



# DIGITAL ASSETS: NON-FUNGIBLE TOKENS

Financial services use  
cases and regulatory  
considerations

April 2023

**Authors:**

Charles Kerrigan and Fiona Henderson, CMS Cameron McKenna Nabarro Olswang LLP

[charles.kerrigan@cms-cmno.com](mailto:charles.kerrigan@cms-cmno.com) and [fiona.henderson@cms-cmno.com](mailto:fiona.henderson@cms-cmno.com)

[Charles Kerrigan | LinkedIn](#) and [Fiona Henderson | LinkedIn](#)

**Disclaimer:**

This Report contains general information relating to blockchain technology and digital assets (including non-fungible tokens (“**NFTs**”)). It does not contain legal, tax, or regulatory advice and is not an endorsement of any business, technology, or product. Readers should do their own research and take advice before taking any action. We make no comment on digital assets as an investment class (and note that the digital assets considered in this Report are principally digitalised versions of traditional financial assets or processes), rather this Report describes the use of blockchain technology and digital assets.

No report on this topic will ever be complete or up to date, as the industry, technology, and legal and regulatory framework continue to develop and/or become more established. However, in this Report, we have aimed to provide a resource that could be useful to the widest range of readers.

To keep this Report readable, we have deliberately simplified some of the technical content.

# STRUCTURE

This three-part Report on NFTs by UK Finance and CMS will cover:

<b>PART 1: TERMINOLOGY</b>	<b>6</b>
SECTION 1: INTRODUCTION	6
SECTION 2: TERMINOLOGY	10
<b>PART 2: NFT USE CASES, OPPORTUNITIES, AND RISKS</b>	<b>20</b>
SECTION 1: CONTEXT AND OPPORTUNITY FOR FINANCIAL INSTITUTIONS	20
SECTION 2: USE CASES	21
SECTION 3: RISKS AND OPPORTUNITIES	24
SECTION 4: ENVIRONMENTAL, SOCIAL, AND GOVERNANCE (“ESG”)	29
<b>PART 3: LEGAL AND REGULATORY PRINCIPLES FOR TOKENS</b>	<b>31</b>
SECTION 1: FUTURE LEGISLATION	31
SECTION 2: FUTURE REGULATION	34
SECTION 3: MARKET SOLUTIONS	39
SECTION 4: REGULATORY RECOMMENDATIONS	41
<b>APPENDICES</b>	<b>43</b>
<b>APPENDIX A: FINANCIAL SERVICES USE CASES, EXAMPLES, AND INNOVATION IDEAS</b>	<b>44</b>
<b>APPENDIX B: LEGAL BACKGROUND</b>	<b>49</b>
<b>APPENDIX C: REGULATORY BACKGROUND</b>	<b>51</b>
<b>APPENDIX D: INTERNATIONAL DEVELOPMENTS</b>	<b>54</b>
<b>APPENDIX E: FURTHER READING</b>	<b>57</b>
<b>APPENDIX F: ACKNOWLEDGEMENTS</b>	<b>58</b>

The structure of this Report is intended to allow readers to focus on and select the areas that are of most interest to them and their expertise. We appreciate members have a range of experience and familiarity with digital assets and, therefore, this Report includes a choice of material, from introductory sections through to more detailed sections.

## UK FINANCE FOREWORD

During the course of writing this Report, the world of cryptoassets has undergone significant change. When the first UK Finance member workshop was held in June 2022, the cryptoasset market was coming down from a late 2021/early 2022 high. As the year progressed, further collapses in the market threw cold water on the NFT marketplaces and a bear market sentiment prevailed. At the same time, regulatory interest grew, driven in part by the market turbulence, and in part by the slow but inevitable growth in knowledge of, and interest in, the sector by more ‘traditional’ firms and regulators, and the opportunities that might lie behind the hype.

As the growing regulatory and legislative engagement played out, we saw, in the EU, the finalisation of the MiCA regulation. In the UK, DCMS published a consultation on NFTs, the UK Jurisdiction Task Force (“**UKJT**”) published a Legal Statement on cryptoassets and smart contracts, the Law Commission of England and Wales (the “**Law Commission**”) published papers on digital assets, smart contracts, electronic trade documents, and other related topics, and His Majesty’s Treasury (“**HMT**”) has published its much-anticipated consultation on the future financial services regulatory regime for cryptoassets.

For UK Finance, this Report has demonstrated how broad and varied the industry viewpoints on this ecosystem still are. Working with our members through three workshops and a series of iterative drafts has shown a huge range of views, diverse and passionate viewpoints, and a high level of expertise and interest in some parts of the industry. As is often the case, we cannot represent all views equally (this Report is already longer than we had intended), but we have sought to adhere to an overall aim to give non-experts a tool to help them get going, and to give those from the TradFi side a view of the possible opportunities available in this technology.

Like many reports on cryptoassets themes, we have commenced with a terminology overview, to help to provide a baseline for those newer to these assets, and to allow readers to navigate the more complex topics. We then go on to discuss the use cases and opportunities of NFTs (in the context of digital assets more broadly), which includes the possibilities for securities, identity information, wrappers (i.e. a NFT used to wrap other tokens, making the package of tokens unique and non-fungible), contracts, warranties, royalties, trade documents, and brand extension. We found that far from being only a collector’s items, there are multiple use cases for NFTs relevant for financial institutions. NFTs, in conjunction with other types of digital assets, can be used for a variety of purposes and analysing the characteristics of tokens will identify future use cases. Both traditional banks and crypto-native start-ups are trying new things, including new products that create new value and experimenting with solutions to traditional issues in finance.

We have sought to explore the risks too. Currently, instances of financial crime account for a small proportion of NFT related trade, and as NFTs are a traceable form of digital asset, they are in theory unattractive for money-laundering. However, DeFi presents unique challenges and hackers are becoming more sophisticated. NFTs and digital assets are like any new technology, in that it takes time for all parties to get comfortable dealing with it; we therefore expect financial institutions undertaking NFT projects to adopt a risk-based approach, starting with small scale or proof-of-concept projects.

We also analysed the ESG considerations for NFTs. Blockchain networks are not all energy intensive and, in fact, have responded to criticism of their energy use more directly than some firms. We also noted that NFTs can be used to track and monitor ESG goals. Blockchain technology and NFTs can be used to drive change and investment in projects, from large corporates to local communities.

---

In terms of the legal and legislative implications, we note that the existing English common law framework is already flexible, iterative, and can accommodate digital assets without requiring a new legal regime. NFTs already can be classified as property, recognised under English law; they are a class of digital assets, that is, there are different types of NFT traded within identifiable markets; and smart contracts are legally valid and binding if they meet the existing requirements for creation of contracts. Further substantive changes are likely to be made to English property law in due course to further accommodate digital assets (including NFTs).

Government-led bodies are also responding to the requirements for certainty in specific areas to support innovation and to keep the UK competitive in this space. NFTs are not specifically addressed in current financial regulation. We note that whether a particular token falls within the regulatory perimeter will depend on the characteristics of that token. There are four types of token, according to the UK regulator: (1) security token (regulated), (2) e-money token (regulated), (3) exchange token (unregulated), and (4) utility token (unregulated). Most NFTs are likely to be unregulated tokens under the current regulatory regime, but, that being said, the characteristics of NFTs should be considered on a case-by-case basis as the technology, propositions, and use cases are constantly evolving.

We are at a time of fundamental change for the regulatory landscape in the UK post-Brexit and there is a lot to play for in terms of the position that the UK carves out for itself. However, jurisdictions across the world are examining and tackling the same questions on digital assets. Therefore, analysing the approaches taken in other jurisdictions will be important in shaping the UK's approach to regulating cryptoassets. Businesses operating in multiple jurisdictions will also need to be aware of all applicable regulatory frameworks.

Ultimately, engagement and investment by the traditional financial industry is what will serve to develop the UK's position as a digital assets hub. Market practice and industry standards will develop further, as more financial institutions invest in blockchain technology. Furthermore, co-ordination and partnerships with existing industry and technical experts and lawyers will result in solutions being found and technical innovations being made to address current hurdles or concerns.

Finally, to end, and to show that we are 'eating our own dog-food', we have also made the cover of this Report into an NFT. You can view it [here](#).

# PART 1: TERMINOLOGY

In this first Part, we establish certain definitions and key concepts in order to create a foundation for the topics in Part 2 and Part 3. To consider and analyse NFTs for this Report, we also need to cover the wider topic of digital assets. Part 1 is particularly aimed at readers who are fairly new to, or unfamiliar with, digital assets. However, this Report does not take into account every variation of NFTs or token standards. In addition, digital assets' projects and technologists continue to push boundaries, creating new variations of the technologies. **This presents a unique challenge to producing working definitions from a technical and a legal perspective, and analysing how digital assets are or should be regulated.**

## SECTION 1: INTRODUCTION

*“Blockchain technology is going to rewire all financial services”,*

**Tom Farley, former president of The New York Stock Exchange,  
interviewed in The Wall Street Journal, August 2022**

This Report seeks to explore whether NFTs and tokens (among digital assets generally) are one of the types of digital technologies that will help financial institutions thrive in the next ten years and beyond.

Before a new technology is accepted by industry, it must be tested and trusted. This is even more important in a regulated environment such as financial services. First, because so much is at stake: financial institutions are trusted to be the safekeepers of the nation's wealth and second, because their current technology infrastructure, built over decades, is not always easily capable of integrating entirely new digital systems. So, we must accept that there is a high bar to make a persuasive argument for financial institutions to adopt digital assets and digital technologies.

### *Blockchain Technology in Finance*

In the current landscape, **blockchain technology is already being tested and used in finance**. The World Bank and the European Investment Bank have both issued bonds using blockchain technology. That is, two of the best-known multilateral development banks in the world have investigated the facility and safety of blockchain technology and concluded that it has value and can be used. Many Central Banks (including the Bank of England) are considering developing Central Bank digital currencies (known as CBDCs). These may validate the further use of blockchain technology in finance infrastructures. Two of the largest investment banks, J.P. Morgan and Goldman Sachs, have also demonstrated the ability to process transactions using blockchain technology.

The Wall Street Journal reported on 22 August 2022 that Goldman Sachs aims to build Wall Street on a blockchain.

---

## Digital Assets and NFTs

It is not possible to examine NFTs, fungible tokens (“FTs”), and blockchain technology independently of each other, so the use cases for digital assets and technologies for traditional financial services should be considered as a collective. It is difficult to fully understand tokens without understanding blockchain technology. That being said, blockchain technology and tokens are different, and NFTs form only a part of the potential use cases (see [Figure 2](#) below). **NFTs could be considered as tools by firms developing their plans relating to the next stage in use cases for digital assets.**

Part of the challenge is that **digital assets (and classes of digital assets) are not all the same**; this affects how they are understood (from a technical, legal, and layperson’s perspective), possible use cases, and their legal and regulatory treatment (both under the existing law and regulatory framework, and analysing the gaps or improvements required). If you are unfamiliar with digital assets, referring to the [diagrams at Part 1, Section 2](#) (Terminology) when you are reading this Report may assist. Of course, these diagrams are highly simplified, so they should be used as aids in understanding the basics of how of how things fit together rather than as technical descriptions used by the industry.

## A UK Cryptoasset Hub

The UK government has been implementing a Global Britain and a Digital Britain agenda for over ten years. This agenda has now been directed towards developing policy, following the end of the Brexit transition period.

---

**Rishi Sunak**, when he was Chancellor of the Exchequer, stated his ambition was:

*"to make the UK a global hub for cryptoasset technology".*

---

---

As **Lord Cromwell** put it in a letter to the Financial Times dated 24 May 2022:

*“Some may wish digital assets would simply go away. They will not, but they will go (or are going) elsewhere if the UK, as a professed home for financial innovation, does not rapidly find a way to understand, “on-board” and regulate digital assets effectively.”*

---

---

There is wider political engagement and education, including **All Party Parliamentary Groups** for both blockchain and crypto.

The UKJT, a group of senior lawyers supported by the Chancellor of the High Court, has published a **Legal Statement on cryptoassets and smart contracts** to “provide the best possible answers to the critical legal questions under English law”.

The Law Commission, the statutory body that keeps the law of England and Wales under review and recommends reform where it is needed, has published papers on **digital assets, smart contracts, electronic trade documents**, and other related topics.

**HMT** is developing policy following completion of **its consultation** on the UK regulatory approach to cryptoassets, as well as a regulatory sandbox (to be established early in 2023) for stablecoins. These plans include the creation of one or more financial market infrastructure sandboxes (“**FMI sandbox**”), which will enable firms to innovate through providing the **services (in particular distributed ledger technology) that underpin markets**.

The Steering Committee for the **Centre for Finance, Innovation and Technology** committed in March 2022 to developing proposals for a new body “*focussed on driving UK financial innovation*”.

The **House of Commons Treasury Committee** is developing policy on the future of financial services, with a broad remit to determine how the UK financial services sector can take advantage of the UK’s new trading environment with the rest of the world, including how to “*facilitate the emergence of FinTech*”.

On 7 February, the **Bank of England** and **HMT** have produced a consultation paper which sets out their assessment of the case for a UK CBDC (which closes on 7 June 2023), and the **Bank of England** will produce a consultation paper on the regulatory framework for systemic stablecoins. Projects on CBDCs worldwide are largely domestic, but some are designed to be used internationally.

---

*“CBDCs are a global phenomenon. There are now more than one hundred countries representing over 95 per cent of the world’s GDP exploring a CBDC, all at different stages of development.”*

**Darrell Duffie**, The Adams Distinguished Professor of Management and Professor of Finance at Stanford Graduate School of Business

---

On 1 February 2023 **HMT** launched its consultation on the future financial services regulatory regime for cryptoassets (which closes for submission on 30 April 2023). The turbulence of 2022 for the crypto market which saw the high profile collapse of FTX Trading Ltd is the backdrop to the much anticipated consultation. As such, the consultation underlines the need for “*clear, effectively, timely regulation*”. However, it also states, “*crypto technologies can have a profound impact across financial services. By capitalising on the potential benefits offered by crypto we can strengthen our position as a world-leader in fintech, unlock growth and boost innovation*”.



## Context and Opportunity

We started by saying that any new technology must be tested and trusted. Why is now the time to analyse whether tokens, including NFTs, can be considered to be tested and trusted?

- **public awareness of NFTs, although in the form of art rather than financial instruments, has increased in recent years:** the first NFT dates from May 2014. In Q1 of 2022, **NFTs generated \$12 billion in trades**.
- **NFTs are not just cartoons:** one of the most often quoted lines about new technology is that it starts out looking like a toy. The cartoon images that are most associated with NFTs are not the functional use case in finance, but a simple way of testing the technology. **Chris Dixon**, an American internet entrepreneur and investor, and general partner at the venture capital firm Andreessen Horowitz, says (on Twitter, naturally): *“it’s important to ask questions about new technologies that go beyond first impressions”*. He sets out supplementary questions to this: (1) if something looks like a toy, ask how fast it will improve, (2) if something is too expensive, ask how fast the price will come down, and (3) if something does not solve a problem, ask if it provides new capabilities.
- **there is institutional demand for digital assets and tokens generally:** according to a 2022 survey of global institutional clients, asset managers, asset owners, and hedge funds commissioned by **BNY Mellon**, 91% of institutional investors are interested in **investing in tokens** (and 41% already hold crypto in their own portfolios); albeit NFTs may, currently, only form a small part of firms’ plans for digital assets. **BNY Mellon**, the world’s largest custodian bank, announced its Digital Asset Custody platform is live in the US on 11 October 2022. *“What we see is clients are absolutely interested in digital assets, broadly”*, BNY Mellon’s head of advanced solutions Michael Demissie said, speaking on a panel on cryptocurrency at Afore Consulting’s 7th Annual FinTech and Regulation Conference;
- **tokens are recognised by regulators and the legal system:** for a regulated entity like a financial institution to work with a new type of technology or asset, it must have certainty as to its regulatory status and recognition under relevant legal systems. Following years of engagement and consultation, both the FCA, as regulator, and the UK courts, as decision-makers, have set out a legal basis for cryptoassets generally, which applies to NFTs depending on their characteristics and how they are being used (see **Appendix B** (Legal Background) and **Appendix C** (Regulatory Background)). The work is not yet complete (Part 3, Section 4 (Regulatory Recommendations) outlines our recommendations for the future regulatory approach specific to NFTs), but the groundwork has already been done; and
- **tokens have specialist service providers to support their use by financial institutions:** starting to use a new technology generally relies on the ability of a new user to hire support from third party experts. For financial institutions to work with tokens, financial institutions must be able to create, record, and transfer them. In September 2022, the **European Central Bank** announced that **Amazon** is one of the five companies selected to develop its digital euro prototype.

**It is critical to be aware that tokens are a technology and an asset class. The asset class may not be relevant to the whole finance industry (today) but, the technology certainly is: it digitalises investments and links them to a secure version of the internet.**

---

## SECTION 2: TERMINOLOGY

### What is an NFT?

An NFT is a token. It is a basic **building block of computer code** that creates a **unique digital representation** of a **digital or physical asset** that is recorded and can be transferred **on a blockchain**.

**NFTs are a class of digital assets.** It is impossible to describe every possible use case, but NFTs can:

- be evidence of legal title to a digital or physical asset external to a blockchain (for example, a share);
- embody rights such that the NFT holder is entitled to claim performance of the obligations recorded by the NFT (for example, any rights attached to a financial instrument);
- be used to grant a licence to the holder to use certain intellectual property; or
- be used to confer intellectual property rights on an NFT holder.

There are very few NFTs where the underlying content is actually embedded into the NFT and stored directly on the blockchain. Larger files (such as high resolution art, music or film) are too expensive to include in the NFT itself due to mining costs, so the standard practice is to include a link to where the file can be found.

**In our context, when examining the utility and use cases for NFTs we use the term “NFTs” to mean digital certificates tracked on blockchains.** Technical experts will tell you that these digital certificates are part of the broader family of digital assets known as “NFTs”. For simplicity in this Report when we refer to NFTs, we mean these digital certificates. Accordingly, a reference to “NFTs” is not a reference to all NFTs.

NFTs are tokens with specific characteristics, enabled by non-fungible token standards, as outlined above. Their place, including their use in financial services, in the broader blockchain framework is illustrated by Figure 1.

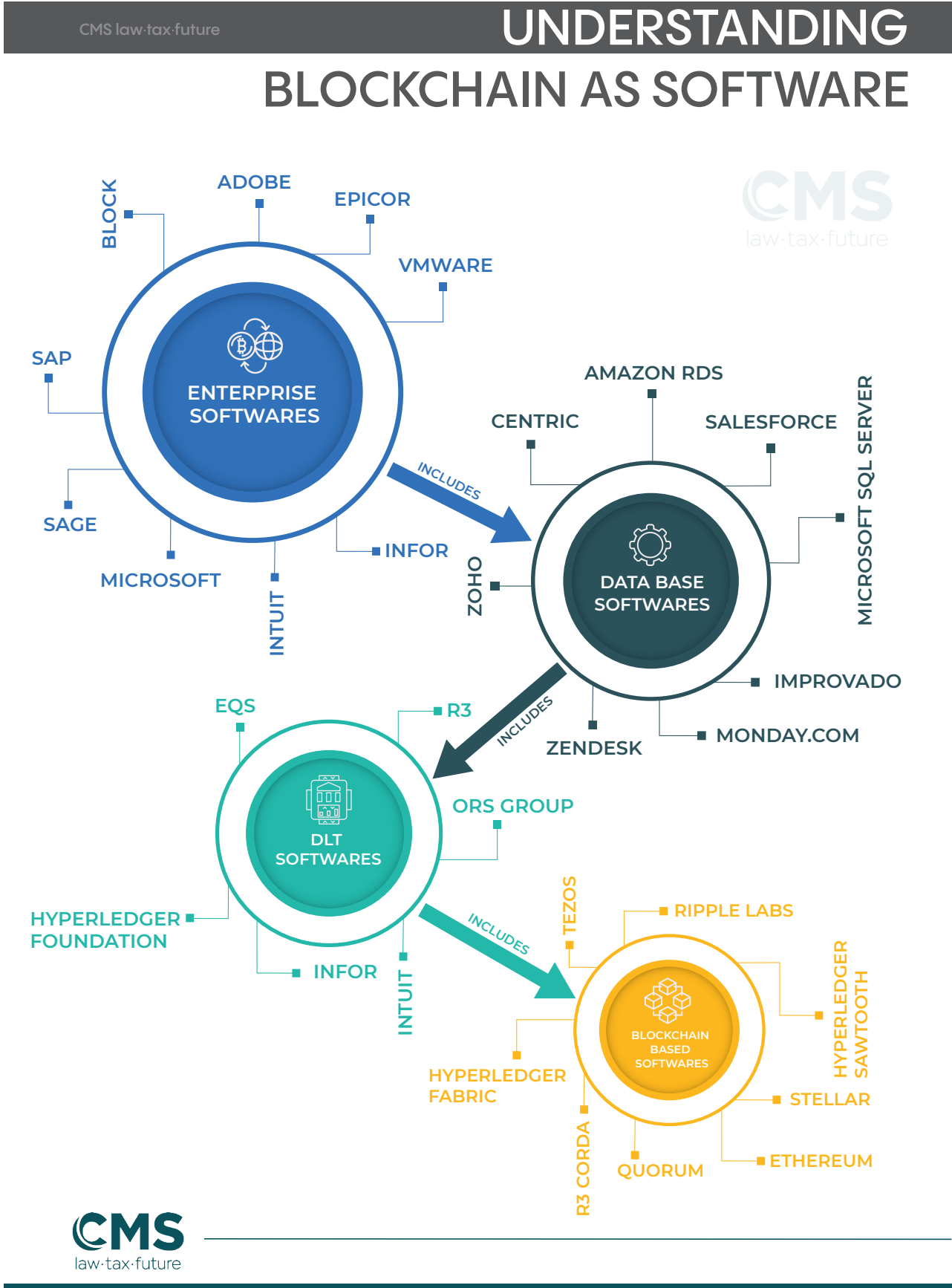
---

**Figure 1** on the next page shows the transition from traditional software providers to blockchain software developers. It is worth noting that, unlike the former which are usually offered by centralized corporations, the latter include a diverse range of entities including decentralized teams and foundations. These blockchain software developers are an unconventional group of developers, distinct from the traditional software providers, by way of their organizational structure, approach and technical skillset.

For a graphical representation of the underlying infrastructure for decentralized systems, please refer to **Figure 2** (page 17). These are software platforms and projects, which are extensively employed by blockchain software developers in the crypto industry, including NFTs used in financial services (as indicated in the top right corner).

**Figure 1** presents examples of builders, while **Figure 2** illustrates their creations.

FIGURE 1.



## *Non-Fungible and Unique*

**NFTs** are tokens that **cannot be replicated or exchanged on a one-to-one basis**. They have a unique token ID.

The unique token ID is, not in and of itself, an exclusive characteristic of NFTs; FTs such as bitcoin have IDs too (and bank notes have unique serial numbers).

It is possible to split an NFT into different parts by way of **fractionalisation**. It is important to note that splitting an NFT is not the same as splitting a £10 note into ten £1 coins. Fractionalising an NFT is equivalent to owning a certain percentage of a specific identifiable asset (a house, for example); the holders own a proportion of one NFT. This has prompted use cases for NFTs in real estate investing.

For the purposes of this Report, NFTs can be thought of like a digital certificate or a receipt for a specific asset.

By contrast, **FTs are identical, interchangeable, and can be exchanged on a one-to-one basis**, like cash. NFTs' non-interchangeable characteristic is the reason that they can be a sought-after collectible (the best known public use case) or represent a unique financial relationship.

The token is not what it represents; the code tells us what it represents but the code is not the asset. Native cryptocurrencies and digital representations of shares in a company can both be tokens. A digital representation of an asset that originates or also exists off the blockchain is a “non-native” (they are “endogenous”).

An example of an FT is bitcoin. Another type of FT is tokenised shares in a company. For instance, if a company has issued two shares of the same class with the same rights, then any tokens representing those shares could be exchanged on a one-to-one basis. By contrast, NFTs have unique, individual values, and cannot be traded on a one-to-one basis. However, taking the example of shares again, if instead a company has issued one share of one class and one share of another class with different rights, then any tokens representing shares of a particular class would be non-fungible.

We say above that bitcoin is fungible. However, digital assets are testing the boundaries of what we mean by the legal concept of fungibility. For example, a newly mined bitcoin is more valuable in the market than an older bitcoin.

## *NFT Misconceptions*

In explaining NFTs in particular, it may be helpful to provide context by listing certain points that are often misunderstood. **NFTs**:

- **are not cryptocurrencies** (see [Part 1, Section 2](#) (Terminology));
- **are not just art**, collectibles, cartoons, currency in computer games, or a speculative investment (see [Part 2, Section 2](#) (Use Cases));
- **are not all used for illegal or illicit activities**: NFTs, in particular relating to digital images popular with retail investors, are used for financial crime but are not a favoured method of sophisticated criminals for laundering proceeds of illicit activities because of their ability to be traced on the blockchain, the sophistication of analytics firms, and the successes that law enforcement bodies have been having in tracing funds: in short, NFTs that are stolen can be traced quickly (see [Part 2, Section 3\(1\)](#) (Risks and Opportunities));
- **are not all environmentally destructive** (see [Part 2, Section 4](#) (Environmental, Social, and Governance));
- **could be used in financial institutions' digital infrastructure** (see [Part 2, Section 3](#) (Risks and Opportunities) and the Appendix A (Financial Services Use Cases, Examples, and Innovation Ideas)); and
- require the **same regulatory analysis that applies to tokens generally** as to their characteristics; under this framework currently most NFTs will be unregulated tokens (on the basis that NFTs are unlikely to be e-money or securities; albeit if NFTs have the characteristics of securities they will be regulated and the characteristics of an NFT should be reviewed on a case-by-case basis - for more, see [Part 3, Section 2](#) (Future Regulation) and Appendix C (Regulatory Background)).

## *DLT*

Distributed ledger technology ("**DLT**") is a piece of software code that allows a record of data to be stored and maintained decentrally on a network of computers (known as nodes).

Blockchains are a type of DLT, but not all types of DLT validate information by linking blocks of data as blockchains do.

However, for the purposes of this Report the term "blockchain" will be used interchangeably with DLT. Proposals on amendments to legislation in the UK recommend that references to specific technology such as "blockchain" and "DLT" are avoided, in order to future proof the legislation.

## Blockchain

A **blockchain** is a piece of software code with particular characteristics. **It is a continuously expanding record of data in which each new record (a block of transactions) is linked to the respective preceding block** by mathematical-cryptographic functions, creating a chain of blocks (hence, blockchain). This linking means that all earlier blocks in the chain are unchangeable. Blockchains are not stored centrally or in the cloud, but decentrally on a network of computers (known as nodes).

Blockchains are sometimes described as being like an enormous excel spreadsheet that is programmed to record information and transactions automatically. The differences to a spreadsheet are that (1) once entries are made they cannot be changed, and (2) the spreadsheet is not stored on one computer or in the cloud, but is stored and maintained collectively by a network of computers. DLT has the characteristics of (2), but not the characteristics of (1).

The Ethereum blockchain is probably the most well-known example of a public blockchain. A **public blockchain** is a network where anyone is **free to join**, by downloading the open source code. A **private blockchain** is a network where only selected and **verified users** are able to join (for example, **Hedera**). On public blockchains, anyone can build their own projects by creating distributed apps (or “**dAPPs**”) which operate on the blockchain.

The software programs that blockchains run on are called protocols.

- Layer 0 blockchain protocols form a foundational framework and function underneath the Layer 1 blockchain protocols. They aim to solve scalability problems and offer communication between independent blockchains (this is referred to as interoperability).
- Bitcoin and Ethereum are Layer 1 blockchain protocols. They do not rely on underlying technology (such as Layer 0 blockchain protocols). Newer Layer 1 blockchain protocols include Solana and Avalanche (and the others set out in the graphic in Figure 2 below). These newer Layer 1 blockchain protocols aim to achieve a high throughput of transactions (speed of transactions), in some cases by utilising a unique consensus mechanism but without offering interoperability (which is instead achieved by way of cross-chain bridges and other cross-chain communication methods).
- Layer 2 blockchain protocols allow older Layer 1 blockchain protocols to scale. Bitcoin Lightning Network is a Layer 2 blockchain protocol; this is Bitcoin’s payment protocol that is layered on top of Bitcoin (being a Layer 1 blockchain protocol). Other examples are set out in the graphic in Figure 2 below.
- “Layer 3 blockchain protocols”, so-called by some market participants, are protocols whose focus is on interoperability to connect all the layers and enable seamless cross-chain use cases such as games, dAPPs (see above), and NFTs. As such, a Layer 3 blockchain protocol is often referred to as the application layer. Layer 3 is not associated with any blockchain and it does not sit on top of Layer 2 blockchain protocols; rather it is a way of referring to projects that focus on interoperability.

References to “**on-chain**” are references to an action being taken on a blockchain (the record comprised by the blockchain is automatically updated by the action), and references to “**off-chain**” are references to an action being taken externally, off a blockchain (the record comprised by the blockchain must be separately updated to reflect the action).

The **benefit and utility of blockchain technology is not limited to the world of digital assets**. As a blockchain can be thought of as an enormous excel spreadsheet, use cases extend to tracking or recording physical assets too. However, while the ownership of tokens is recorded on the blockchain, the record on the blockchain does not necessarily record the ownership of the underlying asset, which creates challenges from a legal and regulatory perspective. For example, the owner of tokenised shares in a company will be recorded on a blockchain. From a legal perspective, a company’s register of members is the *prima facie* evidence of its shareholders. Therefore, the record on the blockchain can only be used as a register of its shareholders if it complies with the requirements of the Companies Act 2006.

*Interoperability* (or cross-chain communication) in the context of blockchain is the ability for blockchains to communicate with other blockchains; to transfer data from one blockchain to another blockchain. For example, Bitcoin and Ethereum cannot exchange data because they are built differently.

*Cross-chain bridges* allow blockchains to be connected to enable a form of interoperability.

*Digital assets* are of two, very different, types:

1. **native digital assets** have no existence outside the blockchain that creates, or hosts, them (cold wallets (see below) are used to store a user's private keys off-chain, not the digital assets themselves). The tokens are the digital assets. Native tokens are the currency of each blockchain. Examples include the native tokens of the best-known blockchain projects, bitcoin in the case of Bitcoin, Ether in the case of Ethereum, Sol in the case of Solana, Avax in the case of Avalanche, and Ada in the case of Cardano; and
2. **proof of ownership / mirroring digital assets that represent an instrument or asset**. In this case, the tokens are digital copies of the underlying instrument or asset.

Digital assets are subject to a further important distinction: they are an **asset class**: it is possible for anyone with an internet link to invest in digital assets; **and** they are a **technical experiment**: they demonstrate the ability to move and manage value via the internet: once we had the internet, Bitcoin (etc.) was inevitable.

*Tokenisation* (or digitalisation) is the process of issuing a token representing an instrument or asset. The process is performed, usually by specialist service provider technology companies, by creating tokens (secure information markets) and registering them on the blockchain that is being used for the project. Tokenisation projects are at their core digitalisation and automation projects, that may involve an element of standardisation or personalisation. They succeed where they improve customer service or choice in some way.

## Token

“Token” is a generic term in computer science.

A token is a secure package of information. It is used to describe a unit of value or utility that is created and distributed by projects that use those blockchains as a host (instead of developing their own fully developed and deployed blockchain known as a Mainnet). It is also used to describe a unit of a cryptocurrency, like bitcoin and Ether, that runs on its own blockchain.

Bitcoin is the blockchain, bitcoin is the cryptocurrency it created.

In this Report, we use the term “token” interchangeably with “crypto-token”, “cryptographic asset”, “cryptoasset” (we use “crypto-asset” where we quote a source using that formulation) and “digital asset”. Use of these terms is not generally an indicator of their characteristics or the rights attaching to them without the relevant context. In particular, when used in this Report, **“tokens” will generally mean NFTs and/or FTs** (although there is some overlap that we will outline).

This can be confusing because tokens have **utility, but** (other than so-called “non-transferable” identity tokens, see Part 2, Section 2 (Use Cases)) transferring a token also transfers value, so the token is a kind of **currency** and tokens also represent part **ownership** of the blockchain they are created by – **users are owners**. So, blockchains are not owned by companies; the “price” of the tokens is set by the market, which values the tokens using a combination of the value of their utility and their value as a part share of something akin to a technology company.

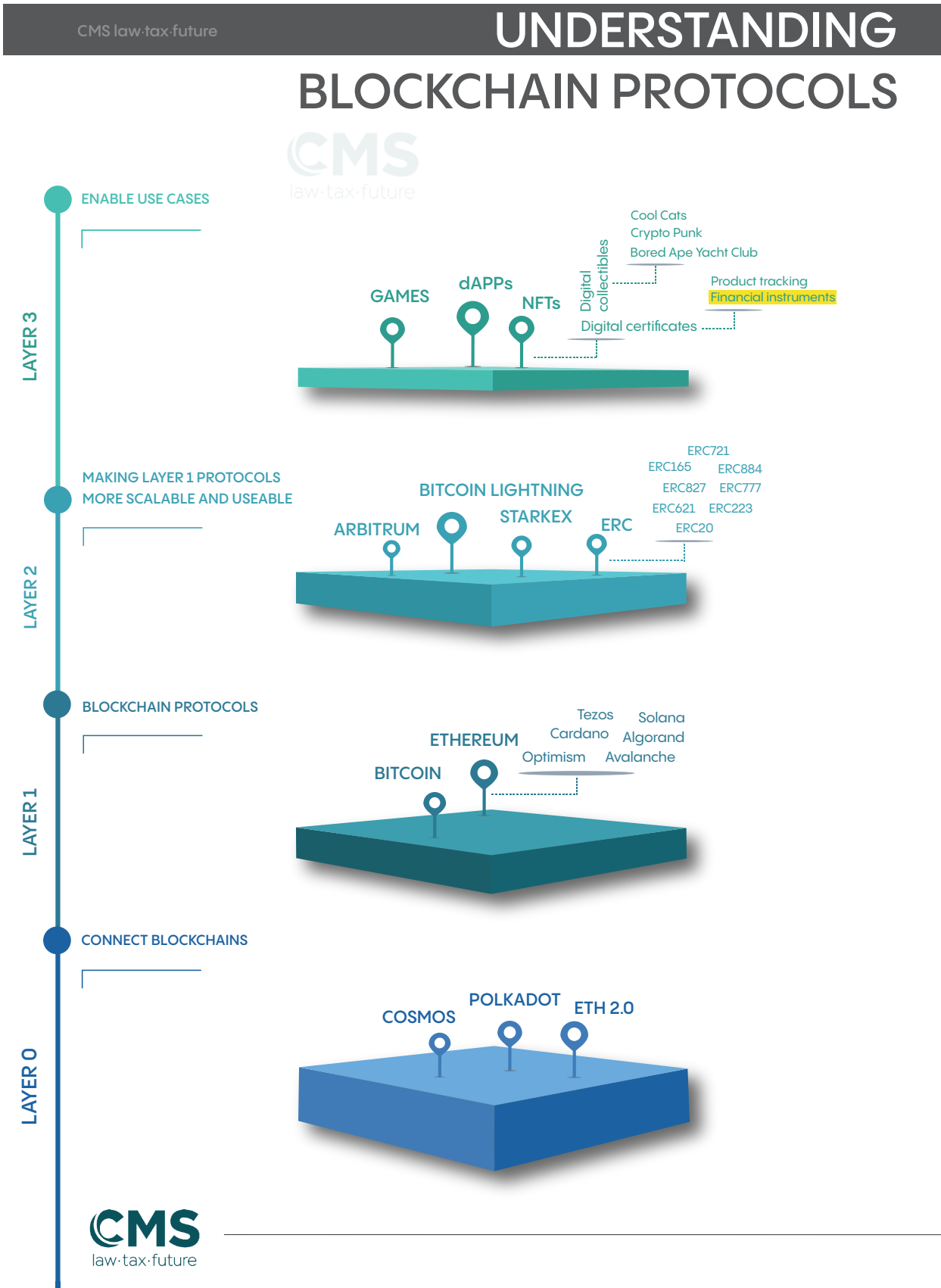
---

Most NFTs run on the Ethereum blockchain (ethereum.org). The Ethereum blockchain supports different data standards that are used to create tokens. ERC-721 is the data standard for creating NFTs on the Ethereum blockchain. Generally, in this Report, references to NFTs are references to the NFT protocol on the Ethereum blockchain. 20 September 2022 marked the five year anniversary of Dapper Labs chief technology officer Dieter Shirley first submitting the NFT standard ERC-721 and coining the term “non-fungible token”.

NFTs are cryptoassets with specific characteristics, enabled by non-fungible token standards, as outlined above. Their place, including their use in financial services, in the broader blockchain framework is illustrated by Figure 2.



FIGURE 2.



## Smart Contracts and Smart Legal Contracts

Smart contracts are **programmable computer code** that run and are recorded on blockchains, with the contract terms embedded in the code. Smart contracts are “self-executing”. They are software that can manage, control, and document contract performance automatically without manual intervention. These operate on instructions: “if X condition is met, then perform Y action”.

For example, a smart contract could be programmed to provide that a token can only be transferred by a transferor to a transferee upon the contract receiving proof or a message that the transferee (1) provided know-your-customer (“**KYC**”) documents and (2) paid the purchase price to the transferor, at which point the transaction would self-execute and the token would be transferred to the transferee.

Smart contracts allow tokens to function. The **contracts create, destroy, and transfer tokens** as well as automate transactions and record information (metadata) relative to particular tokens. One way to destroy tokens is to transfer them to a wallet that has no private keys.

Therefore, a token cannot be separated (or thought of as distinct) from the smart contract or the blockchain on which it was created. NFTs are smart contracts.

The term “smart legal contract” refers to a smart contract which creates a legally binding and enforceable contract. That is, a contract that would be enforced by a court in the UK. However, use of the term “smart legal contract” does not in and of itself mean that it is legally binding and enforceable (and vice versa with respect to the term “smart contract”). See Appendix B (Legal Background).

Smart contracts take actions on blockchains. They move tokens around, either immediately or when specific conditions are met. There is no separate settlement process or enforcement of the contract (the smart contract updates the on-chain data, which comprises both the asset and the record of the asset).

*Fiat Currency* is currency that is **government-issued** (legal tender) and is not backed by a physical commodity (such as gold). Sterling and US Dollar are fiat currencies. Cryptocurrencies are not fiat currencies.

A *platform* is an app or service that **provides the blockchain technology** that maintains the record of ownership of the assets. In other words, it is not necessary to create a blockchain to use a blockchain. As with traditional IT services, it can be procured.

A *wallet* is a common term used to describe a **digital location** where an owner stores and manages their tokens. However, in practice, a wallet is really just a **method of accessing tokens**. It consists of a pair of “digital keys”, being a sequence of letters and numbers. There is a “public key” (also called an “address”, like an email address) that is given out to third parties to transfer payments to, and a “private key” that belongs to the address and is needed to “unlock”, prove ownership of, and access the tokens. A “**cold wallet**” (also referred to as a “hardware wallet”) is used to store private keys offline, which means they are not connected to the internet. A “**hot wallet**” (also referred to as an “online wallet” or a “software wallet”) is used to store private keys online either through an online exchange account or on software installed on a phone or computer.

*DeFi (Decentralised Finance)* is the general term used to refer to **financial services that do not involve intermediaries**. They are provided and accessed via blockchains. This is an outcome of characteristics of blockchains noted already: anyone can participate on a public blockchain and transactions take place directly in the wallets owned and controlled by the individual users. The mainstream financial system, by contrast, is known as “**TradFi**”. DeFi can be thought of as

banking with fewer intermediaries operating in a simplified transaction model (it may be more accurate to say that there are fewer intermediaries rather than no intermediaries). Once assets are tokenised, there are consequences for mainstream financial services in any event. For example, private key management of cryptoassets is the closest equivalent to traditional custody services.

The *metaverse* is a concept for a **shared immersive digital world** – an internet you can live inside. Some metaverse projects involve distributed versions of the internet.

*Web3* is a generic term referencing versions of the **internet that run on decentralised networks**. Web3 enables user-owned platforms where work is rewarded in proportion to value created.

The metaverse generally refers to virtual (online) worlds that have some immersive characteristics. Web3 is a narrower term focused on the economies of these worlds.

# PART 2: NFT USE CASES, OPPORTUNITIES, AND RISKS

## SECTION 1: CONTEXT AND OPPORTUNITY FOR FINANCIAL INSTITUTIONS

Technology has transformed traditional financial services and institutions over the last twenty years. In the fintech and embedded finance sectors, technology companies are competing with banks, providing financial products directly to their own customers and cutting out financial institutions as intermediaries. Tech giants have forged ahead with technological transformation in payment services and financial services products, leveraging their access to big data and customer relationships. For example, Apple Pay in retail banking and, more recently, Apple's buy-now-pay-later offering.

In the traditional finance context, transactions, operating models, and structures are process-based and multi-party; as such, the potential benefits of blockchain technology for these transactions and models are now apparent. **Tokenisation projects are also an extension and continuation of the work that financial institutions have already undertaken**, such as online banking, open banking, embedded finance, and others.

A **report** issued in December 2022 by crypto exchange Binance discusses the emergence of what it describes as “**financialization**” as a specific area of innovation in NFTs, that is the emergence of NFT-based financial products and services.

In this second Part, we explore what there is to gain for financial institutions in terms of the current and potential use cases of NFTs and digital assets generally:

- **tokens are a brand extension tool:** NFTs are most popular among adults aged between 25 and 34 (a hard-to-reach age range for traditional financial services firms);
- **tokens represent digital ownership:** as more of our economic life moves online, an accepted and trusted method of determining ownership of value there will be required;
- **tokens are expected to power the metaverse:** the relevance of the metaverse and Web3 to finance is that in retail, NFTs will likely be used for the representation and verification of collectable digital assets, and FTs will likely be used for the means of exchange (similar to how fiat currency is used in the traditional finance world). Management consulting firm McKinsey estimates that the metaverse could create up to \$5 trillion in value by 2030. Banking group Citi has estimated that the metaverse could represent a revenue opportunity worth up to \$13 trillion by 2030;
- **tokens enable the adoption of digital assets inside a regulatory framework:** incumbents' regulatory “moats” can be a big advantage in winning a share of what is in effect a new market as tokens and blockchain technology bring transformational, rather than incremental, change;
- **digital identity provides early use cases for NFTs:** financial services firms could use them to onboard new customers digitally, and in theory, more efficiently;
- **blockchain technology and digital assets will enable innovation:** blockchain technology and digital assets could bring innovation and scalability in capital markets that has for so long been a national and international policy goal: but they also bring the risk that early adopters come to dominate this market;
- **tokens will make finance more international:** cross-border transactions will be easier and cheaper, but competitors will be global; and
- **the tipping point for new technologies can be reached suddenly:** firms with a wait and see policy may find it difficult to make up quickly for lost time.

## SECTION 2: USE CASES

To recap, NFT use cases have specific characteristics (some of which are shared with other digital assets using blockchain technology) which are summarised below.

- **Unique and Non-Fungible:** NFTs derive their value and utility from their uniqueness; their most important characteristic is their non-interchangeability.
- **Verifiable on a blockchain:** the complete ownership and transfer history is verifiable on the blockchain.
- **Permanence and Tracing:** the data is recorded on a blockchain indefinitely and a complete transfer history can be traced.
- **Immutable:** as a blockchain is maintained and updated by a network of computers, no single network or computer can change the records on the blockchain. As such, blockchains are immutable, which is important when considering using these new technologies.
- **Smart Contracts:** NFTs run on smart contracts so that transactions self-execute (and also can include complex “real world” type contract characteristics, such as conditions for transfer (of value)).
- **Store of Information:** an NFT’s metadata is a store of any information programmed in the smart contract; NFTs can function as a permanent record or register of information.

Certain features described above will not always be suitable for all projects in regulated markets. But, the features can be adapted on a case-by-case basis.

We expect the use cases for NFTs in financial services to develop and expand from an analysis of the characteristics of tokens and blockchain technology generally.

### Why are so many NFTs expensive cartoons?

The original NFTs, like cryptopunks and Apes in the Bored Ape Yacht Club, are promoted as luxury goods. In this context, their security and role as status symbols is more relevant than their utility. These NFTs are not the focus of this Report where we consider NFTs as digital certificates tracked on blockchains.

### 1. Markets for Tokens

We would categorise the markets for tokens as:

1. **crypto-native:** innovation, kudos, and moonshots;
2. **crypto-friendly:** brand extension, consumer engagement, and payments; and
3. **financial:** retail, wholesale, and infrastructure.

## 2. Use Case Categories

### *Securities*

The term “*digital securities*” is commonly used to mean **shares in a company** or **bonds** which are constituted or evidenced using blockchains. In current practice, the tokenisation of real estate means the tokenisation of the shares in a special purpose vehicle that owns the real estate (as it is not possible to register more than four legal owners at HM Land Registry).

We expect the securities use case initially to apply predominantly to FTs and not NFTs, albeit there may be some circumstances where an NFT is considered a security token (depending on the characteristics of that NFT). If the tokens can be exchanged on a one-to-one basis (as is generally the case for traditional financial instruments), then these tokens will be FTs rather than NFTs. In large part, this use case is the focus of financial institutions’ current appetite, development, and use of tokenisation and digital assets, rather than NFTs.

However, securities as a general use case for tokens are included here as backdrop and context for other use case categories that are or could be more readily associated with NFTs, in particular wrappers. In practice, the use cases are developing together and, over time, the distinction between NFTs and FTs may become less important. The characteristics of NFTs will probably, over time, give rise to product innovation in financial markets.

### *Identity, Information and Record Keeping*

NFTs are unique to the owner and can operate as a **record of information, including the identity of an individual**. NFTs proving ID can simplify and improve know-your-client (KYC) processes. In theory, they could also improve privacy for customers. For example, an NFT can be used to prove that an individual has been through a KYC process, is over 18, and is a UK citizen, or to show other characteristics but without sharing their governmental ID documents or more of their information than is necessary. The nature and fact of the specific checks can also be securely, digitally recorded for evidence or audit purposes.

In particular on this category, see Appendix A (Financial Services Use Cases, Examples, and Innovation Ideas) on identity NFTs such as: Ethereum’s soulbound tokens, Binance Account Bound tokens, PhotoChromic KYC verification, and Goldfinch’s Unique Identity.

### *Wrappers*

NFTs can be used to “*wrap*” **other tokens**, that is, to represent and carry rights to the underlying tokens. An owner may hold a portfolio of tokens which are FTs but which are, as a package, personal and unique to that owner. This package could be “wrapped” with an NFT wrapper. As such, NFT wrappers can be used as an equivalent or alternative to investment wallets, for example.

### *Contracts*

Tokens run by smart contracts are programmed to create, destroy, and transfer the token, as well as **automate transactions and store information relative to the token**.

Smart contracts used to issue tokens hosted on public blockchains can help enforce ownership, as information about the creator and creation time (in the case of financial instruments, details of the issuance) is publicly available. Institutions can, for example, issue tokens to counterparties and partners recording details of the relationship. This information can be shared, as decided by the writer of the contract, with a simple search on the relevant blockchain. In principle, information can be made available to be verified by anyone in the public domain.

## Warranties

NFTs are a suitable way of **storing information unique to an owner including warranties for products**. This use case has been taken up by retailers of goods.

Purchasing goods online comes with a series of risks, especially if the item is a luxury good. Digital warranties, provided via an NFT, give customers certainty when making their purchases as to the authenticity and purchasing history, and details about warranty periods. Tokenised warranties also protect the consumer and combat counterfeits of high value goods. Some marketplaces have adopted these “warranty cards”, which include the item’s serial number and are sent directly to the customer’s smartphone.

Warranties related to ESG status are also verifiable, as well as recordable, using NFTs. See Section 4 (Environmental, Social, and Governance) for more.

## Royalties

An NFT’s smart contract can be programmed to make **automatic payments** to creators, for example an artist whose art is referenced by the NFT. Many NFTs are structured such that the NFT “creator” is paid a certain percentage of transaction fees or purchase price on the initial sale, but also on any resale. This use case is unique as compared with other physical assets and secondary sales. It could be adopted in financial services but has not been yet.

However, there are technical complications regarding NFTs and royalty payments: automatic resale royalty payments may not occur if the NFT is resold (which may be at a much higher price) through a different marketplace than the initial one. We understand the ERC-721 token standard may be getting an update for a more effective method of royalty payment that does not depend on the platform that creates the NFT, as the current system is based almost exclusively on the decisive role of marketplaces in aggregating the market and dictating the rules.

## Loyalty and Brand

In the retail sector, NFTs are used as part of **customer engagement strategies** such as brand awareness and loyalty and rewards schemes.

The brand awareness and loyalty points NFT use case are not looking to do anything particularly novel (and in this use case, we are referring to digital images and loyalty points style programs). However, a recent **report** by CB Insights found that news mentions of NFTs for customer loyalty in Q3 of 2022 have increased 36 times since Q1 of 2021.

Event ticketing company Ticketmaster are now minting tickets as NFTs for selected events. As well as entitling the holder entry to the event, the NFTs will also be collectible memorabilia and function as “proof of attendance”.

## GENERAL USE CASES SUMMARY

- Far from only being collector’s items, there are multiple use cases for NFTs relevant for financial institutions.
- NFTs can be used for a variety of identity, information, and record keeping purposes.
- Analysing the characteristics of tokens will identify future use cases.

---

## SECTION 3: RISKS AND OPPORTUNITIES

### 1. Risks

Risks related to using blockchain technology are, in a number of ways, similar to those of projects related to making analogue processes digital. Many of the risks will, therefore, be familiar to financial institutions at a general level; that said, DeFi does present unique challenges because of the implications of decentralisation on governance, liability, and other conventional market issues. The risks are better understood than is often imagined because of the amount of work undertaken in the last five years by crypto firms and the wider industry. Elliptic have undertaken research and produced a report on NFTs and financial crime (**Elliptic's August 2022 Report on NFTs and Financial Crime**) which we refer to below. The risk factors are also set out in full in the prospectuses of publicly traded companies in blockchain and digital assets markets. However, there has been a problem in sharing that understanding with some users. The risks are usually broken down into the types set out below.

#### *Novelty*

Blockchain technology is relatively new. This means it is often used for the first time within a financial services firm's IT environment when an NFT or other digital asset project is developed. There are now a range of service providers in the market to assist with project development, auditing, and testing.

In practice, new projects are normally launched as prototypes or initially at a small scale from a risk perspective.

#### *Consumer and Investor Trust and Confidence*

Tokenisation is (or has been) incorrectly perceived by many outside the digital assets industry to be, by its origin, linked to cryptocurrencies. For example, tokenised deposits at a bank are not linked to cryptocurrencies. Therefore, tokenisation and cryptocurrencies should be understood separately.

Currently, digitalisation or tokenisation projects are mainly undertaken with a view to creating digital versions of traditional assets and improving traditional market infrastructure rather than the native issuance, or use, of cryptocurrencies.

As the technology is novel, financial institutions that implement new digital technologies will need to be able to educate senior managers, internal risk and compliance officers, investors, and customers to address the knowledge gap, from a user-experience perspective and to instil trust and confidence.

#### *Cost/Benefit Analysis*

Undertaking a cost/benefit analysis will be important for financial institutions, particularly to establish whether the new technology or project maximises the benefits for investors or customers in a way that existing technology or products do not, and in a way that mitigates the risks set out in this section. Digital asset projects will succeed where they improve customer service or choice in a way that is commercially proportionate to the cost of delivering that project. However, the outcomes here are significantly affected by assumptions made about time horizons and scale of adoption, as well as the brand value that comes from being (or not being) an innovator in this area.

With respect to NFTs and transactions on the blockchain (including minting NFTs), users must pay transaction costs (so-called "gas fees"). The term "gas" refers to how much computational power a transaction on the blockchain requires. This is just one of several considerations for financial institutions analysing the costs of digital asset projects.



As noted above, new projects are often launched as prototypes. We anticipate that the narrow or broad nature of a prototype project and how to maximise the benefits of digital technologies or assets will be key questions in terms of getting initial projects approved and subsequent scaling.

### *Consumer Protection Considerations*

Financial regulators are concerned about retail investors putting money into crypto. Investment risks therefore dominate discussions. The FCA have introduced their new Consumer Duty for regulated financial services (which will apply from July 2023) with the aim of setting higher and clearer standards of consumer protection.

In this Report, we make an assumption that financial services firms will not use NFTs as a speculative investment tool. Therefore, concerns in this area are not directly relevant to the type of projects that this Report treats. The analysis of this risk type may change if NFTs fall in scope of the UK's regulatory perimeter.

### *Data Protection and Privacy*

Blockchains assist with information security. However, they give rise to General Data Protection Regulation (“**GDPR**”) issues when consumers are involved. In the case of a transaction using a private blockchain, it is possible to use the technology in a data protection compliant manner, whereas for transactions using public blockchains, several issues need to be addressed.

Blockchain technology facilitates transactions with the use of public keys, which are publicly visible on open ledgers. These public keys can, depending on the circumstances, be matched with additional information to identify individuals. For example, public keys could be linked to personal data collected by wallet service providers and IP addresses to identify an individual. Additionally, public keys can reveal transaction patterns which could help identification.

Consequently, in accordance with GDPR and similar regulations, these public keys and the transactional data may be classified as pseudonymised data which is legally given the same level of protection as identifiable personal data.

However, the mechanics of public blockchains do not readily facilitate the protections afforded by data protection regulations, because they are:

- **decentralised:** public blockchains operate by peer-to-peer networks, which means that there is no single data controller that an individual can contact to exercise their data protection rights;
- **public:** decentralised public ledgers are permissionless, which means that anyone can access the network; and
- **immutable:** it is often not possible to edit or delete data on blockchains. Therefore, individuals cannot request that their data be deleted (as per “the right to be forgotten”), and it may not be possible to apply the principle that data should be erased when it is no longer ‘necessary’ (“storage limitation”). Considerations as to immutability in respect of permissionless blockchains are the same for permissioned blockchains, however, a permissioned network can be set-up to enable rectification and the deletion of data.

While the use of blockchains can present data uncertainties and challenges, the risks can be mitigated by using blockchains with access controls (permissioned blockchains), storing data off-chain, and the implementation of technical solutions (for example, encryption, verifiable computations, zero knowledge proofs, and digital identities). In each case, data protection considerations and sharing of data should be considered on a case-by-case basis, rather than on the basis of blockchain technology as a whole. This is the same in any case where personal data is shared via the use of technology, for example, it is not possible or practical to identify a single controller for all personal data shared on the internet. The UK government has also indicated an intention to deviate from GDPR rules as part of its post-Brexit transition, though current proposals do not appear to impact these areas of uncertainty.

## *Financial Crime, Attacks by Hackers, and Security Breaches*

Crypto in general is sometimes associated in the public mind with financial crime. This is also a serious concern for regulators, particularly in light of the recent FTX Trading Ltd bankruptcy (and allegations of unlawful activity).

The statistics in this section are taken from the crypto analytics platform [Elliptic's August 2022 Report on NFTs and Financial Crime](#).

There have been a number of high-profile scams relating to NFTs, but the publicity surrounding these belies how rarely they occur. \$8-9 million of illicit funds have been laundered through NFT-based platforms since 2017. This represents 0.02% of NFT trading activity originating from known sources, which is low relative to other asset classes. The perceived risk of NFT-based crime may therefore be higher at present than the actual risk. The issues that concern experienced NFT investors and service providers (and how they deal with them) include:

- **phishing scams:** a typical phishing method involves posing as a well-known NFT platform or market. Another involves scammers minting worthless NFTs and dropping them into the wallets of potential victims (known as “airdropping”). The scammers will claim that the NFTs can be redeemed for money, causing victims to navigate to the scammers’ phishing site and inadvertently sign transactions. It is important to undertake diligence before interacting with another party;
- **copyright/plagiarism:** some copyrighted works have been copied as the subject of NFTs. In response, many NFT marketplaces have introduced verified collection functionality to prove collection authenticity;
- **crypto mixers:** \$328.6 million (0.81%) of NFT trading activity originates from “obfuscation” services, such as crypto mixers (that is, software services that can be used to increase the anonymity of certain crypto transactions). Their use by threat actors engaging with NFTs further emphasises the need for effective sanctions screening by NFT platforms. Many firms will not accept any funds that have ever been through a mixer;
- **social media and messaging apps:** social media compromises make up 23% of all NFTs stolen in 2022. The growing availability of tailored malware that can bypass multi-factor authentication is thought likely to be partially responsible. Due diligence is the solution here, as is the case for the next four bullet points;
- **swapping scams:** fake NFTs are minted and users are defrauded into swapping their legitimate NFTs for these fake NFTs;
- **“rug pulls” also known as “exit scams”:** scammers establish an NFT project and detail their future plans in a roadmap to give the appearance of a legitimate project, but instead steal the funds raised and shut down the project early;
- **faults in the code:** these can be both deliberate and accidental; and
- **“wash trades”:** studies estimate that around 2% of all NFT-related trading involve wash trades. If a wash trader sells their assets to themselves for deliberately undervalued amounts, it could indicate an attempt to report a loss for tax purposes. If they deliberately overvalue their assets, it is indicative of an attempt to drive up the value of their NFTs, to induce a sale to others at a higher price. As all past sales and sale amounts are recorded on marketplaces, unsuspecting buyers may falsely interpret the artificially inflated sales as an indication that the NFT is worth more than it is.

Currently, theft accounts for a very small proportion of NFT-related trade. This is largely due to NFTs being one of if not the most transparent forms of digital asset, as one of their characteristics is that every purchase and sale, along with listing and sale price data, is permanently visible and traceable on the blockchain. In theory, this makes NFTs unattractive tools for laundering money, concealing stolen funds, or market manipulation in general. However, notwithstanding that an NFT’s transaction history may be capable of being traced, it is still possible that the identity of the ultimate owner or previous owners of the NFT (as distinct from the wallet addresses) cannot be traced. This is an important consideration for financial institutions in relation to KYC/compliance and sanctions.

The main risk facing well-intentioned NFT projects is hacking. Hackers are increasingly sophisticated, have ever-better technologies at their disposal, and coordinate with each other. Some hacking groups are connected to states sanctioned by the United Nations. There is a risk of hacker attacks on the IT infrastructure used by the provider, the platform and third-party service providers, as well as their essential networks and technologies. Any attack may result in:

- systems or services being unavailable and interruption of operations;
- data breaches;
- loss or theft of digital assets;
- other security breaches; and
- loss of consumer and investor confidence in the product and the technology generally, and, as a result, litigation actions and remediation costs.

By deploying a so-called Distributed Denial of Service (“**DDoS**”) attack, attackers can overload a network or a blockchain with a high number of requests and/or transactions and (temporarily) render the network or the corresponding blockchain unusable. If a critical transaction number is exceeded for a longer period of time due to a DDoS attack, users would not be able to access or use the platform during that period.

Risks can be mitigated through working with the cyber security experts in the digital assets industry and having adequate insurance in place (see Part 3, Section 3 (Market Solutions)). Further, increased collaboration by investigators and industry experts in the crypto ecosystem will also be a significant factor in responding to, and disrupting, these attacks. For example, US law enforcement and leading organisations in the cryptocurrency industry were able to seize more than \$30 million worth of cryptocurrency stolen by North Korean-linked hackers in September 2022. This marked the first time that cryptocurrency stolen by a North Korean hacking group had been seized. Finance firms will also be able to employ their existing experience of fighting fraud and bad actors, and the implementation of new digital technologies and assets (including NFTs) will need to be addressed in ongoing operational resilience work.

Most of the foregoing problems relate to unregulated investments rather than NFTs specifically. The larger point for financial institutions is that new psychological and technical attacks are tested against NFT and crypto platforms. They are a valuable lead indicator of the nature and origin of attacks that also come to traditional financial firms.

## RISKS SUMMARY

- Currently, instances of financial crime account for a small proportion of NFT related trade.
- As NFTs are a traceable form of digital asset, they are in theory unattractive for money-laundering.
- However, DeFi presents unique challenges and hackers are becoming more sophisticated
- NFTs are like any new technology, in that it takes time for all parties to get comfortable dealing with it.
- We expect financial institutions undertaking NFT projects to adopt a risk-based approach, starting with small scale or proof-of-concept projects.

## 2. Opportunities

The opportunities from using tokens and blockchain technology in finance are set out throughout this Report. It is still useful, however, to set out the conventional list:

- **simplification of financial market infrastructure:** introducing automation and removing parties that are not actual counterparties to a trade;
- **enhanced liquidity:** lowering technical barriers to trading and improving price discovery;
- **reconciliation:** because there is only one database, so everyone has the same information (or, more often in commercial projects, each counterparty has the same information). Further, reconciliation can occur in real time, as blockchains are available 24/7;
- **efficiency in asset management:** because assets can be designed to fit market demand exactly (for example, by splitting different cashflows relating to a single building);
- **fractionalised assets and democratising investment:** naturally democratisation must be subject to the usual caveats connected with the regulatory perimeter and, now, consumer duty obligations on firms. However, NFTs really do enable the promise of personalisation in products because better consumer information will be available and more choice can be given. The financial freedoms seen in the pensions industry and the UK government's pro-growth agenda make it likely that a period of innovation is starting;
- **reduction in costs:** as a consequence of the previous points (although, as set out above in Section 2(1) (Risks) above, tokenisation or digital assets projects do not immediately deliver a reduction in costs); and
- **secondary markets in private assets:** addressing enhanced liquidity. Markets are driven by liquidity. Liquidity is a function of volumes of accessible capital, confidence in available information and ease of trading. Digitalisation means that more investors of different types can participate in markets and have access to move information in real time. Trading hours are not limited to the working hours of human brokers. These developments aim to remove friction from secondary trading in investments in the same way it has been removed from online retail.

The opportunities have been fairly well rehearsed so we do not set them out in long form here. For example, the **Digital Issuance papers**, supported by the Investment Association, give a good detailed explanation of the current position.

Above all, however, there exists the opportunity to create new value, win new customers, make market infrastructure more efficient, and improve customer service. Financial services firms are now competing with technology firms for customers needing financial services, and the technology firms understand the materials that this Report explains very well.

## SECTION 4: ENVIRONMENTAL, SOCIAL, AND GOVERNANCE (“ESG”)

The environmental impact associated with the energy consumption of blockchain technology is well publicised in the media. ESG measuring and reporting are increasingly important to financial institutions and investors. However, not all tokens are environmentally problematic and, in fact, the technology can support ESG initiatives by providing better and more transparent information.

### *Environment*

Bitcoin has a large carbon footprint. The process used to create (or “mint”) bitcoins is energy intensive because it uses a “proof-of-work” consensus mechanism that rewards computing power.

Not every blockchain is alike. Some blockchain platforms are far less energy intensive. For example, Chia Network was selected by The World Bank’s Climate Warehouse to develop a blockchain which would act as a ledger for carbon offsets. The fact that Chia Network is less energy intensive played a role in The World Bank’s decision. However, projects have responded to criticism inside and outside the crypto community. Ethereum, the second most valuable blockchain protocol switched to a “proof-of-stake” model in September 2022 (the “**Merge**”), resulting in a considerable reduction in its associated carbon emissions. Ethereum has billed this the “biggest event in crypto history” and estimates that the move will cut its carbon emissions by over 99%.

The “proof-of-stake” consensus mechanism rewards membership of the command and requires less energy (a 2021 [UCL discussion paper](#) estimated that “proof-of-stake” models may use over 1000 times less energy than Bitcoin).

It is worth noting, however, that some of the sustainable protocols run on Ethereum, so while these protocols are themselves sustainable, it is also necessary to consider the blockchain on which they run.

Discussions on the energy consumption of different protocols (including comparisons between protocols using proof-of-stake and protocols using proof-of-work) are part of the wider concern with the “blockchain trilemma”. That is, blockchains aim to be decentralised, scalable, and secure. As a technical matter, however, (broadly speaking) no design can optimise for all three and so choices must be made on the trade-offs. Protocols using proof-of-work do, on a like for like basis, use more energy, but their proponents point out that they are more secure. These points remain the subject of intense debate among technologists and policymakers.

In short, technical advances are being made on the environmental impact of blockchains, but it remains a work in progress. On the other hand, the energy usage of businesses in the traditional financial services sector is already very high; so we need work to address this using blockchain technology that is sustainable from its source to its operation as part of digital transformation.

The source of the energy (renewable or fossil fuel generated) used to run a blockchain is also relevant when assessing its environmental impact. Many blockchain operations use alternative energy sources. Net-zero government initiatives, and increasing investment by financial institutions and investors, have further encouraged renewable energy use.

In addition, NFTs are used as a tool to facilitate ESG reporting. For example, JBS S.A. (the world’s largest meat processor) has implemented blockchain technology to track the origins of each group of cattle to ensure they are not from herds grazed on illegally deforested land. The data is then sent to an industry association to be validated. The potential applications to environmental reporting obligations are clear: NFTs are a method of permanent record-keeping and blockchain technology can be used to increase traceability. This could address regulators’ concerns about greenwashing and give momentum to these type of projects.

## Social

Blockchain technology and NFTs can have a positive impact on communities.

Trends in the commercial property sector, such as struggling high streets and a move away from office working have led to blockchain operations being set up in vacant units. NFTs have been used to publicise projects and create reward mechanisms to incentivise the creation of opportunities and enhance value for local communities. Community projects are designed to create local, well-paid jobs.

Community projects can be linked to renewable energy projects. By way of example, **Fasset** tokenises sustainable infrastructure assets, with an aim of allowing people from lower socioeconomic groupings - who may have difficulty gaining access to traditional finance - easy access to sustainable, ethical investments. The origin of many crypto projects is in democratised investment and sustainable infrastructure: an ambition for lower-risk assets that directly impact investors and their communities in a positive way.

The United Nation's World Food Programme platform **Building Blocks** is another good example. As "the world's largest implementation of blockchain technology for humanitarian assistance", the platform has been used to transfer \$325 million of cash transfers to refugees in Bangladesh and Jordan since 2017.

It is also possible to tokenise assets with social or cultural significance. In May 2022, the Vatican announced a partnership with metaverse developer Sensorium to create an NFT gallery in virtual reality hosting Vatican art, in order to democratise access to their art collection.

## Governance

The utility of NFTs for governance has been part of many early projects. NFTs are smart contracts and, like any smart contract, can be programmed to control the underlying asset which the NFT represents. That is, smart contracts can effect payment flows without human intervention and enable decision-making on a decentralised basis. They are also a store of information and a way of maintaining a permanent record.

NFTs can democratise the governance of a project. Governance tokens, typically issued on a one-token-one-vote basis, could be used to decide the appointment of project team members, set fee levels for services, and adopt or amend the rules governing of a project. Where NFTs are used to represent "shares" in an underlying asset, such as a community project, governance tokens could be used to control how that asset is managed. This can work in the same way as shareholders' voting rights in a company, but it can also extend to more day-to-day matters. It echoes the efforts of the asset management industry to increase stakeholders' engagement in corporate governance.

## ESG SUMMARY

- Blockchain networks are not all energy intensive and, in fact, have responded in criticism of their energy use more directly than most traditional firms.
- NFTs can be used to track and monitor ESG goals.
- Blockchain technology and NFTs can be used to drive change and investment in projects from large corporates to local communities.

# PART 3: LEGAL AND REGULATORY PRINCIPLES FOR TOKENS

## SECTION 1: FUTURE LEGISLATION

### *Law Commission: A Third Category of Personal Property*

In July 2022, the Law Commission demonstrated its intention to alter English law to better recognise and protect digital assets. In a departure from the current position, its main recommendation is the explicit recognition of a new, third category of personal property – to cover digital assets (see Appendix B (Legal Background) for an outline of the current English law position).

*“We should try to avoid the creation of a new legal and regulatory regime that will discourage the use of new technologies rather than provide the foundation for them to flourish.”*

said **Sir Geoffrey Vos**, Master of the Rolls (one of the most senior judges in the UK)

As provisionally proposed by the Law Commission in its [consultation paper](#), a **digital asset**:

- **is composed of data represented in an electronic medium, including in the form of computer code, electronic, digital or analogue signals;**
- **exists independently of persons (who may claim to own them) and the legal system (that could be relied on when trying to enforce rights relating to them); and**
- **is rivalrous (with divestibility an indicator rather than a separate criterion).**

NFTs should meet the requirements of (1) and (2) above and should also be able to meet the requirements of (3), provided that:

- in relation to identity NFTs, they are recognised as being capable of being owned as a matter of property law (akin to passports), and that divestibility does not prevent them from meeting the rivalrous criterion in terms of their “non-transferable” nature (although identity NFTs may be technically capable of transfer (e.g. between wallets held by the same owner or offchain), even if they are considered in the industry as “non-transferable”); and
- in relation to fractionalised NFTs, “owned by one person at any time” is read as applying to fractions of an NFT rather than the whole NFT.

As part of their analysis, the Law Commission state the view that “NFTs will take a leading, exploratory role in establishing property rights in data objects in mainstream and retail use”.

The finalised criteria in the Law Commission’s report, once published, will need to be analysed to determine their application to NFTs.

The Law Commission's **consultation paper** also deals with custody and collateral arrangements, among other "transactional" matters relevant to finance firms.

The Law Commission's thought-leadership has proved influential outside the UK too. In October 2022, the Chief Judge of the US Bankruptcy Court for the Southern District of New York (in the on-going US bankruptcy case in relation to crypto lending platform Celsius) referenced the Law Commission's **consultation paper** which might be considered in this case because the legal principles in the consultation, while not binding or applicable on US courts, may be persuasive.

The Law Commission consultation closed on 4 November 2022, and its report is expected to be published in 2023.

### *UKJT: Digital Securities*

In February 2023, the UKJT issued a **Legal Statement** on digital securities (shares or bonds which are constituted or evidenced using a blockchain).

The new Legal Statement clarified English law support for the issuance and transfer of digital securities using a system deploying blockchain or DLT and the types of digital security models that English law can support. In summary:

- English law can accommodate (1) the issuance of digital securities using a blockchain or DLT-based system, (2) digital bonds circulated on a public blockchain without custodians, and (3) the on-chain transfer of digital equity securities;
- many digital bond use cases are not problematic and are unlikely to give rise to novel legal issues due to their contractual nature; particular legal issues identified can be dealt with by appropriate drafting and structuring;
- regulatory identity requirements are not an obstacle to digital bonds; the fact that some blockchains can used pseudonymously does not mean the bond transactions also need to be pseudonymous from an AML perspective. For example, identification could be specified as a condition of issue or transfer of bonds, as set out in the contract;
- digital equity securities are more challenging because of the requirements of the applicable companies legislation, the Companies Act 2006;
- a fully decentralised and permissionless blockchain or DLT-based system cannot currently be used as a register of members for digital equity securities (owing to the prescribed maintenance obligations relative to the register of members under the Companies Act 2006), however a permissioned system could be; and
- it is acknowledged that other jurisdictions have introduced specific "blockchain laws" to support digital securities, but that "English law (like other common law systems) does not necessarily require statutory intervention in order to support new asset classes or financial structures".

As outlined above, NFTs will only be equity or debt securities (and therefore "security tokens") if they have the characteristics of a traditional security.

Government-led bodies such as the Law Commission and the UKJT are paving the way to the certainty required for digital securities to be widely adopted in capital markets. English common law is flexible and is already capable, without a bespoke framework, of accommodating many digital security structures. Further clarification of what is possible under the existing system will keep the UK competitive.



## FUTURE LEGISLATION SUMMARY

- The existing English common law framework is flexible, iterative, and can accommodate digital assets without requiring a new legal regime.
- Substantive changes are likely to be made to English property law to accommodate digital assets (including NFTs).
- Government-led bodies are responding to the requirements for certainty in specific areas to support innovation and keep the UK competitive in this space.

## SECTION 2: FUTURE REGULATION

As set out in more detail Appendix C (Regulatory Background), under the current financial regulations in the UK, **most NFTs are likely to be unregulated tokens** (on the basis that NFTs are unlikely to be e-money or securities; albeit if NFTs have the characteristics of securities they will be regulated) and will not fall inside the regulatory perimeter.

UK Finance members' views on the UK's regulatory approach to date in relation to cryptoassets generally are set out in their response to the Treasury Select Committee inquiry on the cryptoasset industry and in the response to the DCMS consultation on NFTs that closed in January 2023:

- much of the change is being undertaken in a patchwork way, with industry often being pulled in different and competing directions by regulators. One future example relates to the proposed additional powers of the Bank of England in the cryptoasset space for systemic providers: this landscape could become more complicated, particularly where it overlaps with the FCA;
- without clear transparency on roles, responsibilities and priorities, this landscape could become more confusing;
- there are concerns regarding the technical skills and level of knowledge of regulators in this space given the emerging complexity and need for differing approaches to regulation;
- any standards and regulatory decisions should take into consideration the role of different participants in the digital currency ecosystem and how their risks may vary from that of a typical bank (see the 'The Future Regulation of Unbacked Cryptoassets in the UK', a report by UK Finance and KMPG which was produced and published on 15 December 2022 (the "**Future Regulation Report**") in support of the principle of "same risk, same regulatory outcome" on page 4);
- regarding the wider cryptoassets space, regulation should strike the right balance in relation to the DLT technology that underpins cryptoassets generally; and
- due to the lack of regulation of NFTs as a speculative investment, it can be unclear to consumers what is a genuine opportunity. This is less relevant in the context of this Report, which considers the utility of NFTs in traditional financial services rather than NFTs as an investment.

### 1. Financial Services and Markets Bill

The financial services regulatory regime in the UK is described as "technology neutral." In April 2022, HMT published a **response to its consultation and call for evidence** launched in January 2021 on the UK regulatory approach to cryptoassets, stablecoins, and DLT in financial markets. This report stated that "*the [UK] government proposed a staged and proportionate approach to cryptoasset regulation, which is sensitive to risks posed and responsive to new developments in the market*".

In July 2022, the **Financial Services and Markets Bill** (the "**FSM Bill**"), the largest piece of financial services legislation for over two decades, was introduced into Parliament. When the UK left the EU, the body of EU legislation that applied directly in the UK at the point of exit was retained and became UK law. This approach was taken to ensure the continued operation of UK legislation following Brexit but was not a long-term solution (particularly because the Prudential Regulation Authority (the "**PRA**") and FCA are currently unable to make changes to rules set out in retained EU law). The FSM Bill establishes HMT's Future Regulatory Framework (the "**FRF**"), giving the FCA and PRA new powers and objectives, providing the legislative structure for the repeal of EU retained law and its transfer to the FCA and PRA rulebooks. The FRF gives the UK flexibility to be able to regulate cryptoassets according to its own policy.

In October 2022, an amendment to the FSM Bill was proposed by Andrew Griffith MP (the Financial Secretary to the Treasury) at the Committee stage in the House of Commons that would bring "cryptoassets" within the scope of the UK financial services regulatory perimeter. In short, this could mean that cryptoassets are regulated in a similar way to more

traditional securities such as shares and bonds. If implemented, this would lead to a significant change in the regulation of cryptoassets in the UK. Since both Houses must agree on the text of a bill before it can become an act, this proposed amendment is still subject to further negotiation: the amendment will need to be agreed by the House of Lords (who may agree, reject, or propose alternative amendments). HMT would also need to take steps to make changes to the Financial Promotions Order.

The following definition of “cryptoasset” proposed in the amendment is similar to the current definition in the UK’s money laundering regulations, but is wider in its reference to technology supporting the recording or storage of data, which *may* include DLT (See Appendix C (Regulatory Background)):

*cryptoasset* means “any cryptographically secured digital representation of value or contractual rights that:

- a) can be transferred, stored or traded electronically, and
- b) that uses technology supporting the recording or storage of data (which may include distributed ledger technology)”

All NFTs will be a “cryptographically secured digital representation” and meet the requirements of (b).

Most NFTs will be a “representation of value or contractual rights.” By way of example, a tokenised share would represent the share and the contractual rights associated with that share. On the other hand, a consumer engagement NFT or an identity NFT might not necessarily represent any value or contractual rights.

Most NFTs should meet the requirements of (a), including identity NFTs, as they will be capable of being stored electronically, and may also be capable of being transferred (see Section 1 above and Appendix A (Financial Services Use Cases, Examples, and Innovation Ideas)).

In the same amendment, it is proposed that HMT have the power to amend the definition of cryptoassets.

At the time of writing, the FSM Bill is making its way through the parliamentary process and therefore the text is still subject to amendment.

The **Economic Crime and Corporate Transparency Bill** (the “**ECCT Bill**”) (which, at the time of writing, is making its way through the parliamentary process) is intended to make it quicker and easier for UK law enforcement agencies, such as the National Crime Agency, to seize, freeze and recover cryptoassets which are found or suspected to be the proceeds of crime or associated with illicit activity such as money laundering, fraud and ransomware attacks. The definition of “cryptoassets” in the ECCT Bill largely mirrors the definition on the FSM Bill (set out above), save that it references “distributed ledger technology” rather than “technology supporting the recording or storage of data (which may include distributed ledger technology)”.

## 2. HMT Consultation – Future Financial Services Regulatory Regime for Cryptoassets

On 1 February 2023, HMT launched its much anticipated **consultation on the future of the financial services regulatory regime for cryptoassets** (which closes for submission on 30 April 2023). In summary:

- as noted above, the FSM Bill includes a definition of “cryptoasset” for the purposes of the UK’s financial services regulatory framework. However, the consultation paper does not specify the exact proposed definition of “cryptoassets” that will be included within the regulatory perimeter;
- any of the following cryptoassets could be subject to financial services regulation where being used for the financial services activities: exchange tokens, utility tokens, security tokens, NFTs, (fiat-backed) stablecoins, asset-referenced tokens, commodity-linked tokens, crypto-backed tokens, algorithmic tokens, governance tokens, and fan tokens;
- HMT’s starting point is that crypto-backed tokens should be regulated in the same way as unbacked cryptoassets such as Bitcoin;
- when the broader cryptoasset regulatory regime being consulted on comes into force, HMT expects firms undertaking regulated cryptoasset activities to adhere to the same financial crime standards and rules as apply to equivalent or similar traditional financial services activities;
- in terms of territorial scope, HMT proposes to capture cryptoasset activities provided in or to the UK. This means the new regulatory regime would capture activities provided by UK based firms to persons based in the UK or overseas, as well as activities provided by non-UK firms to UK based persons. As such, the regulatory perimeter would be widened (albeit HMT have noted there may be certain exemptions available, such as reserve solicitation);
- the government proposes to establish an issuance and disclosures regime for cryptoassets as part of the intended reform of the UK prospectus regime (the Public Offer and Admissions to Trading Regime). and tailored to the specific attributes of cryptoassets;
- the government proposes to follow a similar approach to that for securities and apply regulation when the asset is admitted to trading on a regulated cryptoasset trading venue and becomes exchangeable for fiat currency, or subject to a public offer. In line with the approach applied to securities, HMT does not intend to directly regulate the “creation” of unbacked cryptoassets under financial services regulation;
- for admission of cryptoassets to a UK cryptoasset trading venue, the government is proposing to adapt the multilateral trading facility model from the intended reform of the UK prospectus regime. However, where there is no issuer (for example, Bitcoin), the trading venue would be required to take on the responsibilities of the issuer if they wish to admit the cryptoasset to trading;
- the consultation paper states that custody represents one of the key aspects of the cryptoasset lifecycle in terms of providing investors access to, and safe storage of, their assets. As such, HMT proposes the application and adaptation of existing frameworks for traditional finance custodians under the current regulatory regime for cryptoasset custody activities, making suitable modifications to accommodate unique cryptoasset features, or putting in place new provisions where appropriate; and
- in relation to the regulation of cryptoasset lending and borrowing activities, HMT believes there is a strong case for developing a cryptoasset lending and borrowing regime; which would be through the creation of a newly defined regulated activity, “operating a cryptoasset lending platform”.

Further, the consultation paper uses the following definition of NFTs:

**“Non-Fungible Tokens (NFTs)** are cryptoassets which confer digital ownership rights of a unique asset (e.g. a piece of digital art), using a technology such as DLT to support the recording or storage of data. NFTs do not provide the rights or features associated with a security token and do not function as a means of payment.”

As outlined in this Report, it appears unlikely that NFTs would be regulated tokens for the purposes of the current regulatory regime. However, as the technology, NFT standards, and the use cases develop, we would suggest caution is exercised in stating that no NFT could have the characteristics of a regulated token. Rather, the characteristics of each token should be considered and analysed on a case-by-case basis.

### 3. Inter-Governmental Consultations

There are also various inter-governmental consultations being carried out at present:

1. the All-Party Parliamentary Group (APPG) Crypto Inquiry 2022 closed for submissions on 5 September 2022. It focused on a range of areas including: the UK's current approach to the regulation of crypto and digital assets; the UK government's plans to make the UK the global home of crypto investment; and the role and current approach of the UK regulators;
2. the Treasury Select Committee Inquiry in the Crypto-asset Industry closed for submissions on 21 September 2022. It asked for responses on: the role of cryptoassets in the UK (including opportunities and risks for consumers and businesses); the potential impact of DLT on financial institutions and financial infrastructure; and the regulatory response to cryptoassets from the UK government, the FCA and the Bank of England, considering how regulation could be balanced to provide adequate protection for consumers and businesses without stifling innovation; and
3. the Department for Digital, Culture, Media and Sport ("DCMS") consultation on NFTs, which looked into the operation, risks, and benefits of NFTs and the wider blockchain. The focus of the inquiry was the risks of the NFT market to NFT investors, particularly the vulnerable. The questions posed in its call for evidence (which closed in January 2023) were as follows:
  - is the UK's light-touch NFT regulation sufficient?
  - what are the potential harms to vulnerable people of NFT speculation?
  - do blockchains offer security to British investors?
  - what are the potential benefits to individuals and society of NFT speculation?

### 4. Alternative Approaches

The **Digital Issuance papers** explore whether regulation can be made more effective if there is a consistent form of representation for digital assets as this would facilitate the implementation of a single operating model across asset classes. They also explore the possibility that conventional compliance restriction could be "at the nodes, rather than on the tokens" (for example, where tokens cannot be operationally issued by a node that cannot, as a maker of compliance with regulation, issue them and tokens cannot be sold to a node that is not allowed to own them). This is proposed as an alternative to embedding the full compliance requirements into each token/smart contract, but it does require that the reference data exists at the node for the compliance terms on the tokens to check

## FUTURE FINANCIAL REGULATION SUMMARY

- The financial services regulatory regime in the UK is described as "technology neutral".
- We are at a time of fundamental change for the regulatory landscape in the UK post-Brexit.
- The government and government-led bodies are responding to the requirements for certainty in the regulatory sphere.

---

## SECTION 3: MARKET SOLUTIONS

As practice develops and blockchain technology and tokens become more prevalent in traditional financial services, there are several practical steps and procedures that market participants will take.

### *Standard Models*

We anticipate that standardised issuance methods and models will be developed. For example, the Law Commission (in their **Advice to Government on Smart Legal Contracts**) have provided a non-exhaustive list of issues that parties may wish to include in, or consider when negotiating, smart legal contracts. For example, the importance of choice of law and the governing law of the contract, and whether a non-conflict clause is to be included in the natural language version of the contract and the code that specifies whether the natural language version of the contract or the code prevails if there was a conflict between the two. These standardised issuance methods and models will reduce time and transaction costs.

### *Industry Experts and Professionals*

Industry experts and professionals in cyber security, IT, and law will be required to audit and undertake due diligence on projects and platforms; identifying possible risks and strategies to mitigate them. Given the risk factors outlined in Part 2, Section 3(1) (Risks and Opportunities), accepted risk management across the financial industry will develop.

Market participants will establish practices to undertake due diligence on vendors and third-party providers (for example, the choice of underlying platform).

Lawyers who are specialists in this area will be required to:

- carry out due diligence on the policies and terms and conditions of vendors and third-party providers; for example, examining policies on business continuity, data governance, security and attack prevention, and procedures for lost or stolen tokens. As the markets on blockchains are open 24/7, and transactions automatically execute pursuant to the relevant smart contracts, these policies must provide for a shorter turnaround time for response and recovery;
- review and negotiate smart contracts, co-ordinating with IT experts who can translate the natural language version of the contract into code and independently analyse and audit the smart contract code; and
- advise on matters of data protection and intellectual property rights associated with NFTs and their transfer.

In time, the reputation of vendors and third-party providers will become established as the market develops. As this is still a nascent area for financial institutions, we anticipate we will see institutions partnering with specialists. We have seen some recent examples of this in the market, such as State Street with Lukka and Copper, and BlackRock with Coinbase.

## *Insurance*

NFT insurance (and DeFi insurance) is developing. There are cryptoasset insurers in the UK (such as Aon and Coincover) who seek to protect the cryptoassets of individuals and investors. There are also a number of decentralised insurance protocols such as Unslashed, Nexus Mutual, and Etherisc. As cryptoassets and blockchain technology become more widely accepted elements of portfolios of institutional investors, it is clear that the demand for insuring these assets will increase.

This has already been noticed by some TradFi market participants. In 2020, the insurer Lloyd's of London partnered with Coincover to create a policy which would protect cryptocurrency held in wallets from theft or hacking. In May 2022, a Lloyd's of London insurance broker (Superscript) announced the launch of a product called "Daylight", a dedicated product for businesses specialising in digital assets, blockchain and DLT. Beyond this initial offering of cover for technology liability and cyber insurance, further expansion is planned.

It is sound practice to make sure valuable assets are insured. Cryptoassets are no exception.

## *Custody*

Firms like Copper (based in the UK), Fireblocks (headquartered in New York), and others provide custody services for digital assets. The services combine technical, operational, and business services.

Partnerships (of various types) with financial institutions are a feature of this market, such as that between Copper and State Street entered into in late 2021.

## **MARKET SOLUTIONS SUMMARY**

- Market practice and industry standards will develop as more financial institutions invest in blockchain technology.
- Co-ordination and partnerships with existing industry and technical experts and lawyers will result in solutions being found and technical innovations being made to address current hurdles or concerns.
- Engagement and investment by the traditional financial industry will serve to develop the UK's position as a digital assets hub.



## SECTION 4: REGULATORY RECOMMENDATIONS

Generally, from a practical perspective in the regulatory sphere:

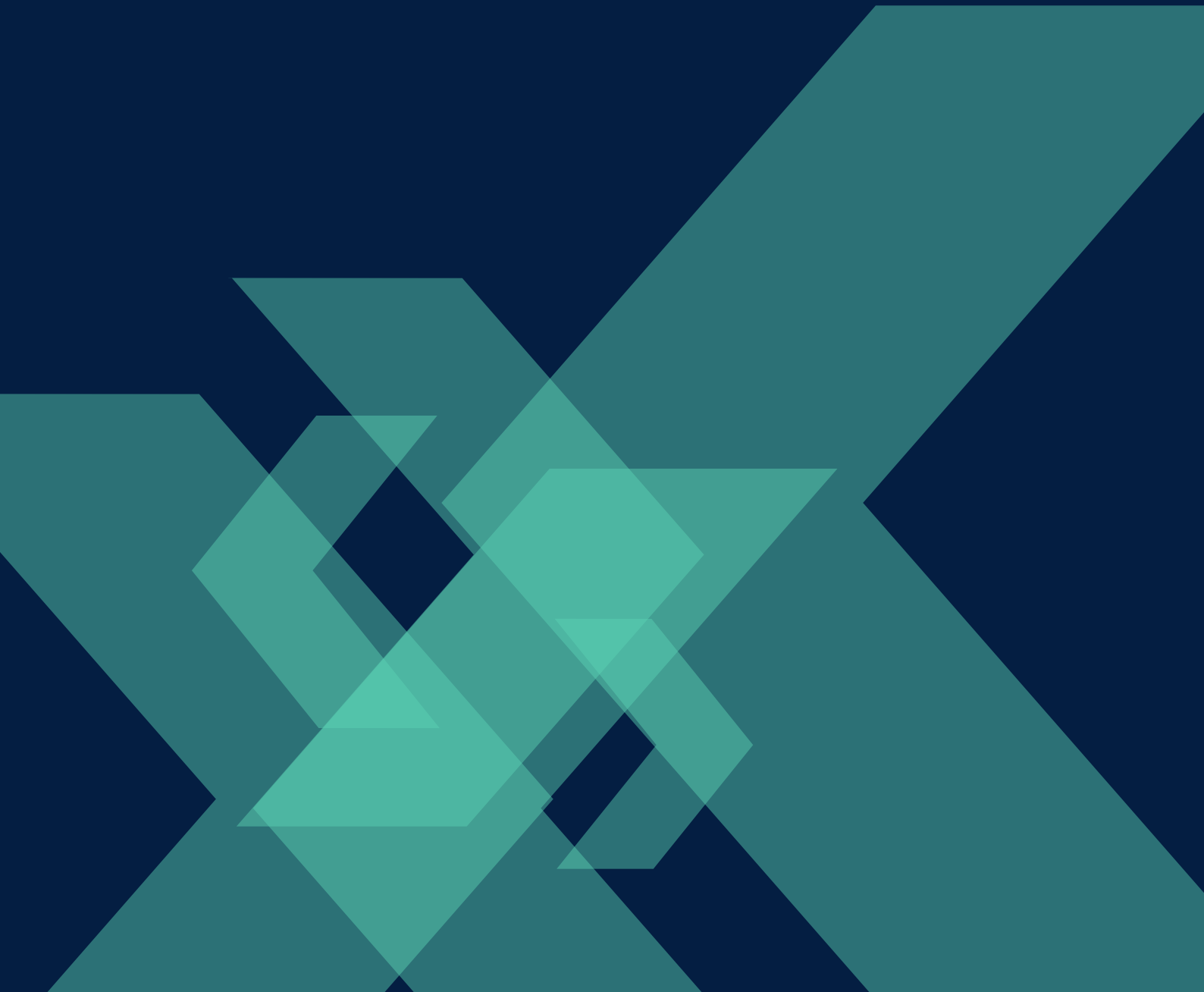
- we would encourage early engagement and dialogue with the FCA on transactions from all transaction parties on regulated projects (or aspects of projects or activities that fall within the regulatory perimeter);
- understanding a network's protocols will be important for transaction parties in terms of their interactions with the regulators - for example, the differences between permissioned and permissionless blockchain and all other technical characteristics;
- the FSM Bill introduced the ability to establish FMI sandboxes(s), enabling financial market infrastructures to, for example, test their activities using new technology (including DLT) (the FMI sandbox(es));
- we can and should learn from the experiences in other jurisdictions, for example the EU DLT Pilot Regime (the equivalent to the FMI sandbox(es)). As outlined in Appendix D (International Developments), most, if not all, of the six tokenisation platforms operating in Singapore have graduated from MAS's regulatory sandbox. There is a substantial amount of cooperation around the approach to cryptoassets, stablecoins, and CBDCs on the global stage. The UK regulators are currently taking a leading role in the following forums: the Financial Stability Board, the CPMI-IOSCO, The Bank for International Settlements, the G7, and the G20; and
- we echo and support the guiding principles and conclusions in the Future Regulation Report (pages 9 and 23). In particular, the UK regulators need to respond and move in a more agile way in order to create or retain a competitive advantage for the UK; uncertainty or a lack of clarity will result in missed opportunities.

In relation to the regulation of NFTs specifically:

- we would encourage regulators to distinguish between classes or sub-sets of NFTs, and to distinguish between NFTs used for a financial services activity and NFTs used for a non-financial services activity. For example, some of the questions posed in the DCMS's call for evidence referred to in Section 2 (Future Regulation) may (intentionally or unintentionally) cover both NFTs as speculative investments and identity NFTs. The call for evidence does not set out a working definition of an NFT for the purposes of their inquiry. As we outlined in Part 1, NFTs are not all the same;
- in addition to the point above and taking into account the principle of "same risk, same regulatory outcome", technical terms should be well understood by regulators such that the different classes or sub-sets of NFTs are not conflated or confused. In connection with this point, while we agree with "same risk, same regulatory outcome" as a general principle, it does require a thoughtful case-by-case analysis of whether the activities are genuinely the same, particularly as DeFi business models continue to test the boundaries;
- we do not recommend that NFTs are regulated based solely on the basis of their non-fungible characteristic (that is, regulation only because they are NFTs). This has the potential to create an unclear regime and would be inconsistent with a principles-based, risk-based, and outcomes-based approach to regulation. This is in line with the existing regulatory regime on tokens, where the characteristics of that token are the determining factor;
- however, use of an NFT as a wrapper should not be capable of obfuscating the regulatory regime applicable to the "wrapped" assets. For example, a stablecoin could in theory be wrapped in an NFT which could then enable it to bypass parts of the current regulatory regime;
- an NFT that is a financial services product (by providing rights to a financial asset or operates in a similar way to a financial instrument) ought to be subject to very different (and tighter) regulation compared to an NFT that is not a financial services product. This is in line with the current regulatory regime on tokens, where the characteristics of that token are the determining factor;

- 
- in terms of the financial promotion regime, assuming the NFT market grows, we are of the opinion that it will be essential for it to deal with NFTs given the potential for consumer harm (particularly in relation to NFTs as a speculative investment, although that is not the focus of this Report); the current criteria for qualifying cryptoassets is restricted to fungible cryptoassets;
  - we acknowledge that some UK Finance Members believe that it may not be appropriate for all types of NFTs to fall within the regulatory perimeter. Any proposed future UK regulation should clearly specify the criteria by which the perimeter will be defined. A proportionate approach, with a degree of flexibility to take into account potential risk factors (such as the potential for the NFT to become systemic), is considered to be a sensible approach; and
  - we can and should learn from the experiences in other jurisdictions. The potential difficulties of categorising tokens that fall outside or inside the regulatory perimeter and the impact of this categorisation on NFTs can be seen in the EU's approach (see Appendix D (International Developments)). The regulators in the UK have the benefit of being able to analyse the approach taken by the EU in MiCA, while taking the opportunity to pursue a new or different approach. We would recommend that this approach is nuanced, taking into account the broad family of digital assets.

# APPENDICES



---

## APPENDIX A: FINANCIAL SERVICES USE CASES, EXAMPLES, AND INNOVATION IDEAS

The use cases, examples, and innovation ideas outlined in this Appendix are given for illustrative purposes only, and are not an endorsement of any business, technology, or product: in particular, no separate regulatory analysis of the projects has been undertaken for this Report.

### *Consumer Engagement*

Financial institutions do not always find it easy to make customers feel favourably towards their brands or spend time on their websites. Well-designed NFT projects can help with this. Many brands provide examples.

FIFA, football's global governing body, launched an NFT platform for digital collectibles as part of its strategy for the 2022 World Cup. The platform, named FIFA+ Collect, allowed holders of NFTs opportunities to engage with teams, players and "moments" from the tournament. FIFA+ Collect will live on Algorand (a blockchain platform accessible via multiple currencies and payment methods).

### *Loans, Liquidity, Derivatives, and Valuation*

The NFTs referred to in this section are generally of the type that represent a speculative investment, and are included for illustrative purposes.

#### **Greengage**

---

aims to bridge the gap between cryptoasset companies and traditional finance. Greengage intends initially to focus on offering fiat deposit accounts to largely unbanked cryptoasset companies. Thereafter, Greengage aims to expand its services by providing fiat loans to SMEs. In the long-term, Greengage's goal is to expand its product offering to include financing options across both fiat currencies and cryptoassets.

#### **Zumer**

---

is a secured lending platform that provides loans against NFTs. Borrowers are able to put up NFTs of various types as security for loans offered through the platform, and are offered liquidation insurance to cover for extreme market conditions. Lenders offer loans based on credit-scoring performed by the platform. The platform includes a provisioning pool for lenders which compensate for default before the underlying security is sold.

#### **NFTfi**

---

is a decentralised marketplace that allows users to lend and borrow on a peer-to-peer basis. Borrowers are able to put up NFTs of various types as security for loans offered through the platform, and are offered interest rates and payment terms by lenders. For the term of the loan, the borrower's NFT is transferred into an escrow smart contract. When the loan with interest is repaid, the NFT is returned to the borrower's wallet. If the payment terms are not met, the NFT is transferred to the lender's wallet.

---

## **BendDAO**

is a peer-to-pool lending platform. Lenders deposit cryptocurrency onto the platform (to be lent to borrowers) and earn interest on their deposited funds. Borrowers deposit high-value NFTs that have been approved by BendDAO onto the platform as security. The borrower can borrow up to 40% of the NFT's "floor price". If the "floor price" of the NFT declines and nears to the original value of the loan, the NFT can be liquidated and put up for auction. In this event, the borrower has 48 hours to repay the loan. If the borrower fails to repay the loan, the NFT is put up for auction and bidders can bid starting at 95% of the NFT's "floor price".

---

## **sudoswap**

is a platform that uses an automated market maker, liquidity pools, and bonding curves to aim to increase the liquidity of NFTs. If there is a liquidity pool available to purchase a seller's NFT, the seller can receive payment in cryptocurrency. sudoswap has buy-only, sell-only, and buy-and-sell liquidity pools. Users can set their pools to utilise a linear or exponential bonding curve to determine the price of the NFTs, which increase and decrease with supply and demand as the trades occur.

---

## **nftperp**

is a project that would allow the trading of futures contracts for top NFT collections, using cryptocurrencies as security. The project would allow traders to short (and therefore hedge) their positions, and would also enable fractionalisation of NFTs so that investors can buy a small "portion" of an NFT. The project is in pre-launch.

---

## **Abacus**

is a liquidity-backed valuation system where traders act as assessors of value of NFTs by allocating capital as value attributable to the NFT. This system rewards appraisers for accurate assessments, and offers liquidity to the NFT owners. The method aims to address some of the issues in valuing NFTs, such as dependency on third party estimations. The project is in pre-launch.

## *Compliance*

---

### **Securrency**

provides blockchain products for the tokenised issuance and trading of digital assets, with a focus on regulatory compliance and interoperability. Security tokens minted with its Compliance Aware Token ("**CAT**") protocols are self-governing and cannot be traded or transferred between wallets that do not comply with the relevant regulatory rules associated with those tokens. Securrency's technology interlinks legacy systems and new infrastructures, meaning the CAT protocols can be transferred between a number of distributed ledgers such as Ethereum, Stellar, Ripple, and GoChain.

Blockchain technology is being used by financial services firms to ensure compliance with regulations. As firms digitise, and outsource regulated activities, it becomes harder and harder for boards to “look inside the box” and be able to perform their fiduciary duties.

NFTs can be used to integrate physical and digital compliance evidence from internal and external sources, to provide an immutable chain of custody that helps to provide this assurance to boards and regulators. An example of this is the **Digital Cognate** RegTech, ACIA platform that sets out to assist chief risk officers deliver transparent board-level assurance of compliance to policy and regulation.

### *Smart Contracts*

The **Chainlink** protocol provides decentralised oracle networks (referred to as “**DONs**”) which connect smart contracts to off-chain data. These DONs bridge the real-world to the blockchain world and aim to give certainty to participants that data flowing in and out of hybrid smart contracts does not come from only one central, humanly alterable, data source. The nodes that run on the Chainlink protocol can be used to facilitate a verifiable random function (referred to as “VRF”) for NFTs that can be used to distribute rare NFTs and assign randomised attributes to NFTs. This provides participants with access to auditable evidence that their NFT assets are created and awarded using theoretically tamper-proof randomness. Additionally, participants can create dynamic NFTs (referred to as “dNFTs”) which have the ability to have their underlying metadata change over time or in response to changes in external conditions, while retaining their unique NFT smart contract ID.

### *Identity NFTs / Soulbound NFTs*

The key characteristic of an identity NFT or a soulbound token (referred to by some as “non-transferrable NFTs”) as compared with other NFTs is that identity NFTs/soulbound tokens are intended to be non-transferable and are not intended to have a market value. By “non-transferable”, generally we mean that they are designed to be (1) associated with only one wallet address, (2) transferable only between particular wallet addresses, or (3) only transferable off-chain. As such, they have been described as “non-transactional” in nature. These types of NFTs are still developing, so each such NFT may have design or operational variations within this sub-set of NFTs.

The importance of identity NFTs in the context of privacy requirements has already been recognised in the blockchain community. Theoretically, soulbound tokens could be the building blocks for how financial institutions will interact with individuals in the future, starting with KYC.

**Ethereum** are developing a new form of personalised token which will be called a “**soulbound token**”. The soulbound token protocol will be similar to existing NFTs, however, the underlying smart contract will be designed from inception to mirror identity NFTs (for example, prohibiting transfer and amendment after minting). Their possible use cases include managing medical records, storing digital ID cards or memberships, and certifying achievements (such as job history or education).

In 2022, **Binance** launched the **Binance Account Bound** (“**BAB**”) token on the Binance SmartChain. Binance users who complete a KYC process can mint these tokens that function as their credentials. BAB tokens cannot be transferred from one wallet address to another, are revocable by the users, and users can only have one BAB token at any time.

**Goldfinch** is a decentralised, globally accessible credit protocol. The protocol makes crypto loans without requiring crypto collateral and determines the creditworthiness of borrowers based on the collective assessment of other participants, taking into account off-chain assets and income. It is different from other lending models like Aave, which requires crypto collateral. Borrowers propose loan terms, which are then funded by the Goldfinch community of investors. Goldfinch have developed Unique Identity (UID), a non-transferrable NFT representing know-your-customer, know-your-business, and/or U.S. investor accreditation verification on-chain. It follows ERC-1155 standards, and is freely usable by any other protocol. No personally identifiable data is stored on-chain. Borrowers have a number of incentives to repay, including their public on-chain history, the desire to continue borrowing from Goldfinch, off-chain legal agreements, and the risk of losing access to investment capital if they consistently miss repayments. Goldfinch represents a hybrid between traditional lending models and crypto: loans are advanced against real world assets so it has more in common with bank lending models than most of the crypto industry. It is more widely used in developing countries but that is not the only use case.

**PhotoChromic.io** technology establishes online KYC verification through the use of live photos, documentation, and “liveliness checks”. Instead of returning a package of KYC data to a bank or KYC service provider, the PhotoChromic algorithm hashes (that is, encodes) the verified identity onto the blockchain and mints an identity NFT for the user, recording the user’s KYC-verified identity on an NFT that cannot be transferred or amended. The identity NFT is permanently embedded into the user’s wallet.

In a **report** issued in December 2022 by crypto exchange Binance, identity tokens are referred to as part of the “Decentralized Social” subcategory of digital assets (page 45 of that report includes other examples of non-transferable and transferable identity and reputation tokens in this subcategory).

In a traditional financial services context, identity NFTs could be designed to contain KYC information verified to a standard that meets relevant regulatory requirements. Financial institutions could develop identity NFTs that include customer-specific banking products that reside remotely in the digital wallet of the customer. These may include credit facilities for use online and in the metaverse. An identity NFT that comprises a KYC-verified identity and a smart contract that manages available funds is like the blockchain credit or debit card. This card NFT would then travel with the wallet owner across the metaverse.

## *Electronic Trade Documents*

In March 2022, the Law Commission proposed **draft legislation** to allow for the recognition of electronic trade documents (such as bills of lading and bills of exchange) against the **current legal backdrop** that is described as “**archaic, inefficient, and wholly unsuited to a world in which processes and transactions are increasingly in digital form**”. The Electronic Trade Documents Bill (“**ETD Bill**”) was introduced in Parliament on 12 October 2022 and, as at the time of writing it is making its way through the parliamentary process.

As is outlined in Appendix B (Legal Background), under English law NFTs are not capable of being possessed. However, it is the possession of the trade document itself which entitles the holder to claim the benefits of the rights or obligations recorded in that document. The Law Commission describes this as the “possession problem”, and as such international trade currently operates largely using a paper-based system.

The ETD Bill sets out the criteria for an electronic trade document (table summarising these criteria given below). Taking into account the requirements and the characteristics of an NFT, NFTs could be used as electronic trade documents.

Criteria	NFT Characteristic
The information in electronic form must be the same as would be required in a traditional paper document.	An NFT is a record of information, the code on a blockchain can include any programmed information.
The system for electronic documents must be reliable.	Blockchains are immutable, improving the fraud and risk analysis.
The electronic trade document must be protected against unauthorised interference or alteration (the “integrity” requirement).	Blockchains are immutable.
The electronic trade document must be capable of exclusive control.	Only the person with the private key can control the NFT to which the key relates.
The electronic trade document must be “divestible” (the document/control of the document must be capable of being transferred).	An NFT (other than an identity NFTs subject to their design) is easily transferred; the smart contract can be programmed to allow for transfer and to specify conditions to be satisfied to complete a transfer.
The electronic trade document must be distinguishable from any copies (to avoid the issue of “double spending”; that the same asset once transferred by the holder cannot be transferred again by that same holder).	An NFT is unique and it is “rivalrous”, (only one person can use or hold it at any time, to the exclusion of anyone else). Fractions of an NFT can also be considered “rivalrous” from a legal perspective.
It must be possible to identify the persons that can exercise control over the electronic trade document.	The wallet that controls the NFT(s) can be verified on the blockchain, each NFT has a unique, individual ID, and the transfer history and ownership is traceable and recorded on the blockchain indefinitely. Although, in DeFi you might not know the identity of the owner but should know the identity of the wallet.

**Trade instruments are being rapidly digitalised.** In 2020, the International Trade and Forfeiting Association introduced a new digital electronic payment undertaking, as part of its Digital Negotiable Instruments initiative (“**DNI**”). This aims to fulfil the requirements of a traditional negotiable instrument and function as a digital equivalent of a bill of exchange or promissory note. In 2022, Lloyds Banking Group announced the completion of the UK’s first transaction using a digital promissory note purchase under the DNI, partnering with Swedish digital documents firm Enigio to carry out a pilot transaction initiated and completed on the same day, involving the sale and purchase of land worth £48m.

## FINANCIAL USE CASES SUMMARY

- Tokens have a wide range of potential use cases and application.
- Both traditional banks and crypto-native start-ups are trying new things including new products that create new value and experiment with solutions to traditional issues in finance.
- NFTs could be used as electronic trade documents.



## APPENDIX B: LEGAL BACKGROUND

### *Are NFTs recognised by the law?*

There are two important characterisations relating to NFTs under English law:

1. between (a) things that can be touched (“tangible property”) such as a car and a house, and (b) things that cannot be touched (or, as the law describes it, possessed) (“intangible property”) such as intellectual property, contracts and goodwill; and
2. between (a) “things in possession”, that is property whose ownership can be demonstrated by its owner having it under physical control, and (b) “things in action”, that is property whose ownership must (ultimately) be demonstrated by a form of action in court. If that sounds extreme, it is in fact the category of most assets held by financial institutions: contracts such as equity or debt securities, bank account balances, or rights to repayment of debts.

Therefore the following can be said about tokens (including NFTs):

- **NFTs are not tangible property.** NFTs are not capable of being possessed. This is equally true of any asset that lives exclusively in the digital world;
- **NFTs are not intellectual property.** Intellectual property rights are created by statute, although a person selling an NFT could (assuming that they own the associated intellectual property rights) transfer those intellectual property rights or a licence to those rights to the purchaser of the NFT;
- notwithstanding that NFTs run on blockchains and are subject to the terms of smart contracts, NFTs are not “things in action”, as **NFTs are not created by contract, rather they are created by software;**
- **NFTs can be a digital representation of an asset (digital or physical) or can be the asset itself;** and
- **NFTs are a class of digital assets,** that is, there are different types of NFT. NFTs can:
  - be evidence of legal title to a digital or physical asset external to a blockchain (for example, a share);
  - embody rights such that the NFT holder is entitled to claim performance of the obligations recorded by the NFT (for example, any rights attached to a financial instrument);
  - be used to grant a licence to the holder to use certain intellectual property; and
  - be used to confer intellectual property rights on an NFT holder.

Categorisation as property has **legal consequences. Property rights are enforceable against third parties** (often referred to as being rights enforceable against the world). On the other hand, contractual rights are personal rights only that bind the parties to that contract.

Cryptoassets such as bitcoin and other cryptocurrencies are considered property under English law.

In 2022, the UK High Court recognised NFTs as property, stating that they had “a particular, personal and unique value to the claimant which extends beyond their mere fiat currency value.” This means that court remedies available to owners of NFTs can recognise the specific character or terms of NFTs.

The recognition in England that digital assets constitute property is also consistent with the developing case law in other jurisdictions, including other common law jurisdictions such as New Zealand and Singapore.

The English case law has also confirmed that tokens (including NFTs) are capable of being held by a trustee under a trust.

In the event of a dispute, tokens are treated as being located at the place where their owner is domiciled. In July 2022, the English High Court allowed the service of proceedings via NFT.

Part 3, Section 1 (Future Legislation) outlines and considers how legislation is developing.

### *Are smart contracts capable of being legally binding and enforceable?*

The Law Commission **has confirmed** that the existing legal framework under English law is sufficiently flexible to accommodate and apply to smart legal contracts without any need for statutory reform.

There are (broadly) three forms of smart contract:

1. a **natural language contract with automated performance** (the contract is written in natural language with some or all of the contractual obligations automated by code on a blockchain);
2. a **hybrid smart contract** (the contract is written in a combination of natural language and code, most often the payment terms are written in code (for example: “on X day pay Y amount from account A to account B”); and
3. a **solely code contract** (the contract is written in code **and there is a “translation” into natural language**).

There are requirements under English law that certain documents are “in writing” and “signed”. These requirements do not cause a problem:

- source code (which uses a combination of words and symbols that can be read by a coder) satisfies the “in writing” requirement; and
- electronic signatures meet the requirement of “signed” (and the requirement can also be met by a person using their private key by way of signature).

Programmable contracts could result in lower enforcement costs because they incorporate the transfer of value. Therefore, they do not need to be “enforced” in practice through court action. It may be that legal remedies in the courts will come to rely less on contractual damages and more on remedies from pre-contract dealings, torts, insolvency rules, and equity.

In 2021, the UKJT published its **Digital Dispute Resolution Rules** which can be incorporated into on-chain digital relationships and smart contracts. The Rules set out a choice of either an arbitration regime (under the existing English arbitration legislation) or expert determination (another out of court dispute resolution procedure) for settling disputes related to cryptoassets, smart contracts or any novel digital technology. The key features of the Rules are that they: (1) facilitate rapid dispute resolution in short time periods, (2) include the ability of arbitrators to implement decisions directly on-chain using a private key, and (3) include the option for anonymous dispute resolution.

## LEGAL BACKGROUND SUMMARY

- NFTs are property, recognised under English law.
- NFTs are a class of digital assets, that is, there are different types of NFT.
- Smart contracts are legally valid and binding if they meet the existing requirements for creation of contracts.

## APPENDIX C: REGULATORY BACKGROUND

The practical relevance of financial regulation to NFTs depends on the context as well as their characteristics. If they are used in wholesale markets they may be regulated, but so will the users. If they are sold as investments to retail customers, all customary consumer protection rules will be triggered.

### *Financial Regulation*

NFTs are not specifically referenced in the UK financial regulatory regime. The characteristics and function of a token determine its regulatory status.

The UK financial services regulatory regime is technology neutral, so whether a particular token (or cryptocurrency) is within the regulatory perimeter will depend on the characteristics of the token (or cryptocurrency) concerned. Four general types of tokens have been identified by the FCA:

Token	Regulatory Status	Function /Characteristics	Examples
<b>Security Token</b>	Regulated	It has characteristics similar to those of traditional securities. E.g. shares, debentures, or units in a collective investment scheme. The latter will be particularly important in the case of the tokenisation of underlying assets to achieve fractional ownership.	<b>EIB's digital bond</b>  <b>Hedgehog's</b> security tokens. Hedgehog is an investment platform that partners with asset owners to offer fractional investments in physical assets - from commercial real estate to renewable energy infrastructure - on its app. Eligible investors are issued security tokens representing their investment.
<b>E-money Token</b>	Regulated	It functions as electronic money for the purposes of the electronic money regulations.	Tether
<b>Exchange Token</b>	Unregulated	It can be held, bought or sold, and does not confer any rights on the owner.	bitcoin  Ether
<b>Utility Token</b>	Unregulated	It confers rights on the owner to obtain goods or services, including rights to other tokens.	Loyalty tokens (see Part 2, Section 2 (Use Cases)).

Identity NFTs (see Appendix A (Financial Services Use Cases, Examples, and Innovation Ideas)) may have some of the characteristics of both Exchange Tokens and Utility Tokens. In any event, these NFTs will be unregulated tokens. It may be that, over time, Exchange Tokens and Utility Tokens are not distinguished and are treated simply as "Unregulated Tokens", or a new category of "Identity Tokens" is adopted.

A business conducting **regulated activities** (such as arranging and placing securities) in the UK **connected to regulated tokens** generally requires FCA authorisation to carry out these activities (unless an exclusion or exemption applies).

Generally speaking, **most NFTs are unlikely to be security tokens or e-money tokens**. Therefore, under the current regulatory regime, **most NFTs will be unregulated tokens**.

## Anti-Money Laundering

Since 2020, UK firms providing cryptoasset services by way of business must be registered under, and comply with, the UK's money laundering regulations (the "MLRs").

A **cryptoasset exchange** must register when providing the following services (including where the business is the creator or issuer of any of the cryptoassets involved):

- **exchanging or arranging the exchange of cryptoassets for money or money for cryptoassets;**
- **exchanging or arranging the exchange of one cryptoasset for another;** and
- **operating a machine which exchanges cryptoassets** for money or money for cryptoassets,

and a **custodian** of cryptoassets or private cryptographic keys on behalf of its customers, in order to hold, store, and transfer cryptoassets must register when providing such services.

As with the financial regulation regime, NFTs are not specifically referenced in the MLRs. Rather, the relevant category for the purposes of the regime is a cryptoasset.

Albeit these NFTs are not the focus of this Report: art market participants dealing in works of art valued at EUR 10,000 or more must be registered and comply with the MLRs. However, NFTs promoted as works of art, luxury goods, or collectibles do not fall within the MLRs definition of works of art.

A "cryptoasset" according to the MLRs is:

*"a cryptographically secured digital representation of value or contractual rights that uses a form of distributed ledger technology and can be transferred, stored or traded electronically"*

An NFT is likely to fall within this category if it is a "representation of value or contractual rights." Most NFTs are likely to meet the other criteria: "a cryptographically secured digital representation" and "uses a form of distributed ledger technology and can be transferred, stored or traded electronically".

All NFTs will be a "cryptographically secured digital representation" and "use a form of distributed ledger technology".

Most NFTs will be a "representation of value or contractual rights". By way of example, a tokenised share would represent the share and the contractual rights associated with that share. On the other hand, a consumer engagement NFT or an identity NFT might not necessarily represent any value or contractual rights.

Most NFTs should meet the requirement that they "can be transferred, stored or traded electronically", including identity NFTs, as they will be capable of being stored electronically. They may also be capable of being transferred (see Appendix A (Financial Services Use Cases, Examples, and Innovation Ideas)).

## Change of Control of Cryptoasset Businesses

Since 11 August 2022, a change of control (set at 25%) in a registered cryptoasset business requires the prior approval of the FCA.

## Financial Promotions Regulation

The UK government has **consulted** on expanding the scope of the financial promotion regime to include certain cryptoassets from a consumer protection perspective. However, the criteria for qualifying cryptoassets is currently restricted to fungible cryptoassets, intentionally leaving NFTs out of scope of any proposed expansion. In making this decision, the UK government considered that the NFT market is still at an early stage and NFTs could represent a wide range of different assets (including those that are not financial services products).

However, the Advertising Standards Authority specifically includes NFTs within its definition of a cryptoasset for the purposes of its **code of advertising**. The FCA issued a **statement** in May 2022 reminding consumers that NFTs are unregulated, and that those marketing cryptoassets must adhere to the Advertising Standards Authority guidelines.

## FATF

The Financial Action Task Force (the “**FATF**”), an intergovernmental body that sets international standards relating to global money laundering and terrorist financing, provides guidance on virtual assets but does not generally consider NFTs to be virtual assets. This has been on the basis that these tokens are in practice used as collectibles rather than payment or investment instruments. As this Report sets out, that characterisation is changing and the FATF emphasises the need for national regulators to consider the characteristics of NFTs. They may fall within the “virtual asset” definition if they are to be used for payment or investment purposes in practice. Further, if an NFT represents a financial asset, it may already fall within the perimeter of the FATF standards for that type of financial asset.

### REGULATORY BACKGROUND SUMMARY

- NFTs are not specifically addressed in current financial regulation.
- Whether a particular token falls within the regulatory perimeter will depend on the characteristics of that token.
- There are four types of token according to the UK regulator: (1) security token (regulated), (2) e-money token (regulated), (3) exchange token (unregulated), and (4) utility token (unregulated).
- This means most NFTs are likely to be unregulated tokens under the current regulatory regime.

## APPENDIX D: INTERNATIONAL DEVELOPMENTS

As noted in Part 1, Section 1 (Introduction), the UK government wants the UK to be an international hub for digital assets. Other jurisdictions have the same ambition. In Europe, the proposed Regulation of Markets in Crypto-assets (“**MiCA**”) is the latest development in the Commission’s digital finance strategy, which aims to bring legal clarity and ensure consumer and investor protection while supporting innovation and market integrity for a subset of digital assets.

Analysing approaches taken by other jurisdictions is recognised by policymakers as an important element for shaping the UK’s approach. Ideally, there will be some international consensus on legislation and regulation in this area, taking into account the nature of digital assets and their role in a global economy.

Below, we briefly summarise the approaches in Luxembourg (a civil law legal system) and Singapore (a common law legal system like England and Wales), and the MiCA proposals.

### *Luxembourg*

Luxembourg has adopted a **tailored legal framework for the issuance and circulation of securities on blockchains**.

Luxembourg’s framework focuses on the activities of the service providers, rather than cryptoassets themselves.

**Cryptoassets are classified either as virtual assets or financial instruments**, so it is necessary to analyse their characteristics (for example, purpose, fungibility, and rights attached to the relevant asset) to determine the regulatory and legal requirements that apply.

### **Regulation**

**Registration** with the Luxembourg financial services regulator (Commission de Surveillance du Secteur Financier (“**CSSF**”)) for anti-money laundering purposes is required for businesses providing exchange or custody services. Businesses that provide investment services related to cryptoassets that qualify as financial instruments require authorisation as an investment firm.

**NFTs** that are financial instruments or virtual assets are subject to these requirements.

### **Legislation**

Luxembourg adopted legislation on dematerialised (or tokenised) securities in 2013. This first enabled the issuance of digital securities. **Luxembourg adopted its “blockchain laws” in 2019 and 2021**. These **facilitate the integration of blockchain in the financial industry**.

The Luxembourg legal framework expressly permits the following activities:

- digital securities can be maintained and transferred on a blockchain;
- digital securities can be registered on or through secured electronic registration mechanisms, including distributed electronic ledgers or databases by central account keepers or settlement organisations; and
- native security tokens can be issued on a blockchain (that is, an issuance where the token does not represent ownership of the underlying asset, it *is* the underlying asset, with the asset being created directly on the blockchain). Therefore, there are two types of tokens that are legally recognised in Luxembourg, (1) proof of ownership tokens (which *represent* an asset), and (2) native tokens (which *are* the asset).

As a response to the growing interest in the use of virtual assets in the financial sector, in January 2022, the CSSF published a whitepaper on DLT and blockchain, including information on the use of virtual assets by credit institutions and collective investment schemes. The **Luxembourg Stock Exchange published new guidelines on the registration of security tokens** (known as DLT financial instruments) on its Securities Official List.

## Singapore

Singapore aims to be a hub for innovative and responsible digital asset activities that enhance efficiency and create economic value. To date, Singapore has not adopted any specific tokenisation or blockchain legislation and has taken a cautious approach to cryptocurrency.

## Regulation

A speech titled “**Yes to Digital Asset Innovation, No to Cryptocurrency Speculation**” given by Ravi Menon, Managing Director of Singapore’s central bank and financial regulator, the Monetary Authority of Singapore (“**MAS**”), in August 2022 summarised Singapore’s approach to digital assets. It detailed how MAS plans to build an innovative and responsible digital asset ecosystem in Singapore, which is a core part of its overall Fintech agenda.

MAS has supported the commercial digital asset environment with targeted industry collaboration. A number of commercial use cases have been explored and developed under MAS’s supervision, including:

- **Partior**: a DLT-driven cross-border payments and settlement network (a joint venture between DBS, J.P. Morgan and Singapore sovereign wealth fund Temasek);
- **Contour**: trade finance on blockchains (backed by nine global banks: Bangkok Bank, BNP Paribas, Citi, CTBC Bank, HSBC, ING, SEB, SMBC and Standard Chartered); and
- **Marketnode**: an asset tokenisation platform (a joint venture between the Singapore Stock Exchange (SGX) and Temasek). Marketnode is also participating in a MAS initiative (**Project Guardian**), of which the first pilot project will focus on the **trading of tokenised bonds** and is led by DBS Bank, J.P. Morgan and SBI Group, together with Marketnode.
- **Project Guardian** completed its first live cross-currency trade on 2 November 2022. A simulated exercise involving the buying and selling of tokenised government bonds was also carried out. In each case, the transactions were completed on a public blockchain network, using digital identity solutions and logic adapted from existing DeFi protocols.

## Legislation

There is little direct legislation in Singapore that addresses digital assets.

There are at least six tokenisation platforms operating in Singapore (most, if not all, have graduated from MAS’s regulatory sandbox). Unlike in Luxembourg there is no tokenisation law so these platforms navigate existing legislation. The implications and practicalities of this are described in the **e-VCC white paper** co-authored by InvestaX, CMS, UBS, and PwC). This means that in Singapore a native issuance of tokens is not possible from a practical perspective.

**NFTs** fall within the MAS guidance on digital asset tokens and they are recognised by the Singapore High Court.

## EU Regulatory Approach - MiCA

The European Union reached a provisional agreement on the **regulation of digital assets, including NFTs**, in June 2022 and a final text of the bill was published in October 2022. At the time of writing this Report, initial plans for the European Parliament to vote on the legislation in December 2022 have been moved, with voting anticipated to occur in early 2023.

---

The EU sees MiCA as a response to the possibility of legal fragmentation within Member States, in order to **avoid different and potentially conflicting regulations for cryptoassets state-by-state**.

The final text of MiCA sets out three categories of cryptoassets: e-money tokens (like bitcoin), asset-referenced tokens (like stablecoins), and utility tokens (like online store credits).

In the Council of the EU press release (30 June 2022) in relation to MiCA, it was noted that “Non-fungible tokens (NFTs), i.e. digital assets representing real objects like art, music and videos, will be excluded from the scope except if they fall under existing crypto-asset categories”. The European Commission is due to undertake an assessment to consider a whether a legislative regime for NFTs is required in the next 18 months. However, there is some uncertainty as to the types of NFTs that will fall within MiCA, the possible narrow interpretation of the exclusion, and the delineation of cryptoassets that are already subject to regulation under existing regulation and those that will be subject to the regime in MiCA.

MiCA will be **applicable to all Member States** in the EU. However, it has a broader reach and will also **impact any businesses doing business in the EU**.

## INTERNATIONAL DEVELOPMENTS SUMMARY

- Jurisdictions across the world are examining and tackling the same questions on digital assets.
- Analysing the approaches taken in other jurisdictions will be important in shaping the UK’s approach to regulating cryptoassets.
- Businesses operating in multiple jurisdictions will need to be aware of all applicable regulatory frameworks.



---

## APPENDIX E: FURTHER READING

For ease of reading, we have not used footnotes in this Report. Selected source material and suggestions for further reading are:

### *Articles*

R Cohen, P Smith, Dr V Arul Chandran, and Dr A Sehra, Journal of International Banking and Financial Law (JIBFL), March 2018, '[\*\*Automation and blockchain in securities issuances\*\*](#)'

C Kerrigan and S McKeering, JIBFL, May 2019, '[\*\*Laws and legal principles relating to blockchain and distributed ledger technologies: a taxonomy\*\*](#)'

C Kerrigan, JIBFL, January 2020, '[\*\*Tokenisation and digital assets: blockchain in capital raising\*\*](#)'

C Kerrigan, JIBFL, November 2020, 'Digitalisation of shares in an English private limited company'

JE Bedar, P Gilman, and D Rosenthal, Thomson Reuters Westlaw Journal, May 2021 '[\*\*Tokenization: The revolution is now\*\*](#)'

R Hay and M Voisin, JIBFL, September 2021, 'Moving towards digital capital markets: The EIB's public blockchain bond'

C Kerrigan, JIBFL, November 2021, 'In search of lost time, Part 2: the effect of the fintech industry's development on automation and standardisation'

CMS LawNow, March 2022, '[\*\*Where's my "NFT" gone? Potential pitfalls of NFT ownership\*\*](#)'

T Marshall, JIBFL, August 2022, 'Blockchain interoperability: connecting decentralised infrastructure for traditional finance'

C Wallace, JIBFL, September 2022, 'Take-off for digital bonds? The EU DLT pilot regime'

C Kerrigan and A Burdzy, Reuters, 2 September 2022, 'Future changes for digital assets and securities'

J Burnie, M Millward, M Kimber, JIBFL, October 2022, 'What's at stake? The legal treatment of staking'

D Stoean and M Kimber, JIBFL, December 2022, 'Bind to law: Soulbound tokens and property law'

S Hammond and T Ehret, 2022, Thomson Reuters Regulatory Intelligence, '[\*\*Cryptos on the rise 2022\*\*](#)'

### *Reports*

The Digital Dollar Project, May 2020, '[\*\*Exploring a US CBDC\*\*](#)'

checkout.com, April 2022, '[\*\*Demystifying Crypto\*\*](#)'

Digital Issuance, July 2022, '[\*\*An Optimal Model for Digital Assets and Transactions\*\*](#)'

Elliptic, August 2022, '[\*\*NFTs and Financial Crime: Money Laundering, Market Manipulation, Scams & Sanctions Risks in Non-Fungible Tokens\*\*](#)'

### *Legal Statements, Consultations, and Government-Led Reports*

Prof. Dr. R Houben and A Snyers, April 2020, '[\*\*Crypto-assets – Key developments, regulatory concerns and responses\*\*](#)' (study requested by the ECON committee)

HMT, January 2022, '[\*\*Cryptoasset Promotions: Consultation Response\*\*](#)'

---

HMT, June 2022, '[Amendments to the Money Laundering, Terrorist Financing and Transfer of Funds \(Information on the Payer\) Regulations 2017 Statutory Instrument 2022: Response to the Consultation](#)'

House of Commons Treasury Committee, 16 June 2022, '[Future of financial services regulation](#)'

Law Commission of England and Wales (Law Commission), 25 November 2021, '[Smart Legal Contracts: Advice to Government](#)'

Law Commission, 15 March 2022, '[Electronic Trade Documents: Report and Bill](#)'

Law Commission, 28 July 2022, '[Digital Assets: Consultation Paper](#)'

OECD, 2020, '[The Tokenisation of Assets and Potential Implications for Financial Markets](#)', OECD Blockchain Policy Series

UK Jurisdiction Taskforce (UKJT), November 2019, '[Legal Statement on Cryptoassets and Smart Contracts](#)'

UKJT, April 2021, '[Digital Dispute Resolution Rules](#)'

UKJT, 3 August 2022, '[Legal Statement on Digital Securities: Public Consultation](#)'

### *Other*

Digital Assets Hub, '[Resource Corner](#)'

## APPENDIX F: ACKNOWLEDGEMENTS

We would like to acknowledge the following people who have contributed to this Report: Erika Federis, Brett Gallie, Chris Glennie, Simon Jennings, Wei Yang Lim, Christopher Luck, Tom Marshall, Giselle Nagle, Matthew Nortcliff, Stephen O'Donnell, Mélanie Poirrier, Euan Reid, Sam Robinson, Yash Singh, Erica Stanford, Catherine Travers, Aurélia Viémont, and Michael Ward.

