

# Cryptocurrencies and Blockchain technology:

## What are they and what are the killer applications?

Sabrina Kirrane, 12.04.2018

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ECONOMICS  
AND BUSINESS



# Background Information

- **Privacy & Sustainable Computing Lab**
- Launched September 2016: launch event with various important stakeholders: technologists, standardization, activists...
- Mission: Developing sustainable and privacy-preserving computer systems by bringing together computer science & human-centric behavioral science

The screenshot shows the homepage of the Privacy & Sustainable Computing Lab. At the top left is the lab's logo, which is a green circular icon with a stylized white 'P' and 'S' intertwined. To the right of the logo, the text "PRIVACY & SUSTAINABLE COMPUTING LAB" is written in a sans-serif font. Below the header is a navigation bar with links: "About", "News", "People", "Advisors", "Projects", "Events", and "Contact". The main content area features a large, vibrant photograph of a modern university campus. In the foreground, there's a paved walkway with a few people walking. To the left, a building has a dark, vertical-clad facade. In the center, a building with a distinctive cantilevered upper section and a red, textured facade is visible. To the right, another building with a glass and steel frame is shown. The sky is blue with some white clouds. Below the photograph, the text "Privacy & Sustainable Computing Lab" is displayed in bold. A paragraph follows, discussing the increasing ubiquity of IT and data in corporate infrastructures and innovation endeavours, noting the need for private, secure, ethical, and value-driven computing. At the bottom of the page, a footer note states: "The Privacy & Sustainable Computing Lab aims at setting new standards in research, education and practice to address ethical issues in computing."

<http://www.privacylab.at/>



**Dr. Ben  
Wagner  
(Director)**



**Dr. Sabrina  
Kirrane  
(Founding  
Director)**



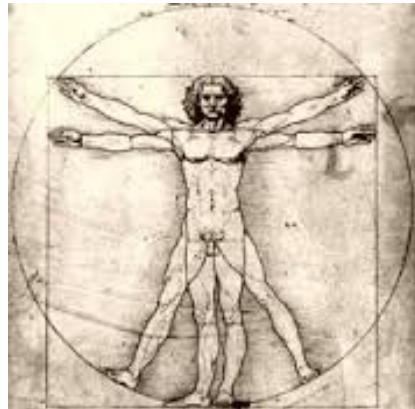
**Prof. Sarah  
Spiekermann  
(Founder)**



**Prof. Axel  
Polleres  
(Founder)**

# Background Information

## Online Privacy



**Humanities**

Net Neutrality

Fragmentation

Open Data

Open Standards

## Public Policy and Legislation Ethical Design



**Computer Science**

Big Data Analytics

Artificial Intelligence

Data Science



**Legal**

# Background Information



Home



**SPECIAL**  
Scalable policy-aware linked data architecture  
for privacy, transparency and compliance

## Project news



Two new papers on RDF data storage

The paper '[Evaluating Query and Storage Strategies for RDF Archives](#)' studies how to measure the performance of RDF databases. '[HDTQ: Managing RDF Datasets in Compressed Space](#)' presents a compact representation of RDF as 4-tuples that can be efficiently queried.

Less than one month to register for our workshop!

The deadline to submit something to our workshop '[Data Privacy Controls and Vocabularies](#)' is 28 February 2018.

[Read more](#)

New Community Group 'Credible Web' at W3C

'[Credible Web](#)' is a new [Community Group](#) at W3C for discussing the possibility of using RDF annotations on data in a distributed fashion to help people evaluate the credibility of information.

[Read more](#)

## Other news



First draft of a standard for verifiable claims

A new working group in W3C recently published the [first draft](#) of a future standard model for verifiable claims.

[Read more](#)



Horizon 2020  
European Union funding  
for Research & Innovation

<https://www.specialprivacy.eu/>

This project receives funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 731601

# Background Information

**dalicc** DATA LICENSES CLEARANCE CENTER

HOME ABOUT ▾ BLOG

SIGN UP LOG IN

The screenshot shows the DALICC website homepage. At the top, there's a navigation bar with links for HOME, ABOUT, BLOG, SIGN UP, and LOG IN. Below the navigation is a large red header bar. The main content area has a teal background. On the left, there's a circular diagram illustrating the DALICC process: it starts with a document icon, goes through a pencil icon, then a hand icon, and finally a database icon, forming a cycle. The text "dalicc GET A LICENSE FOR YOUR WORK" is centered above this diagram. To the right, the heading "LICENSE YOUR DIGITAL ASSETS AND DERIVATIVES" is displayed, followed by a description of the software framework. Below the description is a "READ MORE" button. At the bottom of the page, there are three sections: "SEARCH" (with a magnifying glass icon), "COMPOSE" (with a pencil icon), and "MIX" (with a network icon). Each section has a brief description below it.

LICENSE YOUR DIGITAL ASSETS AND DERIVATIVES

DALICC is a software framework that supports the automated clearance of rights thus supporting the legally secure and time-efficient reutilization of third party data sources.

READ MORE

**SEARCH**

Browse our knowledge base and choose an appropriate license for your work

**COMPOSE**

Use our license composer and create a custom license license for your work

**MIX**

Consult our license negotiator to check license compatibility and detect conflicts

<https://www.dalicc.net/>

# Background Information



Home \ Team

## Team

The goal of the research institute is to bundle the interdisciplinary competence of the Vienna University of Economics and Business. Only through an interdisciplinary approach, which considers the technical possibilities together with economic, social and legal aspects, the potential of this new technology can be met.

### Management

Director of Research Institute



Dr.rer.soc.oec. Shermin  
Voshmgir

✉ shermin.voshmgir@wu.ac.at

### Research Institute for Cryptoeconomics

Team

Research

Teaching

Companies

Partners

Media & Events

<https://www.wu.ac.at/en/cryptoeconomics/team/>

12.04.2018 | doors open at 18:30  
Expat Center, Schmerlingplatz 3, 1010 Wien



Dr. Sabrina Kirrane, who is a postdoctoral researcher working at the Institute of Information Business at the Vienna University of Economics and Business, will be holding a talk on:

### **Cryptocurrencies and Blockchain technology: What are they and what are the killer applications?**

Some of the topics that will be covered are:

- The historical perspective of trading in Cryptocurrencies (e.g. the initial Montgox platform, and influence of Jed McCaleb, etc.)
- What is Blockchain technology? What is its value? What are its potential future applications?
- Bitcoin and its importance as the first cryptocurrency
- What is the difference between Mining vs. Trading and is it necessary to have a Digital Wallet?
- The integration of cryptocurrencies into the mainstream financial markets. The regulation of cryptocurrencies – taxation and transparency
- What is the intrinsic value of Bitcoins/Altcoins and what is a ICO (Initial Coin Offering) and how is it calculated?
- Blockchain for distributed data management and decentralised application development

As usual after the main event, there will be an opportunity to network and discuss the topic in more detail in an informal atmosphere.

# Cryptocurrencies

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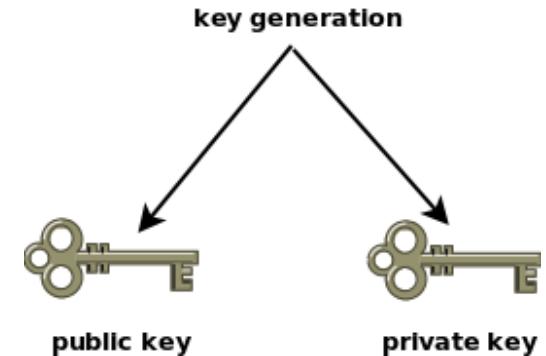
# Cryptocurrencies: What are they?



<http://bitcoin-wiki.com/bitcoin-wallet/>

The screenshot shows the Xapo wallet interface. At the top, it displays a QR code and the text "BTC 5.21 USD 4,496.57". Below this, the "WALLET ADDRESS" is listed as 161PyctH5EG3Dx8p7Vz4jUGKqf80mhJp85 with a checked checkbox next to it. Under "BITCOIN PRICE", it shows "USD 863.07". In the "LAST TRANSACTIONS" section, there are two entries: "Xapo Support" with a timestamp of "Wed Jan 15, 2014" and another entry for "Xapo Support" with a timestamp of "BTC -0.00999900".

<https://www.bitcoin.com/choose-your-wallet/xapo>



[https://courses.cs.ut.ee/2015\\_infsec/fall/Main/PKC-PKI](https://courses.cs.ut.ee/2015_infsec/fall/Main/PKC-PKI)

In Bitcoin, a private key is usually a 256-bit number

# Cryptocurrencies: Where can I find more information?

All	Coins	Tokens	USD					Next 100 →	View All
#	Name	Market Cap	Price	Volume (24h)	Circulating Supply	Change (24h)	Price Graph (7d)		
1	Bitcoin	\$116,239,652,176	\$6,849.23	\$4,215,820,000	16,971,200 BTC	1.41%			
2	Ethereum	\$40,932,647,530	\$414.50	\$1,261,660,000	98,752,578 ETH	4.36%			
3	Ripple	\$19,236,458,873	\$0.492050	\$148,291,000	39,094,520,623 XRP *	1.37%			
4	Bitcoin Cash	\$11,091,615,608	\$649.87	\$231,482,000	17,067,438 BCH	2.03%			
5	Litecoin	\$6,392,440,868	\$114.08	\$192,791,000	56,033,738 LTC	0.46%			
6	EOS	\$5,237,431,848	\$6.66	\$523,805,000	786,581,880 EOS *	11.75%			
7	Cardano	\$4,004,254,555	\$0.154443	\$49,708,000	25,927,070,538 ADA *	2.04%			
8	Stellar	\$3,733,810,071	\$0.201270	\$25,028,300	18,551,249,919 XLM *	1.01%			
9	NEO	\$3,511,527,500	\$54.02	\$101,777,000	65,000,000 NEO *	7.51%			

<https://coinmarketcap.com/>

# Cryptocurrencies: Where can I find more information?

	#	Name	Symbol	Market Cap	Price	Circulating Supply	Volume (24h)	% 1h	% 24h	% 7d
All	Coins									
	1550	Cheapcoin	CHEAP	\$?	\$0.000555	? *	\$1	-0.03%	-9.68%	-6.20%
	1551	Sand Coin	SND	\$?	\$0.700278	? *	\$1	-0.02%	1.67%	-4.26%
1	1552	SuperNET	UNITY	\$?	\$87.98	? *	\$1	-0.39%	17.36%	21.03%
1	1553	Qora	QORA	\$?	\$0.400008	? *	\$0	-0.02%	1.61%	72.61%
2	1554	KlondikeCoin	KDC	\$?	\$0.009268	?	\$0	?	0.75%	-19.70%
2	1555	LLToken	LLT	\$?	\$?	? *	\$0	?	?	?
3	1556	ANRYZE	RYZ	\$?	\$0.004798	? *	\$0	?	?	-13.39%
3	1557	Infinitecoin	IFC	\$?	\$0.000099	?	\$?	?	?	?
4	1558	GameLeagueCoin	GML	\$?	\$0.010049	? *	\$?	?	0.20%	6.90%
4	1559	VPNCoin	VASH	\$?	\$0.003349	? *	\$?	?	0.16%	-2.97%
5	1560	Cycling Coin	CYC	\$?	\$0.001093	? *	\$?	?	0.15%	21.72%
6	1561	Psilocybin	PSY	\$?	\$0.025807	?	\$?	?	?	?
6	1562	TheCreed	TCR	\$?	\$0.000274	?	\$?	?	?	-33.80%
7	1563	Happy Creator...	HCC	\$?	\$0.000069	? *	\$?	?	0.43%	-0.82%
8	1564	MergeCoin	MGC	\$?	\$0.199032	? *	\$?	?	4.40%	12.16%
9	1565	Farstcoin	FRCT	\$?	\$?	? *	\$?	?	?	?
9	1566	TimesCoin	TMC	\$?	\$0.650958	? *	\$?	?	?	?

<https://coinmarketcap.com/>

# Cryptocurrencies: Where can I get them?

OXYGEN All eyes are on our new project: Forbes Nasdaq Bloomberg DISCOVER NOW X

## Exchange cryptocurrency at the best rate

Transfer from one wallet to another within seconds. It's that simple.

YOU HAVE 5718 EUR ✓ ↔ YOU GET 1.00002285 BTC ✓ Exchange!

Buy Bitcoin with Credit Card VISA

<https://changelly.com/>

# Cryptocurrencies: Fluctuation

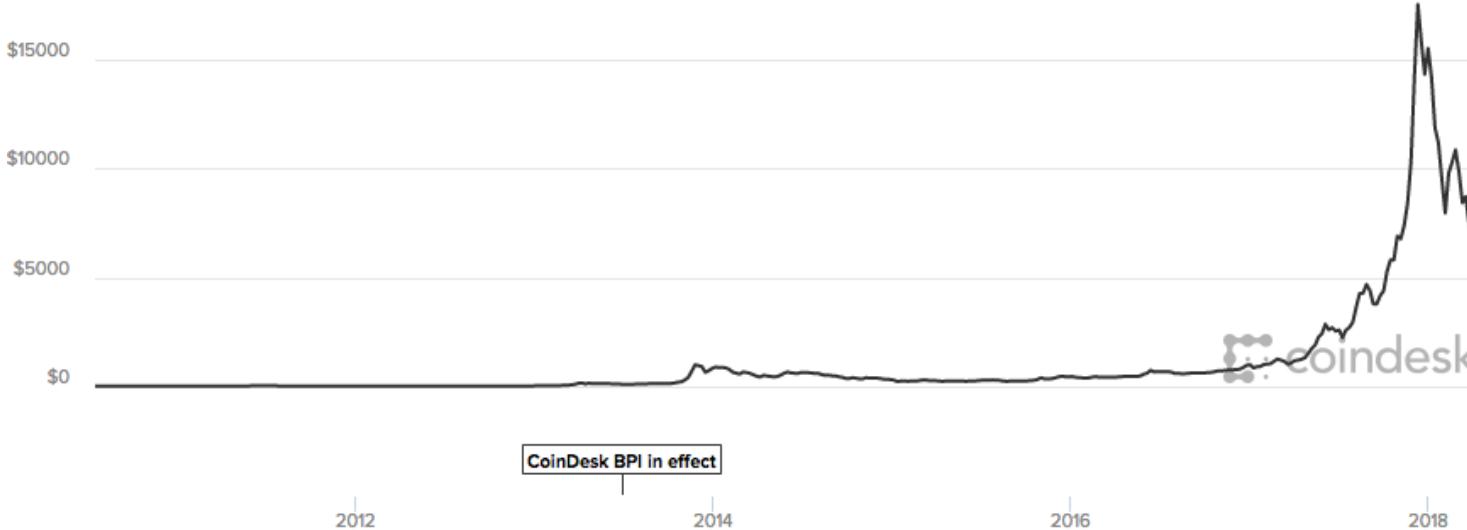
## Bitcoin (USD) Price

Closing Price  OHLC

1h 12h 1d 1w 1m 3m 1y All

Jul 18, 2010 to Apr 11, 2018

[Export](#)



**\$6,920.86** ▲ 1.32%

Today's Open	\$6,830.90	Change	<span style="color: green;">▲ \$89.95</span>
Today's High	\$6,958.89	Market Cap	\$0.117T
Today's Low	\$6,807.44	Supply	16,971,488

# Cryptocurrencies: Fluctuation

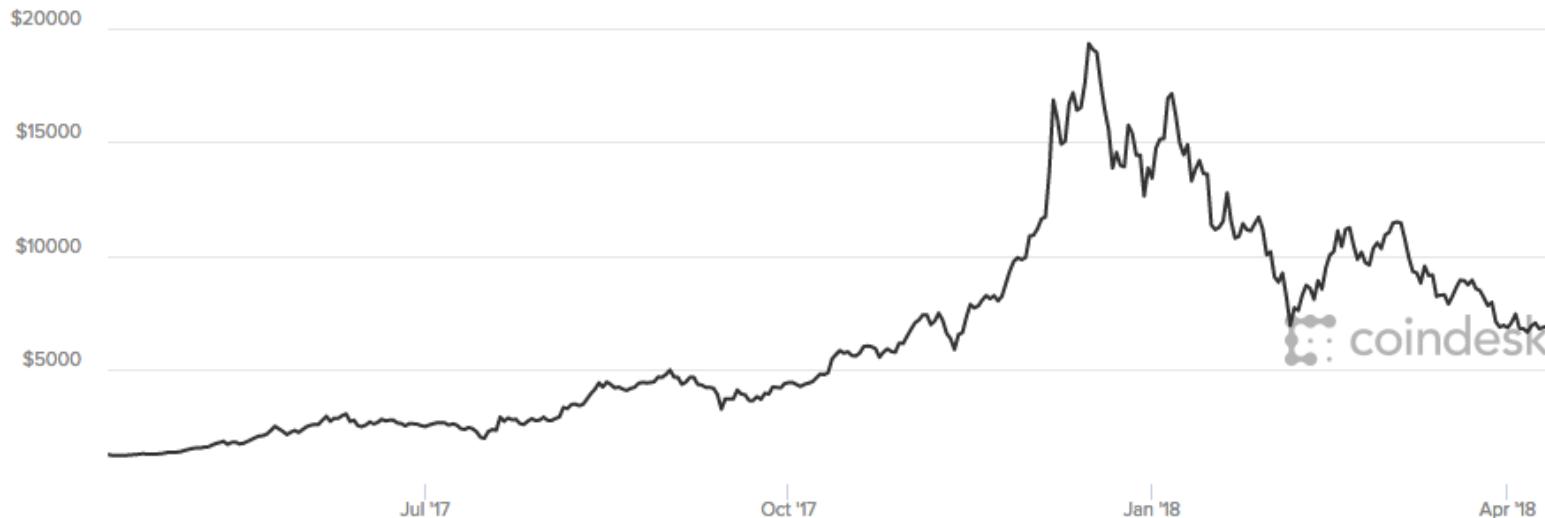
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Closing Price  OHLC

1h 12h 1d 1w 1m 3m **1y** All

Apr 11, 2017 to Apr 11, 2018

Export



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Today's High	\$6,958.89	Market Cap	\$0.117T
Today's Low	\$6,807.44	Supply	16,971,488

# Cryptocurrencies: How are financial transactions handled?

## Latest Blocks

Height	Age	Transactions	Mined by	Size
517702	22 minutes ago	30		7522
517701	22 minutes ago	568	AntMiner	242365
517700	26 minutes ago	908		359790

[See all blocks](#)

## Latest Transactions

Hash	Value Out
7d683d237438dbf63ed07669b2d102f5c5dd38beeb...	0.60096836 BTC
266ed2ec43186f198099e7f69b527aab762d6bd59b8...	0.15002142 BTC
09d3db0d578fbe4d59ad2a00689ef0977775bb9867...	0.10340446 BTC
ba29ea87a9b7d2c9d5a6d56c2504f96dc6b122b1422...	0.00260313 BTC
76c1575f1909f6ea660cb460b495ba964c591bf081...	1.9762774 BTC
ada8d2052dfcf4c2e46120306e2c562bf9acfb0b5ed4...	0.3545435 BTC

<https://blockexplorer.com/>

## Subscribe for updates!

email address

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## About Block Explorer

**Bitcoin Block Explorer** is an open source web tool that allows you to view information about blocks, addresses, and transactions on the Bitcoin blockchain. The [source code](#) is on GitHub.

### What is bitcoin?

**Public Bitcoin API:** Machine readable stats & blockchain info can be accessed directly through the [REST](#) and [Websockets APIs](#).

**Testnet** is Bitcoin's sandbox. Block Explorer supports viewing both the [testnet](#) and [mainnet](#) blockchains.

Thanks to [Private Internet Access](#) for hosting the site. They provide a [VPN Service](#) that accepts Bitcoin.



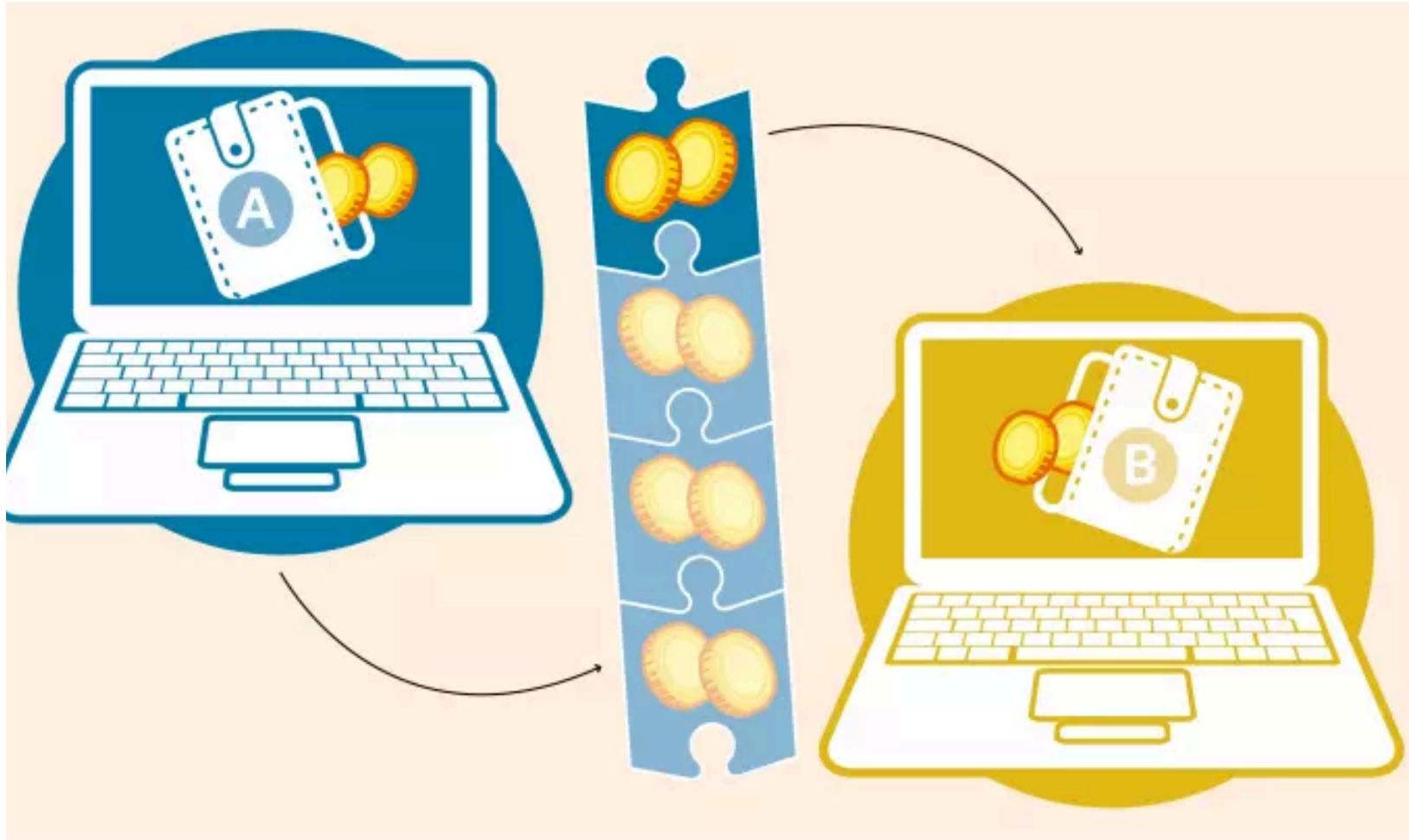
# Blockchain technology

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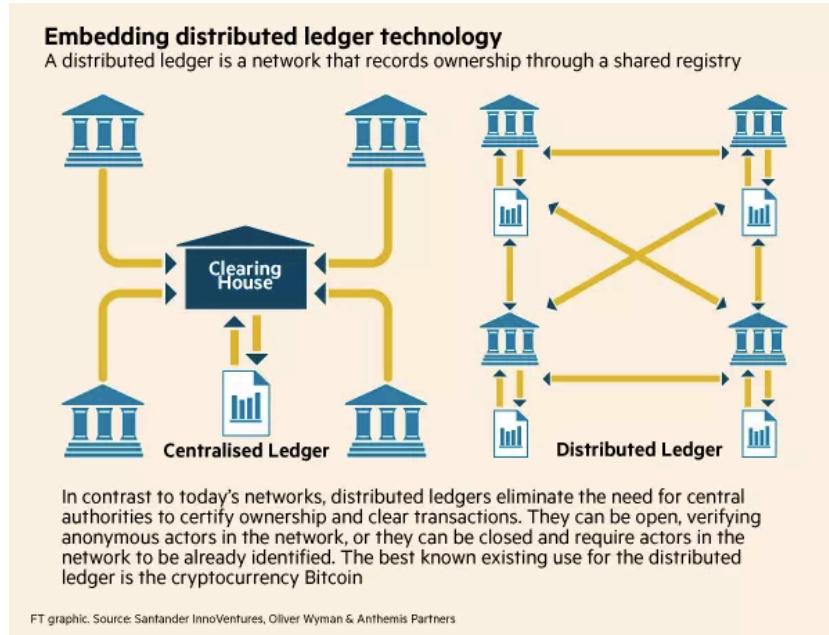


# Blockchain technology



<https://www.ft.com/content/eb1f8256-7b4b-11e5-a1fe-567b37f80b64>

# Centralised vs Distributed Ledger



- When one bank sends money to another, no physical currency changes hands.
- Banks and settlement systems use central electronic ledgers to track assets.
- But they can be slow and inefficient, often relying on faxes or manual input.
- That not only wastes time but racks up fees.
- The system is also open to hacking and fraud.

<https://www.ft.com/content/454be1c8-2577-11e5-9c4e-a775d2b173ca>

# Executing Transactions - Trading

## How a blockchain works

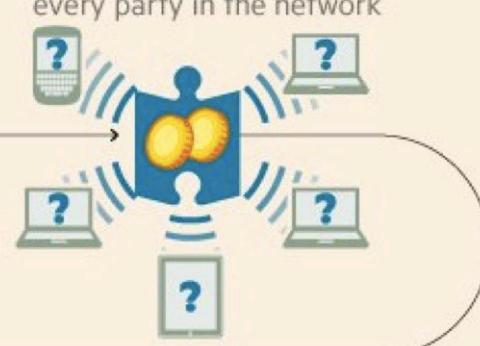
1 A wants to send money to B



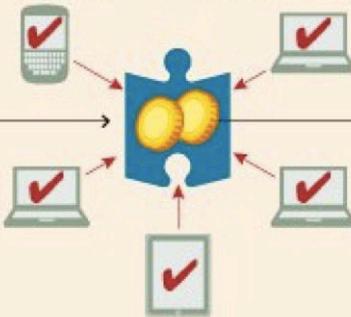
2 The transaction is represented online as a 'block'



3 The block is broadcast to every party in the network



4 Those in the network approve the transaction is valid



5 The block then can be added to the chain, which provides an indelible and transparent record of transactions



6 The money moves from A to B



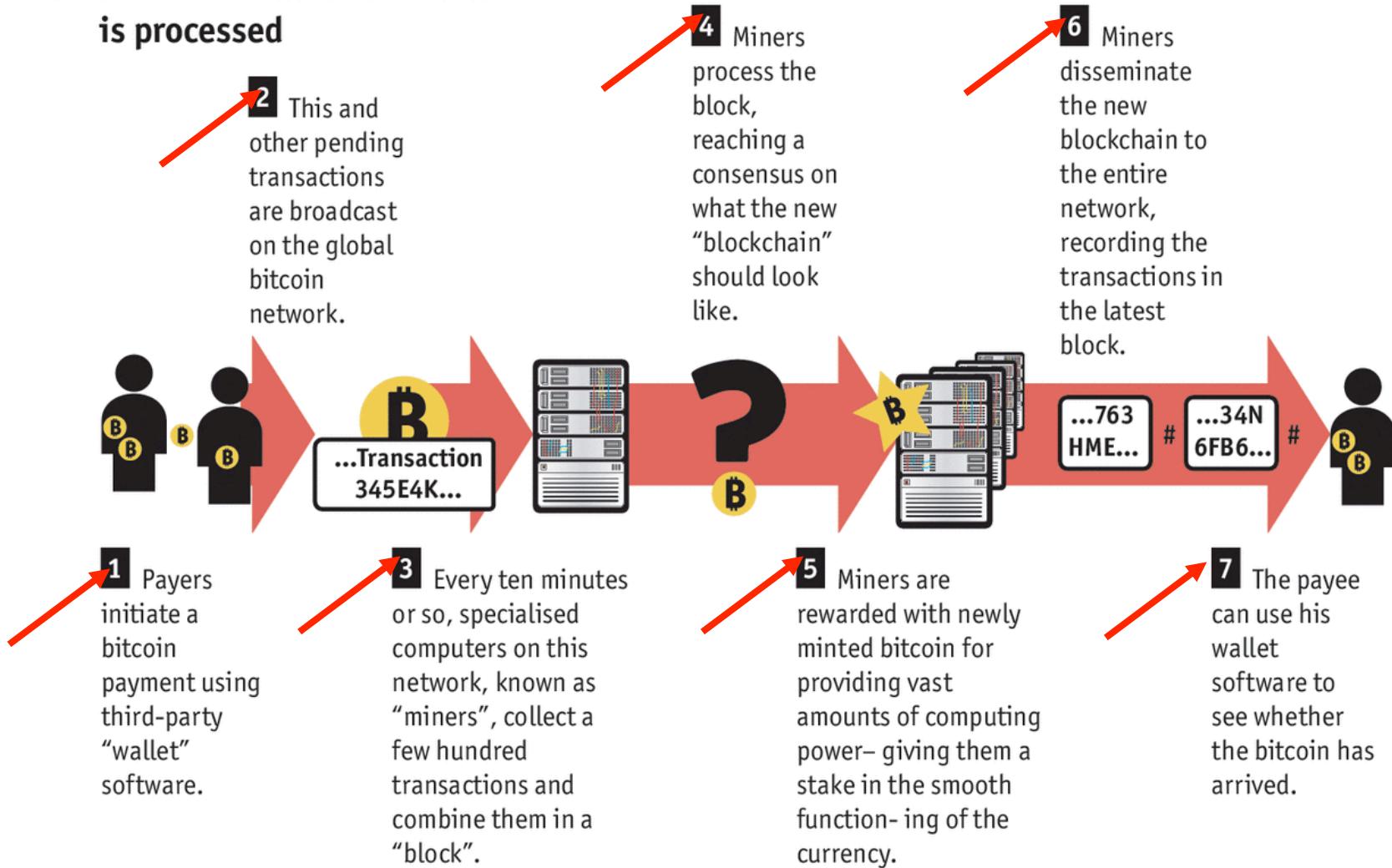
- Major technologies that make Bitcoin include:

- Hashes
- Digital signatures
- Public key cryptography
- P2P
- Proof of Work

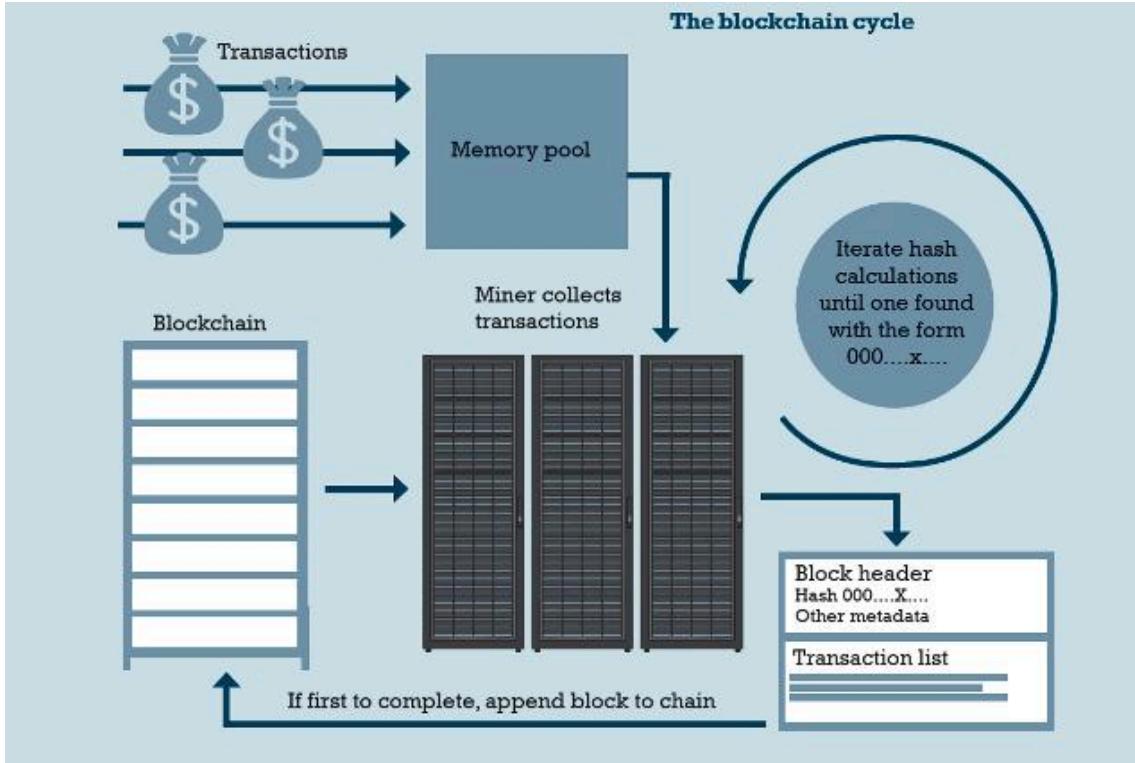
<https://www.ft.com/content/eb1f8256-7b4b-11e5-a1fe-567b37f80b64>

# Processing Transactions - Mining

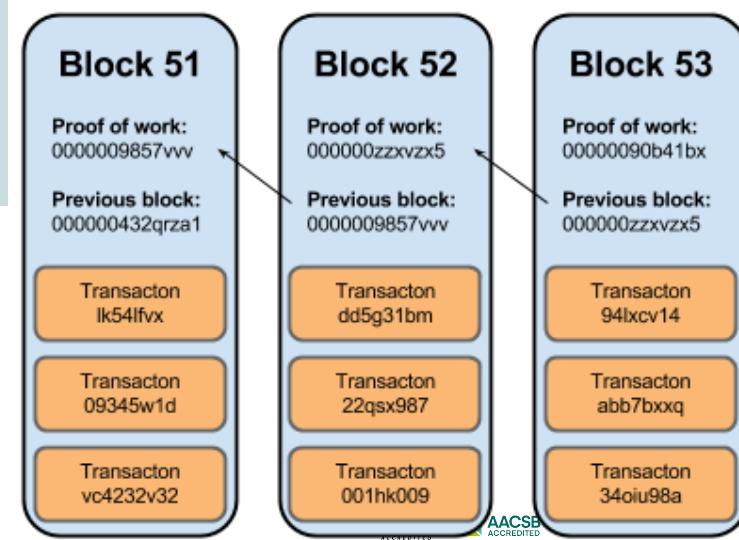
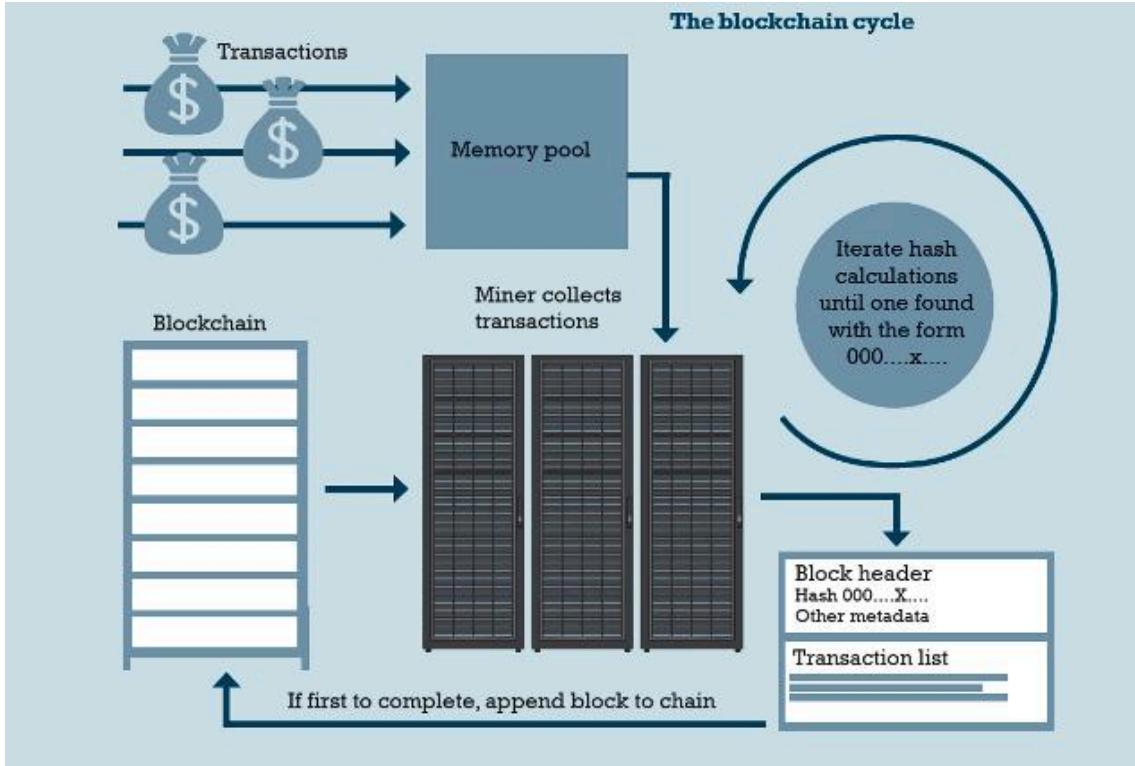
## How a bitcoin transaction is processed



# Processing Transactions - Mining



# Processing Transactions - Mining



# Beyond the Bitcoin Blockchain

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# Ethereum



<https://www.ethereum.org/>

## Build unstoppable applications

Ethereum is a **decentralized platform that runs smart contracts**: applications that run exactly as programmed without any possibility of downtime, censorship, fraud or third-party interference.

These apps run on a custom built **blockchain**, an **enormously powerful shared global infrastructure that can move value around and represent the ownership of property**.





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## Business Blockchain Frameworks Hosted with Hyperledger

### Burrow

Provides a modular blockchain client with a permissioned smart contract interpreter partially developed to the Ethereum Virtual Machine (EVM) specification.

### Fabric

An implementation of blockchain technology intended as a foundation for developing blockchain applications or solutions.

### Iroha

A blockchain framework designed for simple and easy incorporation into infrastructure projects requiring distributed ledger technology.

### Sawtooth

A modular platform designed for building, deploying, and running versatile and scalable distributed ledgers.

### Indy

A distributed ledger that provides tools, libraries, and reusable components for creating and using independent, decentralized and digital identities.

Learn More About Hyperledger Projects

<https://www.hyperledger.org/>



# Killer Applications

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# Killer Apps: Payments

## WHAT'S NEXT FOR BLOCKCHAIN PAYMENTS IN 2018?

• Miranda Marquit • January 2, 2018



The year closed out with a wild ride for Bitcoin. The cryptocurrency surged to \$20,000 and then fell by about 40% before rebounding to some degree.

But Bitcoin isn't the be all and end all of blockchain technology. Indeed, blockchain payments are seeing more interest. So, as a new year gets underway, what can we expect from blockchain payments?

### **Bitcoin Unlikely to Remain the Main Platform for Blockchain Payments**

<https://due.com/blog/blockchain-payments/>

# Killer Apps: Registries

## Notaries turn blockchain into ally for digital transactions

By Jorge Valero | EURACTIV.com

4 Oct 2017

Supporters



Haiti is still struggling to get back on its feet after the 2010 earthquake. All their records were on paper and most of them disappeared. Notaries could build new land registries based on blockchain technology to increase efficiency. [DG ECHO/Flickr]

Comments Print 50

*This article is part of our special report EU law goes digital.*

**Once feared as a technology that would make legal practitioners redundant, blockchain has now actually strengthened the role of notaries as interpreters of complex transactions, best illustrated by the convoluted issue of land registries.**

<https://www.euractiv.com/section/digital/news/notaries-turn-blockchain-into-ally-in-digital-transactions/>



Advertisement

# Killer Apps: Internet of Things

## Blockchain And The Internet Of Things: 4 Important Benefits Of Combining These Two Mega Trends



Bernard Marr, CONTRIBUTOR

FULL BIO ▾



Opinions expressed by Forbes Contributors are their own.

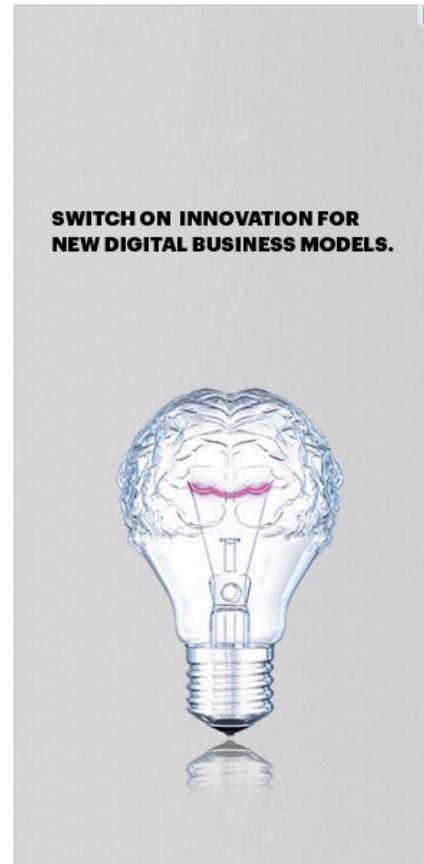
The **Internet of Things** (IoT) and **blockchain** are two topics which are causing a great deal of hype and excitement, not just in the technology circle but in the wider business world, too.



Adobe Stock  
Adobe Stock

Many say they are set to revolutionize all aspects of our lives, while others point out that there is a lot of hot air around both ideas, and a lot is yet to be proved.

However, the idea that putting them together could result in something even greater than the sum of its (not insignificant) parts, is something which is starting to gain traction.



<https://www.forbes.com/sites/bernardmarr/2018/01/28/blockchain-and-the-internet-of-things-4-important-benefits-of-combining-these-two-mega-trends/#635c031c19e7>

# Killer Apps: Media and Entertainment

## How Blockchain Could Start To Make Waves In Media And Entertainment In 2018



Nelson Granados, CONTRIBUTOR

I cover digital trends in travel, media and entertainment.

FULL BIO ▾

Opinions expressed by Forbes Contributors are their own.

TWEET THIS

If you are in media and entertainment, 2018 will be a year to closely monitor and possibly experiment or invest in blockchain innovation, if you haven't done so yet. Otherwise, you could be left behind.



A woman touches an ATM machine for digital currency Bitcoin in Hong Kong [+]

Blockchain technology made big news in December thanks to the bitcoin cryptocurrency surging past \$10,000 to a \$20,000 peak, the launch of [bitcoin futures](#) in major exchanges, and the [announcement](#) that the Australian Stock Exchange will use blockchain technology for trade settlement. Blockchain could also start to be implemented in media and entertainment in 2018.



<https://www.forbes.com/sites/nelsongranados/2018/01/04/what-blockchain-has-in-store-for-media-and-entertainment-in-2018/#3045f0b771f4>

# Killer Apps: Supply Chain Management

## Perspectives

### Using blockchain to drive supply chain transparency

#### Future trends in supply chain

New technologies are presenting promising opportunities for improvement across the supply chain. Using blockchain in the supply chain has the potential to improve supply chain transparency and traceability as well as reduce administrative costs.



#### Monitor advancements

A blockchain supply chain can help participants record price, date, location, quality, certification, and other relevant information to more effectively manage the supply chain. The availability of this information within blockchain can increase traceability of material supply chain, lower losses from counterfeit and gray market, improve visibility and compliance over outsourced contract manufacturing, and potentially enhance an organization's position as a leader in responsible manufacturing.

**Deloitte recommends:** Using blockchain in the supply chain can help participants record price, date, location, quality, certification, and other relevant information to more effectively manage the supply chain.

Using blockchain to drive supply chain innovation

**Download the PDF**

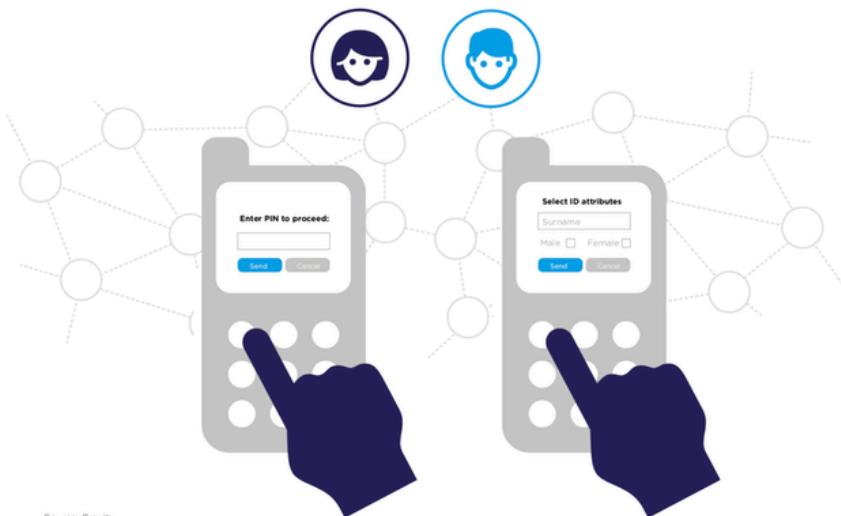
<https://www2.deloitte.com/us/en/pages/operations/articles/blockchain-supply-chain-innovation.html>

# Killer Apps: Digital Identities

## ICTworks

### Two Blockchain Use Cases for Self-Sovereign Digital Identities

By Wayan Vota on January 31, 2018



Source: Gravity

# Blockchain initiatives

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„Diese Technologie hat unglaubliches Potenzial. Wir müssen schnell sein. Wer zögert, hat verloren!“

Harald Mahrer

**bmwfw**

# The Blockchain Summit 2017

KRYPTO-INSTITUT

## Blockchain Summit 2017: „Nicht vor Technologien zurückschrecken, die von Staatsskeptikern entworfen wurden“



06. Dezember 2017, 13:45

Bastian Kellhofer [FOLLOW](#) [LIKE](#)

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Harald Mahrer. © BMWFW

# The Blockchain Summit 2017

KRYPTO-INSTITUT

## Blockchain Summit 2017: „Nicht vor Technologien zurückschrecken, die von Staatsskeptikern entworfen wurden“



06. Dezember 2017, 13:45

Bastian Kellhofer

FOLLOW

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„Wer zu der Spitze der innovativen Leader gehören möchte, darf auch vor Technologien nicht zurückschrecken, die von Staatsskeptikern entworfen wurden. In der heutigen Welt entscheidet sich der Wettkampf häufig zugunsten derer, die dazu imstande sind 'sowohl, als auch' zu denken. 'Entweder oder' ist zu einer anachronistischen Haltung geworden“, so Mahrer vor rund 500 Besuchern beim Blockchain Summit 2017 weiter.



<https://www.trendingtopics.at/blockchain-summit-2017-kryptoeconomisches-institut-an-der-wu-startet/>



## About

ABC – Austrian Blockchain Center

Proposed COMET K1 Research Center

The Center's mission is to be the one-stop-shop Austrian Research Center for Blockchain (and related) technologies to be applied in industrial applications like industry 4.0 / IoT as well as financial, energy, logistics, government and administrative applications. Those new applications and business models resulting from collaborations between established players, innovative startups and top R&D institutes will be the key for the creation of new jobs and establishing Austria among the top ten innovative countries in Europe.

The R&D themes of the center have been organized in 5 Areas targeting economic, technological, applications as well as political and legal topics interfacing with existing COMET centers like CDP, SBA as well as international Blockchain initiatives.

- Emerging Industries
  - *Databases and implementation aspects (Single Source of Truth, Semantics)*
  - *Technological aspects of Industry 4.0 & IoT*
  - *Optimization of processes in Emerging Industries based on blockchain*
- Legal Aspects and Political Implications
  - DLT and Investment
  - Governance and Smart Contracts
  - Data Protection and Privacy
  - Blockchain-based business models

- Cryptoeconomics
  - Business Applications of Distributed Data Management & Smart Contracts
  - Blockchain applications in different industries
  - Economical aspects
- Cryptography, Technology & Security
  - Smart Contracts
  - Consensus Mechanisms
  - Payment Channels

# Thank you / contact details



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