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Dave Sackett

# **Blockchain Solutions for Finance**

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**Technology Evangelist blending Finance with IT  
Advocate of AI, RPA, Blockchain and Crypto**

# Objectives

- Learn about block chain and how the technology works
- Learn the definitions of block chain technology
- Understand an example of solving intercompany reconciliations with blockchain technology
- Learn why there is hype surrounding block chain technology

# What is Blockchain?



## Origin of Blockchain Technology



Blockchain was originally developed as the technology behind cryptocurrency called Bitcoin. A vast, globally distributed ledger running on millions of devices, it is capable of recording anything of value.

Money, equities, bonds, titles, deeds, contracts, and virtually all other kinds of assets can be moved and stored securely, privately, and from peer to peer, because trust is established not by powerful intermediaries like banks and governments, but by network consensus, cryptography, collaboration, and clever code.

## A New Era for Business Transactions

For the first time in human history, two or more parties, who may not even know each other, can forge agreements, make transactions, and build value without relying on intermediaries (such as banks, rating agencies, and government bodies such as the U.S. Department of State) to verify their identities, establish trust, or perform the critical business logic – contracting, clearing, settling, and record-keeping tasks that are foundational to all forms of commerce



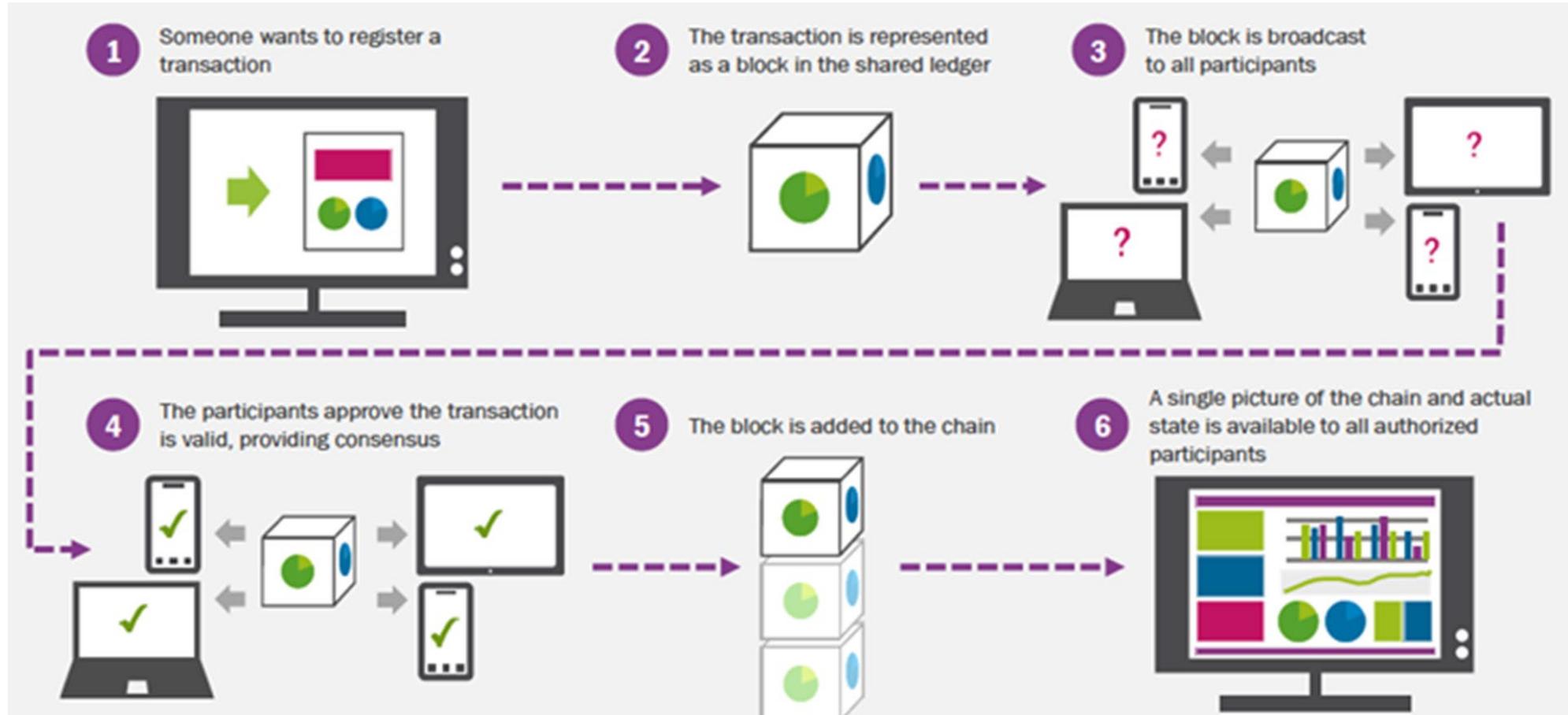
## Chaining Blocks of Information Together



All parties can review previous entries and record new ones. Transactions are grouped in blocks, recorded one after the other in a chain of blocks (the 'blockchain'). The links between blocks and their content are protected by cryptography, so previous transactions cannot be destroyed or forged.

This means that the ledger and the transaction network are trusted without a central authority - a 'middleman'.

# How a Blockchain Works



# Blockchain Glossary

- **Block** A collection of transactions that have happened during a certain amount of time. The transactions are bundled in a block and added to the Blockchain chronologically.
- **Blockchain** A decentralized, unchangeable record of all transactions that have ever happened for a trackable product. It bundles transactions, in order, on blocks and stores them permanently.
- **Consensus** An automated mechanism that allows blockchain participants to agree on which transactions happened and in which order. This agreement is known as a trustless consensus.
- **Trustless** Blockchains are trustless because no participant needs to trust any other participant for transactions to work out. Trust comes from the system itself, which is impartial.
- **Node** One of many participants in a Blockchain network that provides a copy of the entire blockchain to the network.
- **Ledger** A store of records that can only be appended (added to). It is immutable (unchangeable after the fact). Blockchains use decentralized ledgers as their core technology.
- **Distributed Ledger** A type of computer database that is stored on many private computers (nodes) at the same time, instead of central company servers. Blockchains are also known as distributed ledgers.
- **Decentralization** A function of how broadly control is distributed among different actors.
- **Hash function** A cryptography tool that turns any input into a string of characters that serves as a virtually unforgeable digital fingerprint of the data, called a hash.
- **Permissioned Blockchain** A shared database with a blockchain structure that requires participants to obtain permission before reading or writing to the chain. Contrast this with permissionless blockchains, which anyone can join.



# What makes a **good** use case for Blockchain?



## Positive Indicators:

- There is a business problem to solve
- Other technologies have failed
- There is a business network
- Assets are transferred

- Transaction sequence and auditability are important
- Trust between parties is difficult to achieve
- High level of inefficiency in the process

- Benefits multiple parties / participants
- Data privacy and security are paramount
- Complex business contracts exist
- Value in shared data and business logic

# What makes a **poor** use case for Blockchain?



## Negative Indicators:

- X Need high performance (millisecond) transactions
- X Small organization (no business network)
- X Looking for a database replacement

- X Looking for a messaging replacement
- X Looking for transaction processing replacement

- X Process and metrics are not clear within the ecosystem
- X Value, velocity and/or variability are not present

## Some Reasons to Choose a Blockchain Solution



- Blockchains are more secure with more parties in the network. Single-participant networks are not especially secure.
- Blockchains improve trust between participants by providing multiple points of verification.
- Blockchains create permanent records that cannot be edited or deleted.
- Core logic in the system is designed to prevent double counting of assets, and record ownership and transfers.
- Blockchains are transparent; ownership or control of assets is public and transparent by design.

# Private, Permissioned Architecture Optimizes Openness & Scalability

Blockchain-  
architecture options

Architecture based on read, write, or commit  
permissions granted to the participants

		Permissionless	Permissioned
Architecture based on ownership of the data infrastructure	Public	<ul style="list-style-type: none"><li>● Anyone can join, read, write, and commit</li><li>● Hosted on public servers</li><li>● Anonymous, highly resilient</li><li>● <b>Low scalability</b></li></ul>	<ul style="list-style-type: none"><li>● Anyone can join and read</li><li>● Only authorized and known participants can write and commit</li><li>● <b>Medium scalability</b></li></ul>
	Private	<ul style="list-style-type: none"><li>● Only authorized participants can join, read, and write</li><li>● Hosted on private servers</li><li>● <b>High scalability</b></li></ul>	<ul style="list-style-type: none"><li>● Only authorized participants can join and read</li><li>● Only the network operator can write and commit</li><li>● <b>Very high scalability</b></li></ul>

## Block Chain Example: IBM-Maersk Joint Venture

The cost of global trade is estimated at \$1.8 trillion annually<sup>1</sup> with potential savings from more efficient processes of ~10%

The cost and size of the world's trading ecosystems continues to grow in complexity



More than **\$4 trillion** in goods are shipped each year



**80%** of the goods consumers use daily are carried by the ocean shipping industry



By reducing barriers within the international supply chain, global trade could increase by nearly **15%**, boosting economies and creating jobs<sup>2</sup>



The cost of the required trade documentation is estimated to reach **one-fifth** of the value of goods being shipped

# Block Chain Example: IBM-Maersk Joint Venture (Con't)

**IBM-MAERSK will bring to market a trade platform for containerized shipping connecting the entire supply chain ecosystem:**

- An open, neutral, and distributed platform underpinned by Blockchain technology
- Seamless, permissioned document and data sharing with a common access control structure
- Ecosystem participants access the platform via open APIs

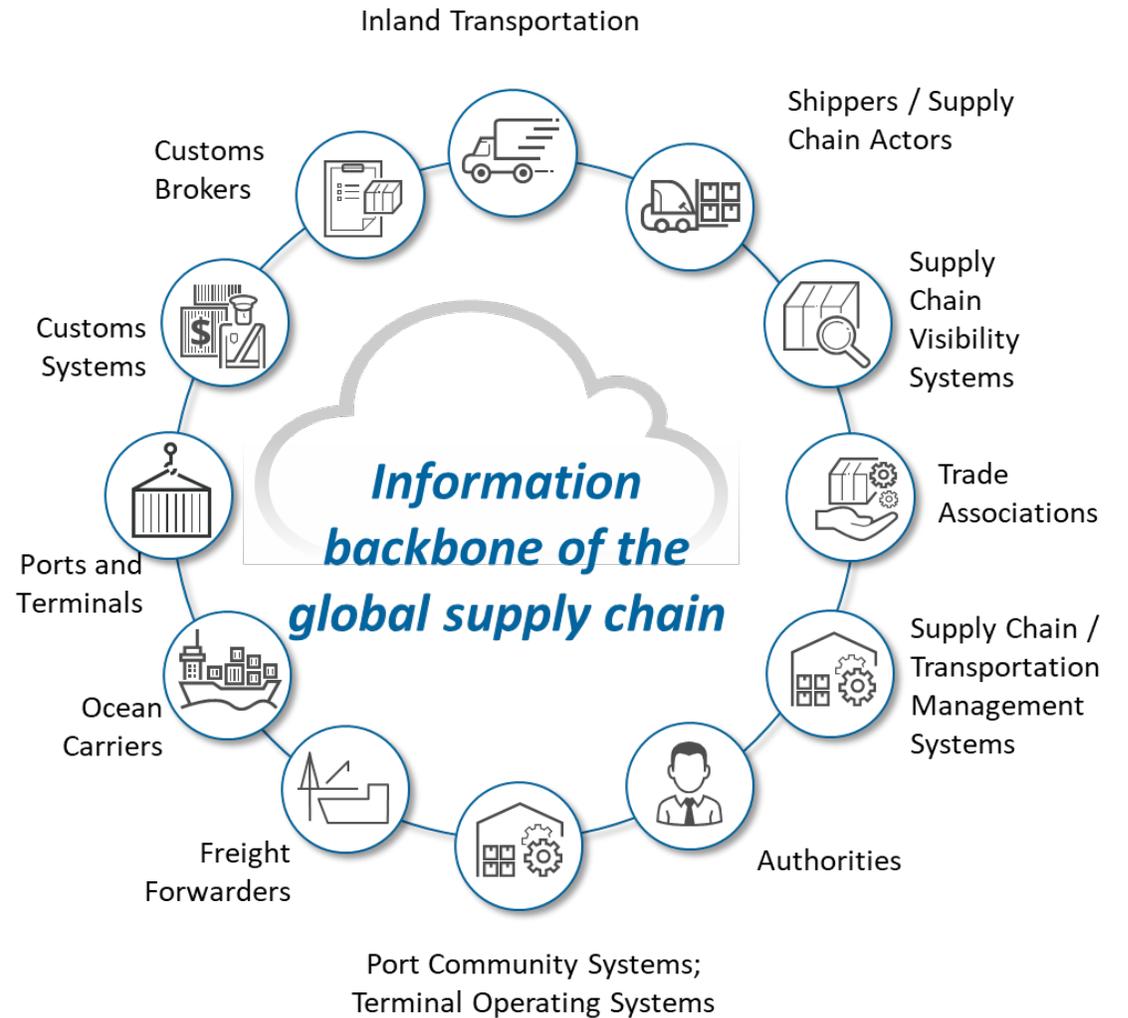


**Two initial applications will be deployed on the platform:**

1. **Shipping Information Pipeline:** Will provide real-time, secure access to end-to-end supply chain information to all actors involved in a global shipping transaction
2. **Paperless Trade:** Will automate filings for the import and export of goods by enabling end users to securely submit, stamp, and approve documents across national and organizational boundaries

# Block Chain Example: IBM-Maersk Joint Venture (Con't)

## Participants Sharing Electronic Documents Shared in this Blockchain Example:



# Finance Cases using Global Blockchain Service (Baas)

	<b>Intercompany</b> <ul style="list-style-type: none"><li>▶ Blockchain for intercompany transactions allows for instant transactions, simultaneous settlement with immutable documentation</li><li>▶ GBS to lead the process simplification, and automating dispute resolution</li></ul>
	<b>Royalties Contract Management</b> <ul style="list-style-type: none"><li>▶ Digital contracts are issued and agreed to via Blockchain, contract rules will automate the processes</li><li>▶ Transactions will be viewable by specified parties only</li><li>▶ Integration into ERP and full reporting</li></ul>
	<b>Treasury</b> <ul style="list-style-type: none"><li>▶ GBS to support Corporate Treasury function by implementing Blockchain-based clearing and settlements.</li><li>▶ Huge credibility improvement opportunities to financial risk management.</li></ul>

	<b>Source to Pay</b> <ul style="list-style-type: none"><li>▶ Smart contracts automatically calculate the exact correct PO</li><li>▶ Track total purchased volume across all parties, invoices are accurate &amp; records are tamper-proof</li><li>▶ Radically reduced cost to administer and audit a complex system</li><li>▶ Greater revenue for suppliers through volume</li></ul>
	<b>Contract Manufacturer</b> <ul style="list-style-type: none"><li>▶ Parent / Buyer, Contract Manufacturer &amp; Suppliers connected via Blockchain</li><li>▶ Parent negotiates global pricing agreements for key commodities with suppliers. Parent can track where in the ecosystem inventory is i.e. supplier, WIP, Finished goods</li><li>▶ Avoid end-of-quarter inventory adjustments</li></ul>
	<b>Cost Allocation</b> <ul style="list-style-type: none"><li>▶ Blockchains with inbuilt smart contracts capability enable financial applications to allocate costs on a real-time basis.</li><li>▶ GBS to help eliminating a manual and error-ridden process.</li></ul>

# Blockchain Elements

## Distributed ledger

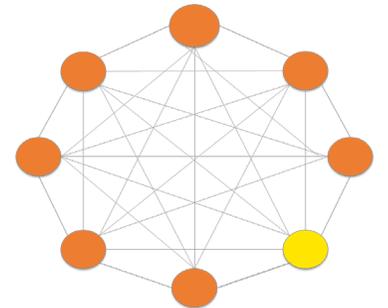
- Shared record book - all parties in the peer-to-peer network keep a copy of all the transactions
- Immutable - transactions are secured with cryptography and time-stamped to prevent tampering

## Smart contracts

- Programmable ledger - transactions can be automated with self-executing encoded business logic; small programs govern when and how transactions are processed

## Consensus mechanism

- Agreement - all parties must agree to embedded trust rules governing transactions - no one party is responsible for approving transactions

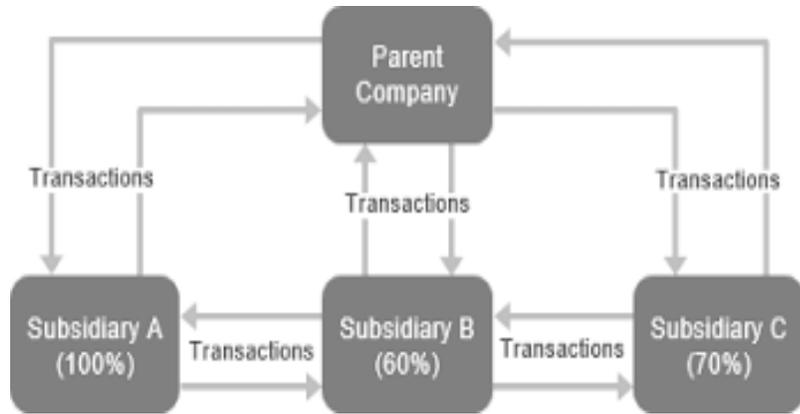




# Blockchain's Benefits for Intercompany Use

- ▶ Distributed ledger provides a centralized intercompany clearinghouse by interfacing across all of an organization's ERPs and eliminates the need for after-the-fact manual intercompany reconciliations, netting and settlement
- ▶ Immutable ledger ensures a time-stamped audit trail of all transactions
- ▶ Peer-to-peer network promotes data distribution and transparency across all parties
- ▶ Algorithm provides means for a single process for agreeing to, creating, posting, and settling intercompany transactions for enhanced data integrity
- ▶ Programmable ledger builds an approval workflow to automate and facilitate netting of and settlement of transactions across disparate ERP systems, to increase settlement visibility and intercompany policy compliance
- ▶ Manages complexity of intercompany accounting and reconciliations, including journal entry creation, currency exchange rates, and recorded taxes
- ▶ Enhanced reporting capabilities to provide global visibility over all intercompany activity with customized performance metrics with drill-down abilities

## Blockchain's Future Intercompany Solution



- Invoicing and payment automatically recorded in blockchain through pre-agreed smart contracts
- Materiality thresholds are pre-defined, and allocation process is automated
- Global processes are streamlined based on a single, smart contract agreement
- “Oracles” enable real-time, automated calculations (e.g., Reuters to inform exchange rates)
- Disparate ERP systems (nodes) are connected through the blockchain distributed ledger
- Transactions are available for validation by connected nodes and AP/AR can be automatically reconciled
- Full audit trail of all intercompany transactions occurring in given period
- All activities on the blockchain are automatically reflected across the network, driving synchronization

# Blockchain Use Cases

## For Tradeable information

**Dynamic Registry** - updates when assets are exchanged

Fractional investing, drug supply chain

## **Payment Infrastructure**

Cross-border, peer-to-peer payments, Insurance claims filing

## For Static Information

### **Static Registry**

Titles to land ownership, food safety, product origin, patent records

### **Identity**

Government ID records, medical records, civil registry to prevent voter fraud

**Smart Contracts** (conditional records to trigger automated actions)

Insurance claim payout, cash-equity trading, new music releases



# How to prepare for Blockchain

- List the highest volume or most time intensive activities in your business that require a third party “trust” broker



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# Estimate the value Blockchain technology brings to the activities listed on the previous slide



## 1. Potential Application

- Internal improvements/savings \_\_\_\_\_
- 3<sup>rd</sup> party improvements/savings \_\_\_\_\_
- Other improvements/savings \_\_\_\_\_

Total Estimated Financial Benefits \_\_\_\_\_

Other considerations - narrative (risks/intangible benefits):

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## 2. Potential Application

- Internal improvements/savings \_\_\_\_\_
- 3<sup>rd</sup> party improvements/savings \_\_\_\_\_
- Other improvements/savings \_\_\_\_\_

Total Estimated Financial Benefits \_\_\_\_\_

Other considerations - narrative (risks/intangible benefits):

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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# Estimate the value Blockchain technology brings to the activities listed previously



### 3. Potential Application

- Internal improvements/savings \_\_\_\_\_
- 3<sup>rd</sup> party improvements/savings \_\_\_\_\_
- Other improvements/savings \_\_\_\_\_

Total Estimated Financial Benefits \_\_\_\_\_

Other considerations - narrative (risks/intangible benefits):

\_\_\_\_\_

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### 4. Potential Application

- Internal improvements/savings \_\_\_\_\_
- 3<sup>rd</sup> party improvements/savings \_\_\_\_\_
- Other improvements/savings \_\_\_\_\_

Total Estimated Financial Benefits \_\_\_\_\_

Other considerations - narrative (risks/intangible benefits):

\_\_\_\_\_

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# Estimate the value Blockchain technology brings to the activities listed previously



## 5. Potential Application

- Internal improvements/savings \_\_\_\_\_
- 3<sup>rd</sup> party improvements/savings \_\_\_\_\_
- Other improvements/savings \_\_\_\_\_

Total Estimated Financial Benefits \_\_\_\_\_

Other considerations - narrative (risks/intangible benefits):

\_\_\_\_\_

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## 6. Potential Application

- Internal improvements/savings \_\_\_\_\_
- 3<sup>rd</sup> party improvements/savings \_\_\_\_\_
- Other improvements/savings \_\_\_\_\_

Total Estimated Financial Benefits \_\_\_\_\_

Other considerations - narrative (risks/intangible benefits):

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# Myths of Blockchain

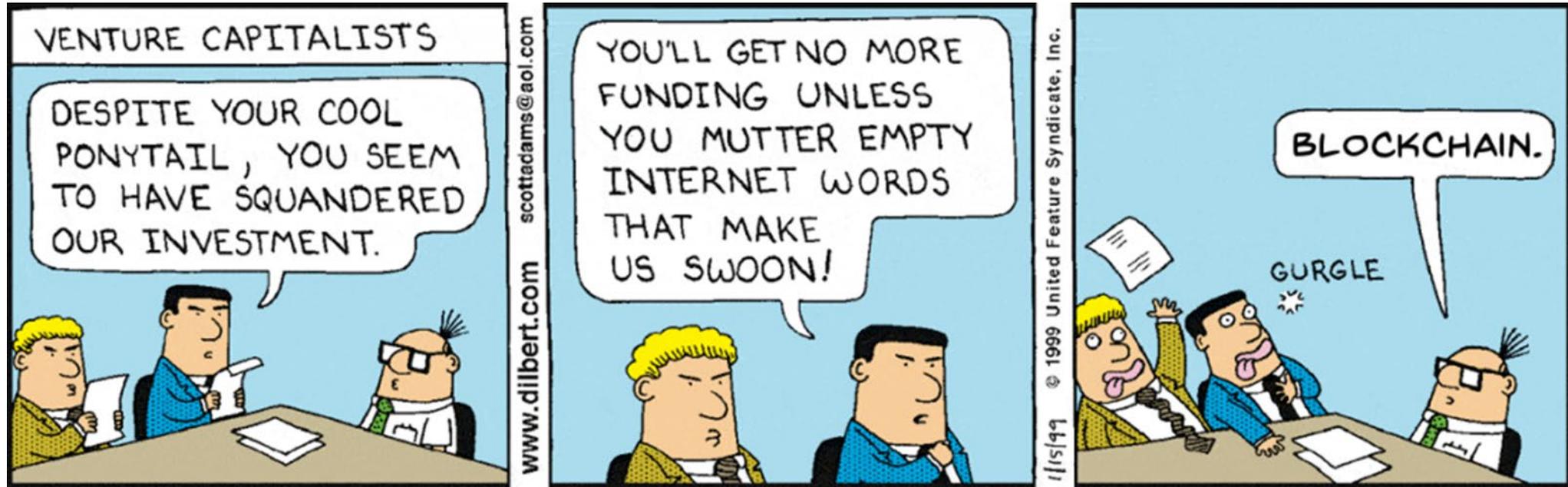


	Myth	Reality
1	 <b>Blockchain is Bitcoin</b>	<ul style="list-style-type: none"><li>● Bitcoin is just one cryptocurrency application of blockchain</li><li>● Blockchain technology can be used and configured for many other applications</li></ul>
2	 <b>Blockchain is better than traditional databases</b>	<ul style="list-style-type: none"><li>● Blockchain's advantages come with significant technical trade-offs that mean traditional databases often still perform better</li><li>● Blockchain is particularly valuable in low-trust environments where participants can't trade directly or lack an intermediary</li></ul>
3	 <b>Blockchain is immutable or tamper-proof</b>	<ul style="list-style-type: none"><li>● Blockchain data structure is append only, so data can't be removed</li><li>● Blockchain could be tampered with if &gt;50% of the network-computing power is controlled and all previous transactions are rewritten—which is largely impractical</li></ul>
4	 <b>Blockchain is 100% secure</b>	<ul style="list-style-type: none"><li>● Blockchain uses immutable data structures, such as protected cryptography</li><li>● Overall blockchain system security depends on the adjacent applications—which have been attacked and breached</li></ul>
5	 <b>Blockchain is a "truth machine"</b>	<ul style="list-style-type: none"><li>● Blockchain can verify all transactions and data entirely contained on and native to blockchain (eg, Bitcoin)</li><li>● Blockchain cannot assess whether an external input is accurate or "truthful"—this applies to all off-chain assets and data digitally represented on blockchain</li></ul>

McKinsey&Company

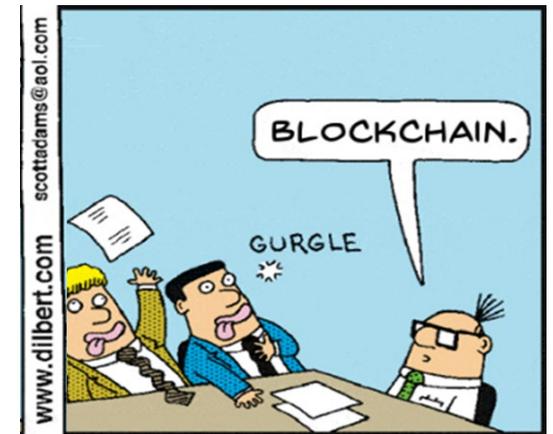
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No longer a joke...



## ...But still in the very early stages of practical application

- Blockchain technology could transform how financial transactions are recorded, reconciled, and reported. It also has the potential to increase security, offer automation, lower error rates, and significantly reduce costs.
- However, it's still a new technology. There will be a lot of progress made in the next several years regarding governance, standards, and how blockchain can fit into a company's existing IT structure and culture.
- Some companies are forcing blockchain solutions where other databases may be more appropriate



# Get Ready for Blockchain!!

Don't miss Dave's presentation on preparing finance teams for Artificial Intelligence.  
It's just a click away: [Get Ready for Artificial Intelligence](#)

# Technology Evangelist blending Finance with IT Advocate of AI, RPA, Blockchain and Crypto

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ULVAC Technologies
- **Cost Accounting Manager**  
Nova Biomedical
- **Corporate Controller**  
GI Plastek
- **Accounting and IT Manager**  
ULVAC Technologies



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# Sources of Information

**McKinsey**

<https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/blockchain-beyond-the-hype-what-is-the-strategic-business-value>

**Technology Review**

<https://www.technologyreview.com/s/610885/a-glossary-of-blockchain-jargon/>

**Proliant**

<http://proliantinfotech.com/>

**Ernst and Young**

[https://www.ey.com/en\\_gl](https://www.ey.com/en_gl)

**Deloitte**

<https://www2.deloitte.com/nl/nl/pages/financial-services/articles/5-blockchain-use-cases-in-financial-services.html>