Making Blockchain Real for Business

Explained

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Contents

What is Blockchain?

Why Enterprise Design considerations?

How can IBM help us apply Blockchain?
Business networks, wealth & markets

- **Business Networks** benefit from connectivity
  - Participants are customers, suppliers, banks, partners
  - Cross geography & regulatory boundary

- **Wealth** is generated by the flow of goods & services across business network in transactions and contracts

- **Markets** are central to this process:
  - Public (fruit market, car auction), or
  - Private (supply chain financing, bonds)
Ledgers are key …

**Ledger** is THE system of record for a business. Business will have multiple ledgers for multiple business networks in which they participate.

– **Transaction** – an asset transfer onto or off the ledger
  
  • John gives a car to Anthony (simple)

– **Contract** – conditions for transaction to occur

  • If Anthony pays John money, then car passes from John to Anthony (simple)

  • If car won't start, funds do not pass to John (as decided by third party arbitrator) (more complex)
Problem …

… Inefficient, expensive, vulnerable
Solution …

… Consensus, provenance, immutability, finality

Shared, replicated, permissioned
Blockchain for business ...

Append-only distributed system of record shared across business network

Shared ledger

Smart contract

Ensuring appropriate visibility; transactions are secure, authenticated & verifiable

Privacy

Consensus

Business terms embedded in transaction database & executed with transactions

All parties agree to network verified transaction

... Broader participation, lower cost, increased efficiency
Blockchain vendors – Offer specialization

Each vendor – Offers specialization

- Variant trust systems – Consensus, Mining, Proof of Work, etc.
- Lock into single trust system
- Purpose built infrastructure components for a specialized use case
- Design being field tested in form of POCs
- Crates fragmented blockchain models for enterprise
How can IBM Blockchain be different?

How do we differentiate?

– Open design
– Providing flexibility with pluggable and modular trust system
– Open for specialized blockchains, e.g., Ripple
– Trust intermediary – a trust system provisioning layer
– Enterprise blockchain platform concept
– Separate business domain with technology that supports it
What would enterprise chain infrastructure look like?

Integrated enterprise will need more than one specialized use case

- Driving synergies between blockchains
- Invisible blockchain infrastructure
- Inter- and Intra-enterprise connections
- Concept introduction
  - Interledger
  - Intraledger
- Cross the trust systems for transactions
- Fractal visibility of ledger data
- Enterprise visibility – control systems
Blockchain – Transaction processing vehicle

Enterprise integration considerations

- Integration with incumbent SoR
- Compliance and regulatory requirements
- Data formats – ISO20022, EDI 820 etc.
- Blockchain to enable transaction processing, and preserve the enterprise SoR systems
- Design intent
  - Path of least disruption
  - Accelerate enterprise adoption
Vision – ‘Interprise Synergy’
Enterprise chain infrastructure

**Design that enables new business models**

- Invisible enterprise chain infrastructure will provide foundation
- Use of connectors, APIs to enable incumbent systems chain aware
- Conditional contracts between chains – ‘Interprise Synergy’
- New business (e.g., P2P lending, crowdfunding) solely on blockchain
Blockchain security – Layered approach

- Trust System Layer – Consensus
  - pBFT, BFT, PoS, PoW, Ghost, Paxos, RAFT, Custom

- Blockchain Middleware Layer
  - Ledger, SSL, Crypto Modules, Sub Ledger, Encryption, ECC, ECDSA, ECDH, ECIES, etc.

- Physical – IT Infrastructure Layer
  - HSM, EAL, Crypto Accelerator, Private Cloud, Isolated Network, EAL5, etc.
Path to enterprise adoption

**Use Case Identification**

*Enterprise Impact and Industry Impact*
Meaningful issues should revolve around significant costs to enterprise and industry

**Business Blueprint**

*Existing business process is distilled down to blockchain-based model*
Reinventing the business based on a trust system

**Technology Blueprint**

*Technology to align with the business imperatives*
Technology design decisions and deployment options

**Enterprise Integration**

*Integration with down stream transaction systems reflecting on critical business systems*

First Project
### 7 design principles of sustainable blockchain business networks

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<th>Description</th>
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<td>Providing network participants control of their business</td>
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<td>Provision for an extensible business network – Flexibility in membership</td>
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<td>3</td>
<td>Permissioned but protected network – Protecting competitive data</td>
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<td>Open access and collaborative global network – Collective innovation</td>
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<td>Scalability – Transaction processing and data encryption processing</td>
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<td>6</td>
<td>Security – New security challenges of shared business network</td>
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<td>7</td>
<td>Coexisting with existing systems of record and transaction systems</td>
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Blockchain benefits

- **Saves time**
  Transaction time from days to near instantaneous

- **Removes cost**
  Overheads and cost intermediaries

- **Reduces risk**
  Tampering, fraud & cyber crime

- **Increases trust**
  Through shared processes and recordkeeping
Contents

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## Blockchain for business – Our point of view

### Community + Code
- **Linux Hyperledger Project**
  - Open Source Code: Blockchain for business;
  - **Consensus | Provenance**
  - **Immutability | Finality**
  - Open Governance – 100 member cross industry board

### Cloud
- **IBM Blockchain**
  - Blockchain managed service on IBM Cloud and z Systems;
  - **Identity | Consensus | System Integration | Hardware-assist for Performance & Security**
  - IBM Blockchain on Bluemix

### Clients
- **Blockchain Solutions**
- **Blockchain Garage**
  - Making Blockchain real for business
  - Blockchain Garage;
  - **New York | London | Singapore | Tokyo**
  - Blockchain Services Practice
## Blockchain NOW

| **Hyperledger fabric on Docker Hub** | Fastest development of blockchain solutions  
Certified Hyperledger fabric instances  
Supported by IBM – available cross platform |
|-------------------------------------|-----------------------------------------------------------------------------------|
| **High security business blockchain on Bluemix** | Dedicated compute power – isolated partition  
Secure key management (FIPS 140-2 Level 4)  
Tamper resistant service container  
Performance optimized (Operating System & Privacy Services) |
| **Bluemix blockchain service** | Fast blockchain network on Bluemix – also now China  
Samples for deployment, customization & usage  
Tool support for development and deployment |

Supporting serious blockchain deployment!
Linux Foundation’s Hyperledger Project

– **Open Ledger Project** announced December 17, 2015 with 17 founders, now over 80 members

– **Hyperledger Project** rebrand in February 2016

– Collaborative effort to advance Blockchain technology by identifying and addressing important features for a cross-industry open standard for distributed ledgers that can transform the way business transactions are conducted globally

– Open source, open standards, open governance

  Enable adoption of shared ledger technology at a pace and depth not achievable by any one company or industry

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<tr>
<td><strong>Chairman</strong></td>
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<td><strong>Executive Director</strong></td>
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<td><strong>Technical Chair</strong></td>
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<td><strong>Contribution</strong></td>
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<tr>
<td><strong>Sprint to one codebase with unified thinking</strong></td>
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www.Hyperledger.org
Engagement model overview

1. Discuss Blockchain technology
2. Explore customer business model
3. Show Blockchain Application demo

1. Understand Blockchain concepts & elements
2. Hands on with Blockchain on Bluemix
3. Standard demo customization

1. Design Thinking workshop to define business challenge
2. Agile iterations incrementally build project functionality
3. Enterprise integration

1. Scale up pilot or Scale out to new projects
2. Business Process Re-engineering
3. Systems Integration

Remote or face to face  Remote or face to face  Face to face  Face to face
Free of charge  Free of charge  For fee  For fee
## IBM & Hyperledger – Selected references

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<th>Company</th>
<th>Service/Project</th>
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<td>HSBC, Bank of America, IDA</td>
<td>Trade Finance - Letter of Credit</td>
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<td>ABN AMRO</td>
<td>Financial Restructuring &amp; Recovery</td>
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<td>Crédit Mutuel Arkéa</td>
<td>Consortium Shared Ledger</td>
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<td>Japan Exchange Group (JPX)</td>
<td>Post Trade</td>
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<td>Mizuho</td>
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<td>IBM Global Finance</td>
<td>Shadow Chain for Dispute Resolution</td>
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<td>Everledger</td>
<td>Diamond provenance</td>
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<td>Bank of Tokyo – Mitsubishi UFJ</td>
<td>Business Partner Contracts</td>
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<td>CLS</td>
<td>Bilateral netting service</td>
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<tr>
<td>UBS</td>
<td>Digital trade finance</td>
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Summary

Blockchain …
– is a shared, replicated, permissioned ledger technology
– can open up business networks by taking out cost, improving efficiencies and increase accessibility
– addresses an exciting and topical set of business challenges, which cross every industry

IBM …
– supports the Linux Foundation Hyperledger open standard, open source, open governance Blockchain
– has an easy to access, proven and incremental engagement model giving customers the confidence to get started NOW
Thank you!
Further information – Use case links

HSBC, Bank of America, IDA:

ABN AMRO:

Crédit Mutuel Arkéa:

JPX:

Kouvola Innovation:

London Stock Exchange:

Mizuho:

IBM Global Finance: