# Why is crypto important?

A seriously simple guide for people not (yet) into crypto.

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octopus ventures

Before we begin….This deck contains personal views and information I've gathered from people I respect. It doesn't reflect the views of Octopus. There will be lots of gross simplifications and details overlooked in favour of being easy to digest for people new to crypto. It is for educational purposes only and nobody should make any decisions (investment or otherwise) based on anything contained in this deck. Thanks.

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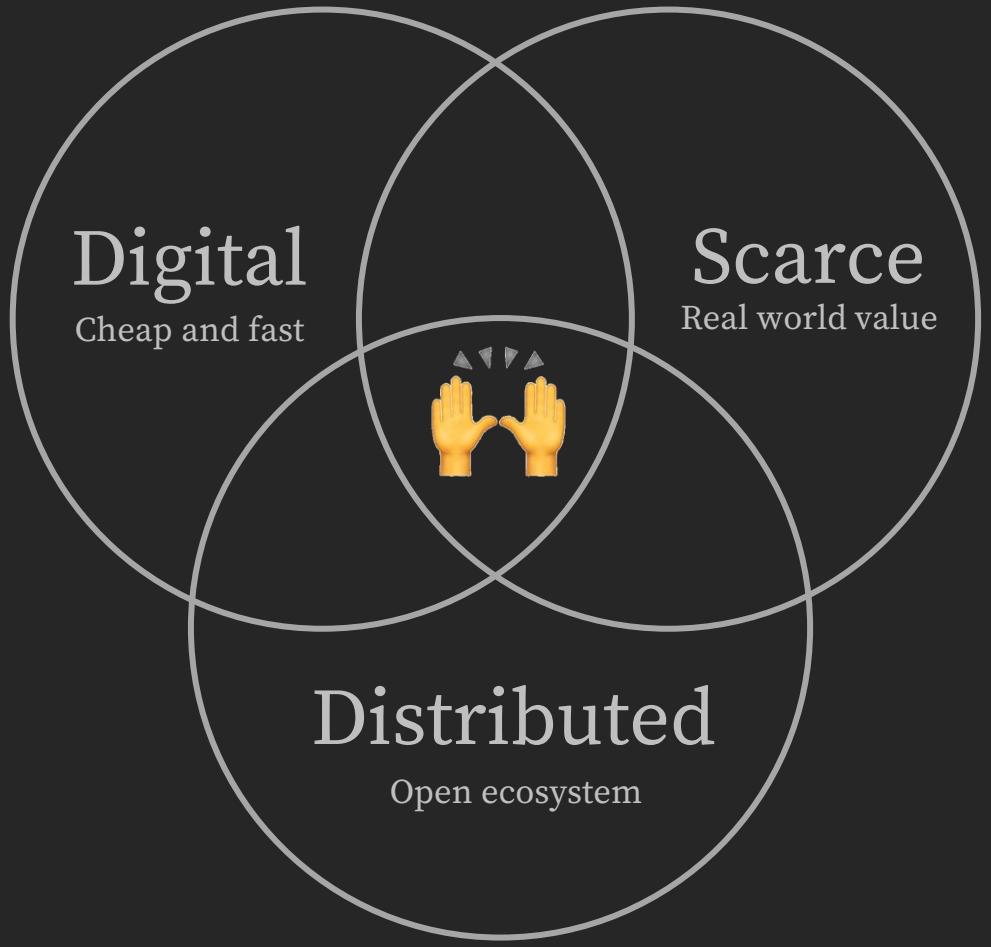
It's also in dark mode to go easy on your eyes after the battering they've taken over ten months (and counting) of videoconferences. You're welcome.



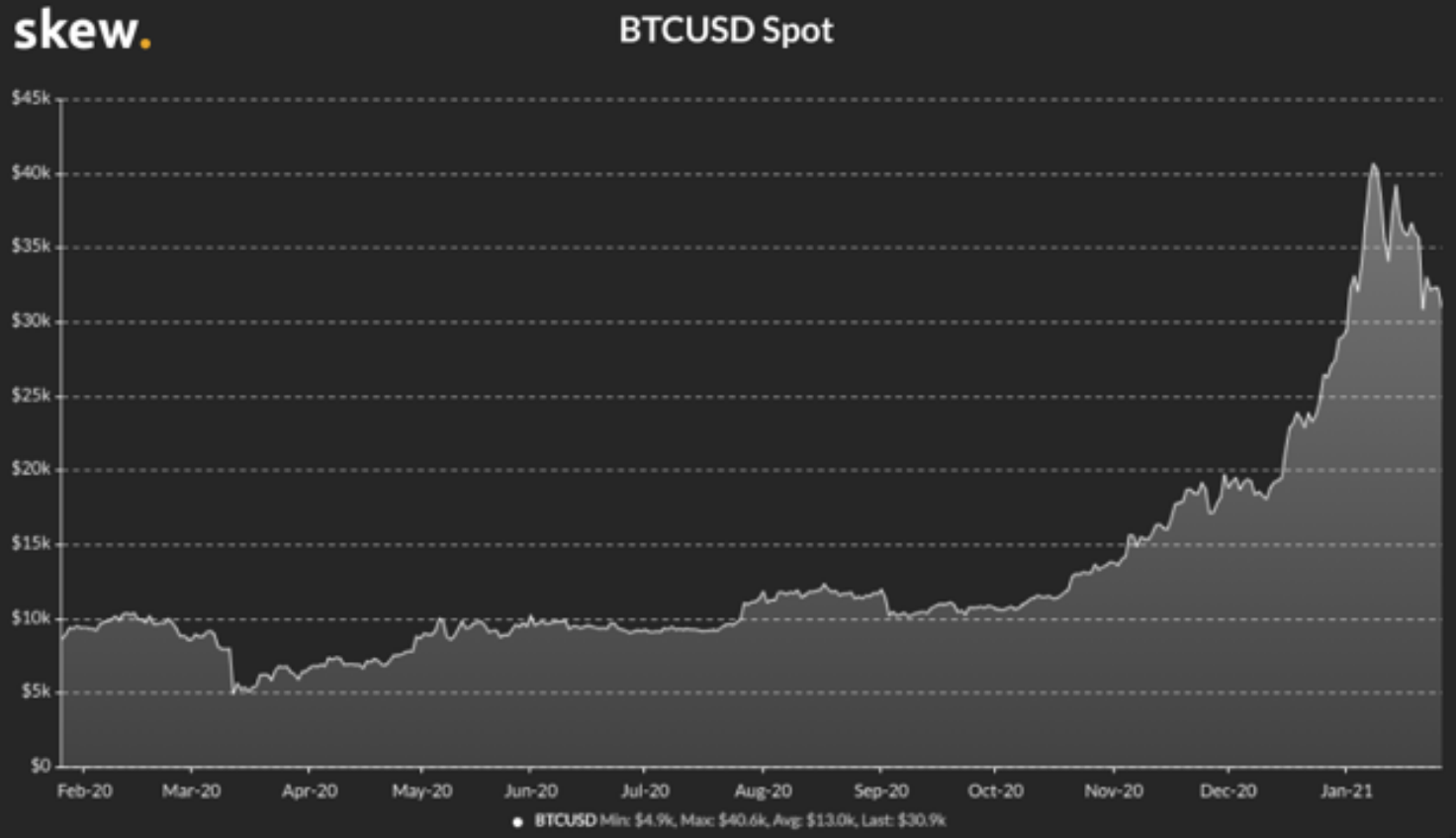

🙌 = crypto

tl;dr: Crypto is important because it gives us the benefits of digital + scarce + distributed.

If that makes perfect sense to you, feel free to close this deck and get on with the rest of your day.

Otherwise, read on....

# It happened again. The price of Bitcoin (and a bunch of other cryptoassets) shot up in a matter of weeks*.




* This happens every few years, for some reason it's always around Q4. I've got no idea why it's always towards the end of the year…if you know (or have a theory) please tell me!

The price of Bitcoin gets all the sexy headlines, but it's worth remembering why Bitcoin and other cryptoassets are so exciting for the future of society.

This deck is my attempt to explain that from first principles in words that anyone can understand.

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If I'm wrong I'd love to know about it: zihao@octopusventures.com

# In the real world, things are scarce.

This means most things we care about are limited in supply, and it costs resources, human effort and time to make more of those things. Things don't just appear out of thin air for free.

If for example I have a house, I can't easily make a copy for you to live in while keeping the original for myself. The house belongs to you or to me, not to both of us.

The same thing applies to the £10 note in my pocket.

# In the open digital world, things are not scarce.

Digital things are just information, and information can be replicated and distributed for essentially zero marginal cost. If I record a song in .mp3 and send it to you, you get to listen to it but I don't lose it. Your copy has very much appeared out of thin air for free!

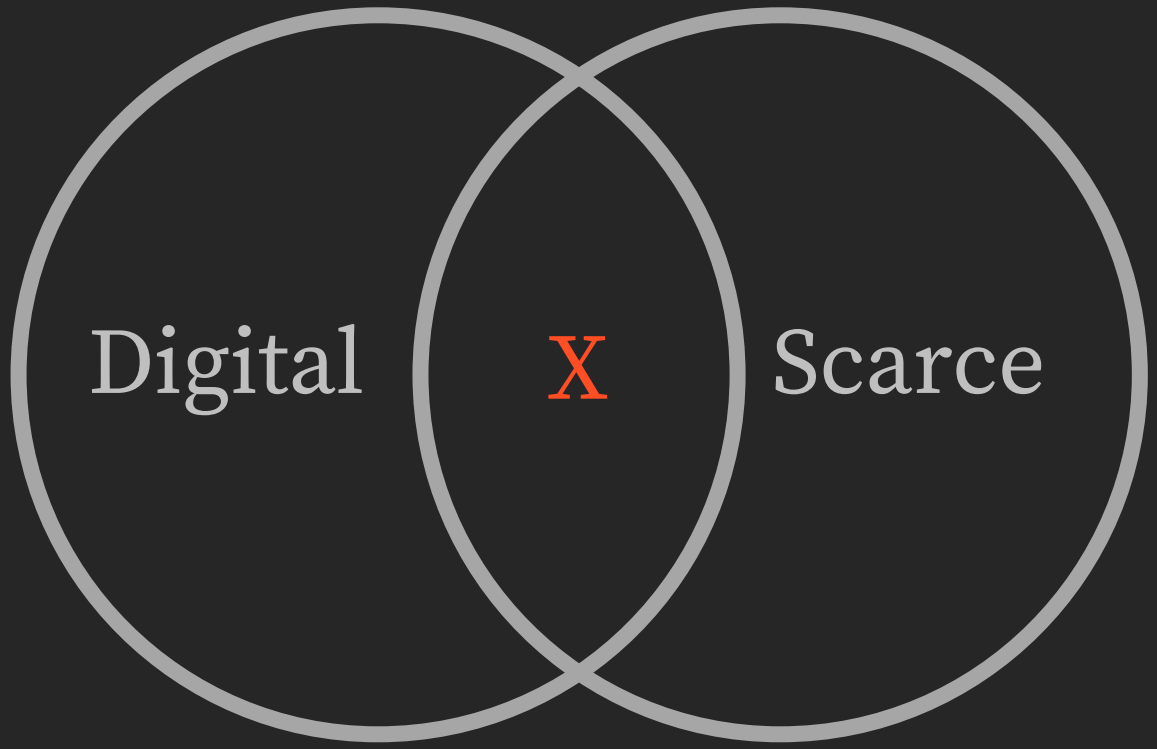
The same thing applies to PDF files, live video streams, and any database of information – all of it could be replicated and shared for a close to zero marginal cost.

# Getting rid of scarcity is pretty awesome. It's literally one of the best things we've done as humans.

Being able to replicate and distribute all kinds of information for almost zero marginal cost means we can share and swap data and ideas farther and faster than we ever could before. This has enabled our society to collectively get smarter, experimenting and collaborating on building the amazing things we have the world.


# But sometimes getting rid of scarcity is annoying. Scarcity can be critically useful.

If we want a digital representation of something in the real world, then it needs to be scarce. For example if I wanted a digital representation of a £10 note, it can't just be a file on my computer in the same way that a real £10 note can just be a piece of paper in my pocket. I could replicate that digital file and fake having more money than I really do. I'd need the digital version to also be scarce in order to be useful.




Wouldn't it be great to combine the characteristics of being digital with being scarce? We'd be able to transact things in the real world at close to zero marginal cost at close to the speed of thought – epic.

We can do this, through a centralised digital database.

X = centralised digital database

# A database is just a list of stuff.

It's a structured list that often represents something in the real world.

A seating plan is a database of people and seats.
A bank account is a database of money in and out.
A library ledger is a database of books in and out.
A payroll is a database of people and salary.
HM Land Registry is a database of real estate.
Etc etc.

# A digital database is a list of stuff stored in a computer.

Being on a computer means we can easily edit and manipulate the list as well as share it with others anywhere in the world in seconds and for free.

# A centralised digital database is the only list of stuff stored in a computer that we believe.

We have to have a single source of truth. If we have multiple versions of a database that anyone could edit, there would be mass confusion. Imagine if each guest at a wedding made their own version of the seating plan, or if each of us had edit rights on our own bank account...carnage ensues.

Centralisation creates scarcity since someone can make sure the list matches what we have in the real (scarce) world.

# “Believe” just means we’re willing and able to enforce what this list says in the real world.

Enforceability is what makes the list important, and separates the “source of truth” list from the “whatever who cares” list.

I can write my own version of the UK land registry that says I own the magnificent (albeit run down) house at 94 Piccadilly, but HM Land Registry’s list is the only one that the police will refer to when they remove me from the premises and read me my rights.

# Humans ❤️ enforcing lists of stuff in the real world. These sources of truth run our entire society.

**First National Bank**
1234 First Avenue
Primo Vista, CA 90783-1409

Statement of Account
109-654-5454-45

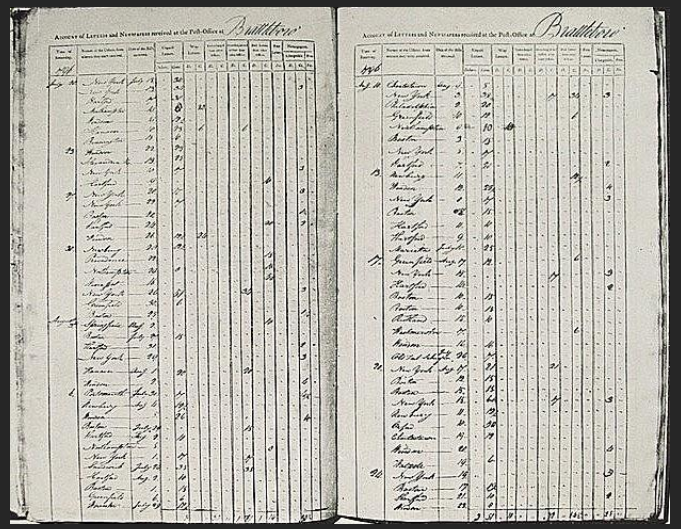
April 30, 20X8

Vector Management Group
3214 Tangent Ln.
Circle Park, CA 90778-3421

| | |
|---|---|
| Balance Last Statement | 7,358 |
| Total Credits | 14,083 |
| Total Debits | 13,239 |
| Balance This Statement | 8,202 |

| Date | Check | Debits | | Credits | | Balance |
|---|---|---|---|---|---|---|
| 4/1/20X8 | | | | | | 7,358 |
| 4/2/20X8 | | | | 3,200 | | 10,558 |
| 4/2/20X8 | 1541 | 152 | | | | 10,406 |
| 4/4/20X8 | 1547 | 330 | | | | 10,076 |
| 4/5/20X8 | 1551 | 18 | | | | 10,058 |
| 4/6/20X8 | | 20 | SC | | | 10,038 |
| 4/6/20X8 | 1553 | 152 | | | | 9,886 |
| 4/7/20X8 | 1554 | 87 | | | | 9,799 |
| 4/9/20X8 | | | | 2,800 | | 12,599 |
| 4/10/20X8 | 1555 | 1,524 | | | | 11,075 |
| 4/11/20X8 | 1556 | 765 | | | | 10,310 |
| 4/12/20X8 | | 253 | DM | | | 10,057 |
| 4/12/20X8 | 1557 | 32 | | | | 10,025 |
| 4/13/20X8 | 1558 | 304 | | | | 9,721 |
| 4/14/20X8 | 1559 | 3,227 | | | | 6,494 |
| 4/16/20X8 | | | | 3,100 | | 9,594 |
| 4/17/20X8 | 1560 | 81 | | | | 9,513 |
| 4/19/20X8 | | 50 | SC | | | 9,463 |
| 4/19/20X8 | 1561 | 152 | | | | 9,311 |
| 4/20/20X8 | 1562 | 66 | | | | 9,245 |
| 4/20/20X8 | 1563 | 1,325 | | | | 7,920 |
| 4/21/20X8 | 1566 | 358 | | | | 7,562 |
| 4/23/20X8 | | | | 3,400 | | 10,962 |
| 4/24/20X8 | 1567 | 429 | | | | 10,533 |
| 4/24/20X8 | | 345 | NSF | | | 10,188 |
| 4/25/20X8 | | | | 1,565 | CM | 11,753 |
| 4/27/20X8 | 1568 | 3,188 | | | | 8,565 |
| 4/30/20X8 | 1569 | 381 | | | | 8,184 |
| 4/30/20X8 | | | | 18 | INT | 8,202 |

Symbol key: CM = Credit Memo (see attachment) INT = Interest
DD = Direct Deposit NSF = Not Sufficient Funds
DM = Debit Memo (see attachment) SC = Service Charge



# They’re so important we have to put them in trustworthy places.

We trust these places because:

1. They’re filled with trustworthy people who understand how important the lists are.
2. They put lots of infrastructure and processes in place to stop people messing up or cheating.
3. Society puts regulations and controls around them to stop them from being super bad.
4. We don’t really have a choice…the lists these places keep are the ones that get enforced in the real world.

The trouble is sometimes they're not as trustworthy as we think they are, or other times they mess up because they're only human after all.

(this guy here didn't mess up…he was just a bad dude)

# The other big issue is that these centralised places are also the gatekeepers.

You need permission from those in charge in order to try anything new, and they usually don't have enough time nor enough information to properly assess whether or not you should get that permission.

As a result, these centralised systems can't run as many experiments as we might like them to. They're "closed ecosystems".

# If we decentralise or “distribute” these systems and allow anyone to access and experiment with them we bypass the gatekeepers.

We end up with “open permissionless ecosystems” where almost anyone gets to try new things without having to convince a small group of people that it’s a good idea. If we get the incentive structures right in these open ecosystems we get magic.

# Open ecosystems tend to out-innovate closed ecosystems by orders of magnitude.

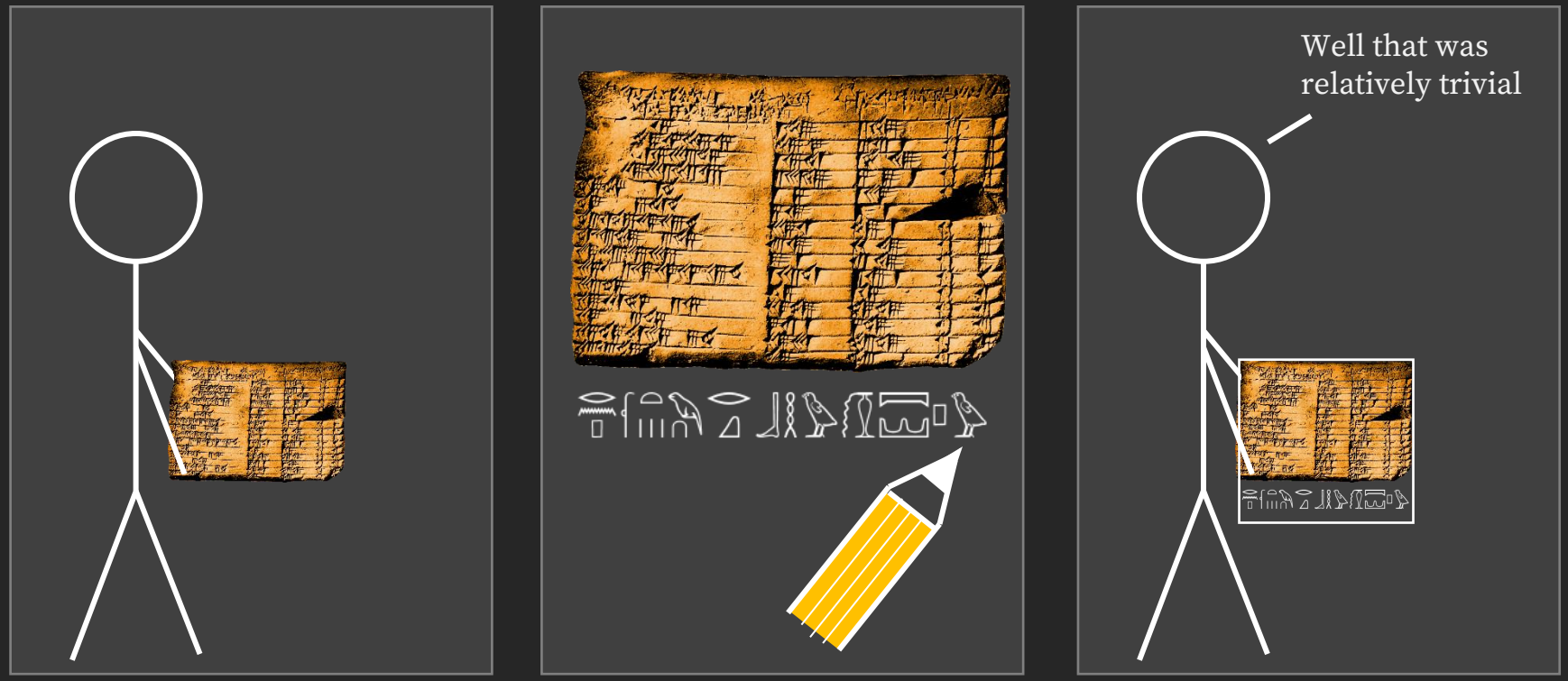
Because people get to try anything, the ideas that win are more likely to be the best ideas, and not just the ones that sounded good to the decision-makers. Ideas that sound stupid in a boardroom are sometimes really good.

| Examples of closed ecosystems | Their counterpart open ecosystems |
|---|---|
| Microsoft Encarta: "Encyclopaedia are important so we need to control what they contain to make sure the content is very high quality." | Wikipedia: "Let's let anyone edit this encyclopaedia with what they know since the body of human knowledge is far too broad for any one company's stewardship." |
| AOL: "Most people are rubbish at making websites so we must control which sites people can visit in order to give them the best experience online." | Open Internet: "Wouldn't it be wonderful to see what sort of websites people come up with. The rubbish ones won't get any visitors." |
| Planned Economy: "The world's resources are scarce and must be used properly – we'll ensure this happens through proper and detailed planning of what goods and services should be produced from our limited resources." | Market Economy: "The world is too complex and dynamic for any group of people to decide how to use our scarce resources; let's enforce contracts and property rights and let the people closest to the action figure out what to do." |

But when you decentralise control of the database, you also lose the scarcity characteristic.

Anyone can write what they want and there is no longer a single source of truth that we all believe.

# That's because we have to update our databases to reflect changes in the real world. Updating a centralised database is relatively trivial...



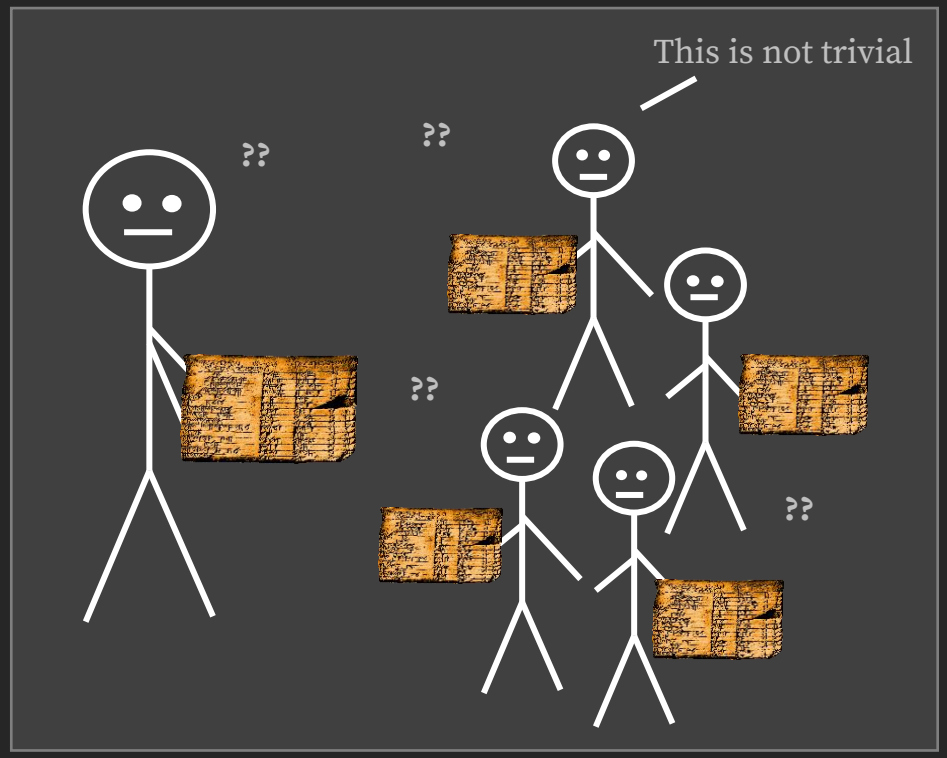
# …but updating a decentralised (aka distributed) database while maintaining a single source of truth is not trivial.

Who gets to decide what changes we should make?

How do we know the changes are accurate?

How do we ensure everyone's copy is consistent?

What stops everyone putting 94 Piccadilly under their own name?




Note: decentralised and distributed aren't exactly the same thing, but for our purposes they can be thought of as much. For a deeper dive into decentralisation, look up "The Meaning of Decentralisation" by Vitalik Buterin.

# Crypto enables us to update distributed databases while maintaining a single source of truth.

This deck doesn't talk about how this happens, although a future one might. If you're curious in the meantime, Google "Byzantine fault tolerant consensus".

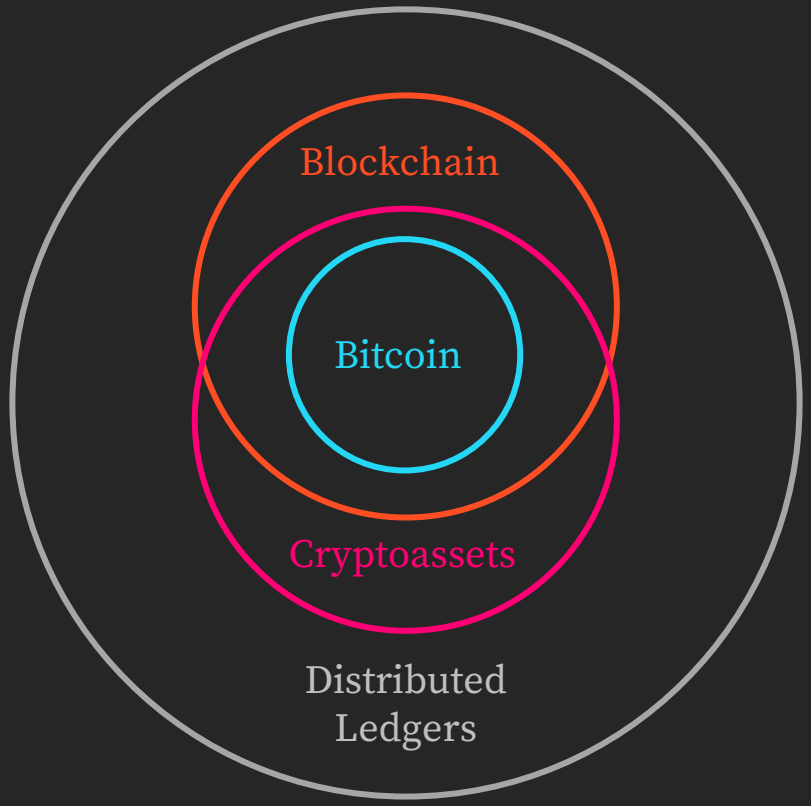
# A “blockchain” is the most popular structure for a distributed and cryptographically secured database.

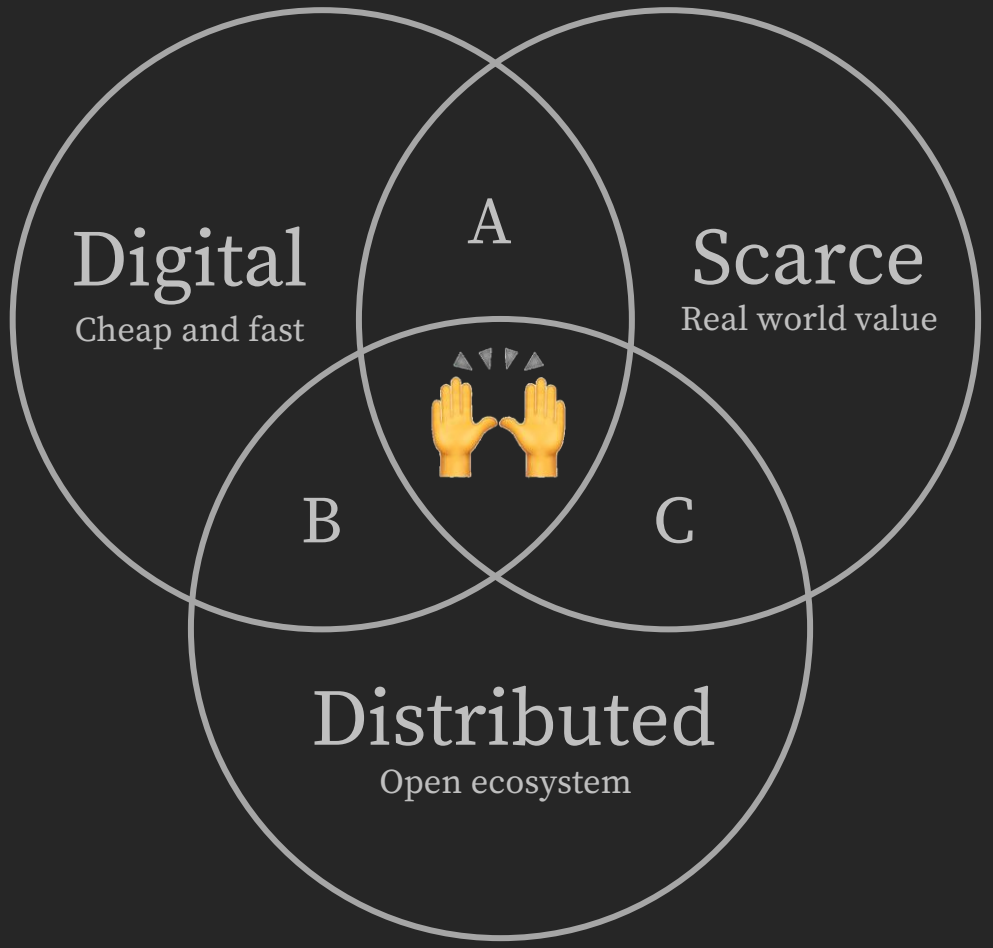
## Blockchain

/’blɒktʃeɪn/
*noun*

A cryptographically secured append-only database accessed and managed on a peer-to-peer network

(aka a single list of stuff where you can’t do anything to except add data, hosted and written to by lots of computers, with a system for agreeing what new data to write…and everyone believes that list…and nobody can mess with it)






# Crypto is important because it gives us the benefits of digital + scarce + distributed.

A = centralised ledger (e.g. bank ledger)
B = digital information (e.g. Wikipedia)
C = physical things (e.g. coal, labour)

🙌 = cryptoassets

The underlying benefits of being digital + scarce + distributed can be applied to many different concepts by adding some crypto magic.

# Three such concepts worth mentioning:

## 1. All the money, managed by central banks

"All the money" refers to the entire money supply within a jurisdiction. How this is managed has a huge impact on how the economy performs. Decisions influencing key characteristics of the US Dollar are made by the Federal Open Market Committee (twelve people) at the Federal Reserve. Decisions related to the Pound Sterling are made by the Bank of England's Monetary Policy Committee (nine people).

## 2. Some of the money, managed by financial institutions

When individuals and businesses interact with their own money, they typically do so through an institution such as a bank, a broker, an asset manager, an exchange, etc. These institutions hold the keys to what we can do with our money and they have rigorous processes for deciding what new products and features to release.

## 3. Not the money, often managed by large corporations

These databases cover practically everything else that drives society. Social graphs, ridesharing demand and supply, employment records, browsing history, academic citations, purchase history, electricity usage…you name it and there's probably a centralised list out there that some large organisation looks after.

# And the crypto community is building its own versions:

## 1. All the money x Crypto → Sound Money

Some people believe that money is too important and too complex to leave in the hands of a small group of individuals, no matter how wise and benevolent they might be. By building monetary systems on distributed infrastructure and enshrining their characteristics in code for all to see, we may enable more robust forms of money – aka "sound money".

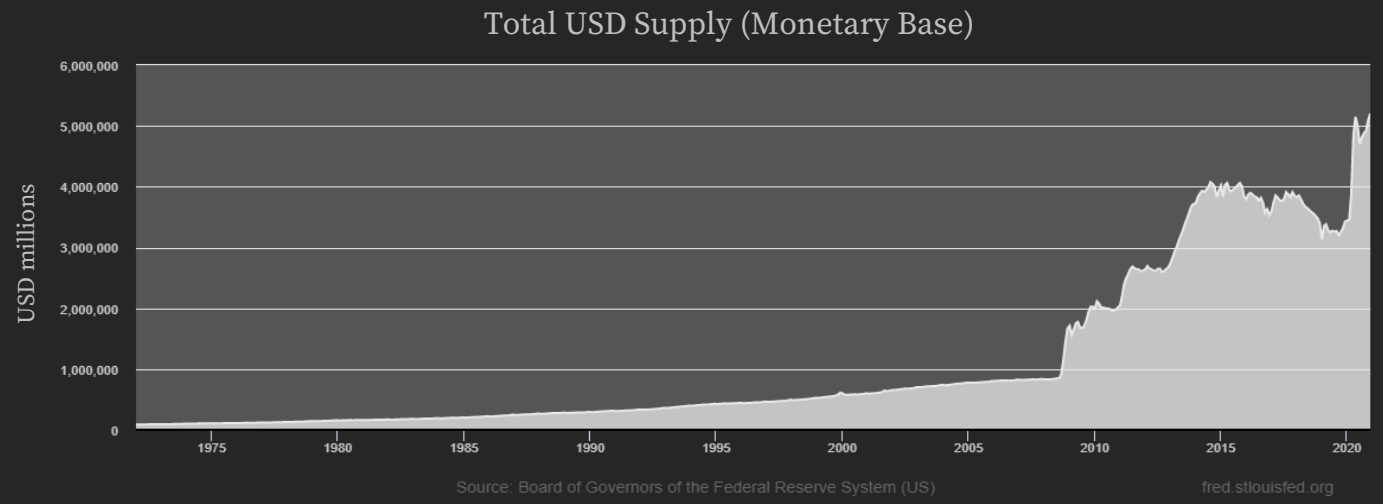
## 2. Some of the money x Crypto → Decentralised Finance (DeFi)

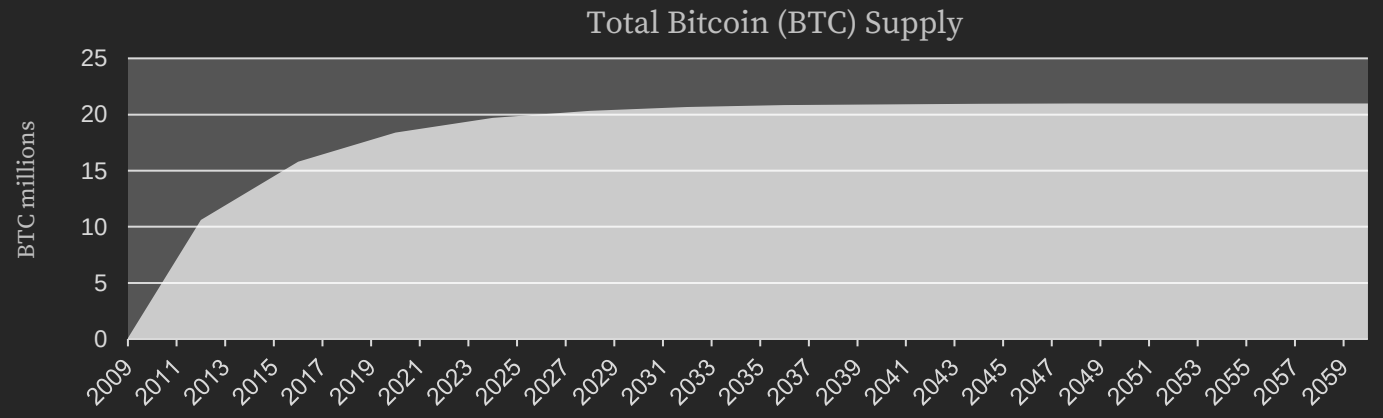
How people and companies interact with their own money is really important – earning, investing and spending money is how we trade and collaborate at scale in society. The DeFi movement is augmenting and replacing traditional centralised financial intermediaries with distributed and open protocols that anyone can use, interact with, contribute to, and replicate. Nobody gets to change the list in secret – not even Bernie Madoff.

## 3. Not the money x Crypto → Web3

Let's say you don't like how Facebook works. You can try to build your own social network but if none of your friends use it you won't have much fun. If Facebook were built on a decentralised protocol then anyone could fork the network (i.e. make a copy) and make any improvements they see fit. Same thing could happen with a decentralised Uber or even National Grid. Lose the single points of failure and gain open ecosystems. That's the aim of the Web3 movement.

# 1. Sound Money summarised on one slide




If money represents valuable things in the real world – e.g. resources, products, services – and those things are ultimately scarce, then shouldn't money be scarce as well? If the amount of money grows faster than the amount of valuable things in the world, then over time each unit of money will be able to buy fewer things – the money is "unsound" and subject to long term inflation.

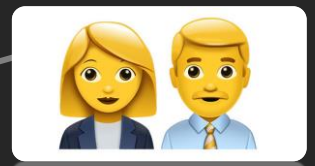
The top chart represents the supply of USD over time, controlled by a central committee. The bottom chart represents the supply of Bitcoin over time, controlled by the maths built into the Bitcoin protocol. Predictable supply is a core element to sound money.

There's enough written on this topic to fill libraries, but we'll leave it here (for now).

# 2. DeFi summarised on one slide

"We decide what happens to your money, and we'll tell you about it in a way that suits us. Hopefully it suits you too but there are so many of you we can't really be sure. We might also change our minds about things without asking you – e.g. stopping you trading $GME. If anyone wants to do things differently, they'll need to book an appointment and convince us that it'll be good for us and our shareholders. We'll then apply for internal resources to see if we can prioritise exploring that idea. Also we're super busy so we don't have time for terrible ideas. We've generally done a good job but from time to time someone has behaved atrociously. When we catch those people we punish them."

- Smart people at any centralised financial institution



"I'm literally just maths. Anyone in the world can see exactly what happens to their money, and nobody gets to change what happens without telling everyone else. I can't stop you trading $GME. If someone wants to try out a new idea, they can make a copy of me and have a go. Most new ideas will probably be rubbish but some will be amazing, and the user gets to decide – nobody needs to make an appointment or a slide deck to convince anyone that their idea is any good. Anyone can check my maths and include it in stuff they're building if they think people will find it useful – or even just build it for themselves if they'd like to. Sometimes bad people will also build maths to trick others, but people can usually spot them by checking the numbers if they look hard enough."

- Permissionless DeFi Protocol

The DeFi ecosystem is still really early so there's not a huge amount for most normal people to participate in just yet, but over time we might see mature decentralised protocols dealing with the saving, lending, and investing activities of everyday consumers and businesses. If we believe that open systems will continue to out-innovate closed ones, we should expect some amazing things to emerge.

# 3. Web3 summarised on one slide

Imagine we're building a new decentralised society on the internet. DeFi is how we plug into financial markets. Web3 is how we plug into everything else. Ridesharing, music streaming, esports, job marketplaces, cloud storage, etc...anything that can be managed and traded digitally can be decentralised and subjected to the permissionless innovation that comes with open ecosystems.

# So why is crypto important?

Because if Sound Money, DeFi or Web3 gain any meaningful traction, the incentive structures driving society will dramatically change. Watching the price of Bitcoin go up is fun but restructuring incentives in the right way can shape the next thousand years.

# Finally, a bit about us....

Octopus Ventures helps pioneers change the world. Our investment team is built to specialise in the four areas we believe will change the world for the better: health, money, deep tech and consumer. With £1.3 billion under management and investing over £100m a year, Octopus Ventures is one of the largest and most active venture investors in Europe.

My name is Zihao Xu and lead the Future of Money team at Octopus Ventures. I work with a number of our portfolio companies including Elliptic and Skew, and have been learning about crypto since around 2012. I believe that our species' ability to collaborate at scale is perhaps the premier force for improving general living standards. This collaboration is underpinned by responsibly harnessing and efficiently exchanging the natural riches of the earth and the products of specialised human industry and ingenuity. The infrastructures that govern how we exchange and allocate scarce resources and human efforts are often monetary ones - if you're building massive improvements (faster, more efficient, better priced, etc.) on what exists today, please get in touch!

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