SNS COLLEGE OF TECHNOLOGY

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DEPARTMENT OF INFORMATION TECHNOLOGY

BLOCK CHAIN AND CRYPTOCURRENCY
IV YEAR - VII SEM

UNIT 5 – **CRYPTO CURRENCY REGULATION**

CRYPTO CURRENCY REGULATION

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Contents

What	. . are Blockchain technologies ?
Why	. . is it relevant for our business?
How	. . can IBM help us apply Blockchain?

Business Networks, Markets & Wealth

- Business Networks benefit from connectivity
  - Connected customers, suppliers, banks, partners
  - Cross geography & regulatory boundary
- Wealth is generated by the flow of goods & services across business network
- Markets are central to this process:
  - Public (fruit market, car auction), or
  - Private (supply chain financing, bonds)

Transferring Assets, building Value

- Anything that is capable of being owned or controlled to produce value, is an asset
- Two fundamental types of asset
  - Tangible, e.g. a house
  - Intangible e.g. a mortgage
- Intangible assets subdivide
  - Financial, e.g. bond
  - Intellectual e.g. patents
  - Digital e.g. music
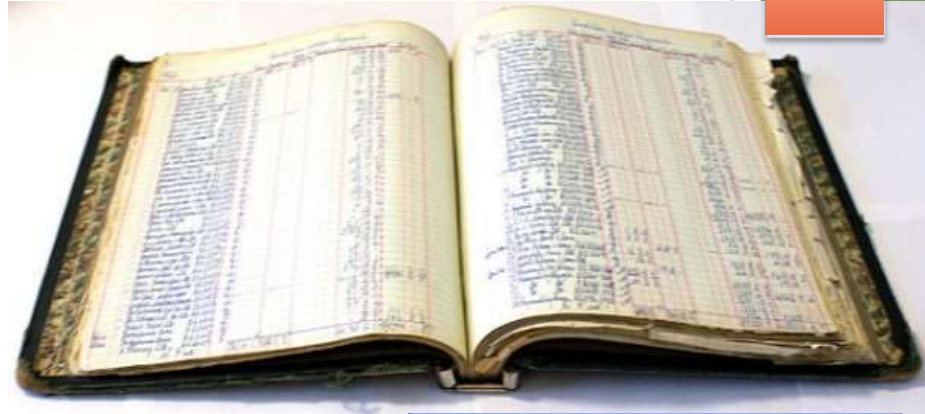- Cash is also an asset
  - Has property of anonymity

Ledgers are Important

- Ledger [1] is THE system of record for a business

– records asset transfer between participants.

- Business will have multiple ledgers for multiple business networks in which they participate.

[1] The principal book (or computer file) for recording and totaling financial transactions by account type, with debits and credits in separate columns and a beginning monetary balance and ending monetary balance for each account.

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Participants, Transactions & Contracts

- Participants - members of a business network
  - Customer, Supplier, Government, Regulator
  - Usually resides in an organization
  - Has specific identities and roles
- Transaction - an asset transfer
  - 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)

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Contract

Introducing Blockchain

A shared ledger technology allowing any participant in the business network to see THE system of record (ledger)

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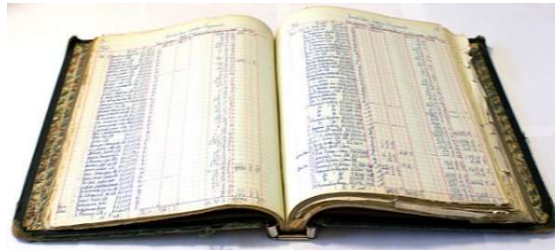
Problem - Difficult to monitor asset ownership and transfers in a trusted business network
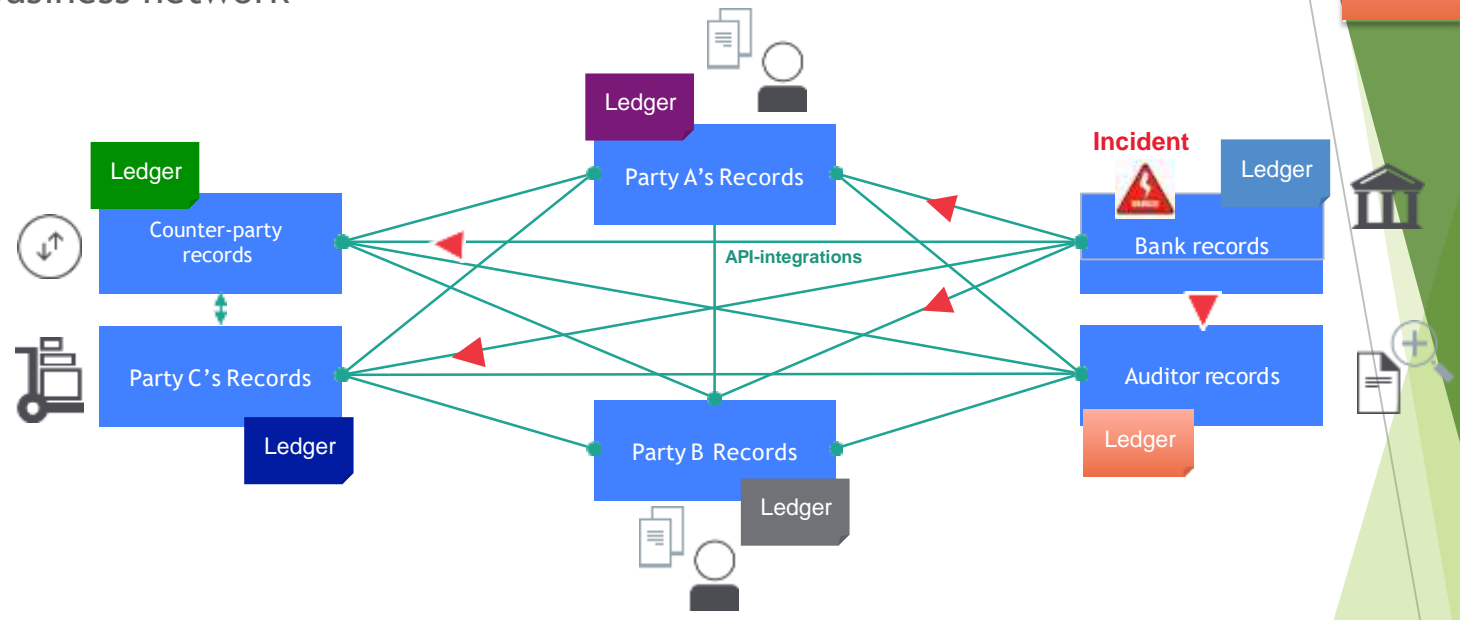
Inefficient, **expensive**, **vulnerable**

Solution – a permissioned, replicated, shared ledger

Counter-party records

Ledger

Party A's Records

Ledger

Bank records

Ledger

Party C's Records

Ledger

Ledger

Party B Records

Auditor records

Ledger

Participants have multiple shared ledgers

NOTE : Participants same as before
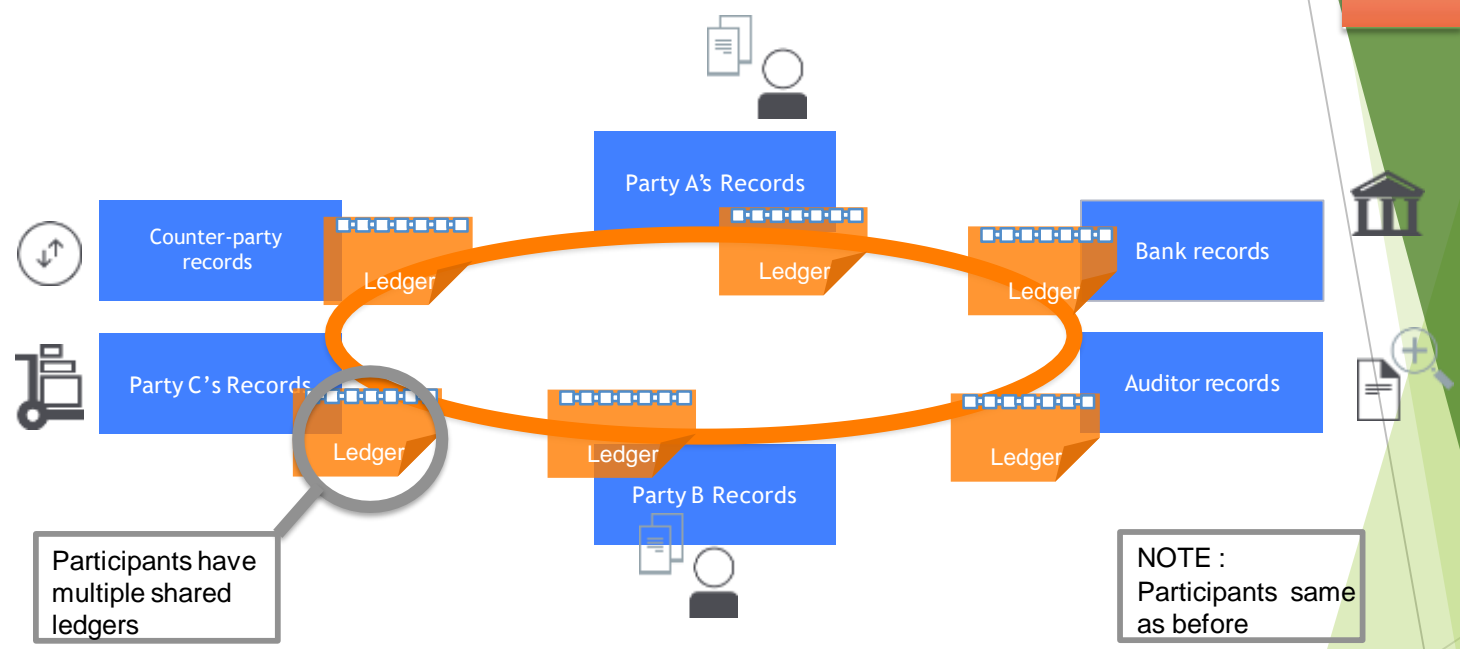
Consensus, provenance, immutability, finality

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Blockchain underpins Bitcoin . . .

1. ₿ *bitcoin* is unregulated, censorship-resistant shadow currency
2. Blockchain ensures "cash like" coin passing
    - unique,
    - immutable,
    - final
3. ₿ *bitcoin* the first Blockchain application
    - Blockchain is not ₿ *bitcoin*

4. Digital currencies different from cyptocurrency

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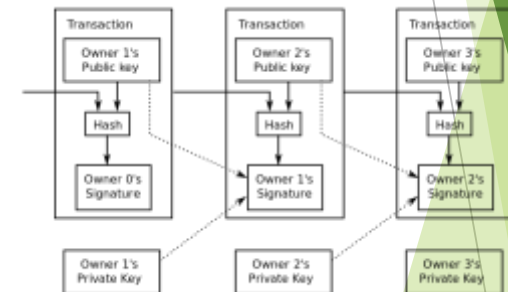
Blockchain for Business

What?

| Append-only distributed system of record shared across business network | Shared Ledger | Smart Contract | Business terms embedded in transaction database & executed with transactions |

| Ensuring appropriate visibility; transactions are secure, authenticated & verifiable | Privacy | Validation | All parties agree to network verified transaction |
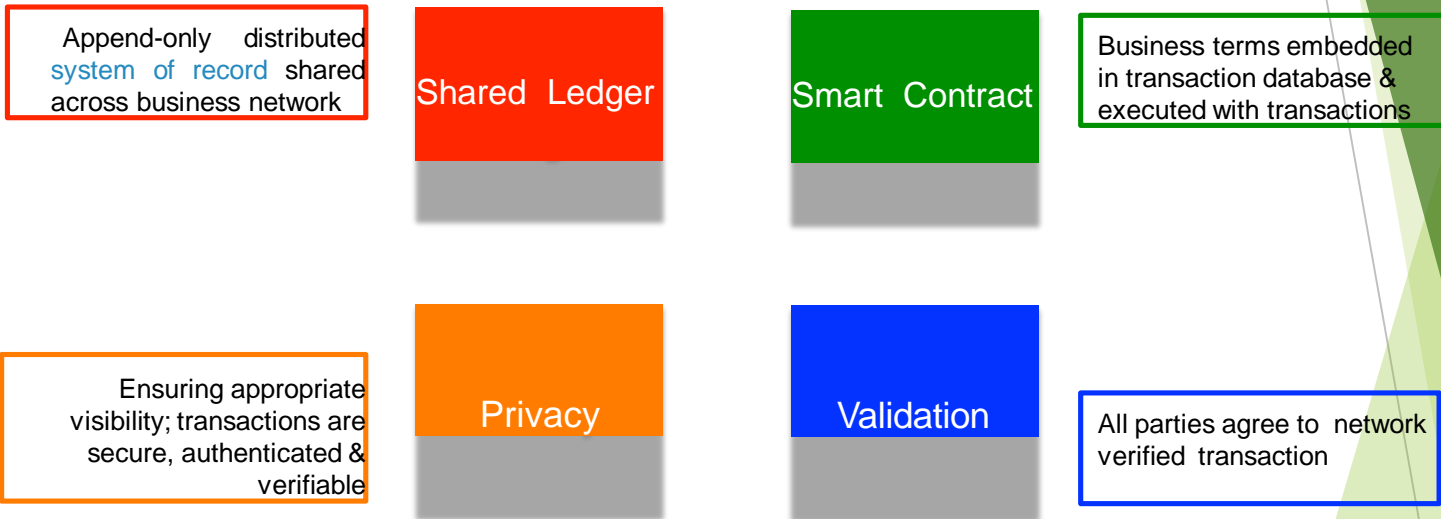
Broader participation, lower cost, increased efficiency

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Shared Ledger
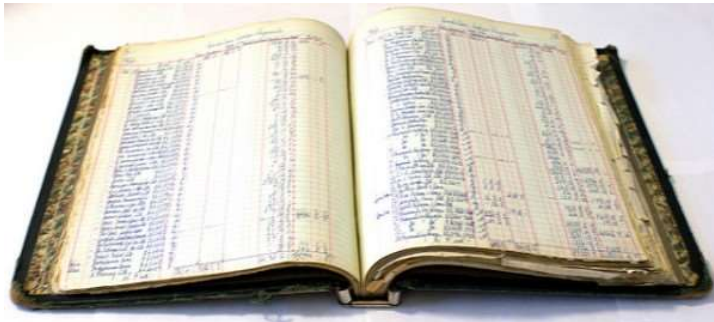
- Records all transactions across business network

- Shared between participants

- Participants have own copy through replication

- Permissioned, so participants see only appropriate transactions

- THE shared system of record

Smart Contract

- Business rules implied by the contract . .

- . . embedded in the Blockchain &

- executed with the transaction

- Verifiable, signed

- Encoded in programming language

- Example:

– Defines contractual conditions under which corporate Bond transfer occurs

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Privacy

- Ledger is shared, but participants require privacy

- Participants need:
  - Transactions to be private
  - Identity not linked to a transaction

- Transactions need to be authenticated

- Cryptography central to these processes

Validation

- Transaction verification & commitment
- When participants are anonymous
  - Commitment is expensive
  - *bitcoin cryptographic mining* provides verification for anonymous participants but at significant compute cost (proof of work)
- When participants are known & trusted
  - Commitment possible at low cost
- Multiple alternatives
  - proof of stake where fraudulent transactions cost validators (e.g. transaction bond)
  - multi-signature (e.g. 3 out of 5 participants agree)
- Industrial Blockchain needs "pluggable" consensus

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Industrial Blockchain Benefits

Reduce costs and complexity

Trusted recordkeeping

Improve discoverability

Shared trusted processes

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Blockchain – not for all . . .

❌ NEGATIVE Indicators
1. Need high performance (millisecond) transactions
2. Small organization (no business network)
3. Looking for a database replacement
4. Looking for a messaging solution
5. Looking for transaction processing replacement

Patterns for Customer Adoption

(1) INTERNAL LEDGER

- Ledger for internal reporting, audit and compliance,
- Consistent view of key business assets,
- Provenance, immutability & finality more important than consensus.
- Access to auditor and regulator

(2) CONSORTIUM SHARED LEDGER

- Created by a small set of participants
- share reference data between themselves and consumers.
- Consistent real-time view of key information

(3) INFORMATION HUB

- A ledger set up in a single organization
- Sharing of information between participants (e.g. voting, dividend notification)
- Assets have *information*, not financial value,
- Require provenance, immutability & finality.

(4) HIGH VALUE MARKET

- Ledger for the transfer of high financial value assets
- between many participants in a market.
- Requires all enterprise features of Blockchain

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Use Case – Letter of Credit

What?

•Bank handling letters of credit (LOC) wants to offer them to a wider range of clients including startups

•Currently constrained by costs & the time to execute

How?

•Blockchain provides common ledger for letters of credit

•Allows bank and counter-parties to have the same validated record of transaction and fulfillment

Benefits

•Increased trust

•Increase speed of execution (less than 1 day)

•Vastly reduced cost

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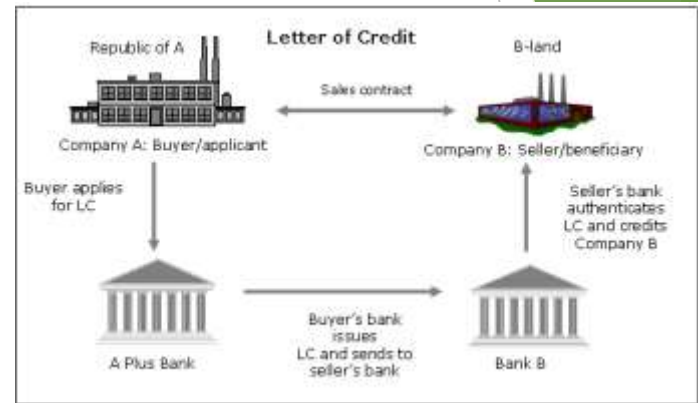
Use Case – Corporate Debt (or Bond)

What?

•Bank holding a corporate debt would like to

   – pay vendors quickly for transactions validated by the client

   – allow the corporate client to see the payment is made

   – provide government with oversight of the process

How?

•Blockchain provides a common ledger for recording the corporate debt / bond,

•available to bank, corporate client, vendors & government.

Benefits

•Speeds up vendor payments bigger net discounts

•Eliminates risk and accelerates decision making

•Owning bank can spread the cost across each market.

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Use Case – Business to Business Contracts

What?

•Buyer wants efficient way of converting a purchase order into validated, self executing contract updated to reflect the status of the supply.

•Agreement must be visible to the buyer, the seller, banks, logistics partners and other stakeholders.

How?

•Blockchain provides a shared record of the contract status which is updated as the contract progresses.

•Available to all parties to the agreement, their banks and partners.

Benefits

1.increased efficiency and transparency across the supply chain.

2.risk management improved through the near real time

update of all contracts.

Use Case – Smart Refrigerator

What?

•Value of connected smart devices limited by ability to interact with business systems

How?

•Blockchain to manage automated interactions with the external world

•ordering and paying for food to arranging for its own software upgrades and tracking its warranty.

Benefits

1.business value from connected technology

2.efficiencies in network and supply chains.

3.status transparent to all network members

Use Case – Open, Trusted Supply Chain

What?

•Consumers demanding transparency on where and how their products are made.

•EU requires more information about corporate supply chains, with penalties for non-compliance.

How?

•Blockchain enable safe digital transfer of property across the end to end supply chain.

Benefits

1. verifiable, preventing any party from altering

2. efficiencies through greater transparency

3. consumers can make informed purchases

4. governments get reliable information

Use Case – Aircraft Maintenance

What?

•Provenance of each component part in complex system hard to track

•Manufacturer, production date, batch and even the manufacturing machine program.

How?

•Blockchain holds complete provenance details of each component part

•Accessible by each manufacturer in the production process, the aircraft owners, maintainers and government regulators.

Benefits

1. trust increased no authority "owns" provenance

2. improvement in system utilization

3. recalls "specific" rather than cross fleet

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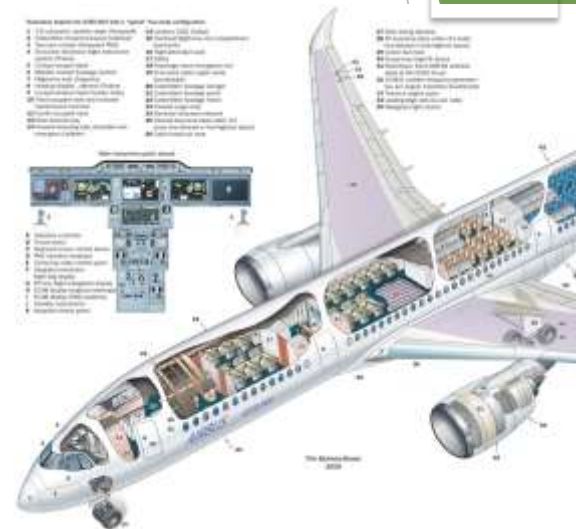
Use Case – On Line Gaming

▶ What?

• Game player wants to trade "gold" earned in current game for the currency or assets of another game

• Use experience with the current game to put me ahead and not have to start cold in the new game

▶ How?
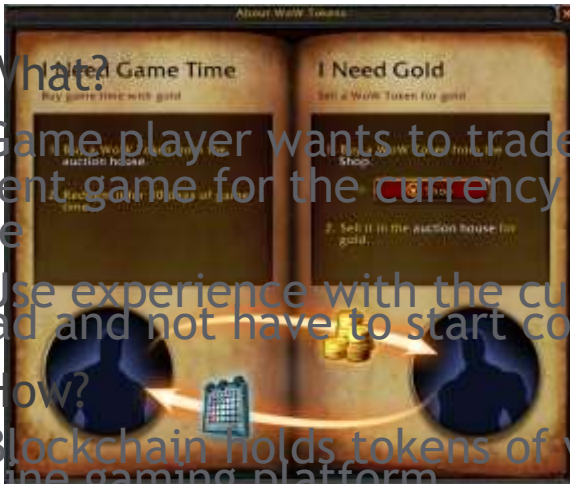
• Blockchain holds tokens of value shared across on line gaming platform

▶ Benefits

• Transparency to game player, game owners & infrastructure providers

• Efficiencies through elimination of intermediaries

• Increased trust for all involved parties.

Other Potential Use Cases include . .

- **Securities**
  - Post-trade settlement
  - Derivative contracts
  - Securities issuance
  - Collateral management
- **Trade Finance**
  - Bill of Lading
  - Cross-currency payment
- **Syndicated Loans**
- **Intra-bank settlement**

- **Retail Banking**
  - Cross border remittances
  - Mortgage verification
  - Mortgage contracts (smart contract)
- **Public Records**
  - Real estate records
  - Vehicle registrations
  - Business license and ownership records

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Hyperledger Project

- Linux Foundation - announced 17th December 2015

- New open ledger project to transform the way business transactions are conducted around the world

- Project members understand that an open source, collaborative development strategy supporting multiple players in multiple industries is required
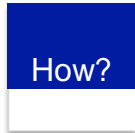
Enable adoption of shared ledger technology at a pace and depth not achievable by any one company or industry

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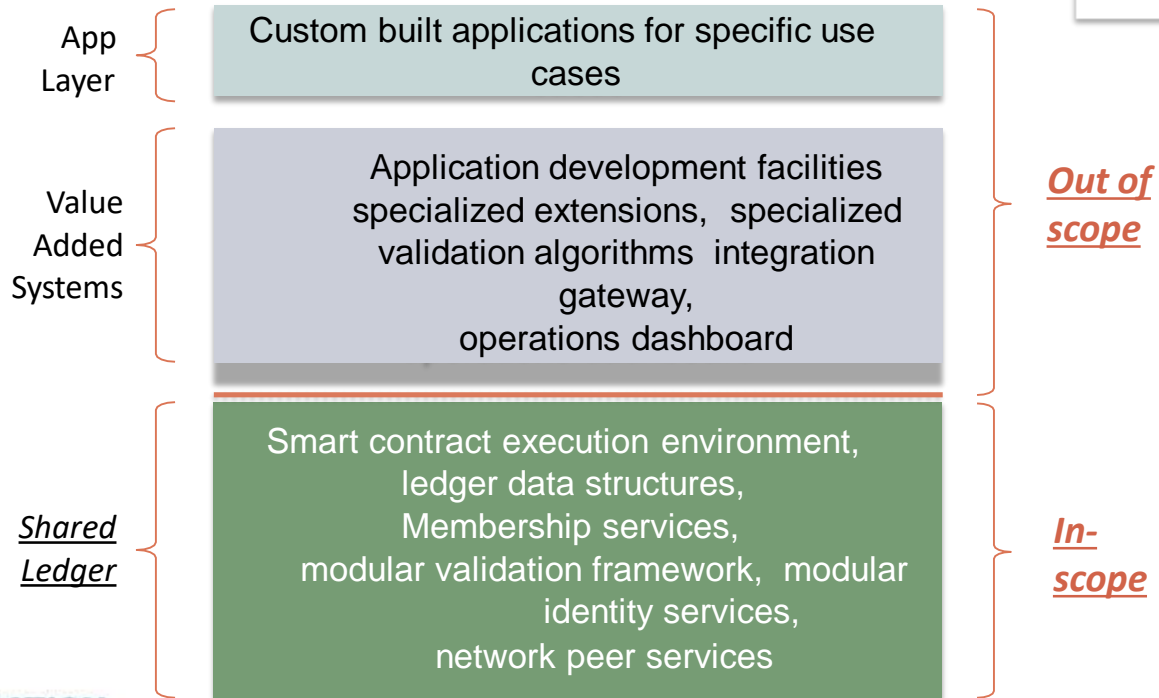
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Hyperledger Project Members [1]

[1] At 17th December 2015

Hyperledger Project – Draft Scope

How?

App Layer
Custom built applications for specific use cases

Value Added Systems
Application development facilities specialized extensions, specialized validation algorithms integration gateway, operations dashboard

Out of scope

Shared Ledger
Smart contract execution environment, ledger data structures, Membership services, modular validation framework, modular identity services, network peer services

In-scope

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Engagement Model overview

Conversation & Demonstration	Proof of Technology	First Project
1. Discuss Blockchain technology 2. Explore customer business model 3. Show Blockchain Application demo	1. Understand Blockchain concepts & elements 2. Hands on with Blockchain technology 3. Standard demo customization	1. Design Thinking workshop to define business challenge 2. Agile iterations incrementally build project functionality 3. Enterprise integration
Remote or face to face	*Remote or face to face*	*Face to face*
Free of charge	*Free of charge*	*For fee*

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Enterprise Integration

What?

•Customer realizes full benefit of Blockchain solution by scale up, scale out and enterprise integration

How?

•Full range of consulting, system integration & project skills

•Extension of Agile from Proof of Concept

•Integration into customers existing systems and business processes

•Metrication to prove Return on Investment

Commercial?

•For fee

Summary

1. Blockchain is a shared, replicated ledger technology

2. IBM supports an open standards, open source, open governance Blockchain

3. Blockchain can open up business networks by taking out cost, improving efficiencies and increase accessibility

4. Blockchain addresses an exciting and topical set of business challenges, which cross every industry

5. Linux Foundation Hyperledger project developing open source, open standards shared ledger technology

6. IBM has an easy to access, proven and incremental engagement model giving customers the confidence to get started NOW

Thank You!