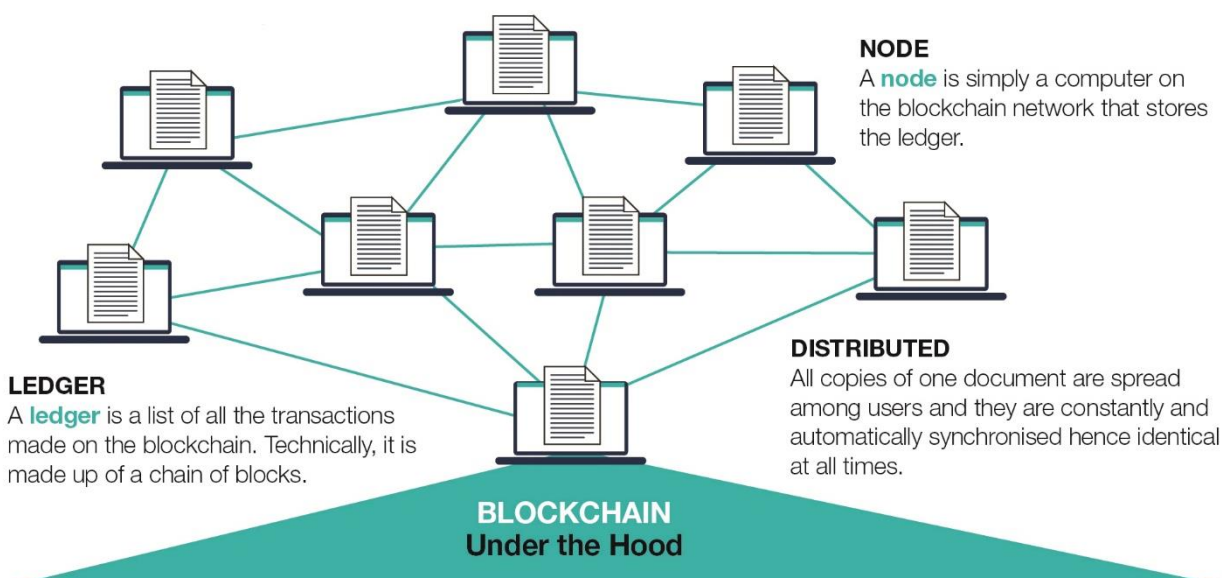


## Blockchain at the OECD

Blockchain, and other distributed ledger technologies (DLTs),<sup>1</sup> offer a new way of securing data and transaction records for use by multiple parties, without reliance on a trusted, central authority. Emerging first as the technology behind “crypto-currencies” such as Bitcoin and Ether, today DLT has far wider implications, changing business models and offering new ways to exchange value and trace its creation, with impacts across a wide range of policy areas.

Figure 1. The Blockchain in practice



Source: OECD (2018a), “OECD blockchain primer”, <https://www.oecd.org/finance/OECD-Blockchain-Primer.pdf>.

### Box 1. Key features of blockchain

**Distributed:** In a blockchain, each node independently constructs its own record of transactions, meaning that there are, at all times, copies of the same ledger being maintained by each node in the network. As such, the record is highly secure, because in order to change the ledger, each version held by the different nodes would need to be changed. In other words, a malicious actor would need to attack all, or at least a majority, of the nodes rather than just one single, centralised record-keeper.

Further, rather than multiple different records being maintained by different parties to a transaction, which would then need to be cross-checked for verification, with blockchain, the ledgers automatically synchronise through a consensus mechanism.

**Immutable:** Through its use of cryptography, once a transaction is added to a blockchain, it generally cannot be undone. As such, all users can have confidence that, unlike in a centralised database, the record has not been altered, whether through error or misfeasance.

## Policy implications of distributed ledger technology

In considering the policy implications of DLTs, it is important to acknowledge that despite reaching a peak in the technology “hype cycle”, DLT is still in its infancy both in terms of development and of adoption. The rapid pace of change however and the fact that some applications, particularly DLT-based digital financial assets, are already in use (Box 2), means that policymakers and regulators must already have an understanding of the technology and what it means for them.

### Box 2: Digital financial assets

The term “tokenisation” describes the process of transferring rights to a physical or digital asset into a digital representation – or token – on a blockchain. Being in possession of that digital token gives you the right to that asset, and the ability to trade and track it digitally.

In addition to tokenisation of physical assets, there are three main types of DLT-based *digital* financial assets:

1. **Payment tokens.** Intended to operate similarly to traditional, fiat currencies (legal tender backed by the issuing government), payment tokens are usable as a means of exchange for any goods or services, and possibly also as a store of value. Bitcoin is the most well-known example.
2. **Security (or Asset and Financial) tokens.** Designed as tradeable assets that are held for investment purposes, and classified as a security (or equivalent) under applicable laws. For example, BCAP tokens issued by Blockchain Capital and through those investments in their fund gives token holders exposure to the venture capital market.
3. **Utility (or Consumer) tokens.** Their primary use is to facilitate the exchange of or access to specific goods or services. They may for instance act as a licence to allow the holder access to a particular service, as a pre-payment or voucher for a good or service (and may be issued even before the relevant good or service is not yet available). Examples include Storj, a token that provides access to a peer-to-peer network cloud storage service, and the Basic Attention Token used by the Brave search-engine to reward users for their search data.

## Blockchain and....

### Public administration

Already, almost 50 jurisdictions around the world are launching more than 200 DLT-based initiatives in the public sector. Some of the most common use cases being explored include identity (e.g. credentials, licenses), personal records (e.g. health, insurance, financial), land title registries and asset inventory.

Questions relating to the technical complexity of DLT, how public and personal data on the DLT is protected and managed, and the technology’s appropriateness for different uses, are common across the public sector. In the OECD report “Blockchains unchained: Blockchain technology and its use in the public sector” (Berryhill, Bourgerie and Hanson, 2018), answers to these questions are explored from the perspective of public officials, as well as providing a snapshot of current public sector blockchain “proof of concept” and pilot cases across the world.

### Financing for small and medium-sized enterprises

Beyond crypto-currencies, the other major financial sector industry use of DLT to date has been in relation to initial coin offerings (ICOs), or more accurately initial token offerings (ITOs). In most cases so far, ICOs do not offer tokenisation of a security i.e. an economic interest in the underlying business, but rather offer a utility token in exchange for funding (Box 2). Some ICOs have been shown to be fraudulent or have failed at an early stage; since 2014, only 38% of ICOs globally have been successfully completed (OECD, 2019).

However, in an appropriately regulated and supervised environment, ICOs do offer an important opportunity to free small and medium-sized enterprises (SMEs) from some of the barriers that they face when it comes to raising funds for business development (Box 3). However, a precarious regulatory environment and a host of legal and market integrity issues are creating challenges to the core goal of financial regulators: to maintain markets that are orderly and worthy of participants’ confidence. The OECD report “Initial coin offerings (ICOs) for SME financing” (OECD, 2019) explores these issues from a policymaker’s perspective, including the trading of tokens issued in ICOs, and compares emerging practices with more traditional SME risk financing mechanisms, such as venture capital and crowdfunding.

**Figure 2. Benefits of initial coin offerings**



Source: OECD (2019), "Initial coin offerings (ICOs) for SME financing", [www.oecd.org/finance/ICOs-for-SME-Financing.pdf](http://www.oecd.org/finance/ICOs-for-SME-Financing.pdf).

### Transport

Digital technology continues to reshape the transport industry, focusing on building a 21st century transport system based on deeper co-ordination of urban mobility services. DLT, when combined with other emerging technologies, could help redefine how people access, pay for and use transport in their everyday lives, allowing different actors in the transport system to share verifiable, anonymised data more easily. A description of how DLT could be used to achieve these policy goals, including a set of recommendations for public authorities is set out in "Blockchain and beyond: Encoding 21st century transport" (ITF, 2018).

### Public equity markets

With their features of verifiable, traceable and transparent record-keeping, DLT-based tokens (whether utility tokens or security tokens) offer a unique funding mechanism for assets, projects and companies. In most cases, ICO ventures often resemble start-ups that would otherwise solicit financing through more conventional sources such as angel or venture capital investments. A global snapshot of ICOs, different regulatory approaches, and consideration of blockchain's potential in mainstream capital market fundraising, is found in *OECD Equity Market Review Asia 2018* (OECD, 2018b).

This report touches on questions relating to the design of blockchain networks, and whether they can truly improve current practice in certain settings. Private, permissioned networks (as opposed to large open networks anyone can join) are more appropriate for sensitive financial processes like public offerings, but would do little to alleviate the information asymmetries that require intermediaries and careful regulation today. However, there is potential for blockchain and DLT to automate other more routine functions of equity finance such as dividend payments, trading and registries of share ownership.

### Competition policy

Viewed from a competition policy perspective, DLT creates both opportunities to enhance competition and efficiency, as well as risks of anticompetitive conduct. Relevant considerations include the ability for DLT to disrupt existing business models, how data in a DLT will be managed and how accessible it will be, and by whom, the opportunity for collusion through the DLT, and abuse of market dominance by incumbents. These issues, as well as possible remedies, including DLT-based solutions, are explored in "Blockchain technology and competition policy" (OECD, 2018c).

## Looking ahead: The OECD Blockchain Policy Centre

Building on more than five years of OECD research and analysis exploring this emerging technology from the perspective of government, in 2018 OECD members agreed to establish the OECD Blockchain Policy Centre. At its core, the Centre's objective is to support governments to address the challenges raised by DLT and its applications, as well as to seize the opportunities it offers for achieving policy objectives and delivering more effective government services. In doing so, the Centre's work will also consider DLT's interface with other emerging technologies such as artificial intelligence.

The OECD's work on the different policy implications of DLTs is now being extended, with more than 20 projects across a broad range of policy areas, including financial and capital markets, public administration, financial services, tax, responsible business conduct, transport, investment, trade, insurance and infrastructure. In addition, training for OECD officials and member country delegations is being rolled out, ensuring that government officials are well placed to assess the merits of potential blockchain projects, and how the technology will change the environment in which policy implementation takes place. In March 2019, our second "hackathon" to explore DLT-solutions for cross-border public sector challenges will take place. Partnerships with other international and regional organisations working on DLT policy questions are also being forged, to ensure an effective sharing of knowledge between institutions, while engagement with a broad range of stakeholders ensure that we can draw on the latest developments in this sector.

On 12-13 September 2019, our flagship event, the 2nd **Blockchain Policy Forum** will be held at the OECD in Paris. Attended by more than 1 000 people from government, business, civil society and academia, the Forum is an opportunity to both learn about recent OECD work, and to understand the latest developments and future possibilities, hearing from experts in the field.

## Note

1. Blockchain is the most well-known type of distributed ledger technology. In this document, the two terms are used interchangeably.

## Further reading

Berryhill, J., T. Bourgerie and A. Hanson (2018), "Blockchains unchained: Blockchain technology and its use in the public sector", *OECD Working Papers on Public Governance*, No. 28, OECD Publishing, Paris, <https://doi.org/10.1787/3c32c429-en>.

ITF (2018), "Blockchain and beyond: Encoding 21st century transport", *International Transport Forum Policy Papers*, No. 52, OECD Publishing, Paris, <https://doi.org/10.1787/bf31443f-en>.

OECD (2019), "Initial coin offerings (ICOs) for SME financing", [www.oecd.org/finance/ICOs-for-SME-Financing.pdf](http://www.oecd.org/finance/ICOs-for-SME-Financing.pdf).

OECD (2018a), "OECD blockchain primer", <https://www.oecd.org/finance/OECD-Blockchain-Primer.pdf> (accessed 8 March 2019).

OECD (2018b), *OECD Equity Market Review of Asia 2018*, [www.oecd.org/daf/ca/OECD-Equity-Market-Review-Asia-2018.pdf](http://www.oecd.org/daf/ca/OECD-Equity-Market-Review-Asia-2018.pdf).

OECD (2018c), "Blockchain technology and competition policy", [https://one.oecd.org/document/DAF/COMP/WD\(2018\)47/en/pdf](https://one.oecd.org/document/DAF/COMP/WD(2018)47/en/pdf) (accessed 8 March 2019).

Digital technologies and large-scale data flows are fundamentally changing how people live and work, interact with one another, participate in the economy, and engage with the government. The OECD's *Going Digital* project examines how government policy can help ensure this digital transformation benefits all by increasing growth and improving well-being. Going Digital Policy Notes provide insights into key trends, opportunities and challenges, and the policy directions needed for making the most of digital transformation.

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