Moving Toward Conscious Competence: Onboarding for Blockchain in Healthcare

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Conflict of Interest

David Houlding, MSc, CISSP, CIPP

Has no real or apparent conflicts of interest to report.

Agenda

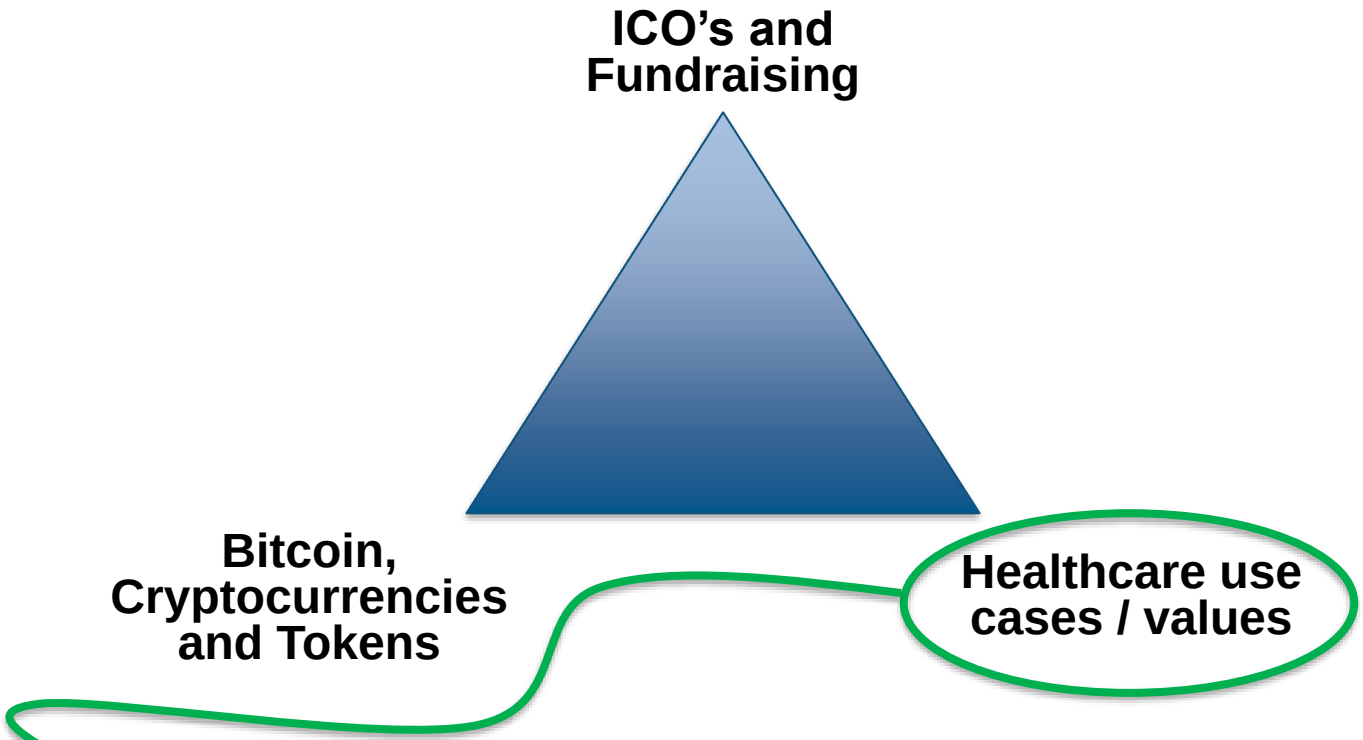
1. Blockchain and DLT Fundamentals
2. Blockchain Strengths and Limitations
3. Delivering Healthcare Value with Blockchain
4. Blockchain Reality vs Hype
5. Healthcare Blockchain Evolution: Opportunities, Barriers
6. Q&A

Learning Objectives

- Outline foundational concepts in blockchain technology
- Delineate operational and philosophical elements of blockchain as they relate to healthcare
- Describe opportunities and barriers to blockchain implementation

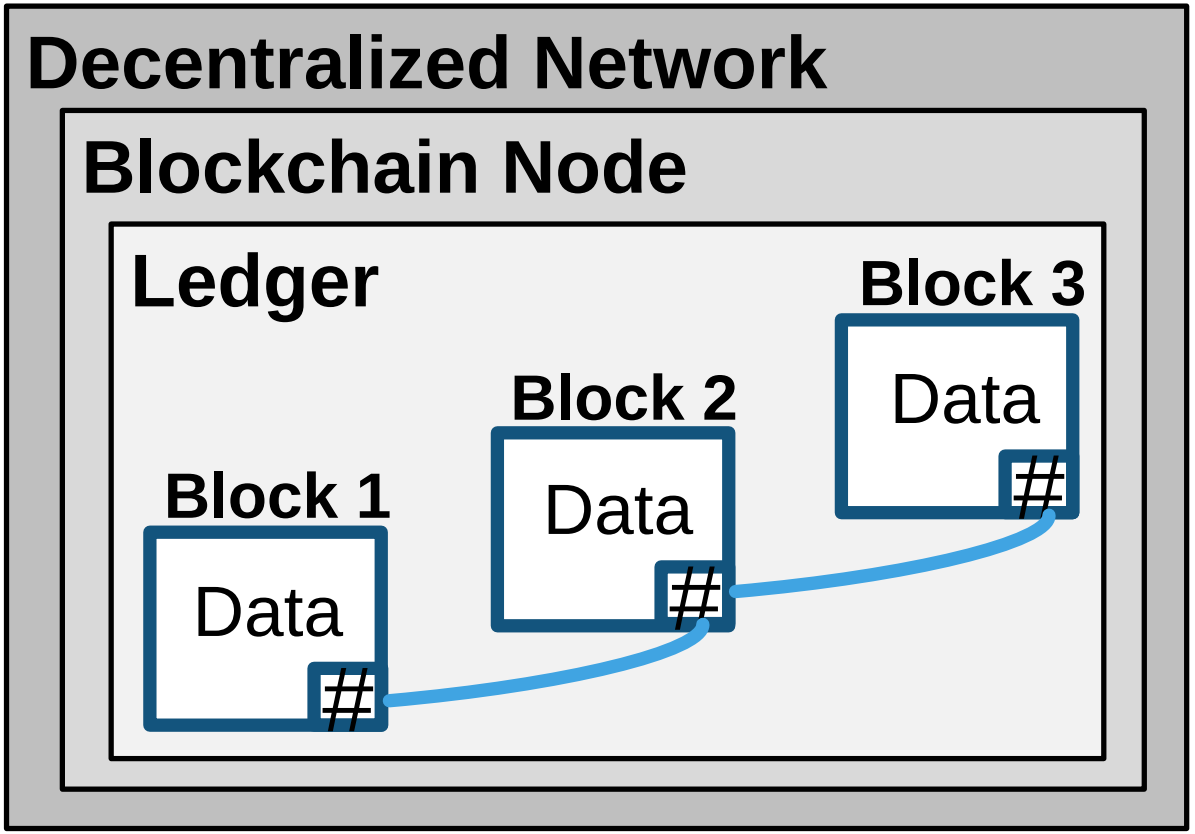
Blockchain and DLT Fundamentals

3 Facets of Blockchain in Healthcare

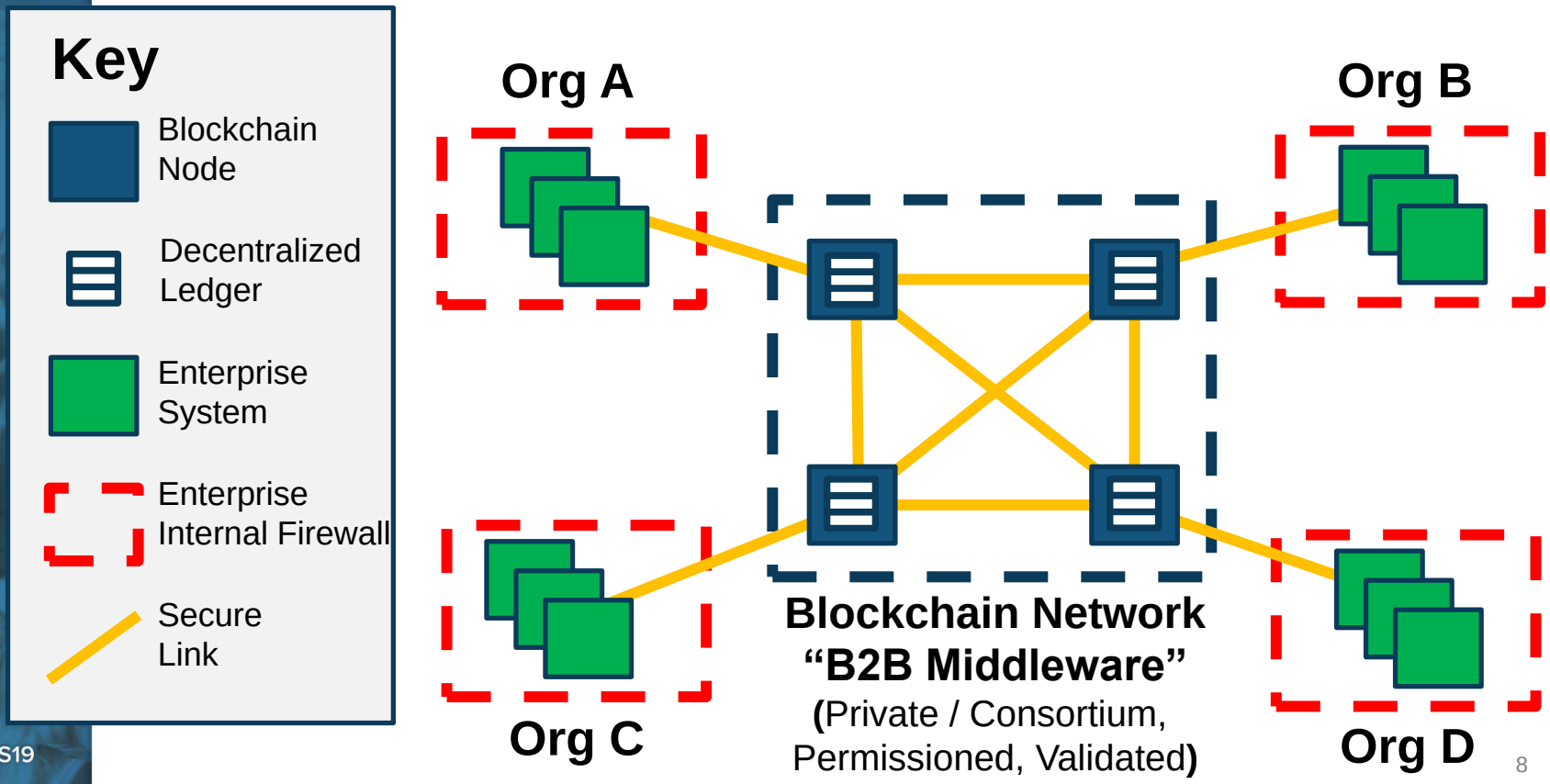


- We are focusing in this session on the healthcare use cases and associated healthcare values of blockchain

Blockchain and Distributed Ledger Technology

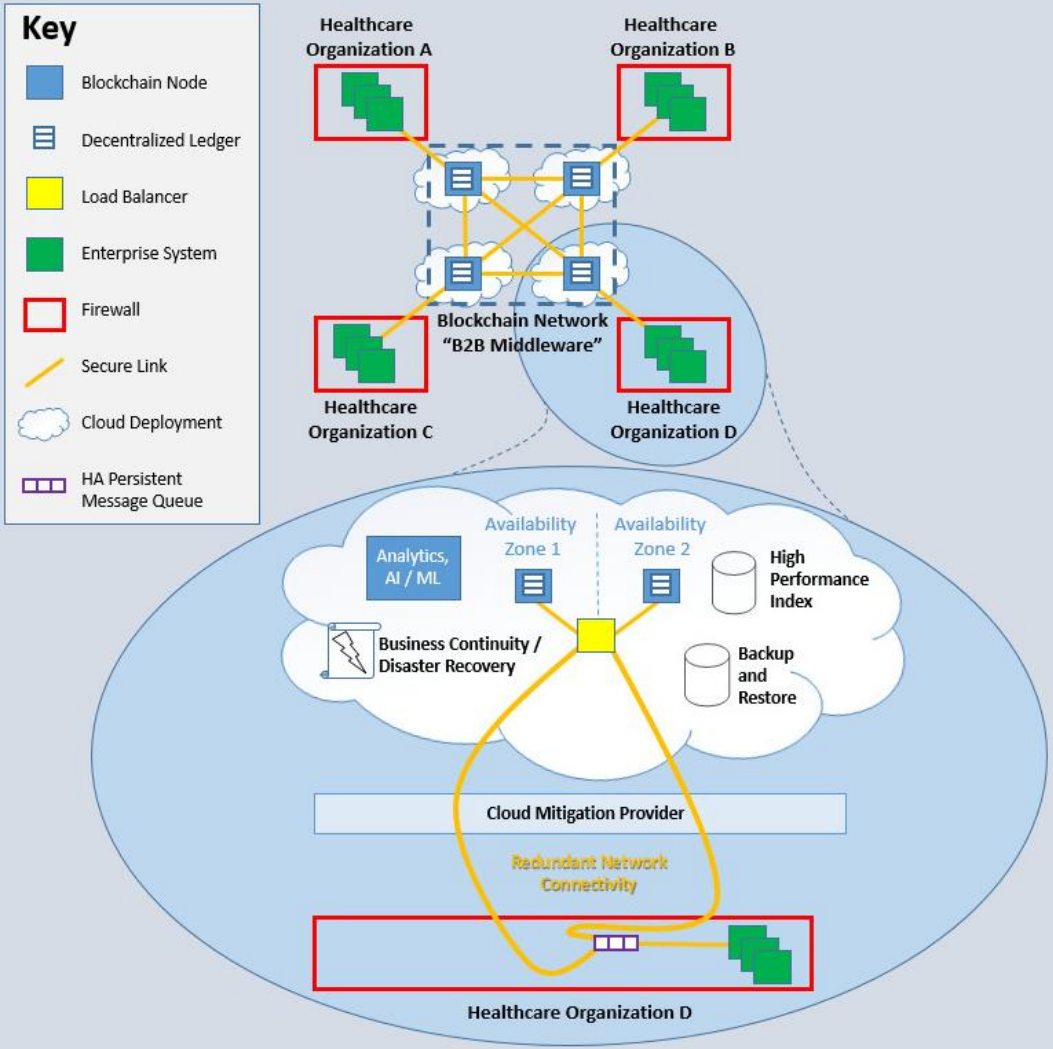


Blockchain Architecture



Blockchain Node Deployment

- On premises
- In cloud
- Heterogeneous deployment options
- Consistent consensus



Blockchain Strengths and Limitations

Making it work in practice

Blockchain Strengths

- Secure, targeted sharing of healthcare data, where it makes healthcare business sense
- Data integrity
- Transparency

- Decentralization, resilience, availability of the network
- Anti-fraud

Identifying Use Cases and Business Value Propositions

- Its about the network of healthcare organizations, not a database
- Collaboration around shared data for business value
  - Reducing healthcare cost
  - Improving patient outcomes
  - Improving patient engagement, experience
  - Improving healthcare professional experience
- Existing B2B networks are near term opportunities

Delivering Healthcare Value with Blockchain

Use Case	Reduce Cost	Improve Patient Outcomes	Engage Patients, Enhance Experience	Enhance Healthcare Professional Experience
Provider Directory	✓			
Drug Supply Chain	✓	✓	✓	✓
Medical Device Track and Trace	✓	✓	✓	✓
Health Information Exchange	✓	✓	✓	
Provider Credentialing	✓			✓
Anti-Fraud	✓		✓	

Building the Consortium, Buy-in, Trust

- B2B middleware
- Building the consortium, trust is the hard part
- Existing B2B networks are early opportunities and points of traction

- Add blockchain to deliver additional business values
- Prove blockchain out, pave way for new more revolutionary use cases

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Security

- Protect CIA of sensitive data and systems
  - Integrity
  - Availability
    - Network
    - Nodes
  - Confidentiality

- Adequate security across the consortium

Privacy

- Privacy risks, and strengths
- Minimal but sufficient data
- Avoid PII / PHI on blockchain where possible
- Ability to review and amend data
- Consent, opt-in / opt-out
- Transparency through data lifecycle: collection, storage, use, disclosure, disposal
- Access: audit trails, patient ability to review

Compliance

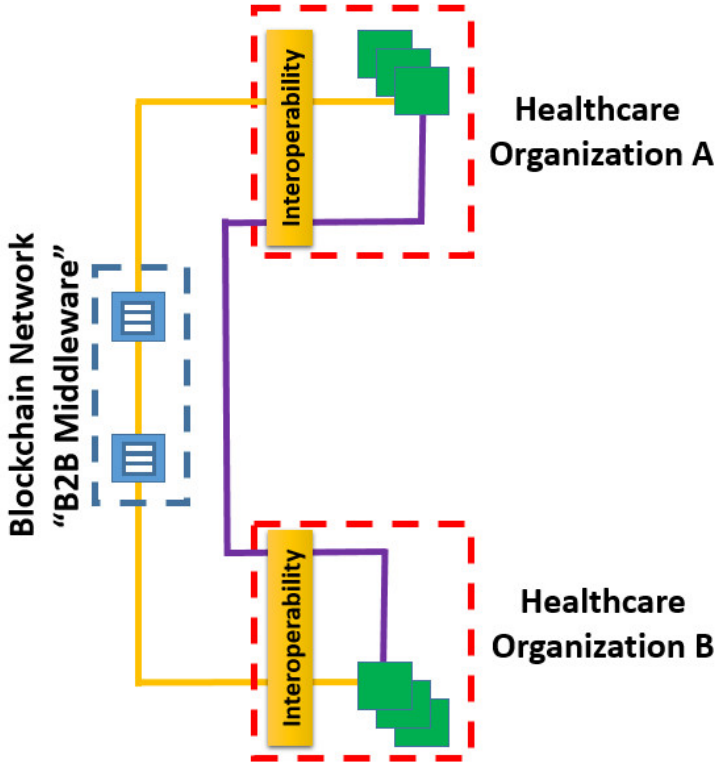
- Types of data on blockchain
  - PII
  - PHI
- Location of blockchain nodes
- Data sovereignty / trans-border data flow
- Immutability and right to be forgotten

Performance, Throughput, Scalability

- Bitcoin: ~ 1 per 10 minutes
  - Public, untrusted, conservative consensus
- Vast majority of healthcare blockchain is private consortium
  - No mining. Not storage or compute bound. Network bound
  - Consensus algorithm type paramount
  - Typical throughput from 100's to 1000's blocks per second
- Batching transactions in blocks for higher throughput
- Check your use case performance and throughput requirements early for blockchain suitability

Integration, Interoperability

- B2B middleware integrated with enterprise systems
- Interoperability critical for blockchain success
- Blockchain does not deliver interoperability
- Blockchain depends on interoperability for success
- Blockchain should maximize use of existing applicable interoperability standards, eg FHIR
- Blockchain is a forcing function and opportunity for us to get interoperability right!



Pilot, Case Study / Attestations, Scale

- Multiple healthcare blockchain pilots in progress, ending in 2019
- Consortiums of recognizable, respected healthcare organizations
- Centered on healthcare use cases and business value(s)
  - Provider Directory
  - Provider Credentialing
  - Etc
- Results and case studies with attestations of business values, and areas to improve are imminent
- Establish a solid foothold to scale both consortiums and use cases

Blockchain Reality vs Hype

1. Security
Hype: blockchain fixes security
Reality: blockchain has security strengths and limitations you have to compensate for, for effective security

2. Replacing Enterprise Systems
Hype: blockchain will replace enterprise systems
Reality: blockchain will co-exist with enterprise systems, where it makes business sense

3. Public vs Private Blockchains
Hype: only public blockchain is truly blockchain
Reality: with focus on healthcare value, the vast majority of healthcare use cases are using private / consortium blockchains

Healthcare Blockchain Evolution: Opportunities and Barriers

- Mostly private / consortium blockchains
- An archipelago of blockchain islands
- Interoperability challenge
- Pilots, case studies, attestations

- Natural selection
- Winners scale in size, use cases, network effect
- Gradual move over time to larger islands
- Pave way for richer smart contracts, DAOs

Questions?

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