. InvestaX operates a secondary market exchange which enables direct listings by fund managers and investors, provided that the fund documents permit secondary market trading (i.e. conditions around secondary market allowance can be pre-programmed into the fund share tokens by the Fund Manager).

For fund managers that allow for fund share tokens to be listed on InvestaX's secondary exchange, and for Investors looking to access the secondary exchange the onboarding process largely follows the same process as described earlier in *Section 4.1 Customer Onboarding Journey* under Primary Issuance and Distribution, if not already onboarded. Any fund manager who wants to allow its tokens to be listed on the InvestaX Exchange will be required to undergo an initial assessment and comply with InvestaX Exchange listing rules. The InvestaX Exchange also allows fund managers who have previously raised a traditional closed-end fund to list on the exchange as a secondary offering without having availed the primary issuance and distribution services from InvestaX or through a direct listing. InvestaX will provide tokenization technology to such fund managers and facilitate listing on the secondary exchange.

5.2 Cash Management

To begin trading on the InvestaX Exchange, investors who submit a buy order are required to pre-fund their accounts in fiat currency to complete transactions on the secondary market. There will be no changes in the way in which cash management processes are performed for a fund that is listed on the secondary market to that of a primary issuance. Cash management activities will still happen off-chain given that we are using fiat currency as opposed to digital currency.

5.3 Data Management

There are no changes in the data management process for security tokens listed on a secondary exchange.The data parameters are determined by the Fund Manager at the inception of the tokens.

5.4 Valuation & Pricing for Secondary Trading

When a fund launches on a secondary exchange, there are two distinct components: (1) *valuation*; (2) *pricing*. The fund must be closed i.e. it is no longer raising capital for it to be listed on the secondary market.

Valuation of a fund is defined as the NAV of the underlying book of the fund, which is independent of the price at which tokens are traded on the InvestaX Exchange. The trading price of the fund tokens does not impact the NAV calculations which are provided for the e-VCC Fund on a quarterly basis by the Fund Administrator.

The “listing price” of a token can be guided in principle by its latest NAV when an investor decides to list their fund share security tokens on the InvestaX Exchange. However, the actual price received by the seller will be determined through a method in which the market generates price discovery. The price discovery mechanism on the secondary market could be through a direct listing i.e. the reference price of the security is determined by the buyers and sellers who will place orders for existing securities, and not by market-makers or underwriters as in a traditional IPO process where new securities are issued.

Pricing on the InvestaX Exchange reflects the buying or selling interest of the e-VCC Fund tokens for both new and existing investors. Trading price is determined by market forces of supply and demand, and it does not impact the notional value or the commitment amount that each token represents. If a seller sells a token at a discount, the underlying notional amount that a token represents as committed capital to the fund does not change. As a closed-end fund, the loss/gain is represented by the price at which the security trades. Issuance and redemption of shares have to be at NAV, except when it is listed in the secondary market. Therefore, the capital in the fund remains constant.

Market forces can lead the closed-end fund to trade at a premium or a discount to its NAV as well as at different bid-ask spreads. Drivers of premium or discount to NAV can be driven by a number of factors – especially for private markets. Time will tell if digital asset exchanges (enabled by a more efficient DLT-based environment) will be able to attract more liquidity (and thus tighter bid-ask spreads) vs non-DLT based private market alternative marketplaces already in existence today.

5.5 Custody for Secondary Trading

Each investor will be assigned a wallet on the InvestaX Exchange, whose private keys are held by DAC. A whitelist of wallet addresses is maintained for each fund.

Currently, most digital securities exchanges operate a two-tier structure where digital wrapper tokens of existing securities which have been tokenized are created for reconciliation and trading purposes. In the two-tier structure, the exchange registry and the custodian registry must be reconciled periodically in order to determine the ultimate beneficial owner after any trades have been executed. The e-VCC Project allowed for the issuance of blockchain-native e-VCC fund shares such that each investor's tokens could be mapped on an address on the DLT and the blockchain registry will be updated automatically whenever a trade is executed on a near real-time or "T" basis, instead of the current industry standard of "T+2" basis. As the register of members is not a public document, there is no requirement to update ACRA every time a trade is executed and ownership of tokens is changed, and removes the need for manual reconciliations.

06 | Governance & Compliance

Investment funds typically delegate the operational and administrative functions (fund valuations, fund accounting and transfer agency) to service providers for practical and operational efficiency reasons (e.g. service providers may have certain expertise that can be delivered at greater economies of scale) while still retaining ultimate responsibility for the operation of the investment fund.

6.1 The Role of a Fund Administrator

Although the VCC Act does not require a fund administrator, a fund administrator would assist in carrying out numerous functions on behalf of the e-VCC, its directors, and its manager. A Singapore-based fund administrator is also necessary for the VCC to avail itself of applicable tax incentive schemes. Fund administration services include valuation, accounting, settlement of expenses and acting as a transfer agent. The key functions executed by the transfer agent today include record keeping of ownership of fund interests, maintaining the issuer's security holder records, cancelling and issuing certificates, and distributing dividends among other corporate actions. Some of these functions can be taken over by the blockchain in an e-VCC Fund, such as record keeping of fund interests on a digital registry, however, legal responsibility still needs to remain with an appointed transfer agent.

Ultimately, with adequate regulatory guidance, alongside industry maturity, it may be possible for more functions currently performed by a transfer agent to be performed entirely by DLT / smart contracts.

In this e-VCC Project, the transfer agent role was assumed by the Fund Administrator who can access the registry on the network at any given point in time.

6.2 Role of Corporate Secretary

In the case of a VCC, the following registers are not available to the public:

1. Register of Members
2. Register of Beneficial Owners
3. Register of Nominee Directors
4. Register of Debenture Holders

However, the VCC Act requires that these registers be made available to regulatory authorities like ACRA and the MAS whenever requested. The VCC Act also provides that the statutory registers can be maintained electronically or in paper form. With a native security token, whenever a new e-VCC token is issued or an e-VCC token changes hands, the transfer of title to such blockchain-native securities is recorded on DLT and the register of members is

automatically updated. As such, we can say that the register of members is on-chain and is the source of the ultimate truth.

With more fund administrators and corporate secretarial firms going digital and making use of DLT to manage corporate actions, the ideal situation would be when such firms are able to have API plug-in with both ACRA and platforms like InvestaX so that there is a seamless flow of information from digital exchanges to corporate secretary firms and in turn to ACRA. This would eventually lead to creation of a digital ecosystem providing for an end to end management of all corporate actions relating to digitally native securities. The other alternative is if ACRA could have an API plug-in with such digital security issuance and trading platforms to allow for seamless flow of data from one system to another.

07 | Post-Tokenization Lifecycle Management

In this e-VCC Project, we studied how corporate actions are executed in a traditional fund, and evaluated how this process changes for the e-VCC, with a primary focus on: (1) Dividend Distributions and (2) Fund Redemptions.

Below were some assumptions made by the Working Group:

(a) The NAV for the fund is in forward pricing, that is NAV calculation is only available on a "T+X" basis. This NAV calculation is provided by the Fund Administrator and the capability to provide this real-time with on-chain data has not yet been developed.
(b) In a typical closed-end private equity fund, investors are given an election option for dividend payouts during the initial subscription and have to pre-select whether they would prefer to receive cash payouts or reinvest their dividends. However, with a VCC fund structure, wherein the umbrella fund can have multiple sub-funds which can hold single assets, in the case of a sale of the underlying asset, there will be no option for reinvestment. Thus, with single asset funds, as assumed for the e-VCC Fund, there is no prospect for reinvestments.
(c) When the e-VCC Fund is listed on to the secondary exchange for trading, new incoming investors can easily make amendments to their dividend election option i.e. select an option that is different from what previous fund token owner had selected. Thus, the elected option will not impact the pricing of the security tokens on the secondary exchange.
(d) The Fund Administrator does not need to make any significant changes to the processes to accept such amendments from the investors.
(e) These changes can only be accepted outside of the dividend distribution period.
(f) The Fund Manager has oversight and control over the dividend distribution and reinvestment decisions for all investors in order to manage the dilution of equity.

7.1 Dividend Distributions

Project e-VCC reviewed existing dividend distribution and fund redemption processes for a traditional fund, and developed appropriate process flows for an e-VCC Fund, including the process flow required for digital securities service providers like InvestaX and the digital asset custodian. For the purposes of the e-VCC Project, distributions are made in fiat currency, therefore, the key consideration was to build a workflow for smooth dividend distribution by Fund Manager through the InvestaX platform.

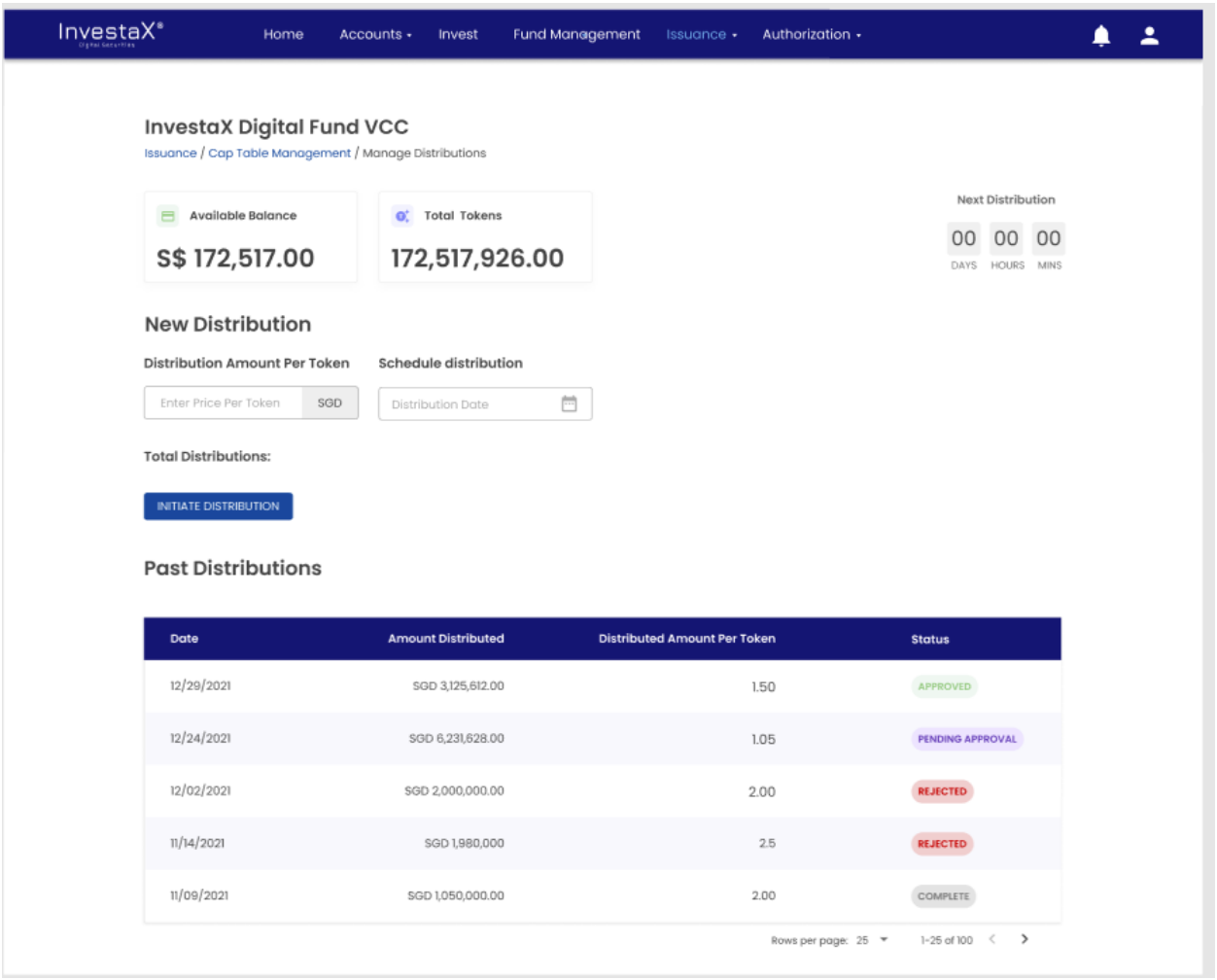


Figure 7.1.1: InvestaX Platform wireframe for Dividend distribution

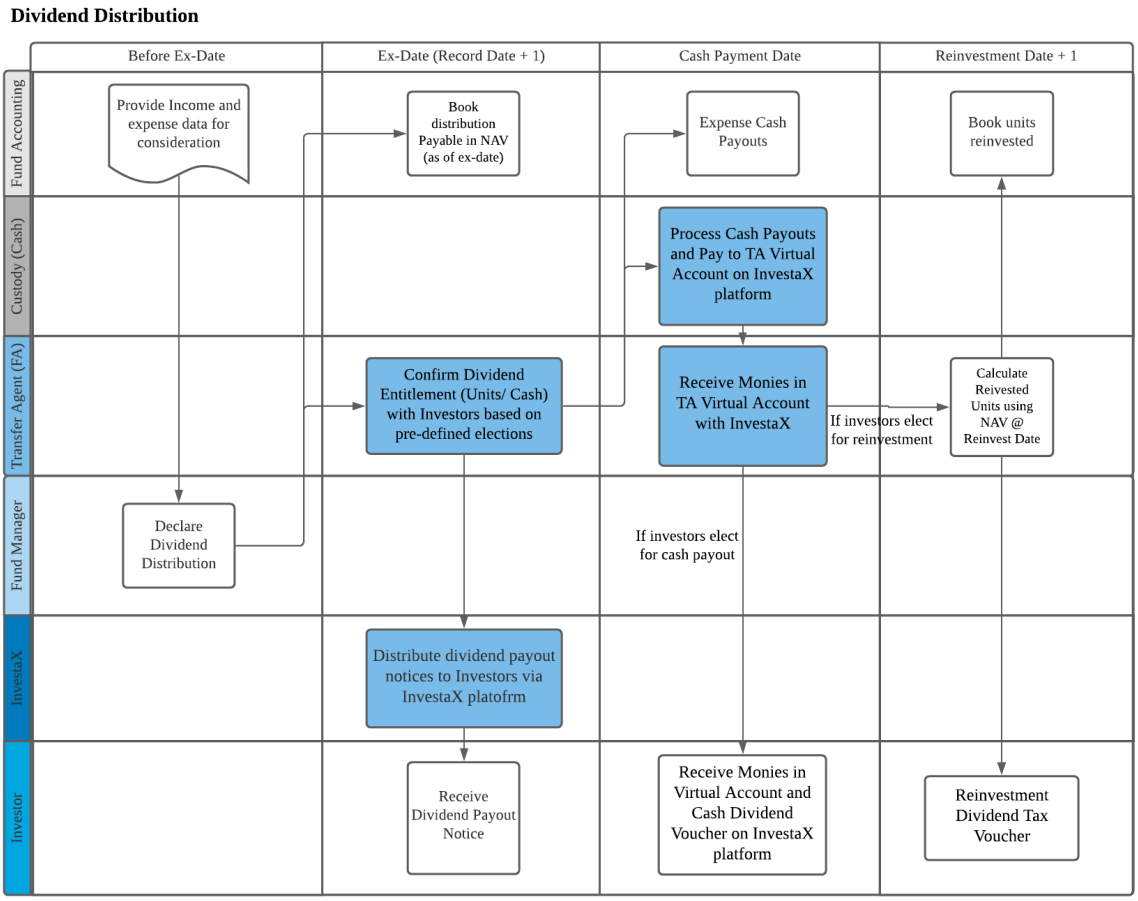


Figure 7.1.2: Dividend distribution journey for tokenized fund, courtesy of State Street

7.2 Fund Redemptions

For fund redemptions, when an investor submits a redemption request, herein defined as “Trade Date”, the request is realized and processed on “Trade Date + X” by the Fund Manager. The contract notes are distributed to the investor by the Fund Administrator through the InvestaX platform while a new NAV is generated for the redemption of the fund tokens. The Fund Administrator also simultaneously notifies the cash custodian to process the payment. Then acting as a transfer agent, it distributes the funds to the respective investors and the Fund Manager also simultaneously triggers the token redemption function on the InvestaX platform, which once authorized by InvestaX, enables the recall of the tokens from the DAC and the smart contract is updated to reflect a change in the number of tokens outstanding. See Figure 7.2.1 below.

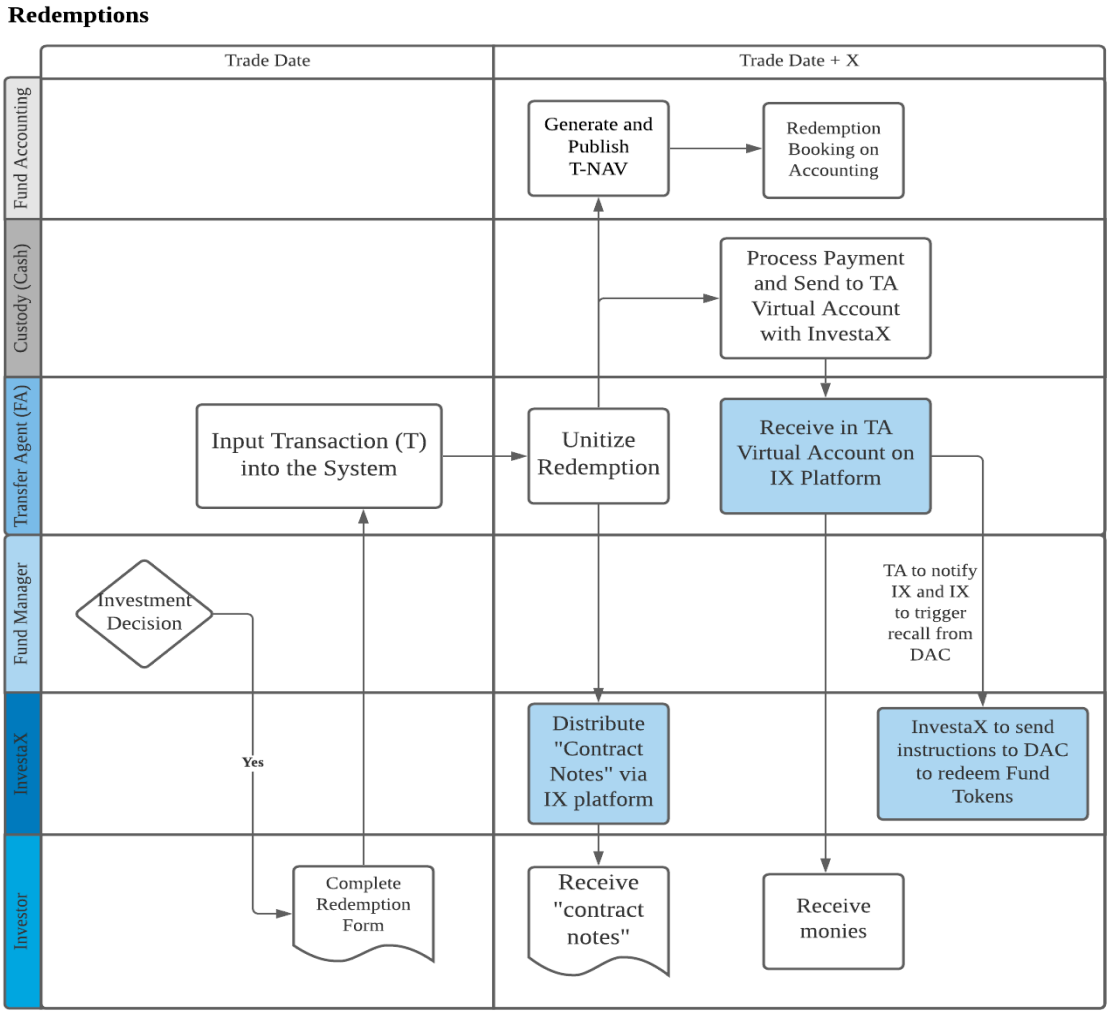


Figure 7.2.1: Fund redemptions journey for tokenized fund courtesy of State Street

08 | Digitization / Technology

8.1 Blockchain Protocol Providers for the e-VCC Fund

As part of this e-VCC Project, InvestaX assessed both public and private protocols in connection with issuing a blockchain-native VCC Fund. InvestaX is protocol agnostic and looks to provide greater flexibility to VCC fund managers when it comes to selecting the right type of blockchain protocol. Blockchain protocol choice is dependent on a number of factors such as privacy of information, governance attributes, distribution capabilities and network effect of the protocol, and risk appetite of the fund manager among other considerations *(See section 8.2 below).*

8.2 Key Considerations for Fund Managers

A number of factors were considered to help uncover some of the key trade-offs / implications of different protocol choices.

These include:

(a) ***Fund Manager's Risk Appetite***: as public blockchains are permissionless and allow for many different participants to directly access and use the network, there may be enhanced risk factors to consider (e.g. anonymity of counterparties, new technology, information security, etc). More progressive fund managers and investors may have enhanced risk management frameworks in place that enable them to interact with permissionless networks – thus benefiting from more open / wider distribution reach and access to real-time open-source innovations.

(b) ***Distribution and Network Effect:*** certain investment products can be deployed on DLT networks to tap into large user / investor bases (i.e. typically the case for permissionless public networks). Other more niche investment products may generally have a limited set of interested and accredited investors, and therefore, may not benefit as much from open / very wide distribution networks. Instead, private permissioned networks could be preferable / sufficient.

(c) ***Smart Contract standards:*** token (smart contract) standards impact ***interoperability between exchanges*** and ***distributor networks.*** Most global digital asset platforms and exchanges are integrated with popular public blockchain protocols (i.e Ethereum, Tezos, Hedera Hashgraph, Algorand, etc.) which offer standardized smart contracts formats (i.e. ERC20, ERC1400, Tezos FA1.2, etc.). The selection of certain protocols and smart contract / token standards, may impact the breadth of liquidity venues (i.e. digital asset exchanges) that issuers and investors can access. As private networks generally function as a closed loop and are permissioned, exchange interoperability may be more narrow.

(d) ***Consensus Mechanism and Forking:*** drives practical design and management considerations regarding transaction ordering, network security, predictability of transactions (e.g. block times), and how to manage/anticipate/risk manage upgrades such as hard forks. Certain public networks have embedded the capability to upgrade without the need to hard fork through carefully designed on-chain governance (i.e. architecture that is self-amending and allows for proposing, selecting, testing, and activating protocol upgrades). This means that should there be any failure to proceed for a period, the whole process reverts to the first period, effectively restarting the whole process. In many private networks, on-chain governance is policy-based and uses

various features to facilitate consortium governance and secured decision-making. Such features provide granular access control over each node's authority in the network by defining their respective roles, rights, and privileges, such as for network onboarding and participation, transaction voting and approval prior to consensus, and veto privileges (e.g. for regulators and central banks). Certain consensus mechanisms for block production ensure that only one block is created at any point in time for transaction finality, thus, removing the possibility for forking.

In both public and private networks, in the case forking does happen, securities on the new chain may not be recognised. The treatment of assets post forking especially in public networks has to be agreed in the legal instruments. To avoid tax or legal disagreements, the governing council can have a "trusted node" led by an objective third party to establish the source of truth.

(e) ***Governance***: most public networks typically have a native cryptocurrency and the consensus mechanism is governed by economic incentives. Having an economic incentive is not necessarily a "safer" model, but rather a different approach to governance that tries to solve for a wider permissionless access and allows for scalability and to protect against malicious attacks (i.e double spend) using game theory. In the case of a failure on a public network, stakeholders should have safeguards in place such as keeping "backup copies" off-chain when dealing with regulated activities. Alternatively, stakeholders can agree to introduce a "trusted node" whose function serves to establish the source of truth in the absence of a governing council in public networks and converting the public chain into a more permissioned chain by introducing an additional layer of governance.

In contrast, private permissioned networks rely on traditional legal dis/incentives for governance. Consortiums and/or rule books are typically formed to govern different forms of network failures. The network operator's level of ownership / liability in the case of a failure also varies.

8.3 Smart Contract Design

The selection of smart contract standards is driven by the specific use cases and the fund managers preferences, and the on-chain parameters are determined by the fund manager based on these drivers. Fund Managers can decide between using one single smart contract with all the functionalities required for fund operations or create separate smart contracts for each function. Some common smart contract functionalities for a VCC Fund include redemption, issuance, force recall/redeem. It is also possible to add multiple functions within a single smart contract with specific instructions. If the fund manager chooses to have separate

smart contracts for different corporate actions, InvestaX works with the fund manager to determine the functions and data inputs required for each smart contract.

8.3.1 Public Protocol Selection: Tezos

InvestaX has integrated with Tezos as the public protocol provider for this e-VCC Project, however, InvestaX remains protocol agnostic as the ultimate decision on blockchain protocol will be based on the various considerations which matter to an issuer.

Tezos is a public liquid proof-of-stake network. Liquid proof-of-stake means that participants in the consensus algorithm are chosen to find blocks in proportion to their stake on the network. Tezos provides built-in governance mechanisms to ensure consensus and innovation over the long term to exceed the length necessary for asset life cycles and this governance mechanism is upgraded regularly. Tezos also has a forkless architecture, and allows for proposing, selecting, testing and activating protocol upgrades without a hard fork. Tezos has several standards that make it suitable for e-VCCs or master-feeder fund structures, including FA 1.2 and FA 2 asset standards. The more recent FA 2 standard can enable e-VCC structures with more complex business logic.

8.3.2 Private Protocol Selection: STACS

For the purposes of this e-VCC Project, STACS provided domain knowledge about the operations of a private blockchain protocol. STACS provides an enhanced-Ethereum permissioned blockchain designed with a highly modular architecture, with additional features built directly at the node level to enhance processing capability and optimize enterprise access control. Since STACS utilizes the Solidity programming language for smart contract development, which is interoperable with other Ethereum-based enterprise blockchain protocols, it is able to support the use of well-established and audited ERC standards that are compliant with the industry for asset tokenization.

STACS is interoperable with custody platforms that create asymmetric public-private key pairs with the Elliptic Curve cryptography algorithm [software-based KMS systems and hardware security modules (HSM)]. Integration with banking systems is also possible through HTTP APIs and other traditional payment rails.

As a permissioned protocol, the STACS blockchain is run by industry participants each hosting their own high availability node(s).

09 | Challenges and Recommendations

9.1 Technological Challenges and Recommendations

In order to achieve full automation of the operational processes discussed through this e-VCC Project and to realize the true potential of DLT, there needs to be complete integration between different stakeholders and legacy systems for all activities to be on-chain.

With improved technical integration between systems, it will be possible to embed more functions onto the smart contract. With more capabilities on-chain, fund managers can customize requirements to enhance automation and encourage full scale adoption. On-chain data parameters can also be expanded to support greater functionalities.

Lack of interoperability between industry participants and even protocol providers limits scalability of any blockchain-based product. Not all participants will be adopting DLT solutions immediately due to major changes required in internal processes and operations. Additionally, the industry still lacks clear guidelines from regulators or even leading financial governance bodies to enable data standardization that we see in other publicly traded markets. There also has to be a shift in the traditional mindset of financial institutions and the closed-wall legacy systems architecture that has been built as decentralized finance (DeFi) is fundamentally driven by the fact that it is open source and democratizes investment opportunities.

Moreover, many of the tokenized securities platforms focus on a business-to-consumer model and the industry is very fragmented with multiple platforms providing different value-chain services to the end investor and requiring sign ups on multiple platforms. Platforms such as InvestaX are trying to improve customer experience by being a one-stop solution for all investors, and making the process of issuing and investing digital securities easier.

9.2 Ecosystem Challenges and Recommendations

At present, cash management processes are off-chain due to the use of fiat currency traditionally by the fund management ecosystem. However, with the use of digital currencies such as cryptocurrencies or stablecoins, these activities can happen on-chain.

Similarly, corporate actions such as NAV calculations and reporting are also currently manual as the transfer agent/corporate secretary has to collate data and perform these off-chain. With full integration, NAV can be calculated without manual intervention and updated real-time.

Another challenge for currently listed security tokens is that liquidity continues to remain low as these investments are only just beginning to gain traction and are thinly traded in the absence of market makers. DeFi platforms have begun to develop different liquidity solutions such as

automated market makers (AMM) which have been providing liquidity through swap options. The industry continues to see new innovations to address such challenges.

9.3 Regulatory Challenges and Recommendations

Transitioning to cutting edge technologies has often required stepping up on the regulatory front as well. Some governments and regulators are spearheading the adoption of blockchain native securities by amending or coming out with progressive laws that not only recognise native securities but also DLT based registry and are thus emerging as friendly fund jurisdictions. For this e-VCC Project, the Working Group studied the changes in legal regime brought about by Switzerland, Delaware and Luxembourg to recognise blockchain native securities. A snapshot of the major legal changes that have taken place in these jurisdictions is given below (*See section 9.3.1 below*).

9.3.1 Recognition and Adoption of Native Securities in Select Jurisdictions

I. Switzerland- Swiss DLT Act

Swiss Parliament has adopted the Federal Act on the Adaptation of Federal Law to Developments in Distributed Ledger Technology **("DLT-law")**. One of the central pieces of the DLT-law consists of the creation of a new category of securities called Uncertificated Registered Securities **("URS")** which are essentially ledger-based securities eg. shares or bonds represented on the blockchain. URS is created when entered in an electronic register/securities ledger[5] and the new regime requires the issuer and URS holder to enter into a registration agreement that the securitised right can only be claimed or transferred through a DLT-based electronic register **("Register").** The DLT-law lays out enabling provisions in the Swiss Stock Corporation Law that allows corporations to issue their shares in the form of URS with ability to recognise such share issuance in their articles of association.

II. State of Delaware

Just like Switzerland, Delaware also introduced a series of amendments for the use and recognition of blockchain-native securities and registries. Delaware amended the Delaware General Corporation Law (**DGCL**) in 2017, the Delaware Limited Liability Company Act **(DLLCA**), the Delaware Limited Partnership Act **(DLPA)** and the Delaware Statutory Trust Act **(DSTA)** (collectively, **"Delaware Amendments"**) in 2018, to use networks of electronic databases, such as blockchain and distributed ledgers, for the creation and maintenance of entity records and for certain electronic transmissions. The Delaware Amendments refer to these blockchain-based distributed ledgers as "Electronic Networks." Delaware law views an Electronic Network as a traditional

[5] Art. 973d (2) CO

uncertificated ownership record—akin to when a company forgoes stock certificates and instead represents equity in an electronic ledger or dematerialised form. Changes were made in the DLLCA, DLPA and DSTA to expressly authorize the use of such electronic databases (including DLT) to facilitate voting by members, partners or beneficial owners, in each case so long as the organization documents do not otherwise restrict, and to maintain their books and records on such electronic databases.

III. Luxembourg

Bill 7637 **("Blockchain II Act 2021")** was approved by the Luxembourg Parliament on January 21, 2021. The Blockchain II Act 2021 amended the existing (i) the Luxembourg Dematerialised Securities Act 2013 and (ii) the Luxembourg Act dated April 5, 1993 on the financial sector. These amendments clarified that central account keepers or settlement organisations may use private or public DLTs to maintain such records. Operating in a DLT set-up, the central account keeper or settlement organisation will operate a wallet (in the form of a DLT or blockchain address) to record dematerialised securities that will be settled like native tokens. As such, a dematerialised security may exist entirely in a DLT environment as a native token that can also be settled in a full-fledged DLT environment.

9.3.2 Analysis of Current Regulatory Regime in Singapore and Regulatory Recommendations

For the purposes of this e-VCC Project, the Working Group looked at the following prevailing Singapore legislations, principally, the Companies Act ("CA"), the Variable Capital Companies Act ("VCCA"), the Electronic Transactions Act ("ETA"), the Securities and Futures Act ("SFA") and certain other rules and regulations governing securities and central depository, and concluded that there is nothing explicit in the existing regulations prohibiting blockchain native security tokens. However, enabling provisions which specifically cover the use of DLT to issue native securities, maintain digital records of such securities, and be treated as book entry securities which do not require any transfer instrument in the event of transfer, would provide the regulatory certainty needed for Singapore to empower the e-VCC framework.

I. Companies Act and Variable Capital Companies Act

A. Companies Act (CA): The CA is the main legislation governing business formation, company structure, shareholder rights and other requirements related to corporate entities. Currently, the CA does not provide for dematerialised securities and requires each company in Singapore to issue physical share certificates to shareholders within 30 days for transfer of shares, and within 60 days for new allotment of shares. Evidence

of title or ownership include a physical certificate with an official seal of the company or the electronic register of members maintained by ACRA.

Taking inspiration from Delaware and Swiss amendments, it would be a helpful measure to have an enabling provision in the CA or VCCA which allows corporations, more specifically a VCC, to issue shares on the blockchain and maintain records/registers of such shares on DLT.

B. Variable Capital Companies Act (VCCA)

The term "share"[6] is defined under VCCA to mean a "unit in a collective investment scheme that is part of the VCC, and includes a share taken by a subscriber to the constitution of a VCC, whether or not it is such a unit". The current definition of "share" in the VCCA does not expressly provide as to how a share can be represented. For regulatory clarity, VCCA should provide explicit recognition that VCC shares can be represented on blockchain or DLT.

The Working Group is of the opinion that the VCCA does not generally conflict with the concept of native security tokens. In fact, VCCA lends itself well to the issuance of native securities because, unlike a private limited company governed by the CA where physical certificates are mandatory, there is no need for the register of members or register of shareholders to be maintained with ACRA and available for public inspection. Having said that, we believe that the VCC constitution would need to be amended to provide that no physical register would be created and no physical share certificates will be issued, but that the register of members would be maintained on DLT, and that title to native securities will be evidenced by the digital register of members maintained on the blockchain.

The provision in VCCA[7] which requires a proper instrument of transfer to be delivered to the VCC in respect of any transfer of shares may need to be amended for an e-VCC. The blockchain native shares should be treated more or less like book entry securities (as described below) and scripless trading and transfer of such shares should be allowed.

Blockchain native securities are, in conventional terminology, 'book-entry securities' whose ownership is recorded electronically. In Singapore, the book-entry securities / shares currently envisaged under Section 81SF of the SFA and related legislation are

[6] Section 2(1) of the VCCA

[7] Section 40(3) of the VCCA (which cross-references to Sections 130AA – AD of the CA)

shares of a Singapore company that meet the following conditions (collectively, "**DLT Book-entry Securities**"):

1. the shares are listed on the Singapore Exchange Securities Trading Limited (SGX-ST);

2. the share certificates are deposited with The Central Depository (Pte) Limited (Central Depository), the clearing house of SGX-ST; and

3. the shares are transferable by way of book entry in the Depository Register maintained by the Central Depository, and not by way of an instrument of transfer.

The Central Depository System holds and transfers book-entry securities and only persons who have an account directly with the Central Depository (or a sub-account with a depository agent) can deposit book-entry securities with the Central Depository.

The launch of the e-VCC in Singapore and recognition of blockchain native securities would require the concept of book entry securities to be expanded with a similar set of requirements to those listed above, albeit adjusted appropriately to the use case of the e-VCC as a tokenized fund. The proposed changes to the definition under suggested conditions are set out below:

1. the native shares are 'listed' on a licensed digital securities exchange (e.g. InvestaX);

2. native shares are transferable by way of book entry on the register of members maintained on the blockchain; and

3. the digital securities exchange provides ACRA with real time access to the register of members on demand.

We envisage the following enabling provisions to be added to the VCCA to allow for recognition of blockchain native securities including transfer/trading of such securities:

1. Definition of share in VCCA to be amended to provide for explicit recognition of the shares issued on blockchain or other electronic networks including DLT;
2. No transfer instrument required for transferring of VCC shares which means there needs to be an explicit provision in the VCCA that blockchain native shares of a VCC would be treated as book entry securities;
3. Section 81 of VCCA expanded to include that the register of members can be kept on DLT.

II. Securities and Futures Act, Securities and Futures (Central Depository System) Regulations 2015, and the CDP Depository Rules.

A. Securities Futures Act (SFA): SFA is the main legislation governing regulation of activities and institutions in the securities industry. The definition of book entry securities in the public markets in Singapore supports a two-tier approach where the physical certificates are to be immobilised with the depository or its nominee and then securities are transferred and recorded by book entry mechanism.

The definition of securities in the SFA[8] may need to be further clarified to specifically include blockchain native shares similar to how Switzerland has included URS in the definition of securities in Financial Services Act[9].

Additionally, regulatory changes to the advertising restrictions in SFA for exempt offerings (i.e. private placement, qualified accredited investors and institutional investors, small offerings) would further facilitate the intended goal of wider access and distribution enabled by blockchain offerings and other forms of offerings intended to democratize access to financial services. Currently, the SFA requires all potential investors to be verified accredited investors before they are even able to view offerings on digital platforms. In order to create a vibrant digital financial ecosystem, Singapore can look to other progressive jurisdictions which allow investors to self declare their accredited/institutional status without having to undergo a full verification. A similar approach may be taken here in Singapore primarily for purposes of parity and ensuring that Singapore stays competitive with our global peers.

Furthermore, the definition of Eligible Securities[10] in the CDP rules may also be

[8] "securities" means —
(a) shares, units in a business trust or any instrument conferring or representing a legal or beneficial ownership interest in a corporation, partnership or limited liability partnership;
(b) debentures; or
(c) any other product or class of products as may be prescribed,

[9] Art. 3 securities are standardised certificated and uncertificated securities, derivatives and intermediated securities, which are suitable for mass trading;

[10] Rule 4.2 Eligible Securities shall comprise of securities which meet the following criteria:
4.2.1 being of good delivery and where applicable, accompanied by duly executed and properly stamped instruments of transfer in favour of the Depository or its nominee;
4.2.2 capable of being held on a fungible basis;
4.2.3 are not subject to any restrictions on foreign ownership, unless otherwise agreed to by the Depository; and
4.2.4 are not subject to any restrictions on transferability in a book-entry system, unless otherwise agreed to by the Depository.

expanded to include and better fit the requirements of digitally native securities which will not necessarily need any instrument to be executed in favour of the depository or it's nominee.

III. **Electronic Transaction Act (ETA):** The ETA appears to be drafted in a technology neutral manner and focuses on functional equivalence which would likely facilitate the adoption of native securities, for instance, Section 6 of the ETA provides that information will not be denied legal effect, validity or enforceability solely on the ground that it is in the form of an electronic record (i.e. a record generated, communicated, received or stored by electronic means in an information system or for transmission from one information system to another). In view of this provision itself, the ETA is unlikely to prevent blockchain records from reflecting the members' shareholding in a VCC or otherwise serving as evidence of the title of the member to the shares. Nevertheless, it would help to clarify the current language of certain provisions in the ETA so that it takes into account or fits better with characteristics of DLT and native securities.

IV. **Accounting Corporate Regulatory Authority (ACRA):** Currently the VCCA provides that incorporation and registration of a VCC is to be carried out by a Registered Qualified Individual **("RQI")** who is registered with ACRA. This entire offline process of incorporating a VCC makes it paper intensive, slow and error prone. In an e-VCC enabled environment, VCC's could be incorporated by the sponsors of the VCC on their own without having to go through a RQI. This can be made possible if ACRA/Bizfile+ is an open platform which could be accessed by everyone and not just a RQI, eliminating the need to go through an intermediary to incorporate a VCC. Secondly, if ACRA has an open API which could be plugged into platforms like InvestaX, there could be seamless flow of information particularly in respect of different registers that a VCC is required to maintain and more importantly the register of members which will be on the blockchain.

10 | Tax and Stamp Duty Considerations for Blockchain Native Securities of an e-VCC

The wider use of DLT is posing challenges for regulators in different areas including tax policy and administration. Singapore's Inland Revenue Authority of Singapore ("IRAS") has taken a lead and issued certain circulars and guidance on the topic. As a part of the e-VCC Project, the Working Group examined the tax implications of blockchain native VCC fund shares, including an assessment of "Income Tax Treatment of Digital Tokens" issued by IRAS on 9th October 2020 **("Digital Tokens Circular")** and "Income Tax Treatment of Hybrid Instruments (Second Edition)" issued on 21 October 2019 **(the "Hybrid Instruments Circular")**. The Singapore tax assessment below is based on the determination that blockchain-native securities represent shares/equity in an e-VCC as it represents interests in a closed-ended VCC which provides for capital contribution in exchange for capital gains/losses and dividend returns.

10.1 Singapore Income Tax Considerations

Tax implications for an investor holding blockchain native securities characterised as equity may arise at three stages of a e-VCC fund lifecycle (i) upon subscription; (ii) investment holding period; and (iii) disposal of the blockchain native securities.

(i) Subscription of e-VCC shares

The subscription of blockchain native securities will not be subject to any income tax implications to investors.

(ii) Holding of blockchain native securities

Dividends paid to investors by a Singapore tax resident e-VCC fund should not be subject to tax in Singapore. There is also no Singapore withholding tax on dividends paid to non-residents.

(iii) Disposal of blockchain native securities

Whether the disposal of blockchain native securities gives rise to any capital gains for the investors, the taxability of the gains will depend on the investors' particular situations: (i) legal form of an investor; or (ii) whether an investor is Singapore tax resident or non-resident investor. General tax implications for investors constituted in the form of companies and individuals are mentioned below.

A. **Singapore tax resident companies:** In principle, Singapore tax is only imposed on income and there is no tax on capital gains. Only if gains are determined to be income in nature, gains derived on disposal of blockchain native securities are subject to tax in Singapore at the prevailing corporate tax rate of 17%, unless they qualify for concessionary tax rate or tax exemption.

B. **Singapore tax resident individuals:** Generally, profits derived from buying and selling of shares (i.e. e-VCC shares) or other financial instruments are considered as capital gains and hence not taxable.However, if a Singapore tax resident individual is seen to be carrying on a trade in investments, the gains derived will be subject to tax at the progressive individual tax rates of up to 22%.
C. **Non-Singapore tax resident companies and individuals:** There are no Singapore tax consequences if the disposal gains are not derived in connection with a trade or business carried on in Singapore or are not sourced in Singapore.

10.2 Stamp Duty Considerations and Recommendations

Stamp duty is a tax on instruments. Stamp Duty implications on blockchain native securities were also analysed during this project. Pursuant to Article 3(c) of the First Schedule of Stamp Duties Act (**SDA**), instruments that effect the conveyance, assignment or transfer on sale of any stock or shares or any interest thereof is chargeable with a stamp duty. Where ownership of the blockchain native securities are characterised as an interest shares/equity in an e-VCC, Article 3(c) can apply to such securities. However, the initial subscription of blockchain native securities in the e-VCC fund will not be subject to stamp duty in Singapore as it does not constitute a conveyance, assignment or transfer.

Two amendments to the SDA were passed in 2018 which have significant impact on the application of stamp duty for an e-VCC. The first amendment specifically brought the VCC under the purview of the SDA so that any transfers of stock or shares in or any interests thereof in a VCC would be subject to stamp duty. The second amendment, which took effect from 4 October 2018, widened the scope of the SDA to include electronic instruments that effect transactions in chargeable assets, and accordingly, stamp duty will apply to the conveyance, assignment or transfer or sale of blockchain native securities under the “electronic instrument rules” of the SDA. Prior to 4 October 2018, only written documents were subject to stamp duty.

To promote trading of blockchain native e-VCC fund shares on digital platforms and exchanges like InvestaX, we recommend IRAS to consider following two potential approaches:

1. **Provide specific exemption:** In order to avoid stamp duty implication for transfer of securities listed on the Singapore Exchange and promote the development of the capital markets, a specific exemption from stamp duty was granted for transfers through the CDP based on the principle that a scripless book entry system doesn't require any instrument of transfer.[11] The same principle should be applied to any transfer of blockchain native shares whereby securities are transferred on the blockchain without the need to execute any instrument of transfer.

2. **Introduce specific remission**: Introduce specific stamp duty remission for trading of blockchain native securities on platforms like InvestaX on the basis that this is in line with the broader government's objective of promoting the development of Fintech and use cases in the asset and wealth management industry. Similar remission orders have been passed by the government earlier to promote certain financial transactions (e.g. securities lending and borrowing) or development of certain economic activity (e.g. shipping investment enterprise).

10.3 Conclusion

Our regulatory analysis indicates that it is legal to issue blockchain-native e-VCC shares under the current regulatory regime in Singapore. Such blockchain native securities would come under the purview of digital tokens that constitute capital market products/shares/units in a CIS and would thus be regulated under SFA.

Although exchanges like InvestaX have the technical capabilities to provide liquidity and support trading of blockchain-native securities, liquidity and trading volume on such platforms remain low primarily due to certain regulatory and tax challenges, as discussed above. In order to realise the full potential of the e-VCC vehicle, progressive changes in laws will have to be considered. The amendments to Singapore legislation does not need to be wide-reaching. The key concepts that would need to be adopted include:

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[11] Under the Stamp Duties (Exempt Record) Rules 2018 in effect from 4 October 2018, any entry made by the Depository (defined below) in its Depository Register (defined below) by electronic means that effect a transfer of book-entry securities (defined below) between depositors is an exempt record.Under section 81SF of the Securities and Futures Act (Cap. 289):

> "book-entry securities", in relation to the Depository, means securities
> (a) the documents evidencing title to which are deposited by a depositor with the Depository and are registered in the name of the Depository or its nominee; and
> (b) which are transferable by way of book-entry in the Depository Register and not by way of an instrument of transfer.
>
> "Depository" means The Central Depository (Pte) Limited ("CDP") or any other corporation approved by the Authority as a depository company or corporation, which operates the Central Depository System for the holding and transfer of book-entry securities.
>
> "Depository Register" means a register maintained by the Depository in respect of book-entry securities.

- Extension of book-entry securities that satisfy the definition of DLT Book-entry Securities mentioned above, together with confirmation that transfers of such DLT Book-entry Securities are outside the scope of stamp duty (as there is no instrument of transfer to stamp);
- Confirmation that digital securities of a VCC are no different from conventional VCC securities from a Singapore regulatory perspective;
- Powers of attorney entered into in connection with a subscription for shares in an e-VCC to be included within the scope of the ETA (powers of attorney are currently expressly excluded from the ETA, meaning that they can only be created through wet ink signatures, which is impractical for an entirely digitized fund).

11 | Project Outcomes and Findings

11.1 Implications on the Roles of Industry Market Participants

With a blockchain-native issuance for the funds management industry, the role of market participants would change as follows:

Stakeholders	Changes in role, if any
Fund Manager	There is no fundamental change in the role of the issuer or Fund Manager. Depending on the risk-appetite of the Fund Manager and the type of underlying asset, the issuer decides on the type of protocol for issuance.
Fund Administrator	Automatic reporting & dissemination of data amongst key stakeholders real-time, increasing transparency and security of data for market authorities Auto-execution of smart contracts, simplification of servicing and lifecycle management of security tokens, and streamline of processes such as maintenance of ownership registry & cash balances
InvestaX - Digital Securities Platform	The tokenization platform will be a new entrant in the fund management value chain. It will be responsible for the following key functions (which varies based on the platform's capabilities): - Fund distribution to wider network via platform - Investor onboarding to access fund listings

	- Issuer i.e. e-VCC Fund onboarding on InvestaX along with different funds and sub-funds - Reviewing and authorizing the e-VCC and blockchain protocol parameters - Development of e-VCC compliant smart contracts - Issuing tokens to investors on behalf of the Fund Manager to represent fund interests - Data management - OTC trading of e-VCC tokens - Secondary market trading of e-VCC Fund tokens
Digital Asset Custodians (DACs)	Traditional custodians are replaced by DAC who can provide custody for digital assets. DAC holds the private keys for investor wallets, ensuring tokens are held in segregated wallets, responsible for asset servicing, minimizing transaction costs, increasing operational efficiencies by facilitating transfer of securities when trades are executed and managing holdings information.
Settlement Bank/Cash Custodian	Traditionally for the delivery v. payment obligation, the payment leg was managed by settlement banks or custodians. There have been use cases where digital tokens are being used to cover the payment obligations. Once CBDC is recognised as a legal tender there is possibility of payment settlement also being done on blockchain. For this PoC, we have assumed that the payment side operates in the traditional way with the cash settlement being done by a recognised settlement bank.
Investors	Investors stand to benefit the most from the reduction in costs, accessibility to new investment opportunities and availability of secondary trading.
Register of Members	The key functions executed by the transfer agent today (e.g., record keeping of ownership of fund interests) will be executed on the chosen blockchain network once the VCC structure can be tokenized. However, the Working Group observes that the legal responsibility for the typical functions executed by the transfer agent will still need to remain with an appointed transfer agent recognised by a legal contract between the Fund Manager and the transfer agent.
Broker-Dealers	Will make-markets and provide liquidity, price setting,

	and risk management.
Central Securities Depository (CSDs)	With the ledger being maintained at the protocol level, the function of a depository may be reduced in the e-VCC world. But to provide for operational governance, coordination and evolution of the ledger protocols, managing the introduction or cancellation of tokens on the ledger, regulator interface, and so on, the requirement for a central authority to ensure operational governance and smooth functioning of the market cannot be ruled out. Currently, due to lack of interoperability between protocols, this function is minimal and can be overtaken by platforms like InvestaX.
Central Counterparty Clearing Houses (CCPs)	In a near real-time asset transaction settled for cash, there is no longer a need to clear the transaction centrally (as both sides have pre-trade transparency that their counterpart will be able to meet the terms of the transaction, and settlement happens almost instantly).

12 | Future Phases and Commercialization

While the scope of this e-VCC Project was primarily focused on the tokenization of the VCC from a primary issuance perspective, one of the key benefits of tokenization is to enable secondary market trading, and further investigation needs to be conducted on how the e-VCC Fund tokens will be traded on the secondary market. The focus will be on creating liquidity and market-making in the secondary market. InvestaX also continues to work towards expanding partnerships with key infrastructure providers and distribution platforms to facilitate greater interoperability and multiple listings across different platforms within the digital securities ecosystem.

With the findings developed in this project, as a next step, InvestaX will be simulating this e-VCC Fund in a controlled environment on the chosen public and private blockchain networks. As a next step towards commercialisation, InvestaX aims to launch live e-VCC Funds in compliance with existing regulatory parameters, to further revolutionize the funds management industry in Singapore.

A separate feasibility study can also be conducted to further explore different stages in the end-to-end lifecycle management of the e-VCC Fund. This includes adoption of digitally-native currencies to facilitate on-chain cash management, bringing various other corporate actions, NAV calculations and reporting on-chain, and also facilitating cross border transactions for deals which are listed across different exchanges globally.

One of the greatest potential benefits of DLT is fractionalization of share ownership. For investments that traditionally have large upfront capital requirements, tokenization lowers the barriers to entry for investments by enabling interests to be more readily divided across a wider pool of investors, democratizing access to investment opportunities. Tokenization of VCC Fund shares creates future opportunities for substantially broader participation in alternative asset classes with increased flexibility in terms of minimum investment amounts and improved liquidity. Although retail access was not a focus of this e-VCC project, this is another area in which further exploration can be considered.

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14 | Glossary of Acronyms

ACRA	Accounting and Corporate Regulatory Authority
AML	Anti-money Laundering
AMM	Automated Market Maker
API	Application Programming Interface
CBDC	Central Bank Digital Currencies
CMSL	Capital Markets Services License
CSD	Central Securities Depository
DAC	Digital Asset Custodian
DeFi	Decentralized Finance
DLT	Distributed Ledger Technology
IRAS	Inland Revenue Authority of Singapore
KYC	Know Your Customer
MAS	Monetary Authority of Singapore
NAV	Net Asset Value
PoC	Proof of Concept
RMO	Regulated Market Operator
URS	Uncertificated Registered Securities
VCC	Variable Capital Company

15 | Acknowledgements: Project Participants

15.1 InvestaX (Project Sponsor)

Name	Role	Organization
Alice Chen	General Counsel and Co-founder	InvestaX
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15.2 UBS (Fund Manager)

Name	Role	Organization
Andrew Wong	Director, APAC Strategy	UBS
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15.3 State Street (Fund Administrator)

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Joe Ferdi-Irawan	Vice President – Client Service, Fund Administration Specialist	State Street Bank and Trust Company

15.4 PwC Singapore (VCC Regulatory and Tax Adviser)

Name	Role	Organisation
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15.5 CMS (Legal Adviser)

Name	Role	Organisation
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John Finnemore	Partner, Corporate	CMS London
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15.6 Tezos (Public Protocol Provider)

Name	Role	Organisation
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Katherine Ng	Head of Marketing	TZ APAC
Julian Low	North Asia Business Development Director	TZ APAC
Jacob Pouncey	Research & Adoption Manager	TZ APAC
Daniel Oon	Project Lead	TZ APAC

15.7 STACS (Private Protocol Provider)

Name	Role	Organisation
Jin Ser	Solutions Architect Director	STACS
Henry Ng	Technical Solutions Consultant	STACS
Nigel Lam	Senior Manager, Product & Strategic Partnerships	STACS
Chong Xin Yong	Senior Manager, Business Analyst	STACS

About InvestaX

IC SG Pte Ltd (dba InvestaX) is a Singapore-licensed digital securities investment and trading platform that focuses on private market investments. InvestaX provides end-to-end services for digital securities, from tokenization technology to facilitating primary issuance to fund structuring and lifecycle management of tokens to secondary market trading and liquidity on one platform. At present, InvestaX holds a Capital Markets Services license to deal in securities, and is an Exempt Financial Advisor to provide advice on collective investment schemes (pooled investments), as well as an exempt Recognised Market Operator in the MAS sandbox to operate a digital securities trading platform. To date, the company has issued more than 28 private equity offerings that are jointly valued over US$1 billion with 14 successful exits.

About UBS

UBS provides financial advice and solutions to wealthy, institutional and corporate clients worldwide, as well as private clients in Switzerland. UBS's strategy is centered on our leading global wealth management business and our premier universal bank in Switzerland, enhanced by Asset Management and the Investment Bank. The bank focuses on businesses that have a strong competitive position in their targeted markets, are capital efficient, and have an attractive long-term structural growth or profitability outlook.

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About State Street

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CMS is a global law firm with 77 offices across 43 countries world-wide. 4,800 CMS lawyers offer business-focused advice tailored to our clients' needs, whether in their local market or across multiple jurisdictions. Our Singapore funds team is recognised as a Leading Firm for Investment Funds by Chambers and Legal 500, the two leading law firm directories. The same publications also recognise CMS Singapore as a Leading Firm in the Technology sector.

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