Gartner Data & Analytics Summit
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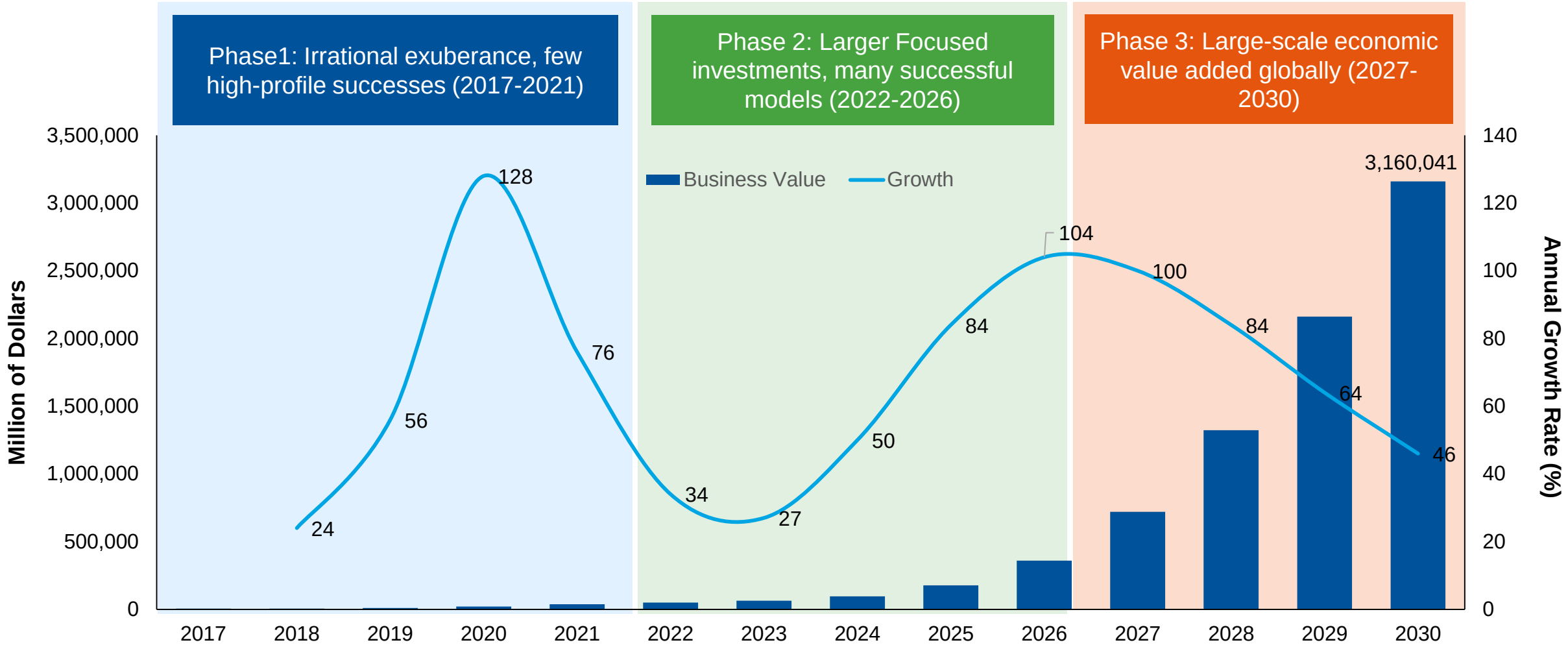
Gartner Summits

Building Blockchain Into Your Data and Analytics Program

Nick Heudecker

What to Make of Blockchain?

Business Value-Add of Blockchain: $3.1 Trillion by 2030



Source: "Practical Blockchain: A Gartner Trend Insight Report" (G00325933)

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Key Issues

1. What is blockchain and distributed ledger technology?
2. How might blockchain disrupt your data and analytics infrastructure?
3. What is the maturity level of blockchain and where should you begin?

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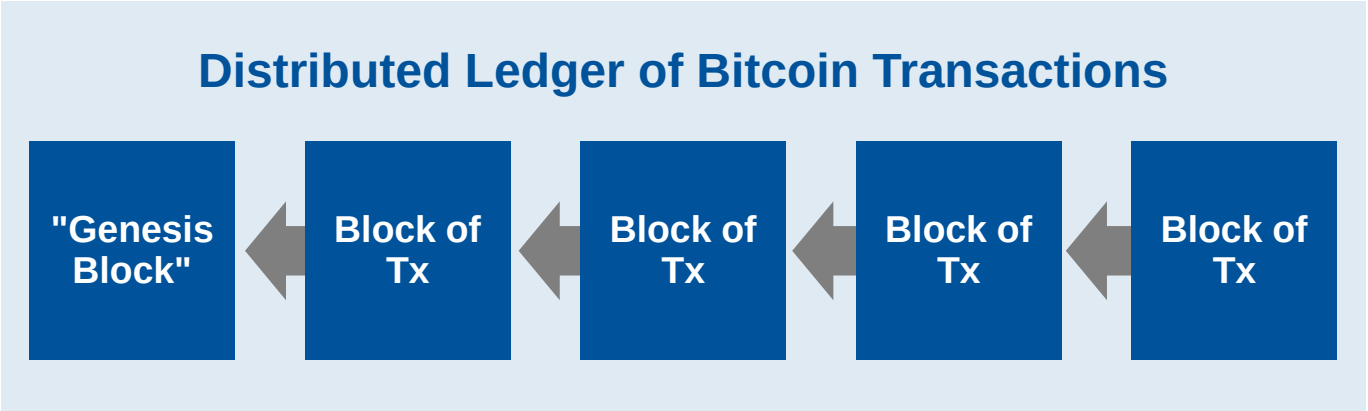
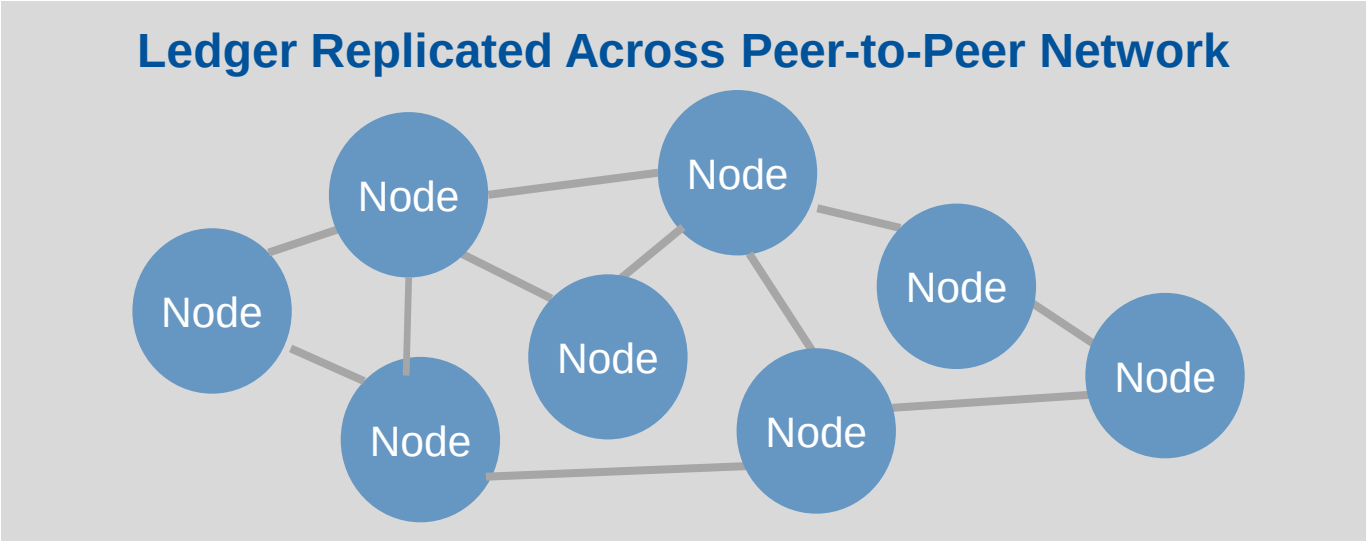
What Is a Blockchain? A "Distributed Ledger"





- 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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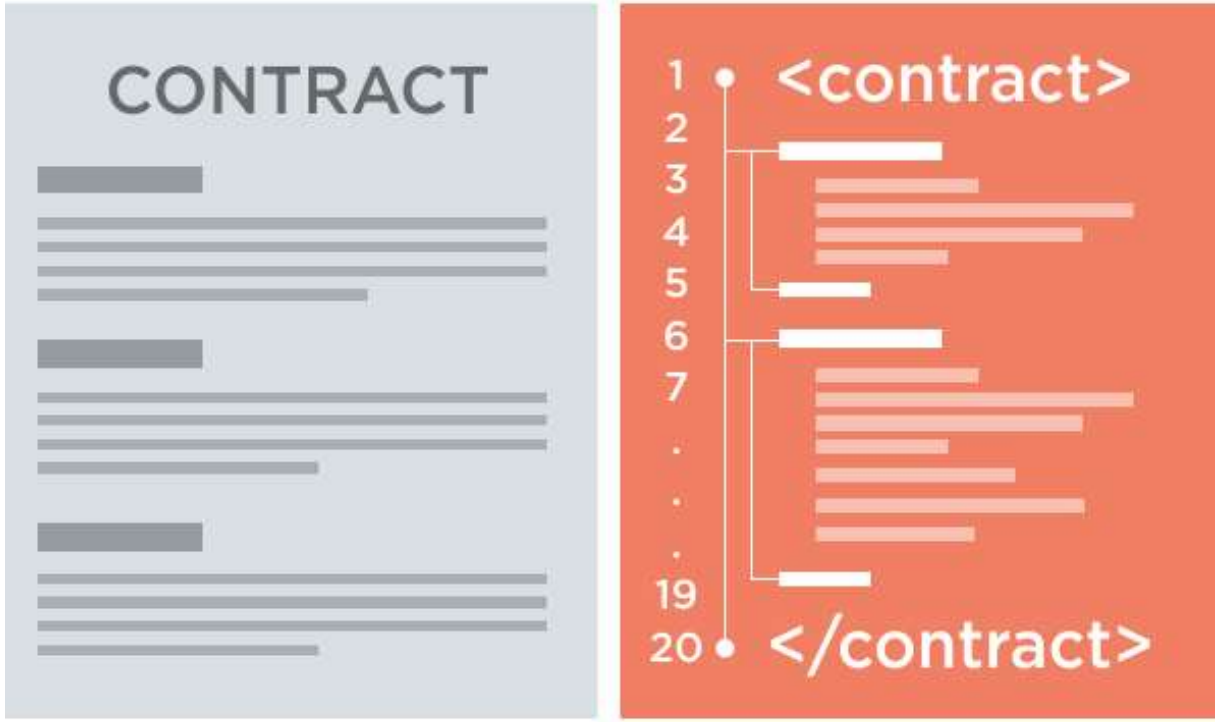
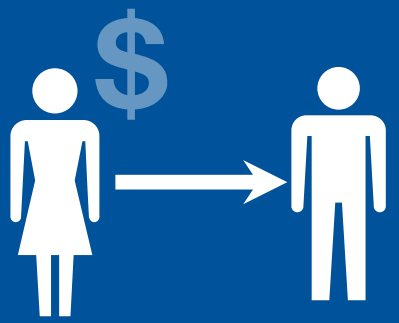
Core Concepts of Blockchain Technology Platform

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

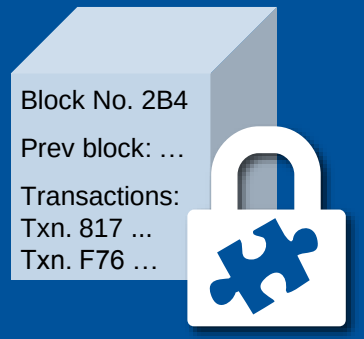


How Does Blockchain Work?

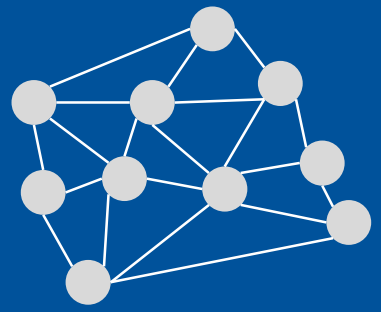
Network member creates a new transaction and proposes it to the network.



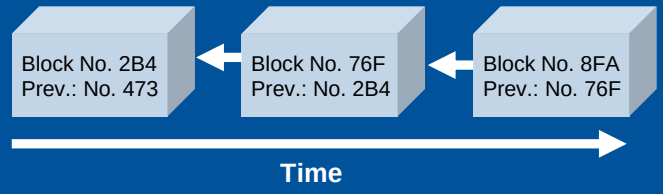
Network nodes combine the proposed transaction with other proposed transactions into a block.



Individual nodes compete to solve the cryptographic puzzle. Correct answer distributed to network.



The confirmed block is appended to the blockchain.



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Industry Examples

- Product origination
- Anti-counterfeit

- Land titles
- Voting
- Smart contracts

- Interoperable health records
- Data sharing

- Software updates
- Digital identity
- Device data sharing

- Consumer data brokers
- Securities settlement
- P2P payment

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There Are Four Types Of Blockchain Initiatives

Blockchain Disruptor

New businesses that rely on a blockchain foundation. Business model may not be new.

Digital Asset Market

New markets based on digital assets formed from nondigital ones (physical and virtual).

Efficiency Play

Efficiency improvements in transactions, interactions and tracking provenance of assets.

Record Keeper

Records management by one entity, for self or for a community.

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Are Blockchains Databases?

- Can blockchains manipulate data?
  - Blockchains are write-only ledgers
- Do blockchains enforce integrity constraints?
  - Integrity is left as an exercise for the integrator
- Is data stored in a blockchain self-describing?
  - Only for block and transaction metadata — payloads are opaque
- Are data structures insulated from the application?
  - Applications must embed data structures
- What about ...?
  - Still not a database

Blockchains are just another data source to integrate

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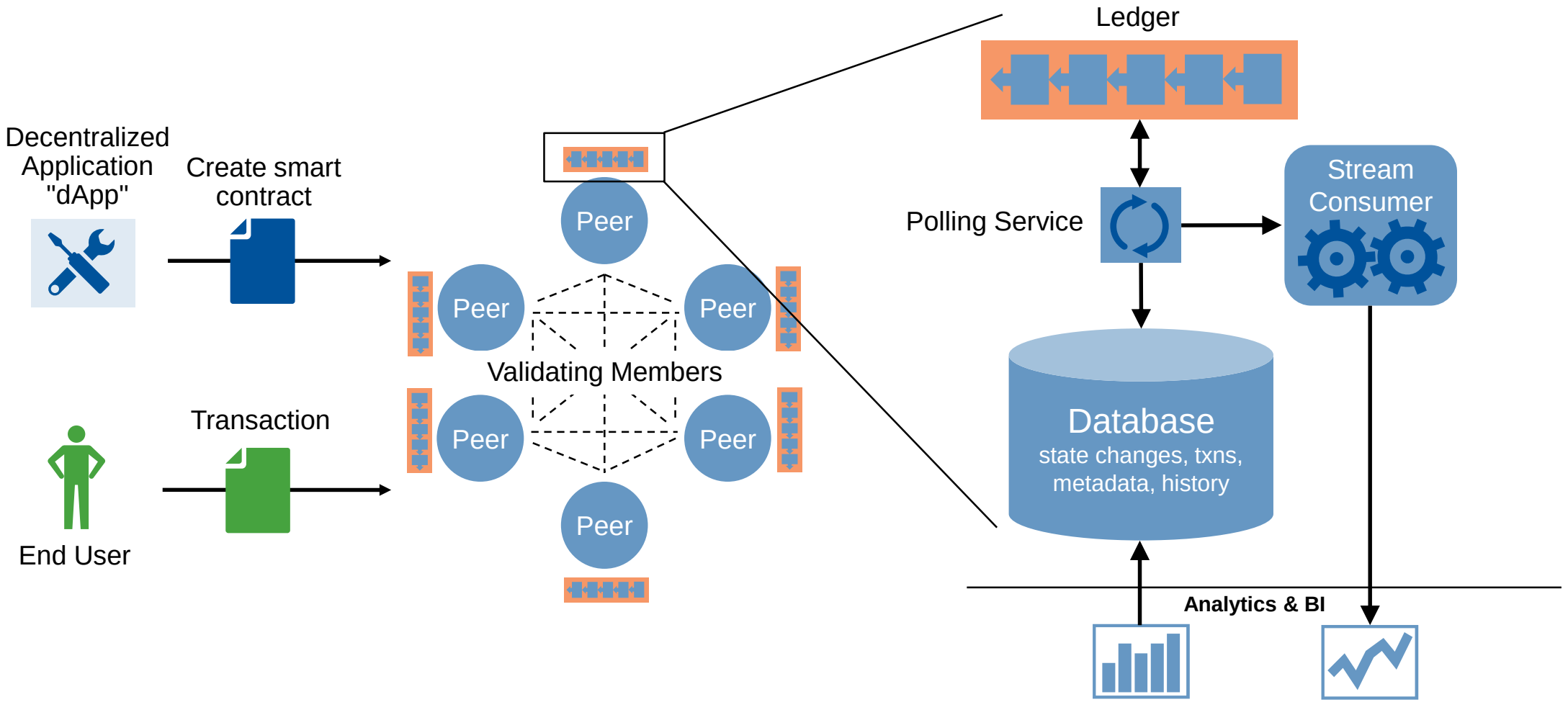
Integrating Blockchain for Analytics



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Challenges Building Real Blockchain-Based Solutions

- **Governance:** Centralized governance strategies will not translate to a distributed ledger
- **Tooling:** Existing tools will not work with blockchain implementations
- **Interoperability:** Multiple blockchain applications will exist in your enterprise
- **Data standards:** Must be defined and agreed to by every party
- **Scalability:** Transaction throughput remains low

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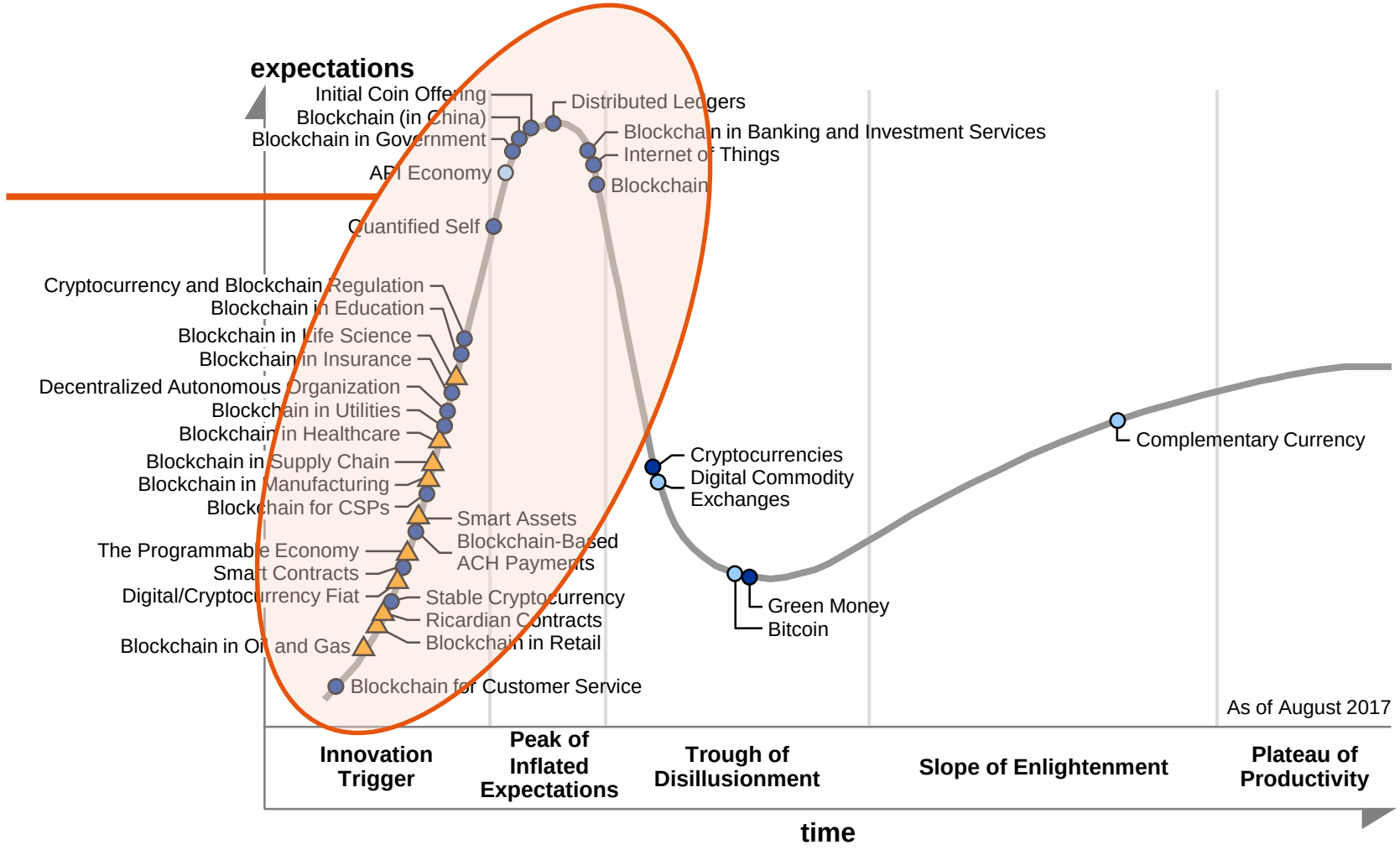
Blockchain Hype Is Increasing in Most Industries

Hype Is Increasing Across the Board



From "Hype Cycle for Blockchain Business, 2017" 10 August 2017 (G00332628)

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Four Challenges in Building Real Solutions

Challenges in creating a blockchain-based solution for peer-to-peer business ecosystem

Platform challenge — current technology is not scalable or complete

Business challenge– need to get ecosystem competitors to cooperate

Data interoperability — need to agree on structure and format of data

Solution challenge — a complex, powerful solution can consume huge resources to build

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Who Will Win Among 80 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 and won

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No Platform Has All the Winning Characteristics

- Bug-resistant smart contract capability
- Multiple independent implementations of protocol spec.
- Ecosystem of tools and frameworks
- Transparent governance with agile effective response to threats
- Scalable to global economy
- True open source from start
- Modular architecture and open APIs enable ecosystem
- Hardened via public blockchain deployment
- Configurable for private or hybrid blockchain

Can we get blockchain benefits without blockchain?

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What Does a Blockchain Platform Provide?

Authenticity 	Through private/public key signing
Data integrity 	Through Merkle tree
No double-spend 	No double-spend through consensus mechanism for ordering of transaction sequence
Replicated state 	Through peer-to-peer broadcast, messaging and processing
Availability and resiliency 	Dynamic peer-to-peer network, fault tolerant mechanisms

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Wide Spectrum of Centralized and Decentralized Systems

- **Purely decentralized:** Public blockchains
- **Semi-decentralized:** Consortium blockchains, private chains
- **Distributed components**:
  - Decentralized storage: IPFS
  - Decentralized messaging: Apache Kafka
- **Distributed Nonrelational DBMS:** CouchDB, MongoDB, FaunaDB
- **Distributed Cloud DB:** Apache Cloud Spanner, Azure Cosmos DB, Amazon DynamoDB
- **Distributed Relational DBMS:** Oracle, Microsoft, IBM, PostgreSQL
- **Centralized Relational DBMS:** Oracle, Microsoft, IBM, PostgreSQL

Answer Five Key Questions First

When? 	Where will this be implemented?
Who? 	Who all have skin in the game?
What? 	What is the scope of the work?
Why? 	Why is blockchain the best option?
Whether? 	Whether this project is needed at all?

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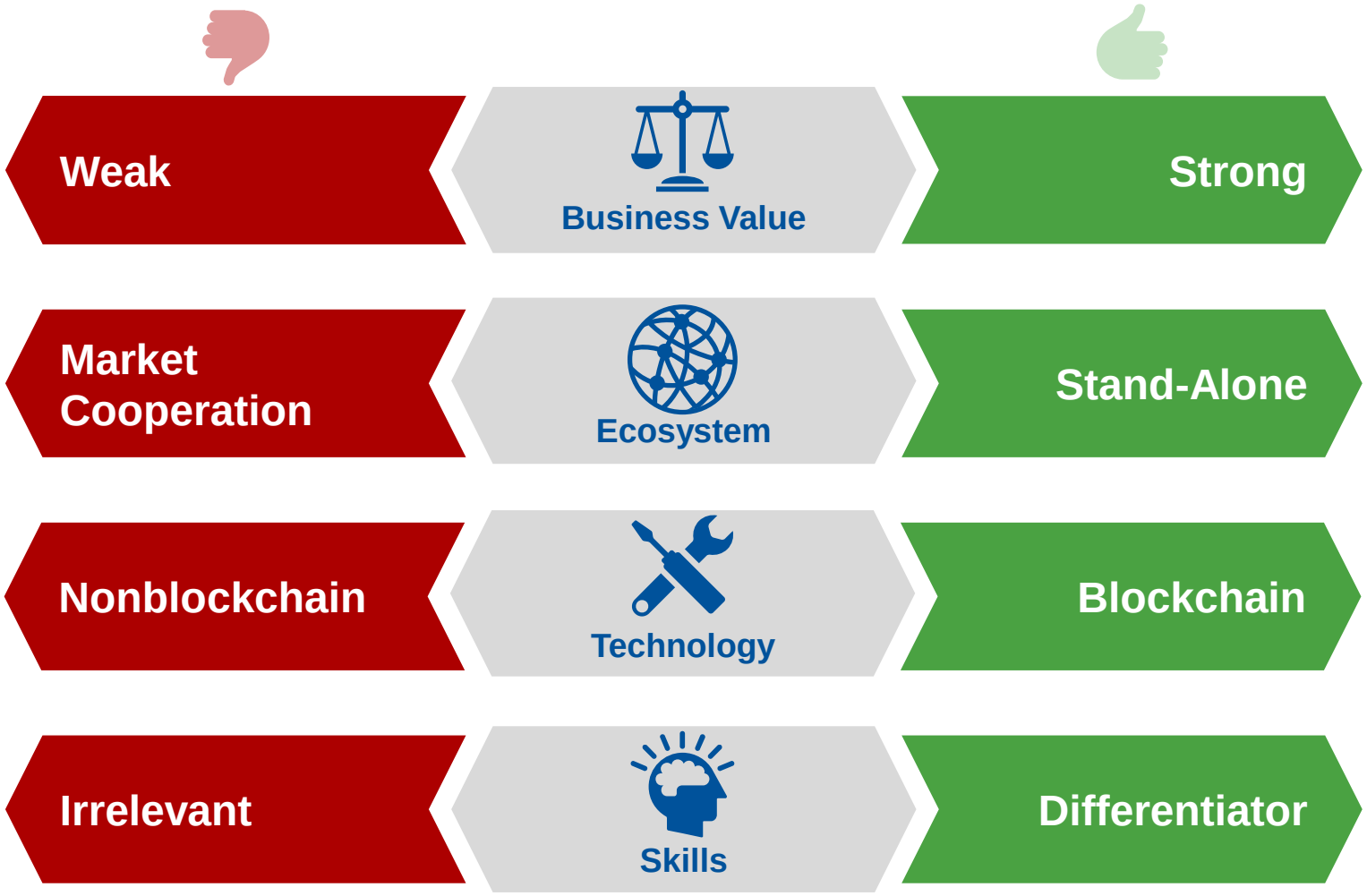
Determine the Business Need



Checklist

- ✓ Agree whether a use case exists.
- ✓ Determine if success needs other firms.
- ✓ Be realistic about the technology.
- ✓ **But:** Invest in skills for the future.

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Recommendations for End-User Organizations

- ✓ Think strategically, act tactically
- ✓ Assume whatever blockchain technology you choose will be obsolete in 18 to 24 months
- ✓ 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 experience to reimagine business processes, business models, markets, products for the era of programmable economy

Recommended Gartner Research

- **Practical Blockchain: A Gartner Trend Insight Report**
  David Furlonger and Ray Valdes (G00325933)
- **Hype Cycle for Blockchain Technologies, 2017**
  David Furlonger, Ray Valdes and Rajesh Kandaswamy (G00332627)
- **Hype Cycle for Blockchain Business, 2017**
  David Furlonger, Ray Valdes and Rajesh Kandaswamy (G00332628)
- **Cool Vendors in Blockchain Applications, 2017**
  Rajesh Kandaswamy, Fabio Chesini and Ray Valdes (G00328047)
- **How to Develop a Business Case for Blockchain Projects**
  Rajesh Kandaswamy and David Furlonger (G00323011)
- **How to Determine If You Need a Blockchain Project, and If So, What Kind?**
  Rajesh Kandaswamy and Fabio Chesini (G00320247)

For information, please contact your Gartner representative.

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