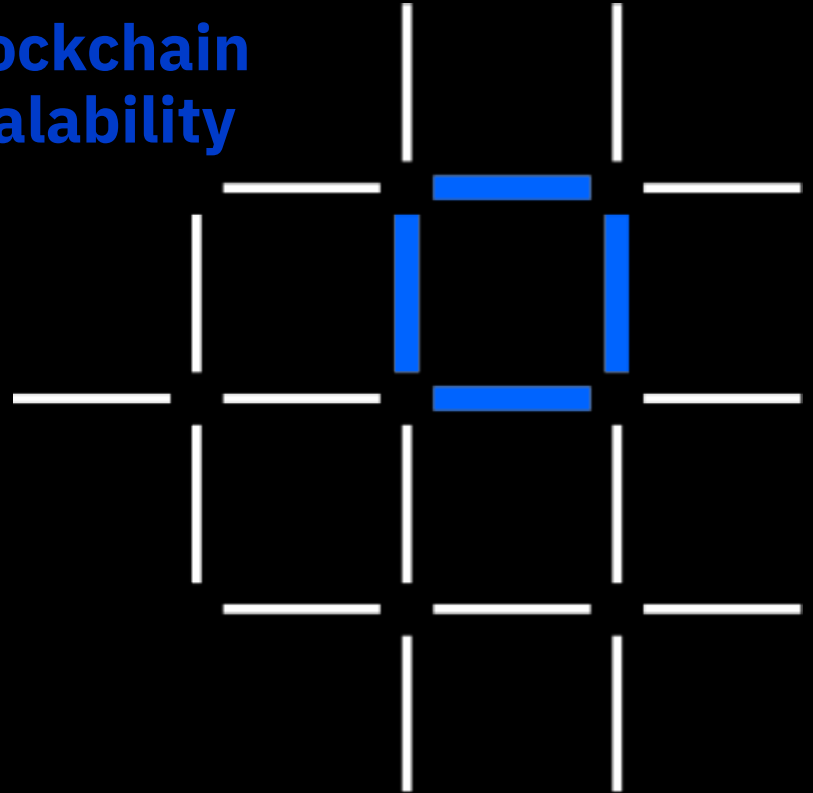# Making Blockchain Real for Business

Revisiting Design principles of Blockchain network: addressing security, scalability and sustainability by design

Inspirations from Real World Use Cases & Deployments

Nitin Gaur – ngaur@us.ibm.com

Director, IBM Blockchain Labs

IBM Blockchain

IBM.
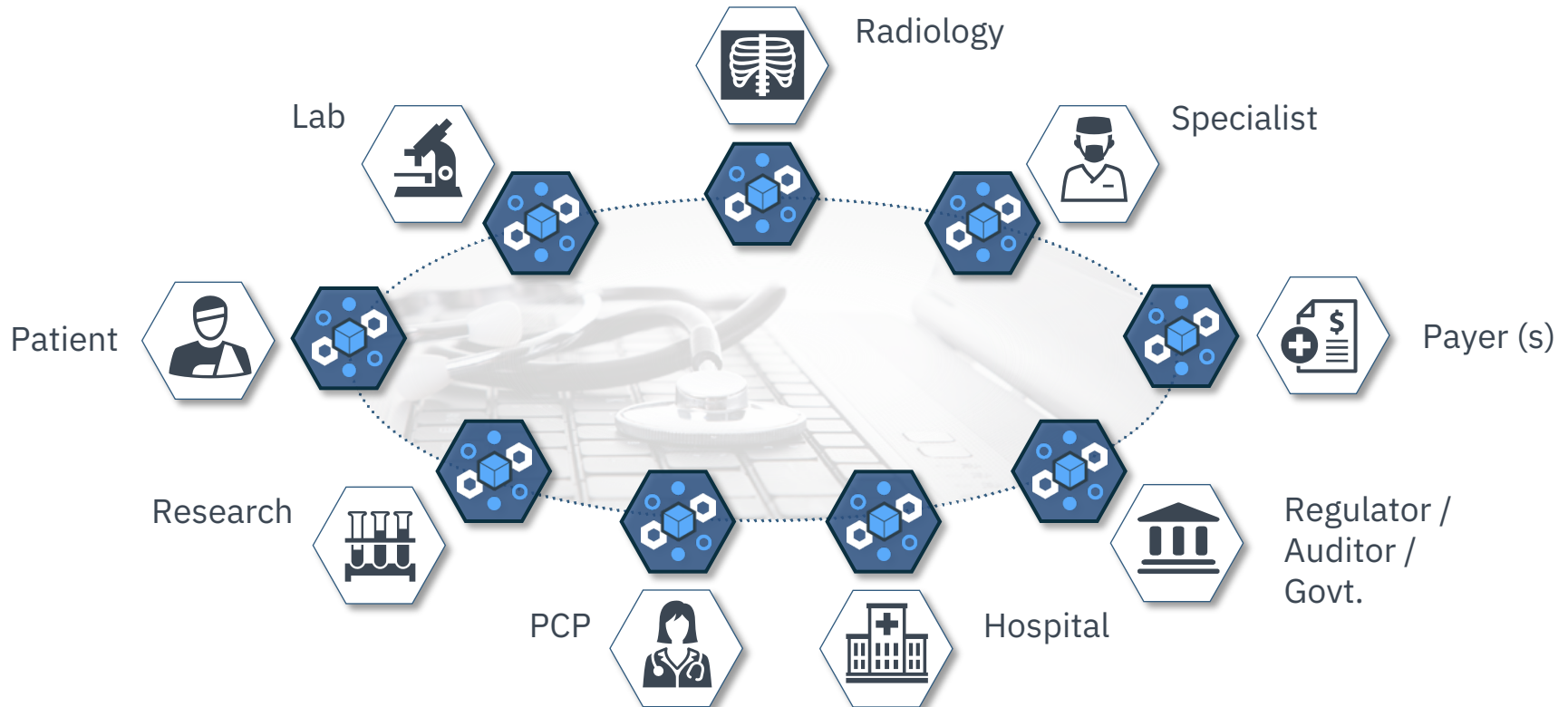
Blockchain and Digital Money

Time & Trust

Blockchain

A Platform for:

- Trusted Digital Transaction System
- Disintermediation
- Co-creation models
- Digital Marketplace
- Multiparty trust network
- And more …

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Blockchain and Healthcare Ecosystem

Blockchain-based solutions can streamline and transform processes in the healthcare industry
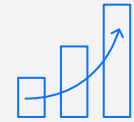
Alternative Payment Models

Coordination of Benefits
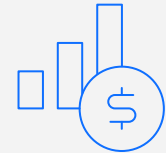
Shared Accumulators

Utilization Transparency

Provider Onboarding

Longitudinal Health Data

Billing & Payment Resolution

Revenue Cycle Management

Bundled Payments: fastest growing Alternative Payment Model

TRIPLE AIM

IMPROVE HEALTH · LOWER COSTS · BETTER CARE

"All-in" reimbursement price for an episode of care
- Goal is to reduce cost of care while improving patient outcomes
- Payers shift risk toward providers

Common Bundled Episodes of Care
- orthopedic surgery, hip/knee joint replacement, cardiac procedures

Program Structure
- Two levels of contracts among stakeholders – bundle program & risk-share agreements
- Coordination of care across multiple healthcare providers
- Information exchange – claim, quality and other data shared across stakeholders
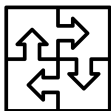- Two primary models – Retrospective, Prospective

Source: Forbes (fastest growing APM)

What makes this problem difficult to solve?

Systemic challenges cause pain points contributing to limited adoption of bundled payment programs

Risk Management
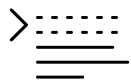Bundled Payment programs result in a major shift of risk to providers

Multiple Stakeholders
Cross-Organization coordination required for success

Low Trust
Payers and Providers do not share a single source of truth.

Lack of Standardization
Multiple program constructs and variation in episode of care definitions

Operational Challenges
System limitations at both Payer and Provider inhibit processing at scale
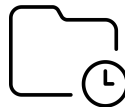
Limited Visibility
Lack of real-time visibility into bundle status across stakeholders limits proactive risk management

Manual Processes
Manual, inefficient and redundant processes across multiple stakeholders.
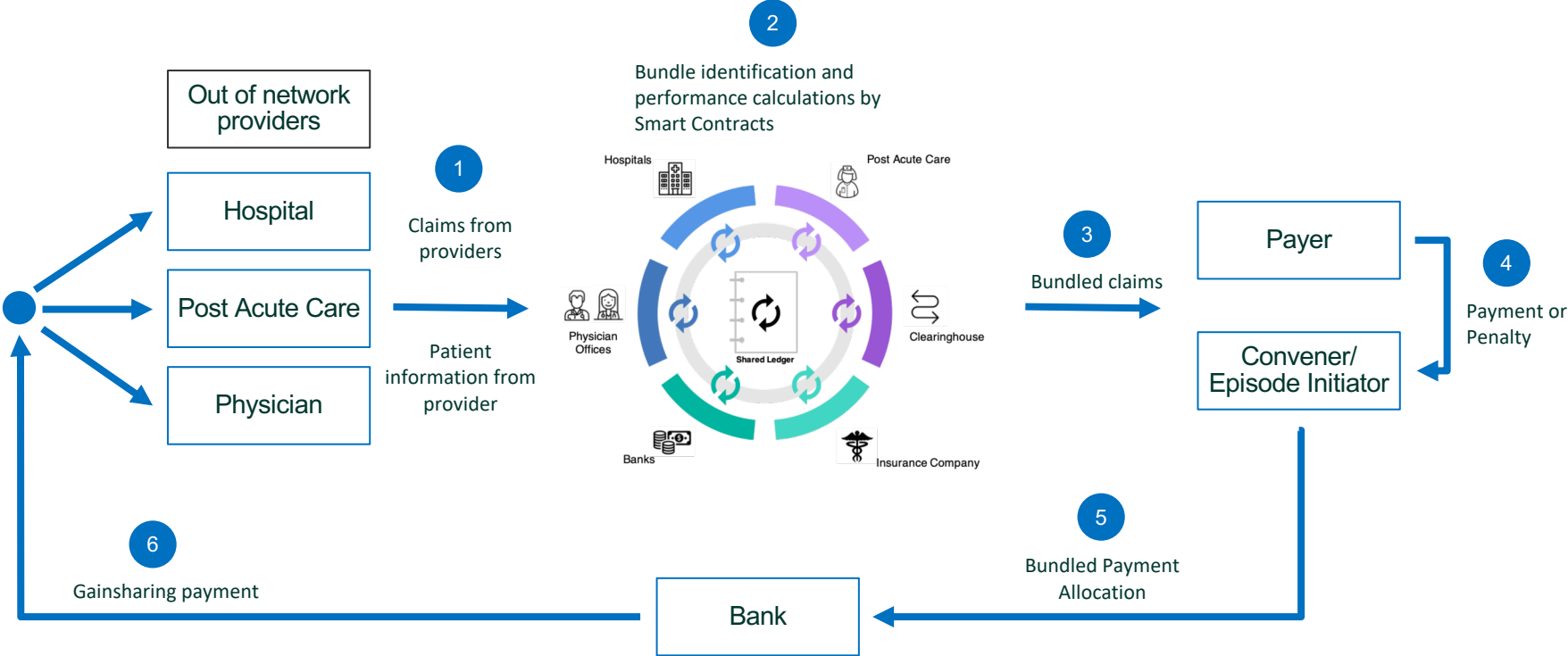
Delayed Reconciliation
Protracted time frames for reconciliation of actual vs target costs.

Lack of Provenance
Unclear history of data associated with each transaction.
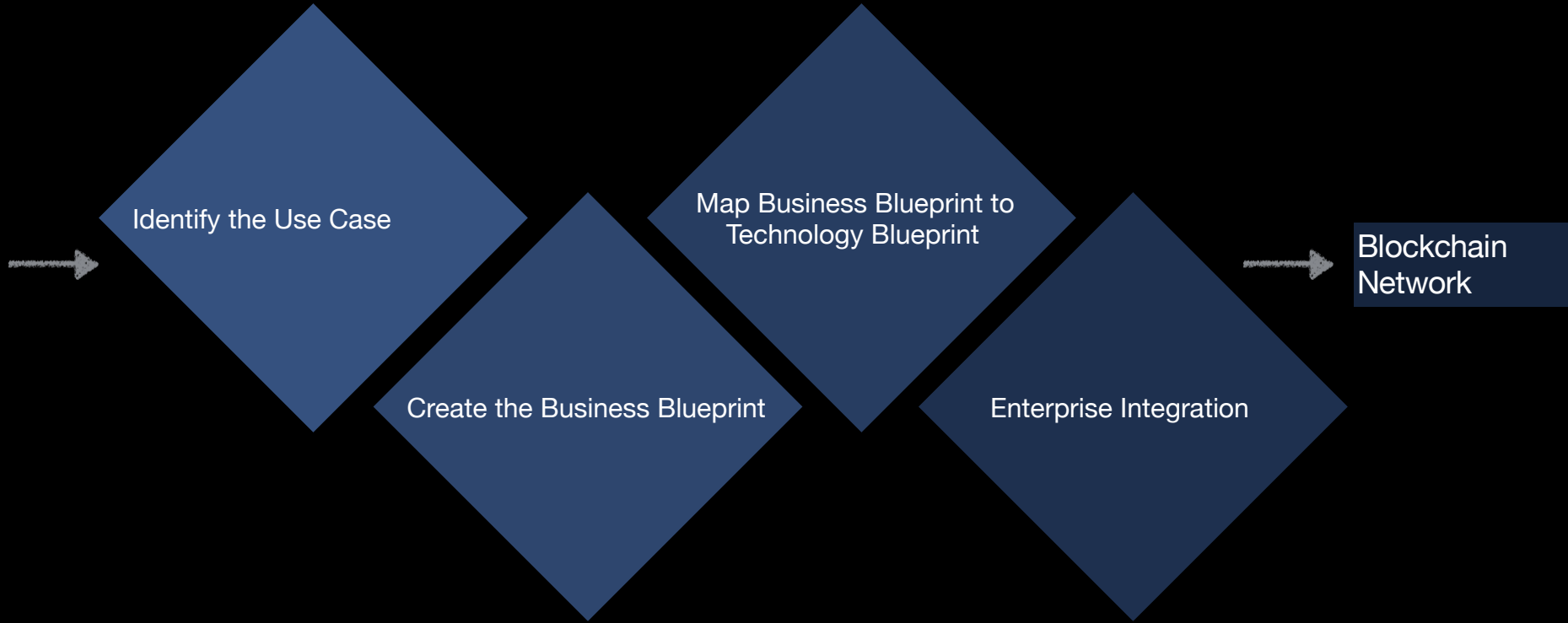
Bundled Payment Solution

Bundled Payments on Blockchain

Risk Assessment
Patient Activation
Pre-Operative Care Management
Referral Management
Pre-Operative Efficiency Management

Pre-Operative

Intra-Operative Optimization
Post-Acute Care Transition and Management
Physician Engagement
Readmission Management

Inpatient

Care Management
Patient Engagement
Readmission Management
PAC Reporting
PRO Surveys

Post- Discharge

Today	With Blockchain/DLT
Manual reconciliation of claims under a bundle	Smart contracts perform automated reconciliation of claims across contract participants
Months for payment reconciliation and no view into bundle performance until reconciliation	Real-time reconciliation and view into bundle performance
Fragmented data regarding claim activity	Shared and trusted information about claims stored on chain
Lack of provenance for payment decisions	Immutable record for provenance and auditing

4 Steps

Identify the Use Case

Create the Business Blueprint

Map Business Blueprint to Technology Blueprint

Enterprise Integration

Blockchain Network

Step 1

Use Case Should Have:

Enterprise Impact

Industry Impact

Why:

Network Effect is essential

Must justify costs of investments

Identify the Use Case

Step 2

Understand the Business Process:

distill existing process into blockchain model

redefine as necessary

narrow the focus

Why:

discover inefficiencies

uncover interaction points

Find dependencies

Create the Business Blueprint.

Step 3

Business components feed into technical requirements:

define the smart contract logic

choose a consensus protocol

format the block data

data visibility rules

existing system integrations

Why:

uncover risk and total costs

understand total impacts

Map Business Blueprint to Technology Blueprint

Step 4

Consider operational integration points:

ensure the trust model tenant is met

eliminate redundancies of existing systems
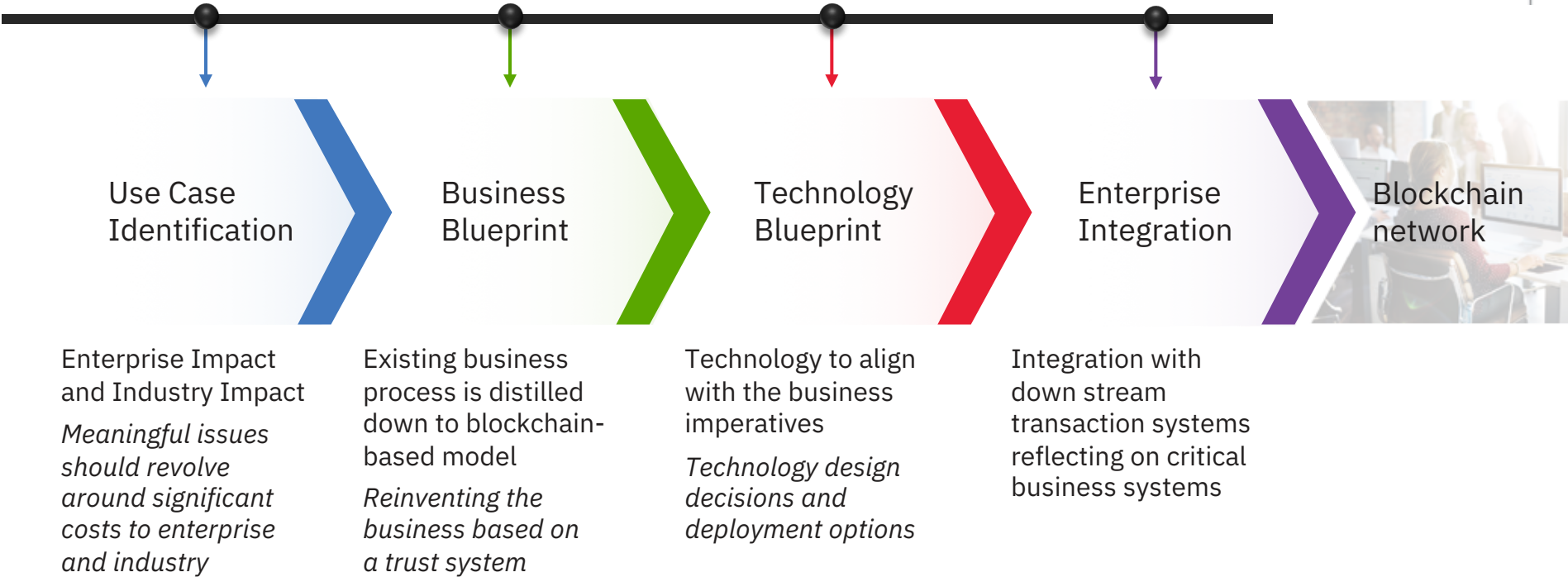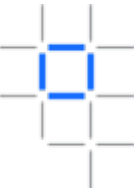
maximize savings and new efficiencies

Why:

work with internal business processes

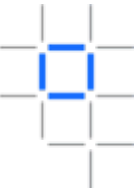proprietary value additions

eliminate roadblocks to adoption

Enterprise Integration

Path to enterprise adoption

Use Case Identification

Business Blueprint

Technology Blueprint

Enterprise Integration

Blockchain network

Enterprise Impact and Industry Impact

Meaningful issues should revolve around significant costs to enterprise and industry

Existing business process is distilled down to blockchain-based model

Reinventing the business based on a trust system

Technology to align with the business imperatives

Technology design decisions and deployment options

Integration with down stream transaction systems reflecting on critical business systems

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Lessons learnt:
7 design principles of sustainable blockchain business networks

1 Providing network participants control of their business

2 Provision for an extensible business network – Flexibility in membership

3 Permissioned but protected network – Protecting competitive data

4 Open access and collaborative global network – Collective innovation

5 Scalability – Transaction processing and data encryption processing

6 Security – New security challenges of shared business network

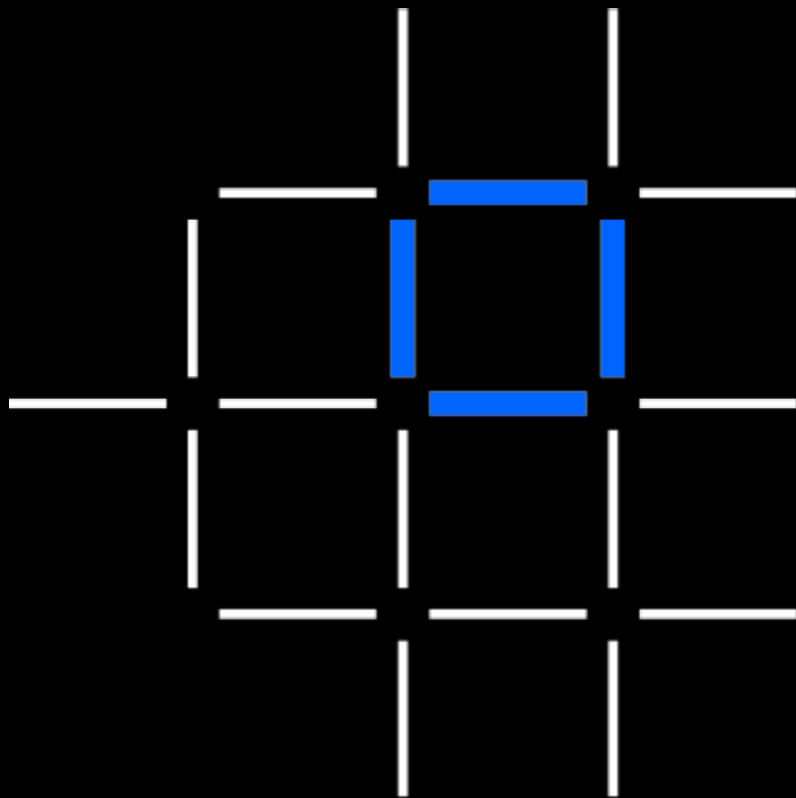**7** Coexisting with existing systems of record and transaction systems
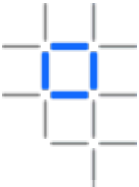
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Recent Publication: Blockchain for Business
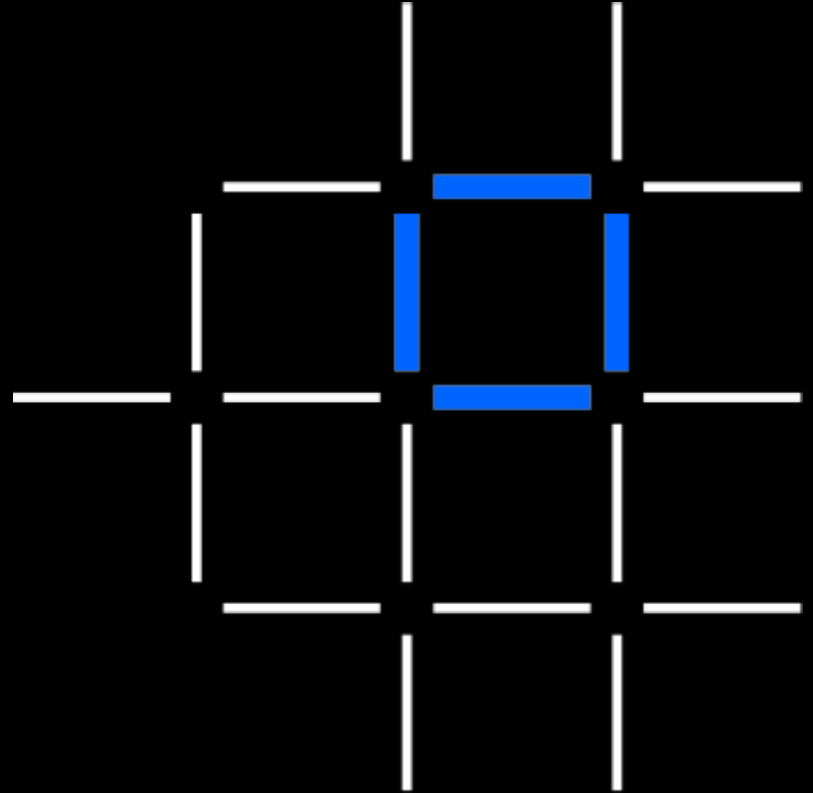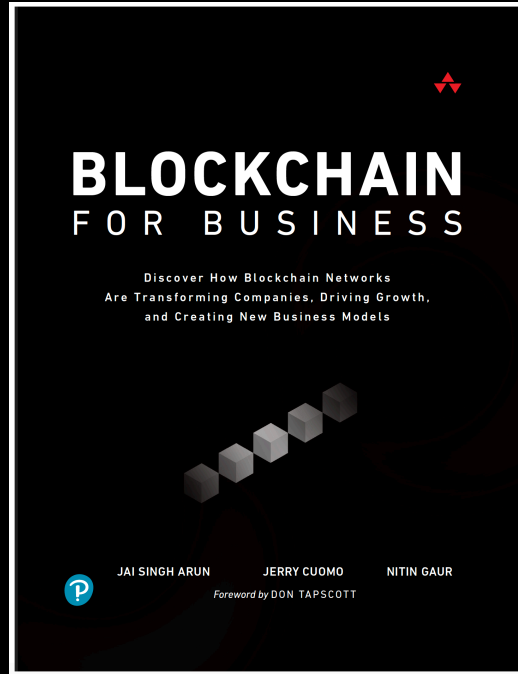
Making Blockchain Real for Business

THANK YOU!

Nitin Gaur – ngaur@us.ibm.com

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Making blockchain real for business with over 600 engagements and multiple active networks

Trade Finance	Pre and Post Trade	Complex Risk Coverage
Digital Trade Chain, MIZUHO, NATIXIS, TRAFIGURA	DTCC, CLS Fundamental to FX, Bolsa Comercio SANTIAGO, JPX TOKYO STOCK EXCHANGE	AIG, Standard Chartered

Identity/ Know your customer (KYC)	Unlisted Securities/ Private Equity Funds	Loyalty Program
SECUREKEY, Crédit Mutuel ARKEA, DIACC	NORTHERN TRUST, BORSA ITALIANA, SBI GROUP SBI証券	UnionPay 银联

Medicated Health Data Exchange	Fraud/ Compliance Registry	Distributed Energy/ Carbon Credit
FDA	دبــي الذكية SMART DUBAI	TenneT, ENERGY BLOCKCHAIN LABS 能源区块链实验室

Supply Chain	Food Safety	Provenance/ Traceability
MAERSK, PSA The World's Port of Call	Walmart, Driscoll's Only the Finest Berries, Tyson, McLANE, Dole, Kroger, Nestlé, Unilever, gsf golden state foods, Mc	everledger

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Network of networks: Driving NextGen economies

GLOBAL TRADE

Customs / Govt. Agencies
Freight Forwarders
Airlines
Port Authorities
Ocean Carriers

Trade Finance
Insurance
Payments

FINANCIAL SERVICES

UniCredit
Rabobank
KBC
HSBC
Deutsche Bank
SOCIETE GENERALE
NATIXIS

Provenance
Digitization
Shared Economy

Supply Chain Finance
Insurance
Payments

CONSUMER INDUSTRY

Agriculture
Supplier
Wholesale
Consumers
Flowers & Perishables
Cattle Farms
Warehouses
Wholesale
Consumers
Retail
Consumers

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Going back to basics

Fundamental Tenets –
Trade, Trust and Ownership

Duality of Transactions –
Issues of Clearing and Settlement

Focus just cannot be on **digital assets**
(Tokenization of assets)

Is **Digital Identity** Essential?
- Non repudiation
- Establish ownership
- Claim on instance of an digital/crypto asset

What are we solving if we are ONLY solving for **reconciliation of ledger entries?**

Digital Fiat or a similar instrument is essential to solve the last mile – settlement issue
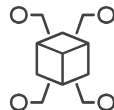
Digital Identity is diagonally essential to Digital fiat/crypto asset/ Digital asset

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My focus for 2019 wrt to Blockchain
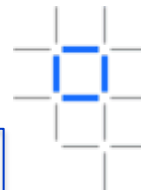
Digital identity
foundation technology
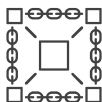to ensure the trade
and ownership

Digital fiat
address the last-mile issue
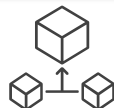of settlement for every
financial transaction

Asset tokenization
ensure that digital
manifestations reflect
real-world assets

**Security design of the
blockchain system**
address non-repudiation,
privacy, confidentiality; and
verifiability of claims with
consent-driven models

**Business of blockchain
business models**
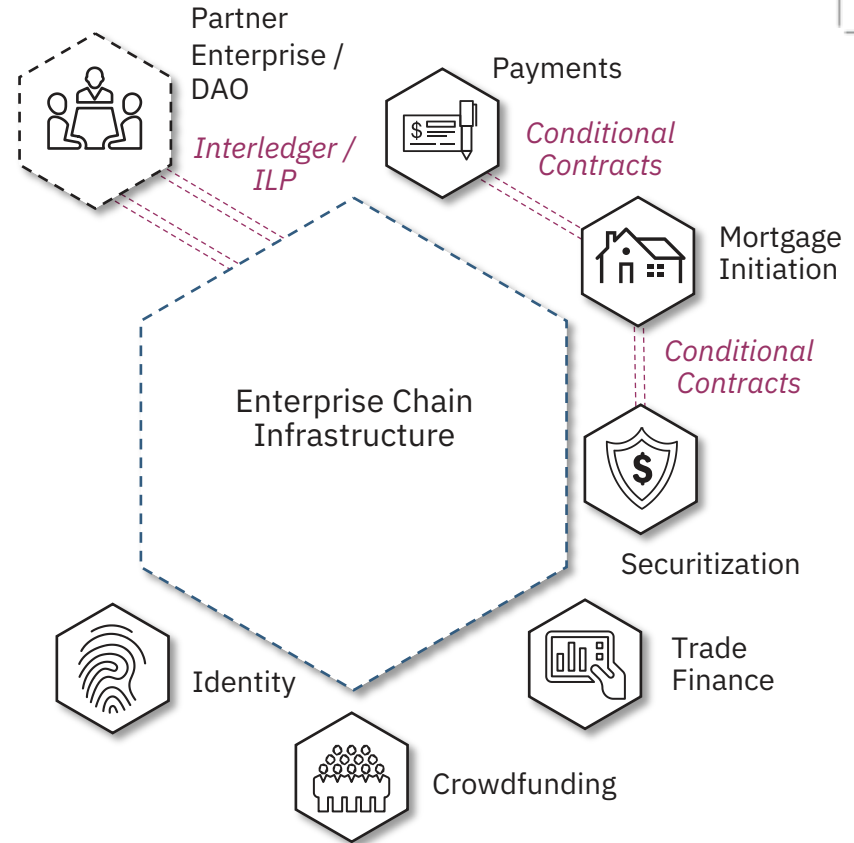a befitting business
model to progress
blockchain agenda

**Governance
model**
self-governance networks
to consortium-defined;
and semi-autonomous
governance structures

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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

Partner Enterprise / DAO

Payments

Interledger / ILP

Conditional Contracts

Mortgage Initiation

Conditional Contracts

Enterprise Chain Infrastructure

Securitization

Identity

Trade Finance

Crowdfunding

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Vision – 'Interprise Synergy' Enterprise chain infrastructure
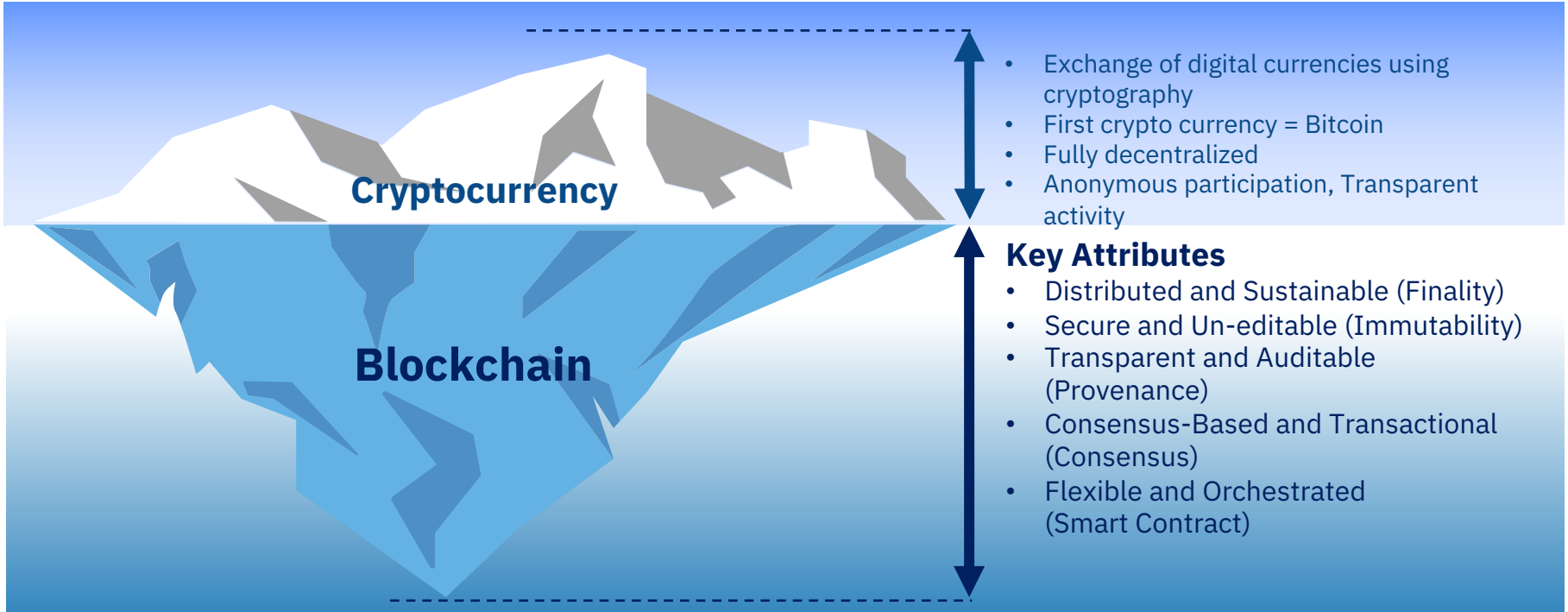
Design that enables new business models

- 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
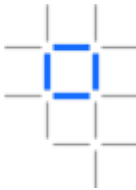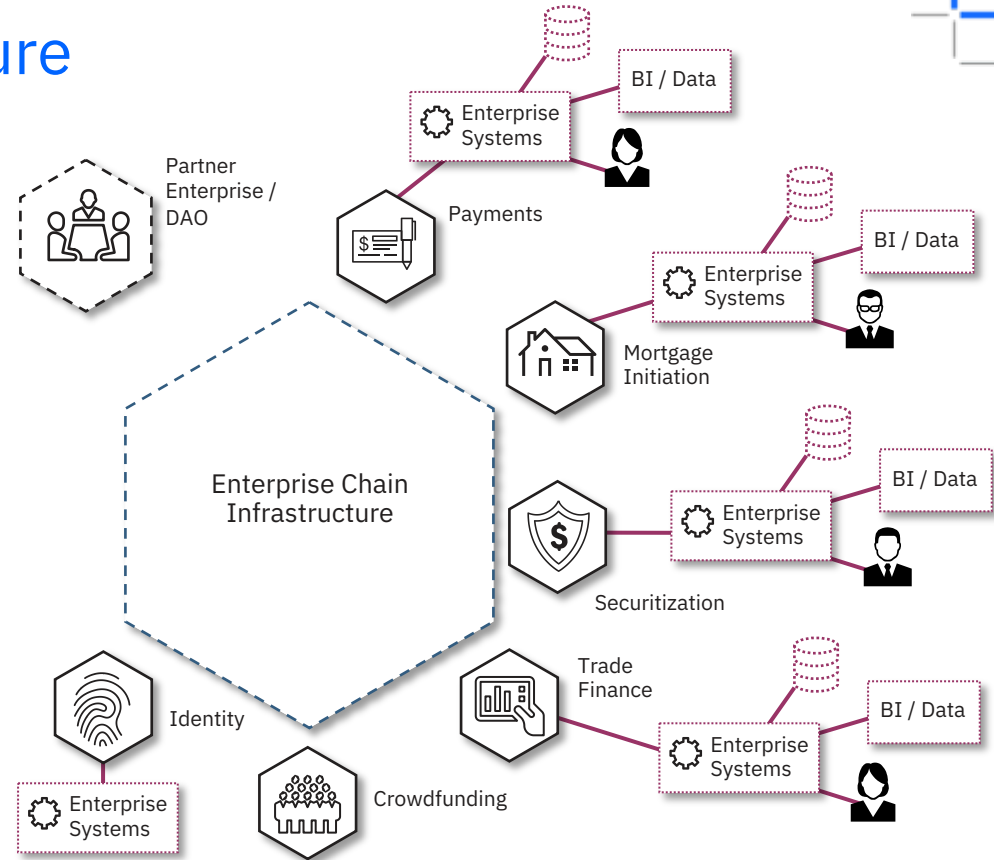
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Separating blockchain from cryptocurrencies
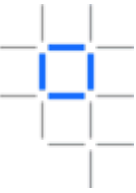
- Cryptocurrencies are one specific usage of Blockchain technology
- Blockchain can be used to solve many more real-life business challenges without the fallacies of cryptocurrency

Cryptocurrency

- Exchange of digital currencies using cryptography
- First crypto currency = Bitcoin
- Fully decentralized
- Anonymous participation, Transparent activity

Blockchain

Key Attributes

- Distributed and Sustainable (Finality)
- Secure and Un-editable (Immutability)
- Transparent and Auditable (Provenance)
- Consensus-Based and Transactional (Consensus)
- Flexible and Orchestrated (Smart Contract)

IBM **Blockchain**   However, we need few key attributes for Blockchain to be business ready