A Gentle Introduction To Digital Tokens

BRAVE NEWCOIN.
Digital Currency Insights

Table of Contents

A Gentle Introduction To Bitcoin

Authored By

Antony Lewis

Antony Lewis has a passion for virtual currencies such as bitcoin, and the underlying technologies behind them, including blockchain data structures and distributed consensus systems. Antony believes that these new ways of putting the technologies together will change the world of business, reminiscent of how the internet changed the distribution of information. Antony consults businesses, helping them understand the implications of blockchain technology.

antony@bitsonblocks.net

@antony_btc

Published By

BraveNewCoin

BNC. Digital Currency Insights

Adapted from

Bits On Blocks

The '**Gentle Introduction Reference Papers™** are the first in a series of accessible documents published by Brave New Coin for industry decision makers. Designed to demystify the inner workings of Bitcoin, Digital Currencies and the emerging Blockchain technology.

Series ONE covers:

"A Gentle Introduction To"

> Bitcoin

> Blockchain Technology

> Bitcoin Mining

> Digital Tokens

Free to Download and Share

Digital Tokens in The Beginning

Digital tokens have come to the fore recently, firstly with excitement about cryptocurrencies such as bitcoin, then with digital tokens being used to represent different assets on a blockchain. What are they? How can you digitise a token? Why is it important?

When I hear the word 'token' I think of round plastic things like a casino chip, or something which I can use to exchange for a beer under a specific system, or in a specific marketplace.

We will explore the original usage of the phrase 'digital token,' then take a look into the world of cryptocurrency tokens, differentiating between blockchain-native tokens like BTC on Bitcoin, and asset-backed tokens like IOUs on Ripple.

When you enter an email address into a website to join a mailing list, you're often asked to check your email and click on a link. The link looks something like this:

*https://www.website.com/confirm_email?***token=4bdebebc-135b-4748-b7ab-25b31a285df8**

In this case, the 'token' is this string of characters which was sent to you. It's a unique string of characters, when you click on it the server is told "yep, the guy definitely got the email, so the email account is definitely his."

The website sent you a token, and you sent it back, proving you had control of that email address.

However, 'token' is now being used ***in an entirely different way***, to mean other things in the cryptocurrency industry. Let's explore.

Cryptocurrency Tokens

Cryptocurrency tokens don't exist as a string like we saw above (if they did, they would be easy to copy), they exist conceptually as entries on a ledger (a blockchain). You own these 'tokens' because you have a key that lets you create a new entry on the ledger, re-assigning ownership to someone else. You don't store tokens on your computer, you store the keys that let you reassign them.

It can be helpful to think of these 'tokens' as specific amounts of digital resources which you control, and you can reassign control to someone else.

We'll cover two types of token:

1. "intrinsic" or "native" tokens in blockchains

2. "asset-backed" tokens issued by a party, on a blockchain, for later redemption

1. Intrinsic tokens (also known as 'native' or 'built-in' tokens)

Intrinsic tokens are made-up resources that have some utility.

Some of the more well known examples of intrinsic tokens are:

- BTC on the Bitcoin blockchain
- XRP on the Ripple network
- NXT on the NXT platform
- ETH on Ethereum

There are many more. See: *http://bravenewcoin.com/price/price-index/#all*

These tokens, or 'coins,' are a core component of these blockchains, and the blockchains would not run without them. They are usually part of an incentive arrangement, encouraging people to help validate transactions and create blocks, or in Ripple's case, they are there to create a small cost per transaction which helps prevent transaction spam.

Cryptocurrency Tokens

How did these intrinsic tokens come into existence?

As these are not backed by anything, they can be created by software, just as easily as you can write down on a sheet of paper "I hereby create 1 billion fun-coins." If you did that, and then kept a good record of which friends you gave these to, and if you could record onward transactions as your friends gave them to other friends, you would be mimicking a digital ledger.

For the examples above:

In Bitcoin, BTC are created ('mined'), according to a schedule. The newly created coins are assigned to the block-maker. The total number of bitcoins increases with time. They are optionally added to transactions.

In Ripple, XRP were created at the beginning ('pre-mined') and shared out among key participants. Each transaction has a fee costing a small amount of XRP. These XRPs are destroyed over time, and not re-assigned to the transaction validators. The total number of XRPs in circulation goes down with time.

In NXT, NXT coins were pre-mined. Each transaction on the NXT network has a fee, payable in NXT. The fee goes to the block-maker (in NXT this is called a 'forger' instead of a 'miner'). The total number of NXT remains constant with time.

In Ethereum, ETH ('Ether') was pre-mined. Transactions and smart contracts need ETH to run, and this ETH go to the block-maker as a reward (a computation fee). The block-maker also gets a block reward.

Network	Coin	Issuance	Block-making incentive
Bitcoin	BTC	Created according to schedule. Total 21 million BTC in 2140.	Block reward + transaction fees
Ripple	XRP	100% pre-mined. 100 billion XRP created.	None
NXT	NXT	100% pre-mined. 1 billion NXT created.	Transaction fees
Ethereum	ETH	72 million pre-mined plus ongoing issuance of 18 million ETH per year.	Block reward + computation fees

A selection of distributed ledger systems and their intrinsic tokens.

Purpose. The main purposes of intrinsic tokens are:

1. Block validation incentives ('miner rewards')

2. Transaction spam prevention (if all transactions cost a nominal amount, spam becomes expensive)

Although these coins have external value (you can buy and sell any of them on an online exchange), they aren't meant to represent anything. They provide utility to their respective blockchains.

Cryptocurrency Tokens

How do asset-backed tokens work?

2. Asset-backed tokens

Asset backed tokens are claims on an underlying asset, from a specific issuer.

Wikipedia's History of money suggests that in the good old days, you could park some gold with a goldsmith, and receive a receipt or "I Owe You" (IOU) note from them. These notes could be transferred from person to person, and anyone holding these notes could go back to the goldsmith and claim the actual gold.

Asset-backed tokens are the digital equivalent. They are claims on an underlying asset (like gold), that you need to claim from a specific issuer (the goldsmith). The transactions, as tokens, get passed between people are recorded on the blockchains. To claim the underlying asset, you send your token to the issuer, and the issuer sends you the asset.

Popular assets for these tokens are currency (USD, EUR, etc) and precious metals (Cryptocurrencies seem to attract the same crowd as gold and silver). But, read the press and every day you'll see people tracking assets on ledgers, by creating a digital token that represents them. Diamonds, art, music… you name it.

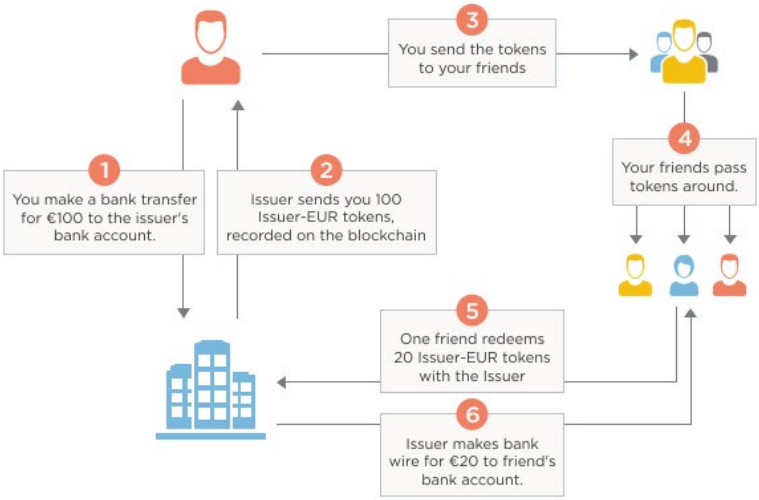
How do asset-backed tokens work?

Let's take the example of Coins-R-Us, a fictitious Bitcoin exchange, issuing Euro-backed digital tokens.

You send Coins-R-Us some money by logging on to your online banking, and making a normal EUR bank payment to the Coins-R-Us bank account for €100. When they log in and see it, they can give you 100 digital asset-backed tokens called Coins-R-Us-EUR.

The creation of these tokens is recorded on a blockchain (whether it's coloured coins on The Bitcoin Blockchain, or assets on Ripple or NXT, or a smart contract on Ethereum). You can then send these tokens to your friends (either in return for something or as a gift), and the tokens continue to be tracked on the same blockchain.

Eventually one friend will want to convert this asset-backed token for something real. She would need to go back to Coins-R-Us, create an account with them, tell them her bank account number, and send them the Coins-R-Us-EUR that she got from you. They would then transfer her some EUR from their bank account to her bank account.



Asset-backed tokens are wonderful in being easy to transfer, with good record-keeping, but on redemption, you still rely on the issuer being liquid.

Tokenless Blockchains

In some discussions, including Tim Swanson's excellent report on permissioned ledgers, there is the concept of tokenless blockchains. This means a blockchain or distributed ledger which lacks an intrinsic token (eg Ripple without the XRP), however asset-backed tokens are likely to still be used. 'Tokenless' refers to lack of intrinsic token, and not the lack of asset-backed token.

You don't always need a token. Depending on the setup of the blockchain system, you may or may not need an intrinsic token.

In general, permissionless ledgers (open to anyone), need some sort of incentivisation scheme for block validators to do their job. However, in distributed ledger systems where you control the validators and block-creators, then they may be doing their job for different reasons, perhaps they are contractually obligated to do so. There's a little more on it here.

Dematerialisation And Tokenising Legal Constructs

There is currently a lot of noise in the media around putting things on blockchains; shares, debt, gold, companies, IPOs, diamonds, art, decentralised organisations, wine, music, countries and so on.

Sometimes, the purpose is to be able to transfer assets (or rather IOUs) quickly and easily, while keeping the physical item secure in a warehouse.

Other times, it's to have a digital token whose digital ownership matches the physical journey object. For example when I sell you a physical diamond, I also send you the digital diamond-token from my control to your control, and so the blockchain records the provenance of the diamond, like a supercharged certificate-of-origin which includes a full record of ownership.

Regarding legal constructs, especially companies and shares, there is a difference between *tracking claims* to underlying objects on a ledger, and *legally dematerialising* the object. Dematerialising something means replacing a material object with a digital one. For example, paper share certificates have now mostly been replaced by ownership registers in databases, and some paper contracts have been replaced with pdf files.

While you can declare "this digital token represents a share of a company," and you can send that to someone else, this has no legal bearing. The token isn't the share, even if you own the share in real life, and you issue the token on the back of it. The token is something outside the law, which you have invented.

As the owner of shares, you may commit to other people that if they own so-and-so token, then you will pass them certain privileges. For example, if you own this token, I will pass any dividends I get (from really owning the share) to you.

However, you own the share because your name is on the share registry, the real legal share registry, not the blockchain ledger which you are using to track the digital token you have created.

If the law changed and by *statute* a specific blockchain became, or was deemed, equivalent to the national register of companies, then you could create a company on that statutory blockchain.

About

BNC.
Digital Currency Insights

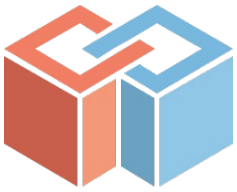
Brave New Coin is a Data & Research company focused on the exponential Blockchain & Digital Equities industry. We collect, index and report on countless digital assets and their market & industry activities.

Subscribe to our weekly newsletters to keep in the loop with industry news.

Subscribe

www.bravenewcoin.com

contact@bravenewcoin.com



Bits on Blocks is a Singapore - based blog, run by Antony Lewis, who focuses on Blockchain Technology. Mr Lewis believes that Blockchain Technology can make the world a better place.

antony@bitsonblocks.net

www.bitsonblocks.net

Explore more resources

 Research & insights

 Market-Data

 Developer tools (API's)