Blockchain for Enterprises

Blockchain Conference, Sydney, Australia

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13-June-2018

Introduction

- Blockchain Coach – Conduct introductory training courses for Blockchain, and HyperLedger Fabric.
- Founder of a Blockchain coaching & strategy consultancy, ‘Blockchain Smart Solutions’.
- Co-Founder of an ICO marketing consultancy, ‘The Marketing Kangaroos’.

knowledgehut

HYPERLEDGER

Blockchain Smart Solutions

The Marketing Kangaroos

Introduction

- ICO Marketing specialist – Working with multiple blockchain projects to lead their digital marketing efforts.
- Marketing specialist for an advisory and consulting firm, ‘Blockchain Advisory Council’.
- Engineering background – worked in Telco, IT, Fintech sectors.

Agenda

- Review of Blockchain Technology features.
- Needs & requirements of Enterprises.
- Introduction to HyperLedger.
- Features of HyperLedger Fabric.
- Real world examples of HyperLedger based projects.
- How to start planning for Blockchain implementation in your organization.

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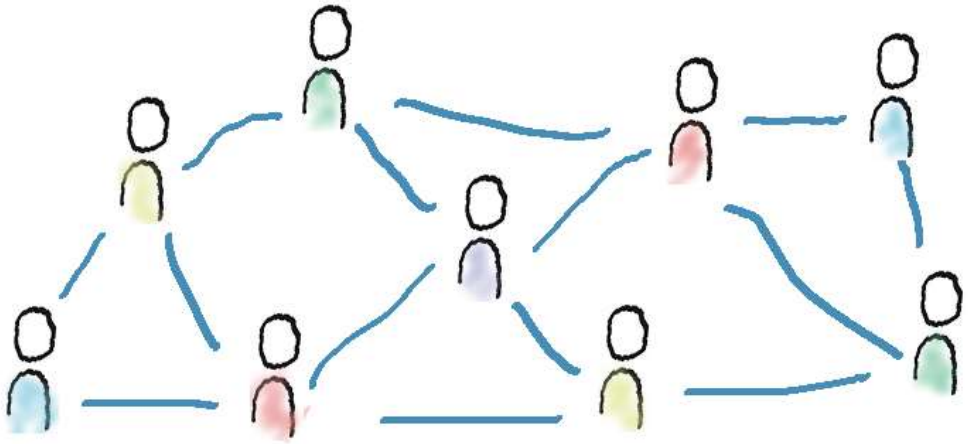
Features of Blockchain Technology

- **Distributed** – collective, synchronized bookkeeping and no single point of failure.

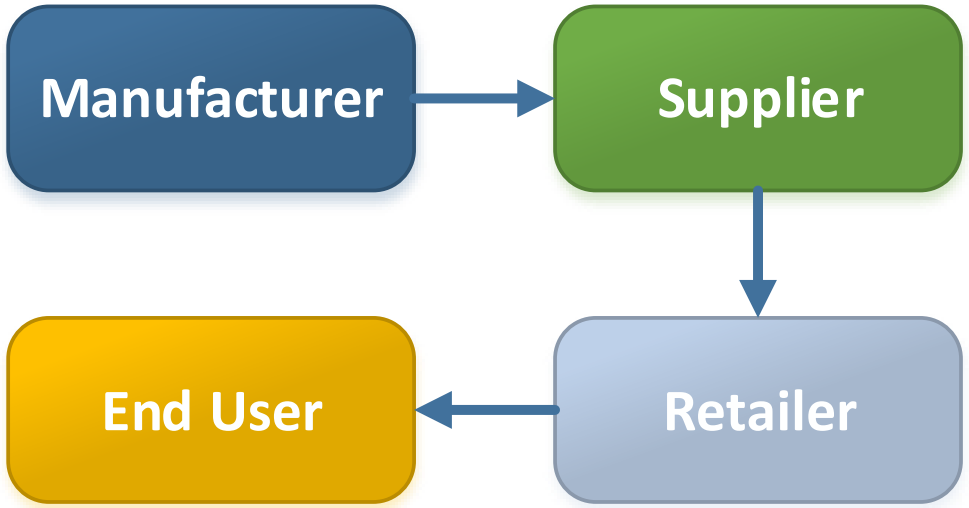


- **Smart contracts** – types of transactions one can carry out are agreed between participants in advance.

Features of Blockchain Technology

- **Consensus** - all parties in the business network agrees on the kind of information to be captured about an asset.

- **Provenance** – parties are able to trace records (of an asset) to its source.



Features of Blockchain Technology

- **Immutability** – records in a ledger cannot be altered or removed.

- **Finality** – when a transaction is committed there is no rolling back.

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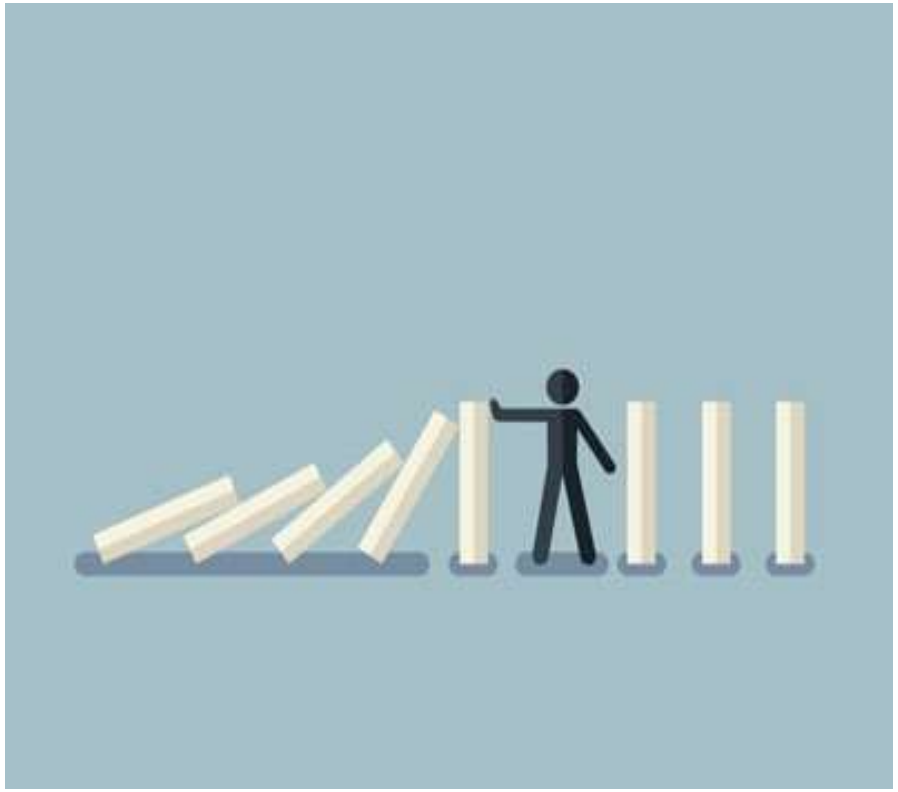
Enterprise’s needs

- Performance at scale.
  - Transactions rates.
  - Sub-second transaction latency.

Payment Network	Transaction rates
VISA	24,000 – 25,000 tps average.
PayPal	~300 tps average
Bitcoin	5.67 tps| 14-Dec-2017
Ethereum	15.6 tps| 04-Jan-2018

Enterprise’s needs

- Operational resilience.
  - Avoid downtime with highly available services.
  - Recover rapidly when some components fail.
  - Traditional enterprise software (e.g. Oracle) use replication of services & redundancy to ensure that the system survives an outage of any single & even multiple components.



Enterprise’s needs

- Security and confidentiality.
  - Restrict transactions and ledger access to authorized participants.
  - Ensure encryption of data in-transit and at-rest.
  - Verify that network messages are tamper-proof.
  - Validate digital signatures.

Enterprise’s needs

- Supportability and management.
  - Assembling, hardening, and support of the blockchain network components, and all their supporting infrastructure.
  - Troubleshooting.
  - Day-to-day administration and monitoring.
  - Patching or upgrades to new versions.
  - Backward compatibility.

Enterprise’s needs

- Enterprise integration.
  - Pre-built onramps for enterprise systems.
  - Event and API-driven integration methods to invoke transactions, share data, and capture blockchain events and ledger updates into systems of record (SORs).

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Solution - HyperLedger

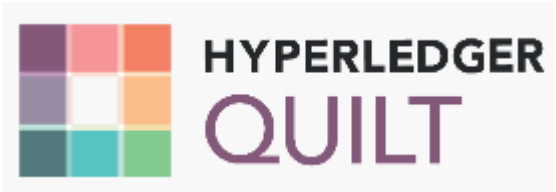
- An open source collaborative effort created to advance cross-industry blockchain technologies.
- A global collaboration, hosted by The Linux Foundation, includes leaders in finance, banking, IoT, supply chain, manufacturing and technology.
- Fastest growing (among 70+) open source organization for Linux Foundation.
- Corporate and Associate members ~200.

HyperLedger Frameworks

- 27 organizations contributing to this open source code.

HyperLedger Frameworks

HyperLedger Tools



HyperLedger Frameworks

- **HyperLedger Fabric:**
  - IBM initiative.
  - Most active project to date, production-ready solution launched in July, 2017.
  - Modular architecture – allows components, such as consensus and membership services, to be plug-and-play.
  - Allows for private channels.

HyperLedger Frameworks

- **HyperLedger Sawtooth:**
  - Initiative of Intel.
  - Consensus algorithm is PoET (Proof of Elapsed Time) for Production.
  - Core system is separated from the application domain.
  - Highly modular, with good performance KPI's.
  - Seth (Sawtooth-Ethereum) integration extends the interoperability of Sawtooth to Ethereum.

HyperLedger Frameworks

- **HyperLedger Indy:**
  - Brainchild of the nonprofit group, The Sovrin Foundation.
  - Purpose-built for decentralized identity.
  - Companies don’t have to store so much personal data. They can store a pointer to the identity.
  - Blockchain software is based on data minimization.

HyperLedger Frameworks

- **HyperLedger Burrow:**
  - Contributed by Monax and co-sponsored by Intel.
  - Permissioned, smart-contract interpreter built in part to the specification of the Ethereum Virtual Machine (EVM).
  - Code written in Solidity (Ethereum language).
  - Consensus is achieved Byzantine fault-tolerant Tendermint protocol, which provides high transaction throughput.

HyperLedger Frameworks

- **HyperLedger Iroha:**
  - Originated with developers in Japan who had built their own blockchain technology for a couple of mobile use cases.
  - Implemented in C++.
  - High performance for small data and focused use cases.
  - Consensus model is a new, chain-based Byzantine Fault Tolerant consensus algorithm, called ‘Sumeragi’.

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HyperLedger Fabric

- Performance at scale.
  - A modular architectural approach that uses separation of concerns;
    - Chaincode; or smart contract; business rules.
    - Transaction ordering.
    - Transaction validation.
    - Transaction commitment.
  - Fujitsu trial transactions speeds upto 13,500 tps on v0.6.1.

HyperLedger Fabric

- Operational resilience.
  - Redundant nodes.
    - Endorsing Peers.
    - Committing Peers.
  - Autonomous monitoring and recoverability of failed components.
  - Continuous embedded backup of configuration information and ledger data.

HyperLedger Fabric

- Security and confidentiality.
  - Permissioned network model.
  - Digital signatures – HSM (Hardware Security Module).
  - Verification of senders & messages.
  - Transport security.
  - Channel.

HyperLedger Fabric

- Supportability and management.
  - BaaS – Blockchain as a managed service.
  - Service provider would;
    - Deploy and integrate.
    - Monitor and troubleshoot.
    - Manage policies; i.e. chaincode.

HyperLedger Fabric

- Enterprise integration.
  - API-driven development.
  - JSON based database content.
    - Fully query-able.
    - Easy reporting.
    - Auditability.

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Real World Examples

- **Maersk and IBM Joint Venture**
  - Industry Facts:
    - ~$4 trillion worth of shipments.
    - Cost of global trade ~$1.8 trillion.
    - Cost of required trade documentation is ~20% of actual physical transportation cost.
  - Benefits:
    - End-to-end supply chain visibility to all involved parties.
    - Real time exchange of information securely and seamlessly.
    - Digitization and automation of paperwork.
    - Expedited approvals and less prone to errors.
    - Reduced time and cost for clearance and cargo movement.

Real World Examples

- **YES Bank (India)**
  - Used HyperLedger Fabric to design a vendor financing solution for its client, Bajaj Electricals.
  - Digitized the process for discounting & disbursal of funds to its vendors.
    - Confirmation of delivery by Bajaj Electricals.
    - Raising of Bill of Exchange by the Supplier.
    - Submission of invoice and other documents to Bank for payment.
  - Process change from 4 days to almost real-time, with transparency.

Real World Examples

- **PokitDok – a healthcare API company**
  - Existing facts & Challenges:
    - ~18% of GDP expenditure in US.
    - Operational inefficiencies and prone to costly errors.
    - Poor information access and management.
  - Benefits:
    - Identity by Consensus.
    - Autonomous Claims Adjudication.
    - Event-Driven Supply Chain Management.
    - Prior Authorization & Referral.

pokitdok

DokChain

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Implementing HyperLedger. Where to Start

- Consider the impact of a new blockchain application/solution.
- Single-use applications;
  - Little involvement with 3rd parties.
  - Minimal risk.
  - Examples: DB for applications which manage physical/digital assets, record internal transactions.

Implementing HyperLedger. Where to Start

- Localized applications;
  - Private blockchain network.
  - Limited number of trusted counterparties can reduce transaction costs.
  - Examples: Financial, Supply Chain.
- Substitute/Transformative applications;
  - Minimal impact to end users.
  - Functionality coverage, adaptability.
  - Example: Large-scale public identity systems (passport control).

Thank You

Contact

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