

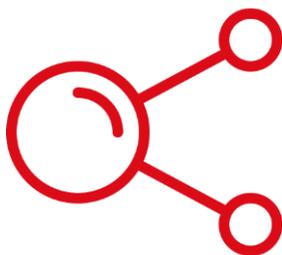
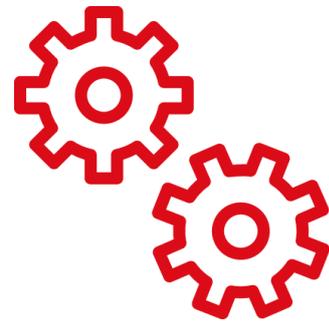
## Distributed Ledger Technology

Distributed Ledger Technology (DLT) is a digital method of recording of information over time. In this Jersey Finance Put Simply we provide clarity on the technology, demystify some of the commonly used terms, and describe some of the financial services applications of DLT.

One of the original and best-known applications of DLT is the technology that underpins digital assets, further reading on this subject can be found in the [Digital Assets & Cryptocurrency Put Simply](#).

### What is Distributed Ledger Technology?

DLT can be thought of as a store of information, recording data points over time, for example a chronological history of transactions. Unlike some forms of traditional databases, DLT can exist in multiple locations at the same time without one central, master database, this is the significance of the term 'distributed' in the name. The 'ledger' part is the information, and 'technology' refers to the way in which people can view and, in some cases, update recorded information.



A DLT system relies on a distributed network of computers called 'nodes' with each node storing a live copy of the information on the ledger, automatically updated via communication with other nodes, in near-real time, as changes are made. This allows for everyone involved in a transaction or activity to hold their own authoritative copy of the ledger and to see the same activity at the same time - particularly useful when dealing between multiple organisations or between different locations.

Each implementation of DLT can be either public, which means anyone can join, view, and update the network, or private in that there are built-in restrictions on who is allowed to participate in the network. Public DLTs are often referred to as 'permissionless', in the sense that everyone can participate, versus private DLTs

which are typically 'permissioned' and locked down to a select few participants. Generally speaking, most types of DLTs which support cryptocurrencies are public, whereas in financial services the DLTs are typically private and support a specific activity amongst a small number of parties.

DLT is suitable for types of activity involving multi-step transactions that need clear traceability of activity and actions taken: cross-border payments and complex trade finance arrangements are, therefore, currently the primary use cases for DLT solutions in financial services.

### **Isn't DLT just a fancy name for Bitcoin and Blockchains?**

The most common application of DLT is in Blockchains, though the terms are often erroneously used interchangeably. Whilst DLT and Blockchains share similar properties, in that they are both vehicles for shared information using distributed networks, Blockchains are a particular sub-set of DLT with specific characteristics whereas DLT can be thought of as the catch-all term for the underlying technology.



Other types of DLT exist, the most common types are Ethereum, Hyperledger Fabric, IBM Blockchain, Ripple, and R3 Corda. All have different properties designed to serve the different needs of organisations and individuals.

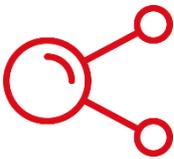
## How Does DLT Work?



1. Someone accesses the DLT network and requests a transaction, such as making a payment in cryptocurrency from Person A to Person B



2. This new transaction request is pooled together with other similar unverified requests to await confirmation before being added to the ledger



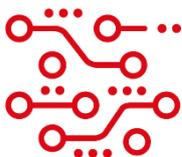
3. The pool of unverified transactions is transmitted to, and shared between, the nodes



4. Each node validates each unverified transaction programmatically, including determining the existence of the sender and that the sender holds sufficient funds to complete the payment, rejecting defective transactions and re-transmitting satisfactory transactions to its neighbouring nodes



5. Once verified, the transaction is combined with other approved transactions in a 'block' of data



6. When the block reaches a certain size or meets some other suitability criteria, such as following a process to establish consensus, it is added to the tip of the stack of existing blocks of transactional data on the DLT



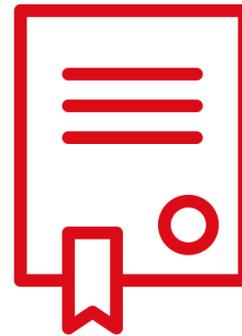
7. The DLT is thereby updated in near real-time and everyone with permission to view the network can see the newly-added block and the confirmed transactions contained within



8. The transaction is then considered complete and the cycle begins again for other transactions

## What Are Smart Contracts?

Smart Contracts are often cited as a key opportunity arising from DLT. Smart Contracts are a form of computer code that, via the medium of DLT, can undertake actions based on pre-set criteria in a contract being met, for example if the price of a certain digital asset falls below a certain amount the contract should automatically buy a certain quantity of that digital asset. DLT technology allows this code to monitor trigger criteria and for instructions to be automatically executed, with the outcome stored on the DLT.



As with existing contracts, not every eventuality can be foreseen and automating contracts to auto-execute may still result in the need for legal intervention in the form of dispute resolution. The growth of Smart Contracts brings a number of interesting considerations: Is the source data agreeable to all parties? Is the data reliable? What happens in the event of a technological issue?

## What is DLT used for today?

DLT is a relatively new type of technology and real-world use cases are emerging all the time. In addition to recording of a transfer of money or cryptocurrency, a DLT can be used when there is a need for information to be secure or where multiple untrusted parties are involved. Providing permissioned or permission-less access is a way of providing transparency to those involved along with a full history of the activity.

### Cross border payments

In traditional finance cross border payments are made using a series of banks and financial services businesses who know each other to route a payment from one company to another. Using the verification built into DLT a payment can be made across the network by validating two parties and transferring the payment without the requirement to trust a series of intermediaries, potentially making the payment process faster and cheaper.



### Insurance

Smart contracts are being used in the world of insurance to improve the claim handling or settlement process. An example of this is in flooding whereby if it can be proven that an area has been flooded, the smart contract can be activated without the need for further investigation and, in line with the conditions of the insurance policy, a claim can be made and settled automatically.

Another example relates to mobile phone or vehicle cover, where sensors trigger that an item has been subject to a certain type of impact that would normally result

in an insurance claim, the process, from claim to pay-out, could be automated, reducing delays and paperwork.

### **Supply chains**

Often supply chains work on the basis of knowing who you bought an item from and who you sold it to. By using a DLT, a firm can see the entire supply chain and history of an item via the ledger, making investigations or product recalls easier.

### **Trade finance**

In domestic and international trade, trade finance is the term used to describe a form of financial arrangement supported by banks and intermediaries that allows a buyer to pay for goods prior to receipt. Most commonly used in international trading, payments are often staged upon the progress of the shipping of the goods. The process can be complicated and labour intensive, with information shared multiple times between multiple parties.



By using DLT and smart contracts, in conjunction with other technologies such as location tracking, progress can be tracked and payments automated based on satisfaction of various criteria over the course of the process. For example, if shipping goods from Asia to Europe, payments could be automated to be released in tranches as the goods travel progressively closer to their destination.

## **A-Z of Common Terms**

Unlike traditional finance systems or databases, DLT uses complex mathematical calculations and cryptography to process transactions and to update the ledger. In this section we explore the common key terms relating to DLT and its functions.

**Address** – a string of numbers and letters to which transactions on the network can be sent or from which transactions can originate.

**Block** – a virtual block of confirmed data which is bundled together and recorded on a ledger, effectively updates to the ledger, written in chunks.

**Block size** – the amount of information or number of transactions that can be stored in a single block.

**Consensus** – consensus mechanisms are a way to reach an agreement between nodes on the network of a settled record of what activity has taken place, in the context of a blockchain, this will be a triggering event for the creation of a new block.

**Decentralised finance** – often shortened to DeFi, this is the ecosystem of financial applications built using DLT solutions.

**Mining** – mining is part of the process of updating a ledger, an example of a Consensus mechanism, used in some types of DLT, those undertaking the solving of problems are called ‘Miners’ and when a Miner successfully solves the puzzle and creates a block they are said to have ‘Minted’ the block.

**Node** – a computer holding a copy of a ledger and participating an interconnected DLT network sharing the ledger, or updates to the ledger, with other neighbouring nodes.

**Proof of Work** – Proof or Work (PoW) is one type of Consensus mechanism; it is the original DLT consensus method. In PoW, the nodes in the network must ‘prove’ that they have undertaken ‘work’. The work required is often the solving of a complex mathematical puzzle, once the solution to the puzzle has been found it is broadcast to the network and other nodes run the same calculations to confirm or deny that the puzzle has been solved, if a solution is approved network-wide the information associated with the solution will be added to the ledger.

When complete, the owner of the hardware which solved the puzzle and minted the block is rewarded, in most cases with virtual currency. This reward is the incentive that drives participants to continue to support the network. An advantage of PoW is that many parties rather than one central entity are confirming that the instruction is genuine, however PoW requires large amounts of energy to undertake the solving of the puzzle.

**Proof of Stake** – Proof or Stake (PoS) was created as a more energy efficient alternative Consensus mechanism to PoW. With PoS, the network allocates the opportunities to solve the puzzle based on an amount of tokens or cryptocurrency that is held.

For example, if Person A held 20% of a hypothetical JerseyCoin cryptocurrency they may be eligible to solve 20% of the puzzles available, compared with a Person B who only held 3% of the JerseyCoin market share and who would be eligible to solve only 3% of the puzzles available.

## **Where can I find more information?**

For more information on Distributed Ledger Technology or fintech visit our dedicated [fintech page](#).