

Interoperability Considerations for Digital Financial Assets

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May 2021

Abstract

In global capital markets, much of the current blockchain/ DLT interoperability discussion centers around layer 1 technology and is focused around various flavors [public vs private markets; permissioned vs permissionless; proof of work vs proof of stake]. We would like to introduce a broader set of interoperability considerations that provide a framework for Financial Institutions [FIs] as they contemplate their foray into digital assets. Key to any interoperability discussion in Digital Assets, we believe, is the notion of Asset Transparency and Asset Interoperability rather than a focus DLT interoperability at a mainly technical level. Asset Transparency — or a common understanding of the component building blocks [i.e., underlying products] is a precursor, we believe, to achieving Digital Asset interoperability, for instance, through the use of Smart Contracts based on standards such as ERC20.

Interoperability — what for?

In 2025 — 2027, approximately USD 24TN of financial assets are expected to be tokenized — as Digital Financial Assets [DFA] with roughly 10% of global GDP being stored and or transacted on blockchain/ DLT up from about 1.3% in 2021¹. The implied DFA growth is impressive, in particular in the context of the still evolving nature of the blockchain/ DLT industry which has neither undergone consolidation i.e., converged towards a dominant industry standard nor has a meaningful number of players dropped out of the market. Accordingly, the ability to exchange a sizeable portion of global GDP across various flavors of blockchain/ DLT is an important requirement to ensure the proper working of global capital markets.

The notion of interoperability stipulates that there is a need and or desire to 1. use products within and across

Special thanks to Lee Pickavance, Joël Glässer, Alessandro Spadoni and Benjamin Nadareski for feedback and review.

1. As reported in the Larazon, institutions such as World Economic Forum, Deloitte or McKinsey anticipate that up to 10% of the world's Gross Domestic Products [GDP] will be managed through blockchain technology in 2025–2027. Fiona Banking, The Era of Tokenization — Market Outlook on a \$24TRN Business Opportunity. Medium 2018

numerous domains or entities; and or 2. to move a product or more abstractly value from one entity/ domain to another domain or entity. This requires a product or more abstractly value to be seamlessly ‘understood’ across domains or entities — i.e., we can listen to [digital] music via a streaming service on multiple platforms without diminished functionality of the product or impacting its value. In this context, platform choice is more about a user’s revealed preferences for a particular experience, like particular features of a platform or a specific User Interface [UI].

A key mechanism for making products available across multiple platforms and in multiple environments is conversion and packaging [using different ‘carriers’] of an underlying abstract product — music that can be used in the form of an analog vinyl record or through a digital streaming service.

Whilst there are differences between financial products and non-financial products, we surmise that there are more similarities than one might first assume. For example, exposure to an investment opportunity — the pharmaceutical industry — can be through a basket of securities that comprise equity, fixed income and any number of synthetic structures that are wrapped in the form of an ETF, ETN, a fund or a derivative structure. As with music, the ability to convert and package financial exposure is a key feature of global financial markets.

In summary, with tokenization the cost of manufacturing new products is close to zero — the real value of the product is only realized through transparency and transferability, which underpins liquidity.

Flavors of interoperability

We can differentiate between functional and technical interoperability. In functional interoperability, services can work together because they exist on the same platform within and across financial institutions. In technical interoperability [i.e., protocol layer] two or more different platforms can work together within and or across financial institutions².

However, as centralized financial institutions maintain their own ledger, one financial service may not be interoperable with another and moving financial products or capital between two or more financial institutions may become costly and cumbersome.

In addition, Financial Digital Asset interoperability is impacted by two major transformations that affect global financial markets; namely:

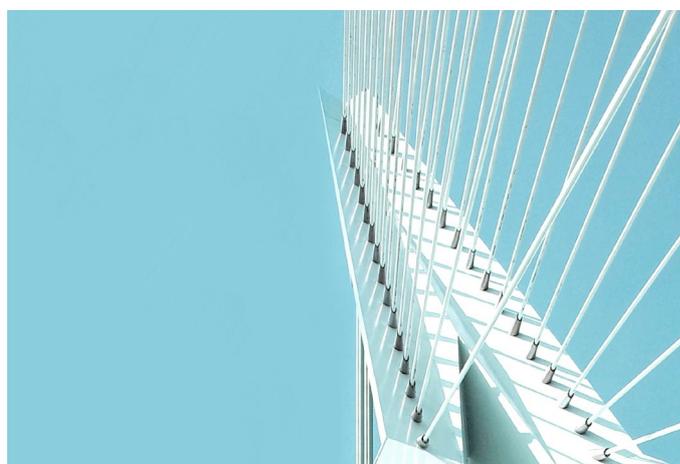
1. Financialization

The process of creating financial instruments and representation of financial assets from underlying non-financial products such as commodities which can be used for risk mitigation or speculative purposes and more recently, the tokenization of ‘Art’ via Non Fungible Tokens [NFT].

2. Digital transformation of financial markets

End to end fully automated digital securities life cycle management.

The original form³ — analog or native digital — of a financial product is a key determinant in how effective a product [i.e., a corporate bond] can be used on and across different platforms i.e., a native Digital Asset versus an existing [digital] financial security. Accordingly, at this stage it is worth defining the exact nature of a financial product and analyze its component parts.



2. Schaer, Fabian: ‘Decentralized Finance: On Blockchain- and Smart Contract-Based Financial Markets’, Economic Research, Federal Bank of St Louis, 2021

3. We use analog to mean an existing financial product which is most likely represented in a digital format but is distinct in that it was initially created as a Non Native Digital Asset [NNDA]

Financial product definition

Any financial product can be defined in terms of five components that can be combined in several different ways to allow the manufacturing of bespoke products, meet local regulatory requirements or cater to the requirements of different constituent user groups.

1. Underlying Basket of Financial Instruments/ Assets:

the key component of any financial product is a single instrument or a basket of underlying instruments that can both be static or adjusted dynamically in line with certain criteria and metrics.

2. Pricing Tool and Payoff Schedule [PTPS]:

a mechanism determining the value of an asset based on current market prices [marked to market] and/ or a predefined valuation formula. A payoff schedule determine how value is distributed over time which in turn is reflected in the value of the instrument or asset over time. A more 'modern' version of PTPS is implemented via 'Smart Contracts' in various DEFI structures and in particular Automated Market Makers [AMMs] that define the incentive structures of liquidity pools and thus play a crucial role in driving liquidity to these pools.

3. Legal Wrapper:

part of the packaging of a financial product to account for different regulatory and jurisdictional requirements plus the idiosyncrasies of different instrument structures [i.e., bond vs equity] to distribute the 'same' core product across a number of different countries or provide variations of the 'same' core product to different end user groups i.e., retail versus professional investors.

4. Tax Structure/ local Booking Model or Legal Entity Structures:

determine where and accordingly how financial assets need to be treated from a tax and regulatory perspective.

5. Process/ Technical Layer aka 'The Carrier or Transport Layer':

in the context of DLT and STP, the ability to process financial products/ assets in a fully

automated manner is crucial. In particular, the notion of a Smart Contract that embeds all business logic and points to all the relevant information pertinent to the underlying financial asset is of paramount importance and allows for automatic execution of product processing logic — i.e., corporate actions and dividend processing, collateral eligibility of baskets of underlying financial products, the monitoring of financial products i.e., Shari'a compliance or ESG and/ or Green criteria throughout the lifecycle of a financial product.

Based on the above definition, interoperability can be understood to take place in a number of different ways and at different points in time or at the component part level of a product. For example, a basket of securities with exposure to the top global 15 pharmaceutical companies [revenue weighted] can be packaged up as different investment propositions [i.e., fund, ETF].

However, the effective functioning of financial markets depends not only on interoperability or a common understanding of what constitutes a product but also a number of additional factors. We would like to highlight three that, we believe, matter most in this context:

1. Liquidity

Sufficient level 1 and level 2 order book depth to allow FIs to execute trades without moving the market; and

2. Transparency

Low levels of information asymmetries between different constituents of the market across different products i.e., high daily average volume often resulting in a tight bid/ask spread; and

3. Transferability

Transferability of value in a cost effective and efficient exchange and or market structure mechanism to transfer ownership of an asset.

The efficient exchange of DA needs to be viewed in a broader context [efficient market structure] and thus highlights the fact that we may well end up with an outcome whereby we have achieved DA interoperability but are unable to transact in an effective manner [i.e., only meet Transparency factor].

In the next section, we therefore explore different scenarios to better understand in what context and under what conditions DA interoperability matters most.

Interoperability — when does it matter?

Any view about the requirements for DA interoperability is significantly dependent on the status of the ecosystem in which DAs exist. Specifically, we can distinguish between two main scenarios:

1. Native DA [excluding crypto currencies] environment, where global Capital Markets [CM] collectively face a ‘Cold Start’ problem [i.e., an initial lack of DA, DA infrastructure and DA liquidity to ignite and support the effective functioning of a DA market].

In such an environment, it is conceivable that a material number of major CM participants — together with a Digital Market Infrastructure [DMI] provider — collectively address the issue to avoid a suboptimal outcome i.e., a prisoners’ dilemma whereby individual firms try to solve [really compete to solve] an ecosystem problem [that by definition can only be solved via a holistic approach] rather than being cooperative with others that face the same issue. Under such a cooperative scenario, there may be relatively little requirement for Asset interoperability given that common standards for DA creation and hence asset transparency have been put in place by a group of foresightful FIs. This scenario may further benefit from a clean break with the past or the setting up of a new parallel ecosystem specifically designed for Native Digital Assets [that is poised to convergence with existing ‘analog’ financial markets over time] to avoid initial Day 1 legacy and backward compatibility issues.

Whilst this may be ideal; we believe a more credible scenario — based on the existing status of global capital markets — is the medium term co-existence of existing Analog and Native Digital Financial Assets and their respective marketplaces.

2. Analog/ Digital Mix where analog and native financial DA coexist over time; this scenario reflects a typical S-Curve adoption model we believe also applies for native Financial Digital Assets that may eventually replace conventional [analog] financial products

over time. Under this second scenario, the ability to interoperate across different rails is important for the effective functioning of global CM. A sufficient level of interoperability may be achieved simply by focusing on the Carrier/ Transport Layer, that is, the packaging of underlying assets into different products without reconfiguring the underlying basket of financial instruments. This is akin to listening to music through vinyl or a high-resolution digital streaming service.

Furthermore, in both of the above scenarios the presence of one or more incompatible or only partially compatible DLT environments at any point adds further complexity. However, given the nature of the Cold Start problem that all participants face under scenario one, we postulate that it is likely that the constituents coalesce around a single flavor of DLT. Conversely, under scenario two, we assume that there will be several [potentially incompatible] flavors of DLT that co-exist at any time. Solving for DA interoperability under scenario two may therefore benefit from a common approach to DA creation to minimize the flavors of DA being created and henceforth keep the required translation between analog/ digital to a minimum.

Conclusions

Whilst the Digital Transformation of global CM is well under way and DLT has started to establish a strong foothold across the industry, a lot of pieces still need to fall into the proverbial place.

However, we believe, that Financial Digital Asset interoperability is poised to benefit from two broad efforts: 1. innovative technical solutions that stem from some of the latest efforts in the DLT space [i.e., layer 2 solutions, applications and protocols that for example run off the Ethereum Mainnet to further increase efficiencies and make use of Oracles to access and interact across a wide network of existing solutions], and; 2. from a functional interoperability perspective, the emergence of industry wide efforts to deal with standards [i.e., via the Global Blockchain Business Council, the World Economic Forum [WEF], the InterWork Alliance or the Enterprise Ethereum Alliance] and thus will pave the way for the emergence of a global Financial Digital Asset ecosystem including a set of interoperability solutions at the financial product and asset level.

Furthermore, we believe that solving an industry problem [including the adoption of Financial Digital Assets] benefits from a collective approach, led by a group of likeminded and motivated pioneers [to form a minimum viable ecosystem] that want to shape the future, can create positive externalities for global

Capital Markets. This still requires the creation of a suitable governance structure with appropriate incentive mechanisms to promote adoption. Thus, allowing us collectively to make a big impact and realize our grand ambitions through a set of small, no regret steps.

About the author



Peter T. Golder joined SDX in June 2020 and serves as its Global Head of Commercial. He has over 25 years of capital markets and investment banking experience as a senior executive, founder and investor. Prior to SDX, Peter held executive

leadership positions at Deutsche Bank/ Dar Al Istithmar [DB's award-winning Islamic structuring boutique], Euroclear, Booz & Company, Prosdocimi and was the founder of Addaura and 776 Capital. Peter has been an adviser to venture capital/ private equity firms and numerous award winning financial services distributed ledger solution providers and crypto startups.

About SIX and SIX Digital Exchange

SIX is a major financial market infrastructure (FMI) provider that operates exchanges and centralised securities depositories [CSD] in Switzerland and, via the acquisition of the BME in 2020, also in Spain. SIX runs the payments system in Switzerland and operates payment infrastructure on behalf of the Swiss National Bank. SIX also manages a financial information business focused on providing data products and services to financial institutions globally.

SIX is building new digital market infrastructure in its fully owned subsidiary SIX Digital Exchange [SDX].

SDX plans to offer issuance, listing, trading, settlement, servicing, and custody of digital assets with streamlining and automation of asset servicing and post-trade processing. SDX is also a global leader in the development of central bank digital currency (CBDC) via its partnership with the Swiss National Bank and the Bank for International Settlements. SDX has partnered with SBI Digital Asset Holdings from Japan to set up a similar digital market infrastructure offering in Singapore.



SDX Vision

A trusted global integrated institutional liquidity network and ecosystem for the issuance, trading & settlement, transfer, custody of digital assets in both public and private markets as well as regulated digital securities and crypto assets underpinned by a data collection and distribution layer advanced analytics capabilities.