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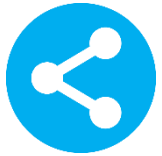

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Enterprise Blockchain: Current Pitfalls, Future Potential

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He is the primary analyst in Gartner core research covering blockchain technology, metacoin platforms and the programmable economy. In addition, he covers application design and development, including web and mobile development platforms.

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The Big Picture around Blockchain

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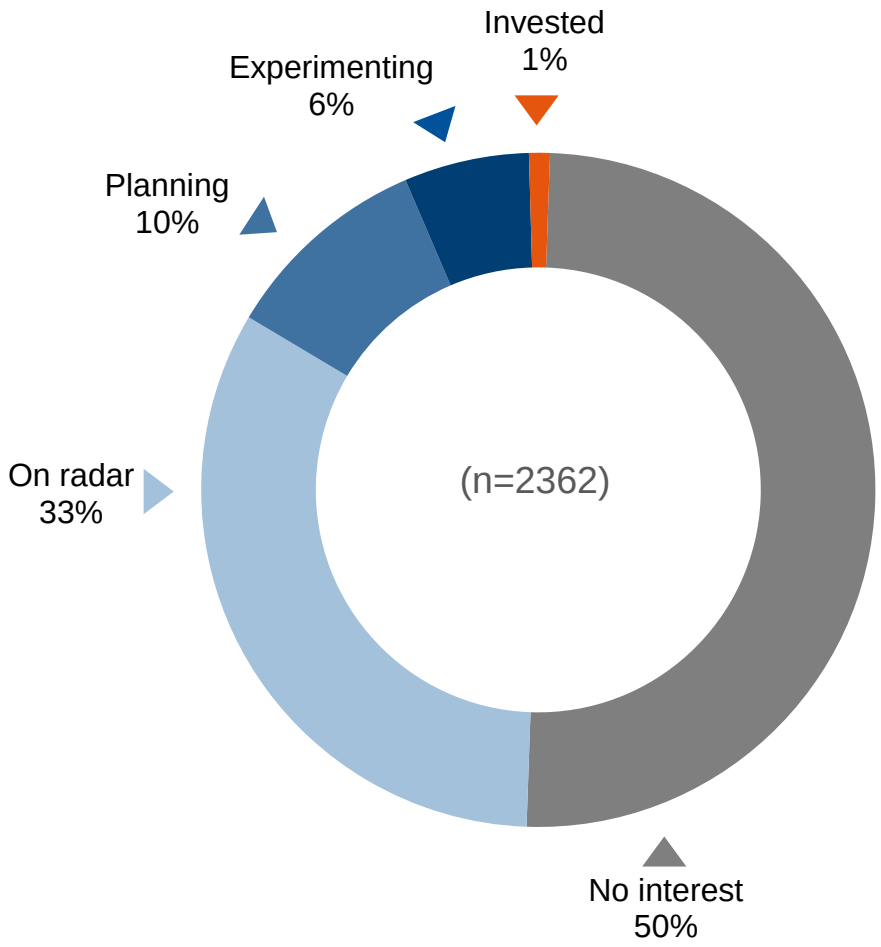
The “Internet of Money”… or better: the Internet of Value

- Long-term global-scale trend
- Technology-driven business transformation
- Impact equivalent to the Internet and the Web
- As inevitable as the Internet
- Short term: big risks & challenges

2017 Gartner CIO Survey: Blockchain

(P-16007)



H2Q7. In your opinion, which three of these technologies have the most potential to change your organization over the next five years?	
Total Answering, excludes DK	2331
Advanced Analytics	81%
Internet of Things (IoT)	48%
Digital Security	43%
Business Algorithms	40%
Machine Learning	22%
Virtual Customer Assistants	19%
Augmented Reality	13%
Blockchain	10%
Autonomous Vehicles	7%
Smart Robots	6%
Other	1%

10% think of blockchain as a game changer

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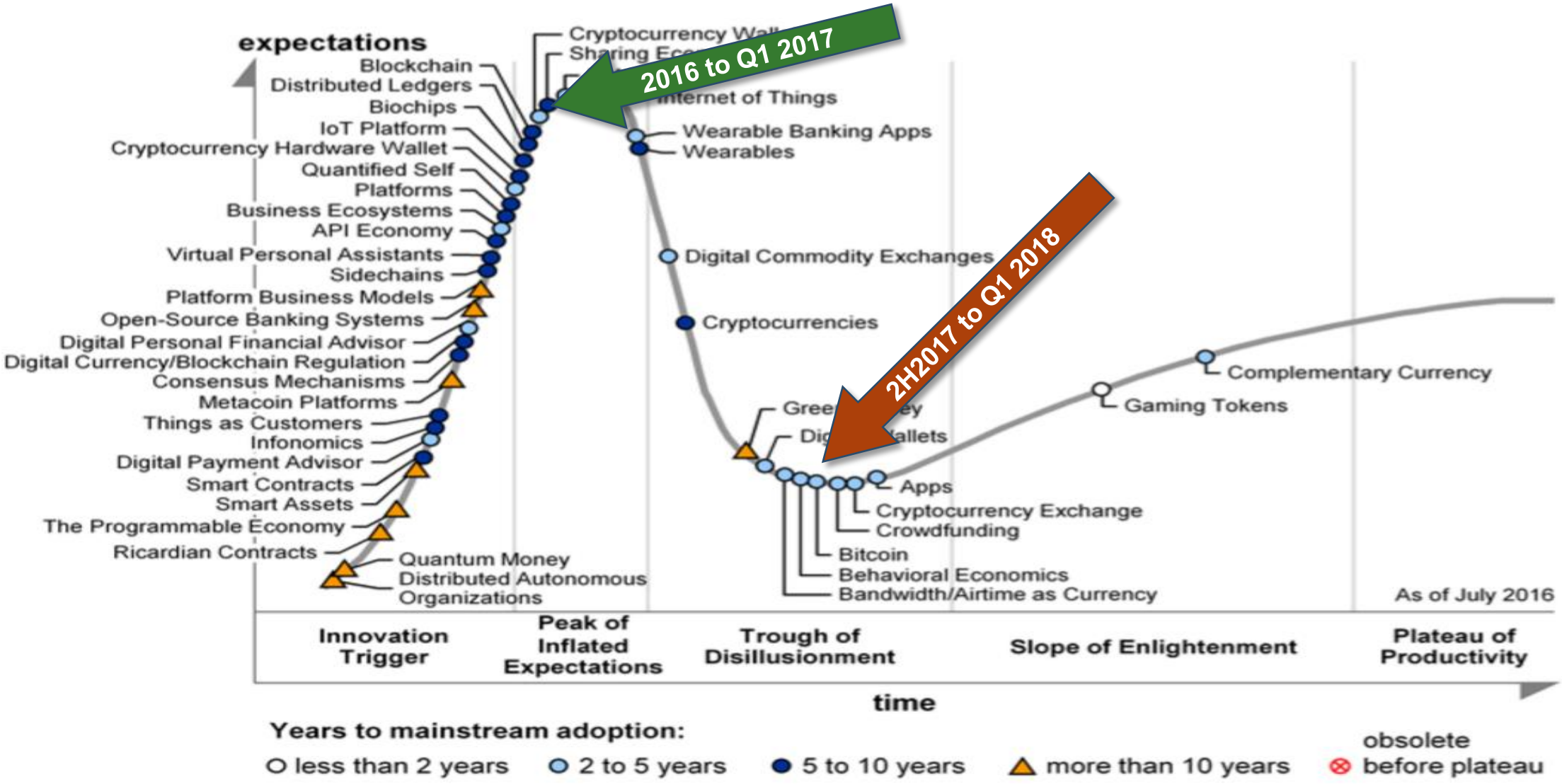
Inevitable Fall From High Expectations to the Trough



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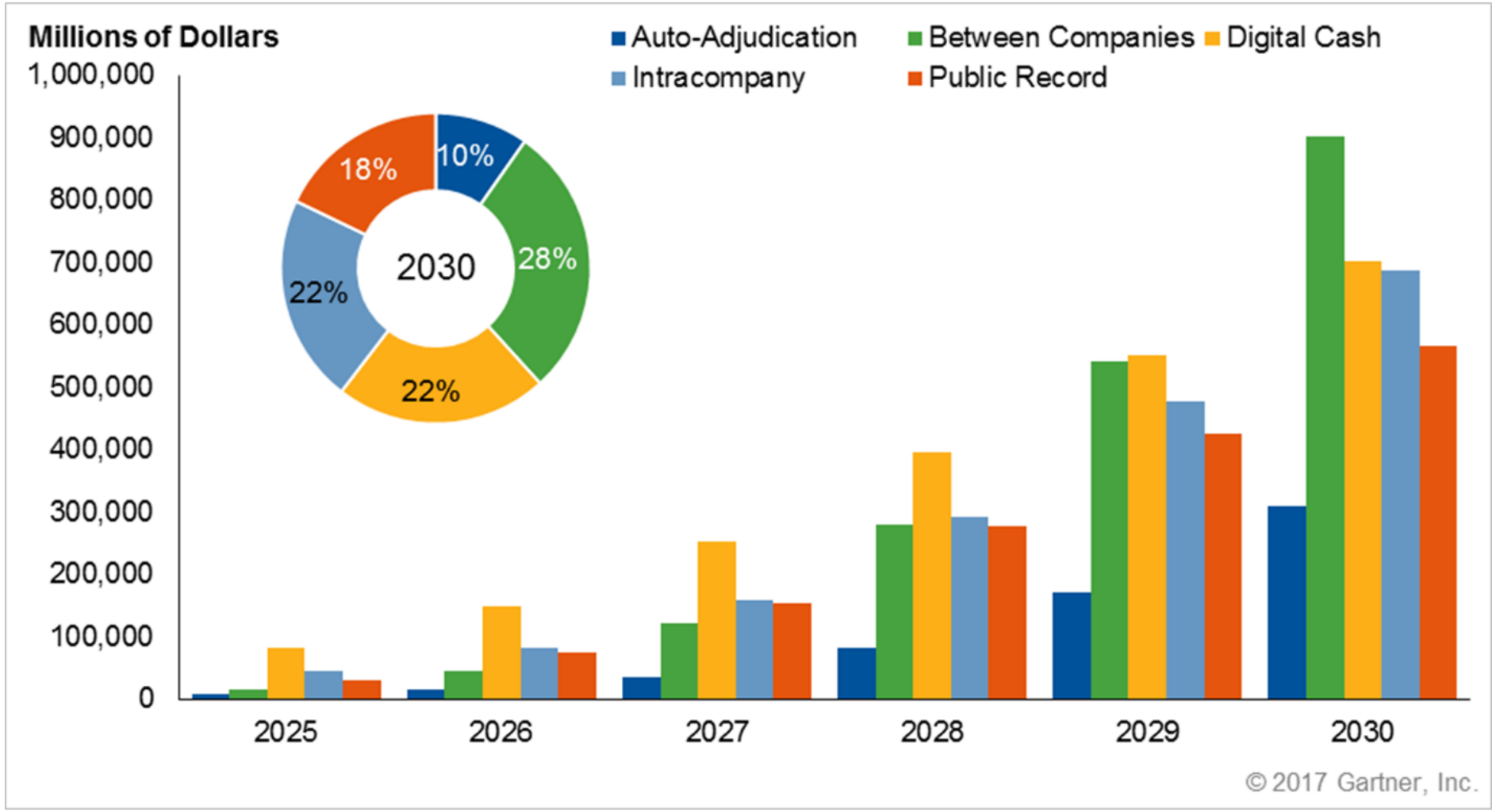
Business value-add of Blockchain - $176 billion by 2025, $3.1 trillion by 2030



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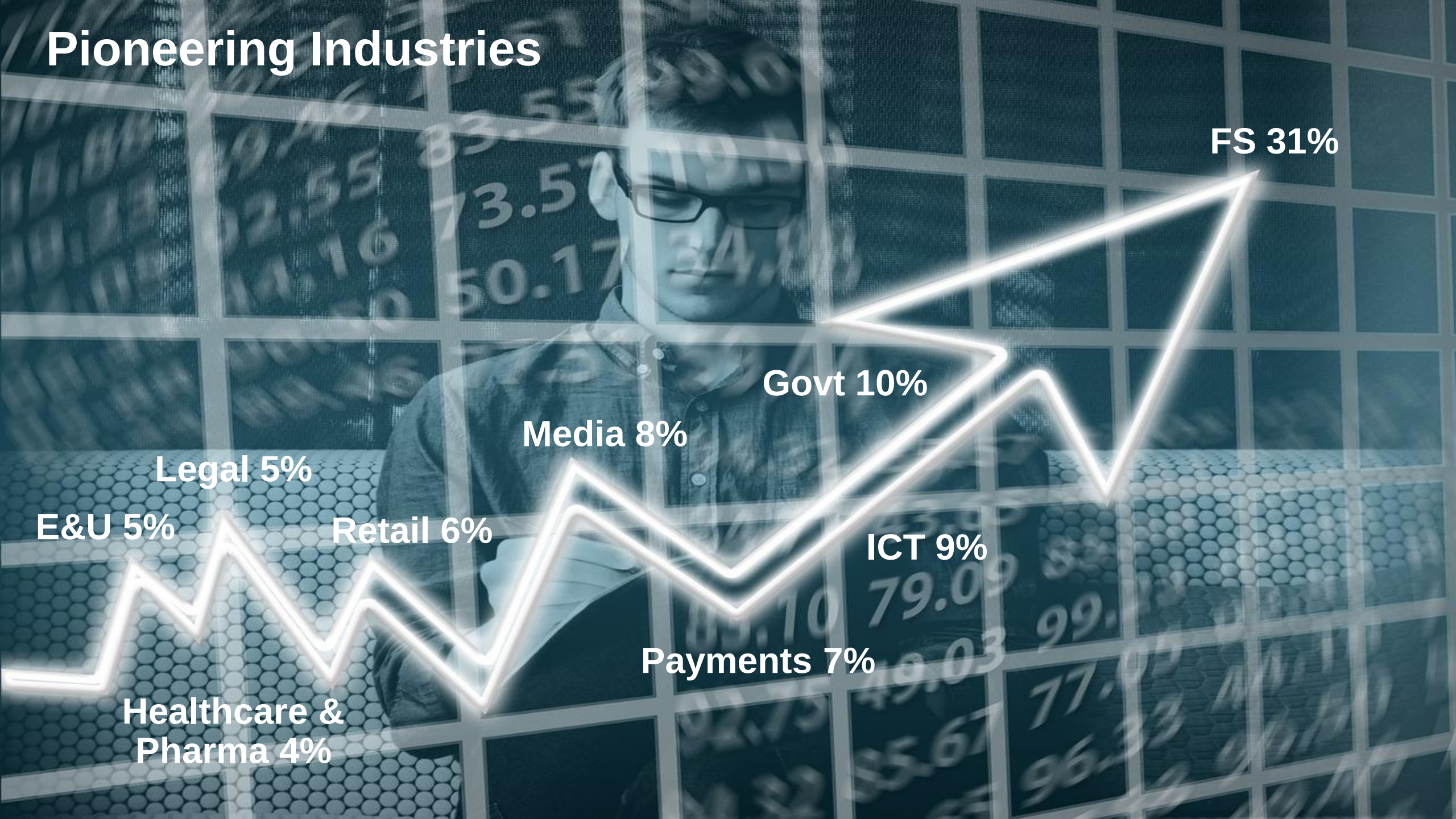
Pioneering Industries



Blockchain Core Concepts

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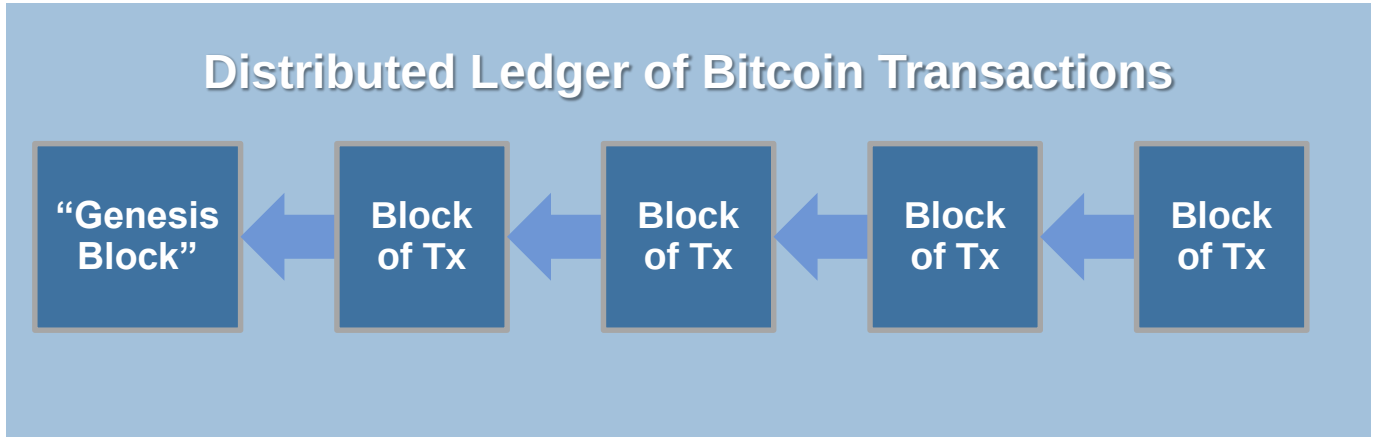
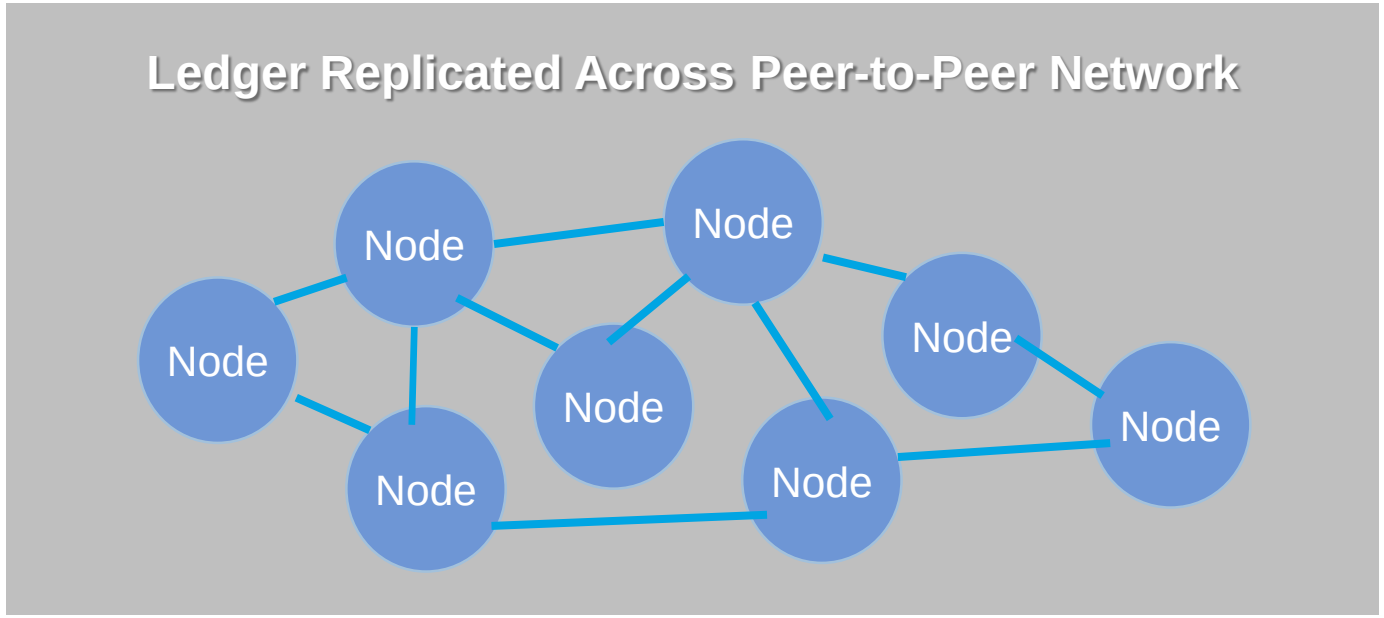
What is a Blockchain?





- The only real, proven distributed ledger is the Bitcoin blockchain
- Linear list of transactions, cryptographically joined in a sequential chain of blocks
- Replicated across P2P network
- Protocol for validation of transactions and propagation across network
- Protocol for consensus – for orderly update to shared ledger, plus creation of new value tokens (i.e., "*mining*")

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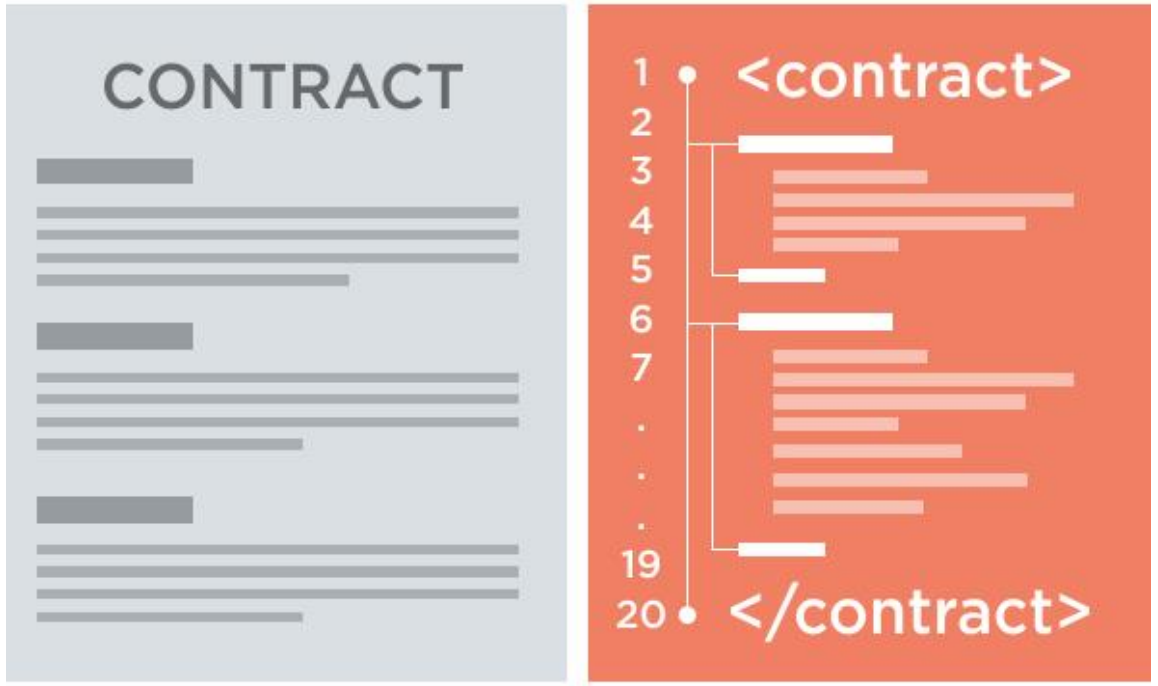
Core Concepts of Distributed Ledger (“Blockchain”)

- Purpose is to add trust in an untrusted environment of “Byzantine” actors
- An authoritative record or log of significant data or events: monetary transactions, property records, or other valued assets
- Not just a passive data record, but can optionally add dynamic programmed behavior to events (“*smart contracts*”)



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Competitive Landscape of Blockchain Platforms

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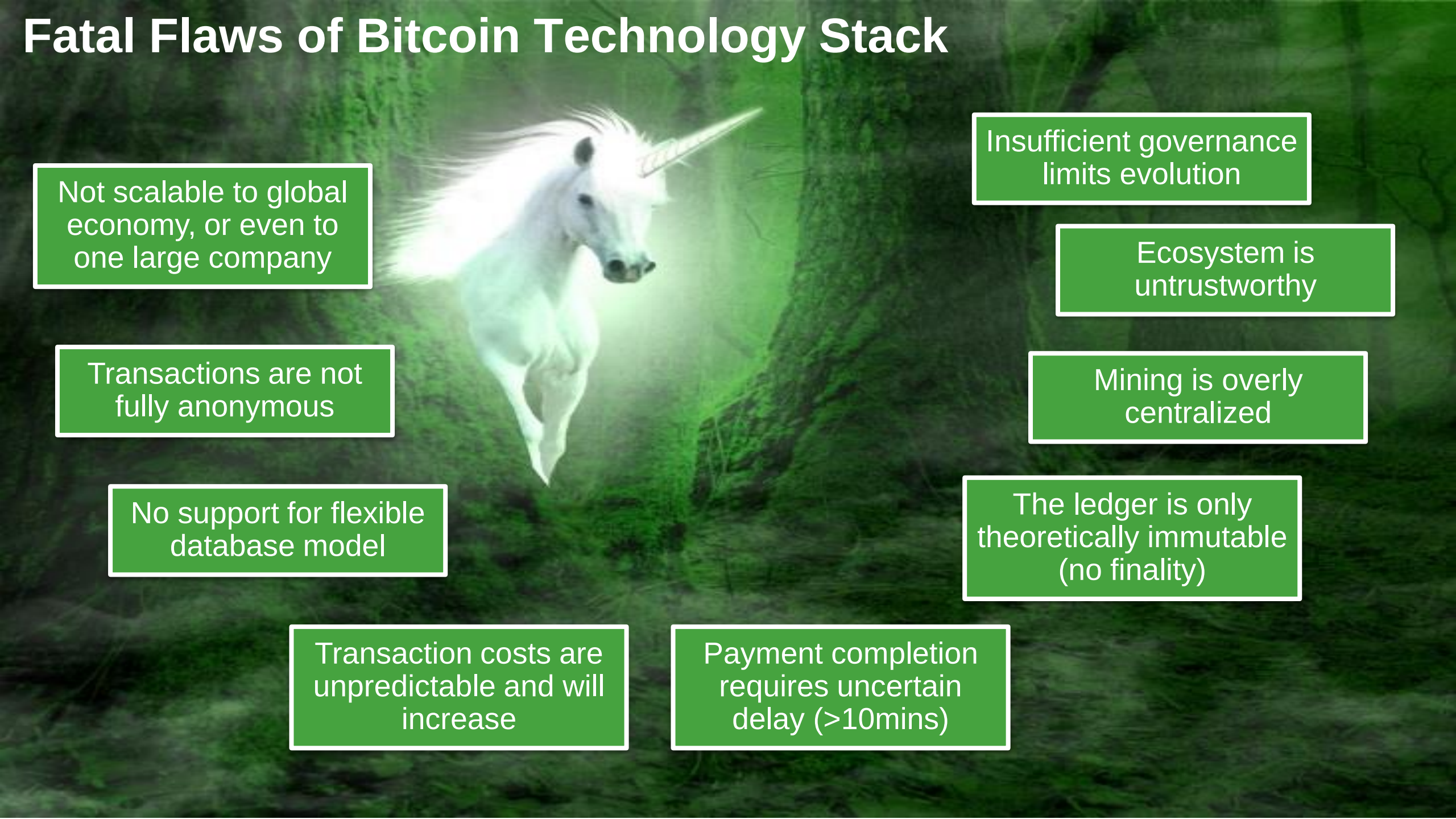
Fatal Flaws of Bitcoin Technology Stack



Not scalable to global economy, or even to one large company

Insufficient governance limits evolution

Ecosystem is untrustworthy

Transactions are not fully anonymous

Mining is overly centralized

No support for flexible database model

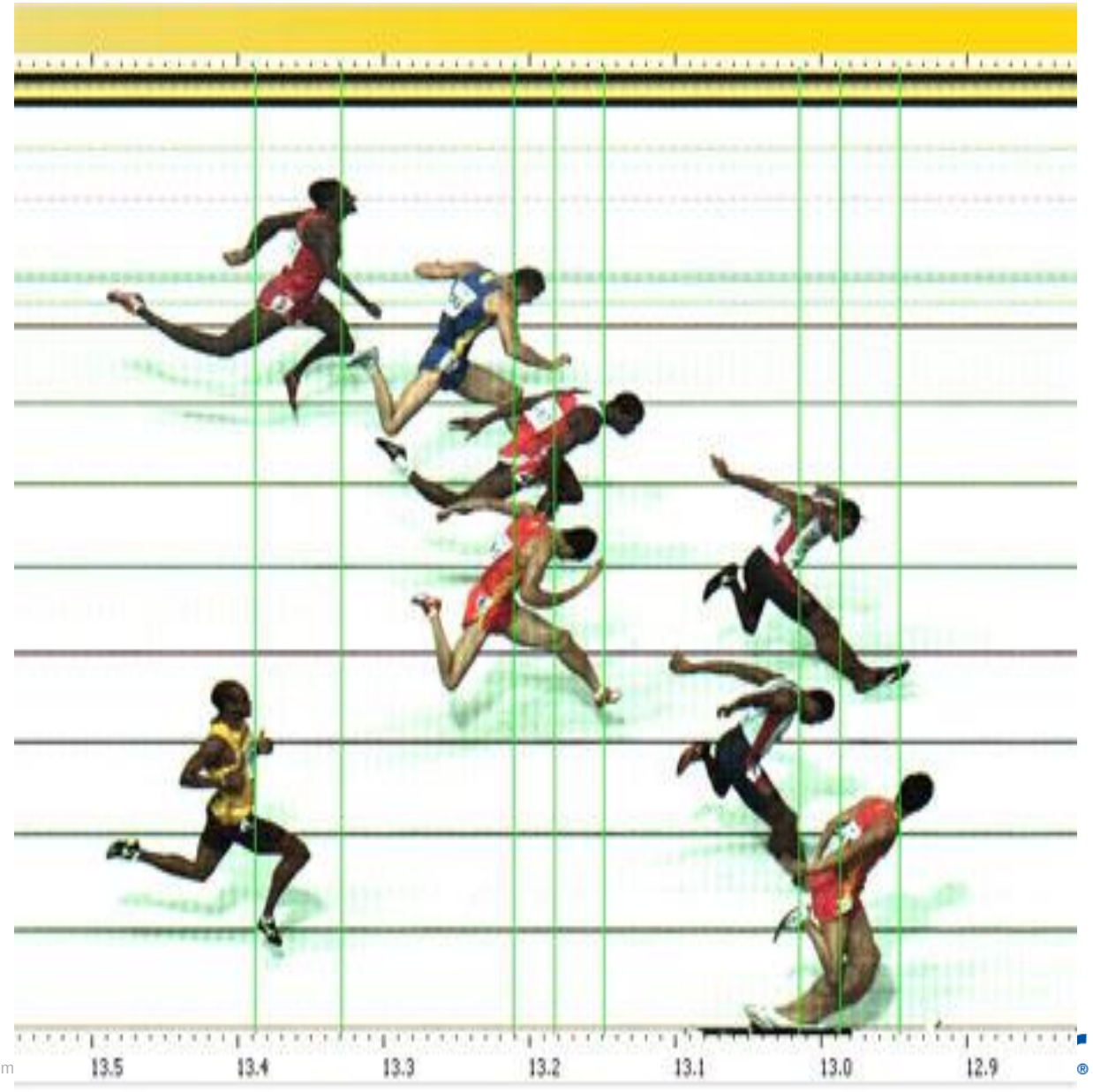
The ledger is only theoretically immutable (no finality)

Transaction costs are unpredictable and will increase

Payment completion requires uncertain delay (>10mins)

Who Will Win Among Competing Blockchain Platforms?

- The one not yet in the market
- Internet search engines in 1995:
  - Altavista, Lycos, Terra, Excite, Yahoo, Magellan were well-established players
  - Google came later and won
- Social networks in 2003
  - Friendster, Bebo, High5, Orkut, MySpace
  - Facebook came later and won
- Mobile OS in 2007
  - Blackberry, Nokia, Win Mobile, etc
  - IOS and Android came later & won



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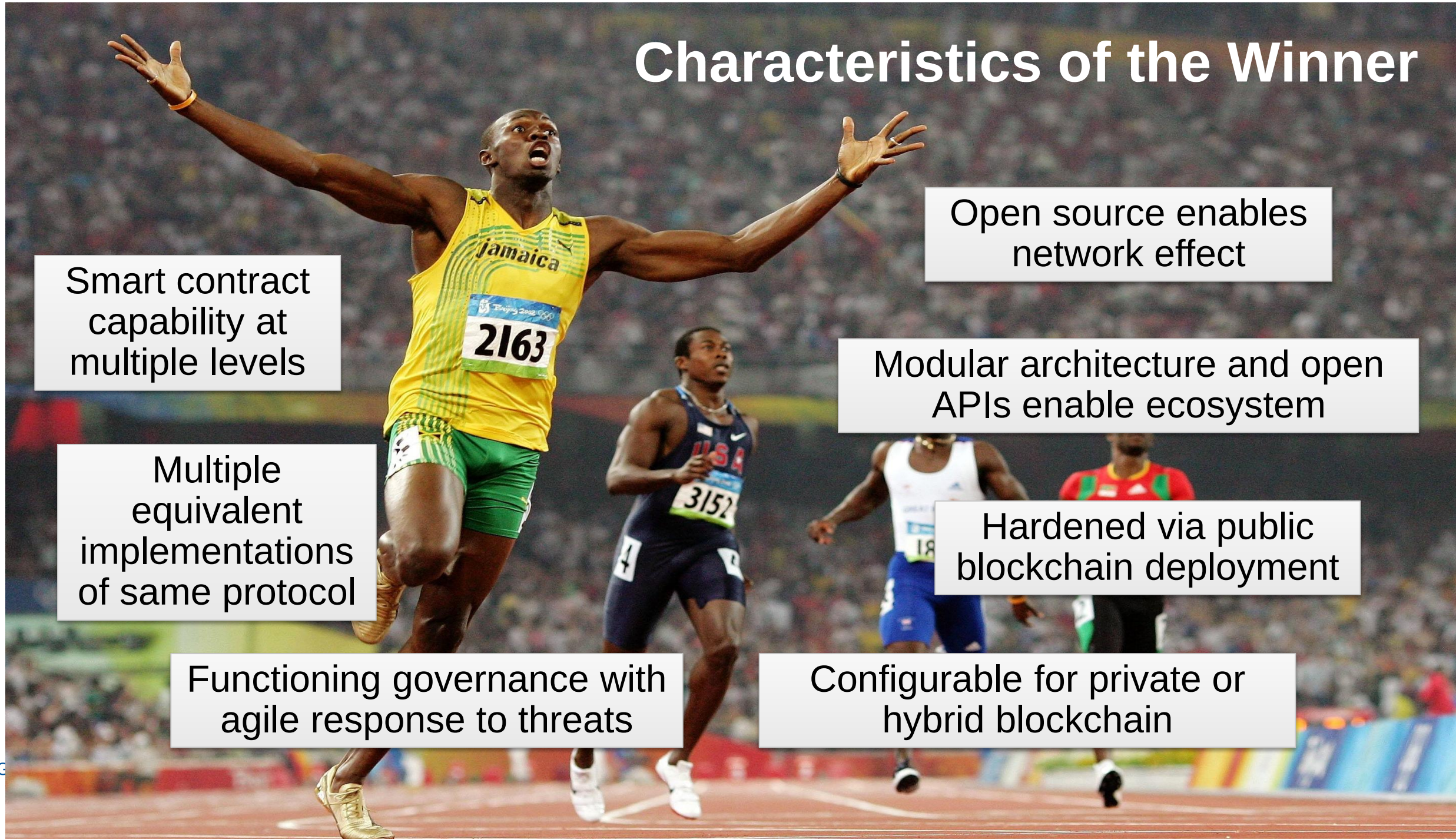
Characteristics of the Winner



Smart contract capability at multiple levels

Open source enables network effect

Modular architecture and open APIs enable ecosystem

Multiple equivalent implementations of same protocol

Hardened via public blockchain deployment

Functioning governance with agile response to threats

Configurable for private or hybrid blockchain

Enterprise Blockchain Technology

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Contradiction between public vs private blockchains?

Public chain

- "*Permissionless*" ledger
- Peer to peer, distributed, decentralized
- Dynamic collection of participants, not all trusted
- Requires mining and proof-of-work for updating the ledger

Private chain

- "*Permissioned*" ledger
- Could be within firewall
- Participants are known and trusted
- Can dispense with mining and proof-of-work
- Might add monitoring & mgt

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Recreating the RDBMS database platform

Blockchain platform vendors current plan

- Remove **90%** of Bitcoin blockchain (currency, mining)
- Add **9000%** of new functions (identity mgt, flexible data model, etc)
- In effect recreate the functions in a complex RDBMS
- Write a lot of new high-stakes code in a hurry
- Result: high risk of immature software, with negative financial impact.

The majority of enterprise blockchain projects in 2016 and 1H2017 don't need blockchain technology.

Instead, project requirements can be better satisfied with conventional database technology.

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Smart Contracts: The Theory

A legally binding, digitally manifest agreement with the power to reengineer itself dynamically, depending on the terms and conditions of the market/commercial context to which it applies, via the implementation of an implicitly encoded set of rules without the need for human intervention or oversight.

The Smart Contracts Goal:

- removal of manual intervention and oversight eg from legal counsel
- reduction in associated legal costs, fees and process (time)
- speed of contract creation and execution
- automated transfer of funds via computer recognizable/definable events
- flexibility in contract execution

Source: Finite and Infinite Games, James P. Carse

Image: Wikimedia Commons - Yeshiva University Museum

Smart Contracts: The Pragmatic Present

- Assets are no longer passive objects but have dynamic behavior
- Behavior can be fine-grain, associated with each transaction
- Contracts can be digital entities that can send and receive value
- Contracts can spawn other digital entities and create an autonomous ecosystem
- Strong caveat: Technology is not ready because it relies on conventional software programming languages
- Future smart-contract platforms will be mathematically verifiable
- Recommendation: No more than 200 lines of code at this point

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Enterprise Blockchain Projects

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Top Ten Mistakes in Enterprise Blockchain Projects

1. Misunderstanding the purpose of blockchain technology
2. Assuming the technology is ready for production use
3. Confusing future generation with present-day technology
4. Confusing base-level platform with a real solution
5. Confusing linear ledger with general-purpose DBMS
6. Assuming interoperability among products that don’t exist
7. Assuming today’s platform leaders will continue to dominate
8. Assuming smart contract technology is a solved problem
9. Ignoring funding and governance issues
10. Failure to incorporate a learning process

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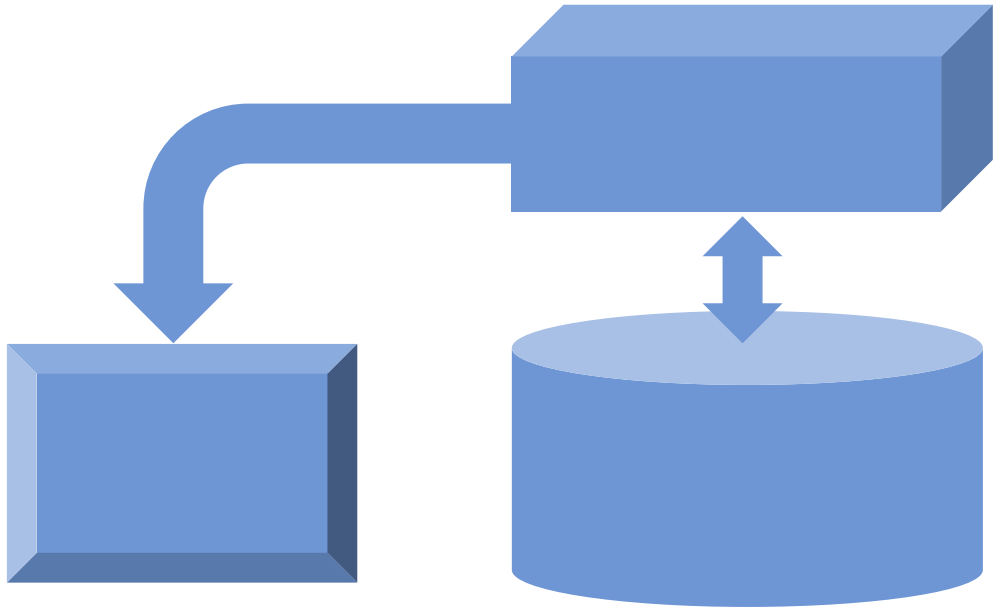
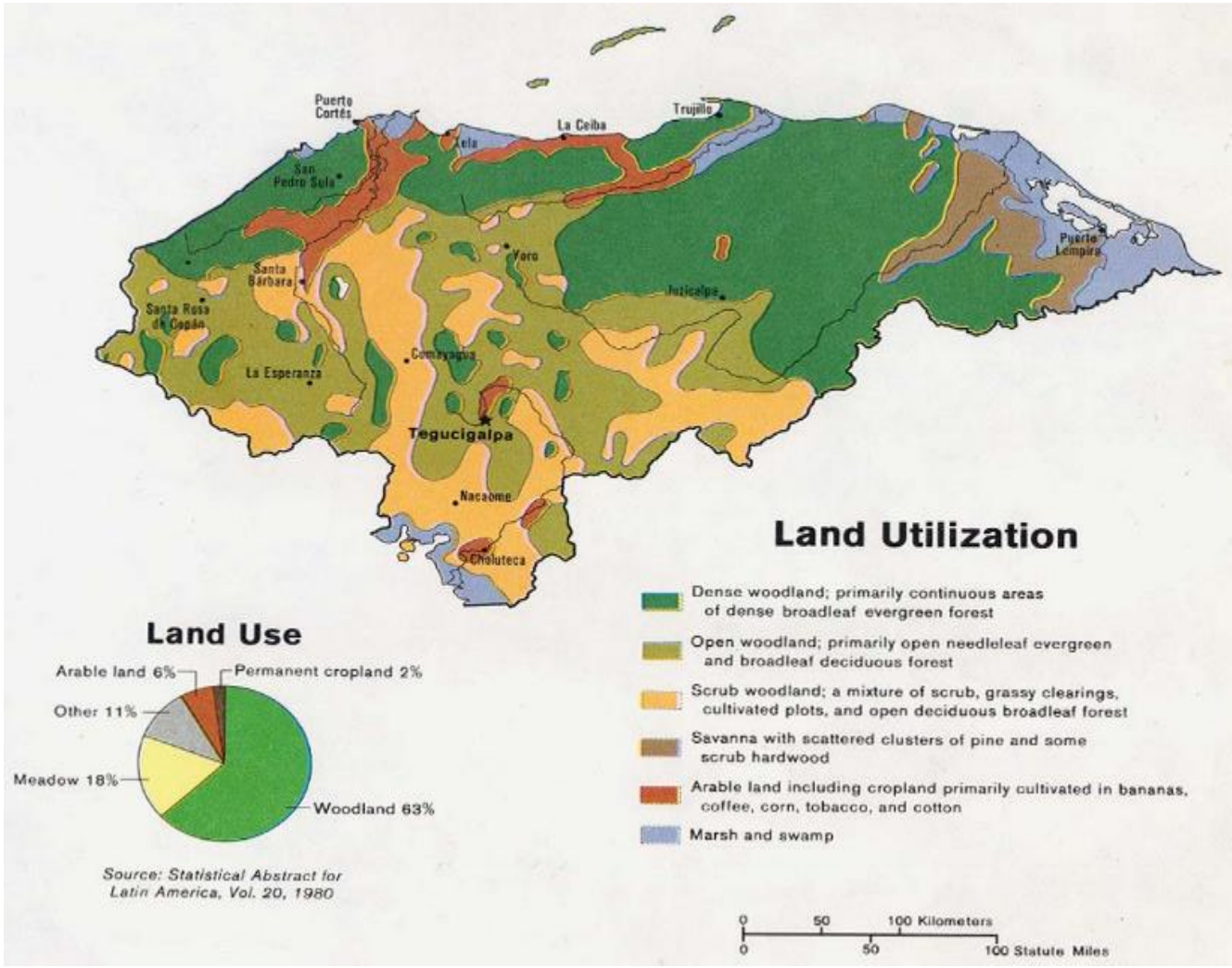
Use Cases: Land Title Registry

Honduras will use blockchain to build a secure land title record system





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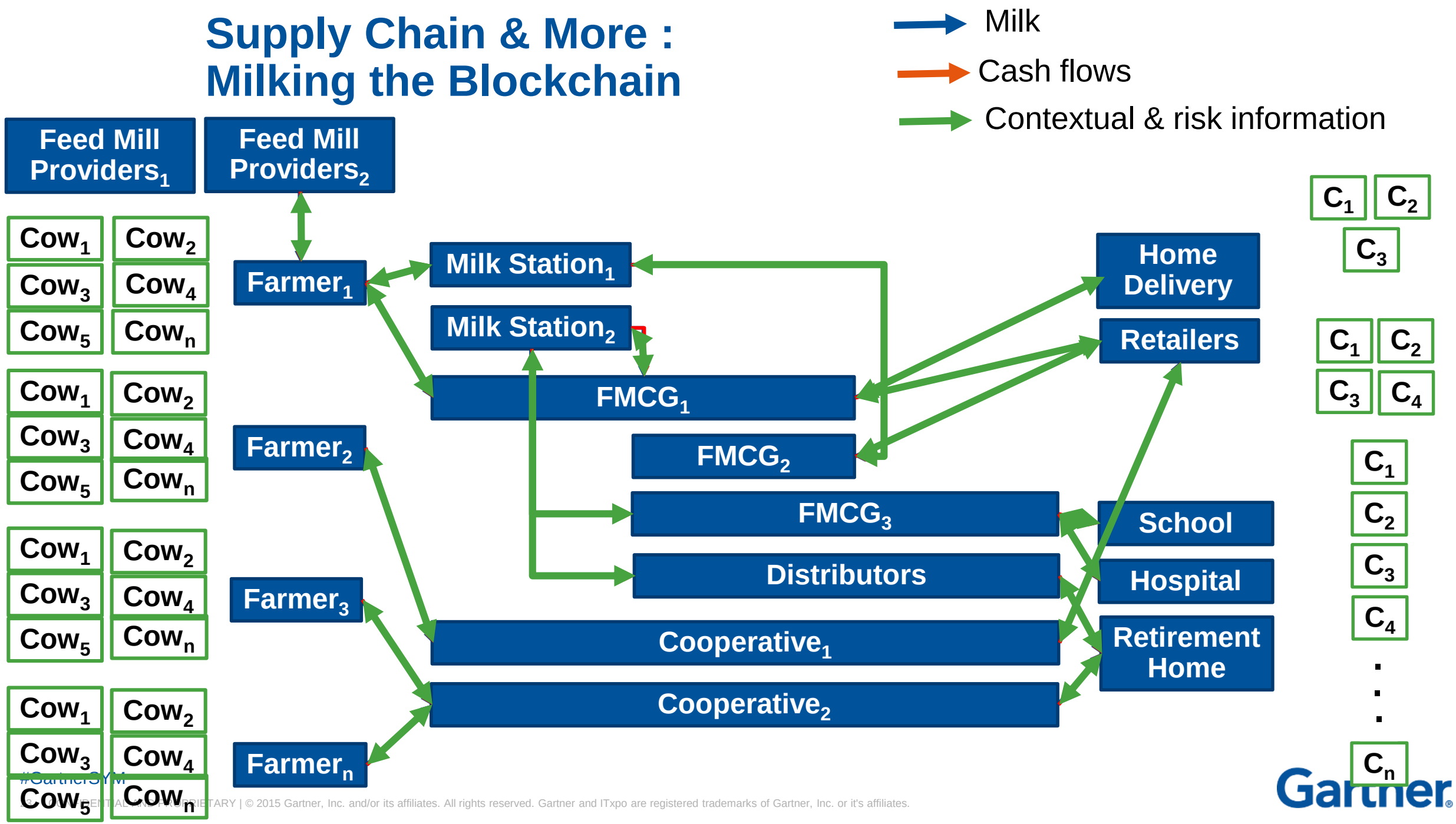
Supply Chain & More : Milking the Blockchain



Recommendations

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Questions CIOs Should Discuss With Their Board

What strategies does the organization have to **compete** in a decentralized, distributed ecosystem?

What offerings should be developed that reimagine the **customer experience** in a decentralized, digitally distributed, multi-asset, self-regulated context?

How will **digitalized "Things,"** making assisted economic decisions, using any kind of asset/value impact the business model?

Do the organization’s risk management and legal policies, and processes accommodate the use of **smart contracts**?

What is the organization’s **change management** capacity and how will blockchain evolution impact our culture?

Blockchain SWOT

Strengths	Weaknesses
▪ Distributed resilience and control ▪ Decentralized network ▪ Open source ▪ Security and modern cryptography ▪ Asset provenance ▪ Native asset creation ▪ Dynamic and fluid value exchange	▪ Lack of ledger interoperability ▪ Customer unfamiliarity and poor user experience ▪ Lack of intraledger and interledger governance ▪ Lack of hardened/tested technology ▪ Limitation of smart contract code programming model ▪ Wallet and key management ▪ Poor tooling and poor developer user experience ▪ Skills scarcity and cost ▪ Immature scalability ▪ Lack of trust in new technology suppliers
Opportunities	**Threats**
▪ Reduced transaction costs ▪ Business process acceleration and efficiency ▪ Reduced fraud ▪ Reduced systemic risk ▪ Monetary democratization ▪ New business-model enablement ▪ Application rationalization and redundancy	▪ Legal jurisdictional barriers ▪ Politics and hostile nation-state actors ▪ Technology failures ▪ Institutional adoption barriers ▪ Divergent blockchains ▪ Ledger conflicts/competition ▪ Poor governance

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Recommendations

- ✓ Think strategically, act tactically
- ✓ Assume whatever blockchain technology you choose will be obsolete in 18 to 24 months
- ✓ Nevertheless it is important to understand the technology
- ✓ Undertake proofs-of-concept to learn about the major platforms
- ✓ Select limited narrow-scope use case for real deployment on a chosen platform
- ✓ Prepare to migrate off that platform in 24 months
- ✓ Use learnings to reimagine business processes, business models, markets, products for the era of programmable economy

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Recommended Gartner Research

- **Practical Blockchain: A Gartner Trend Insight Report** ***(27 reports)***
  David Furlonger and Ray Valdes (G00325933)
- **Maverick* Research: In a Post-Bitcoin World, Metacoin Platforms Enable the Programmable Economy**
  Ray Valdes and Neil MacDonald (G00270509)
- **Hype Cycle for Blockchain Technologies and the Programmable Economy, 2016**
  David Furlonger and Ray Valdes (G00308190)
- **The Bitcoin Blockchain: The Magic and the Myths**
  Ray Valdes, David Furlonger and Fabio Chesini (G00295779)
- **The Future of Money Is the Programmable Economy, Not Just Bitcoin**
  David Furlonger (G00270192)

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What CIOs Should Tell the Board of Directors About Blockchain

Many boards of directors will call upon their CIOs to brief them on blockchain due to the current market hype. CIOs should focus on three points: a description of blockchain, frictionless markets and the cross-industry business impacts of a programmable economy.

Free Research

Enterprise Blockchain: Current Pitfalls, Future Potential

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