Beyond Bitcoin: What to do with Blockchain?

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Beyond Bitcoin: What to do with Blockchain?

http://ericsammons.com/what-is-the-blockchain/
Projected to Grow at **61.5% CAGR** to 2021
USD 210.2 million (2016) to USD 2,312.5 million (2021)

Beyond Bitcoin: The Tip of the Iceberg

Google Trends
Blockchain
Internet of Things
Machine Learning
Beyond Bitcoin: Why the Interest?

**Digital Mesh**
- The digital mesh is a mesh of people, devices, content, and services.
- New business models and processes are needed to cope with a world that is increasingly connected and blended.

**Decentralized Business Networks**
- There is a need to automate business transactions via contracts across network participants in an efficient and cost-effective manner.
- The old “B2B exchanges” and third parties reduce speed & agility.

**Need for Integrity & Visibility**
- Transactions must be conducted openly and securely, with full integrity.
- Many business transactions require an immutable, agreed-upon log.

* https://www.gartner.com/doc/3471559?srcId=1-7484470122#-363727574
Core Concepts
Beyond Bitcoin: Core Concepts

Distributed System of Record

Embedded Business Terms

Security, Verifiability, & Provenance

Consensus & Agreement
Blockchain may be thought of as a **distributed data management platform** where data may be shared across a distributed network, securely and with (potentially) business logic.
Beyond Bitcoin: Core Concepts

Transaction is added to a “block”.

Block is replicated to the participants that need to validate the transactions.

All network parties validate the transaction.

Block is added to the “chain”, creating a tamper-proof audit log.
Beyond Bitcoin: Core Concepts

• Smart Contracts represent a way to introduce business logic into the blockchain.
  • May be triggered by transactions or external events.

• Logic may be executed “on-chain” by the participants in the network, with no central coordinator.
  • Code is run in parallel.
  • Results are compared and agreed upon.

• Opportunity to reduce risk, increase efficiency, and automate the execution of business logic across the network without a central party.
Smart Contracts represent one of the biggest initial opportunities for this technology, starting in the context of private / permissioned blockchains.
So What Can We Do With This?
Use Cases: Product Provenance

Raw Materials → Supplier → Manufacturer → Distribution → Customer → Consumer

Product/Asset Journey

API Integration

B2B API Integration

B2B API Integration

B2B API Integration

B2B API Integration

B2B API Integration
Use Cases: Product Provenance

Distributed Business Network (Blockchain)
Asset Ownership, Asset Details, Auditable / Traceable Distributed Ledger
Secure, End-to-End Asset Provenance
Use Cases: IoT

Product/Asset Journey (e.g. Energy Distribution)

Distributed Business Network (Blockchain)
- IoT Triggered Smart Contracts
- IoT Augmented Asset Information
- IoT Device Verification and Tracking
Use Cases: “Consumer Contract” Automation

**Insurance Claims**
Reimbursements and automatic claims processing for certain types of claims. Unemployment insurance payouts based on smart contract terms and verified employment history/data.

**Airline Compensation**
Automatic payout of compensation to airline passengers according to defined business rules (smart contracts) for situations such as flight delays, flight cancellations.

**Apartment Rental**
Execute smart contracts on verified rental contract to establish all required utilities and services such as water, power, gas, cable.
Use Cases: Government

- **Government To Citizen**
  - Asset Registry and Asset Exchange
  - Licenses & other citizen services.
  - Identity management.

- **Government To Vendor**
  - Contract compliance, budgeting, and payments.
  - Invoice fraud prevention & regulatory compliance (automate legal requirements).

- **Government To Government**
  - Intra-agency information sharing & process automation through smart contracts
  - Contract management.
Use Cases: Energy Distribution

Power created by a central source, and transmitted to end consumers, often over long distances.

Power generated locally, and distributed in a peer-to-peer fashion via smart contracts. (see Brooklyn microgrid as an example)
Use Cases: Health Care & Pharma

Electronic Health Record
Electronic Medical Record
Personal Health Record

Secure, distributed patient health records.

Provider Registry / Directory

Distributed, verified network of provider information.

Claims Processing

Business network of payer, providers, and financial institutions, fraud prevention.

Prescription Drug Provenance

Capturing the complete drug supply chain, from raw materials to consumer distribution.
Use Cases: Async, Global Publishing Layer
Beyond Bitcoin: Ethereum (https://www.ethereum.org)

- Blockchain platform for executing smart contracts.
  - Programmable blockchain that may be used to create operations of any complexity.
  - Turing complete
  - Requires “proof of work” (“Ethash”) in order to successfully mine a block.
- “Suited for applications that automate direct interaction between peers or facilitate coordinated group action across a network” (ethdocs.org)
- Contracts typically are written in “Solidity” (similar to Javascript).
- Native value token: “ether” (ETH).
  - Various denominations
  - Used for pay for computation by purchasing “gas”.
Beyond Bitcoin: Hyperledger Project (https://www.hyperledger.org/)

- Open source effort to advance cross-industry blockchain technologies.
  - Hosted under the Linux Foundation.
  - Community for multiple projects related to blockchain.
  - Encourages interoperable components.
- "Hyperledger Fabric": implementation of blockchain technology intended as a foundation for developing blockchain applications.
  - Designed as a modular architecture.
  - Hosts smart contracts called “chaincode”, run in containers.
  - Other projects: Sawtooth Lake, Iroha, Burrow.
- Not a single blockchain, and has no “built-in” cryptocurrency tokens.
Is a Blockchain All I Need?
For the **appropriate use case**, blockchain can provide “part” of the solution.

However, there are **still questions** to answer:

- How Do I Get Data In/Out of the Blockchain?
- How Do I Extend Smart Contract Logic To My Enterprise?
- How Do I Respond To Events from my Ledger?
- How Do I Analyze Data Contained Within the Ledger?
- Can I Provide Controlled, Managed Access to Blockchain Capabilities?
Beyond Bitcoin: Additional Capabilities

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On-Chain Execution & Storage
# Beyond Bitcoin: Additional Capabilities

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**Off-Chain Storage**
- TIBCO GraphDB
  - ActiveSpaces

**Off-Chain Execution**
- TIBCO (Various)
Beyond Bitcoin: Recommendations

• Not every problem requires a blockchain!
  • Peer to peer networking, distributed data stores, and cryptography have been around for some time.

• Need to look at a number of factors. For example:
  • Number of network participants.
  • Required trust and integrity levels.
  • Amount of data to be stored.
  • Performance requirements and transaction processing times.
  • Ability to automate business interactions across a network.

• A blockchain is only part of the equation.
Beyond Bitcoin: Recommendations

• **Gain awareness through experimentation.**
  - Cloud based services make it easier to get started.

• **Answer the factors (previous slide), and identify use cases / value appropriate for your business.**

• **Determine how the key characteristics of a blockchain can be beneficial to the business network.**
TIBCO Software Meetups

We are 4,301 members across 56 Meetups

TIBCO Software takes businesses to their digital destinations by interconnecting everything in real time and providing augmented intelligence for everyone, from business users to data scientists. This combination delivers faster answers, better decisions, and smarter actions. For nearly 20 years, thousands of businesses around the globe have relied on TIBCO technology to differentiate themselves through compelling customer experiences, optimized assets, and innovative new business models. Learn how TIBCO brings data alive at www.tibco.com
Questions?

AND OVER THERE WE HAVE THE LABYRINTH GUARDS. ONE ALWAYS LIES, ONE ALWAYS TELLS THE TRUTH, AND ONE STABS PEOPLE WHO ASK TRICKY QUESTIONS.