

Blockchain – Not Just Cryptocurrencies. What Pension Professionals Need to Know

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BLOCKCHAIN IS PART OF A DISRUPTION ECOSYSTEM

“An orchestra full of stars can be a disaster”-Kurt Masur

The New Normal:



Alternate Data



Blockchain

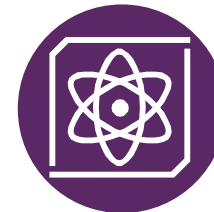


IoT



AI/Cognitive

The Next Threat:



Quantum

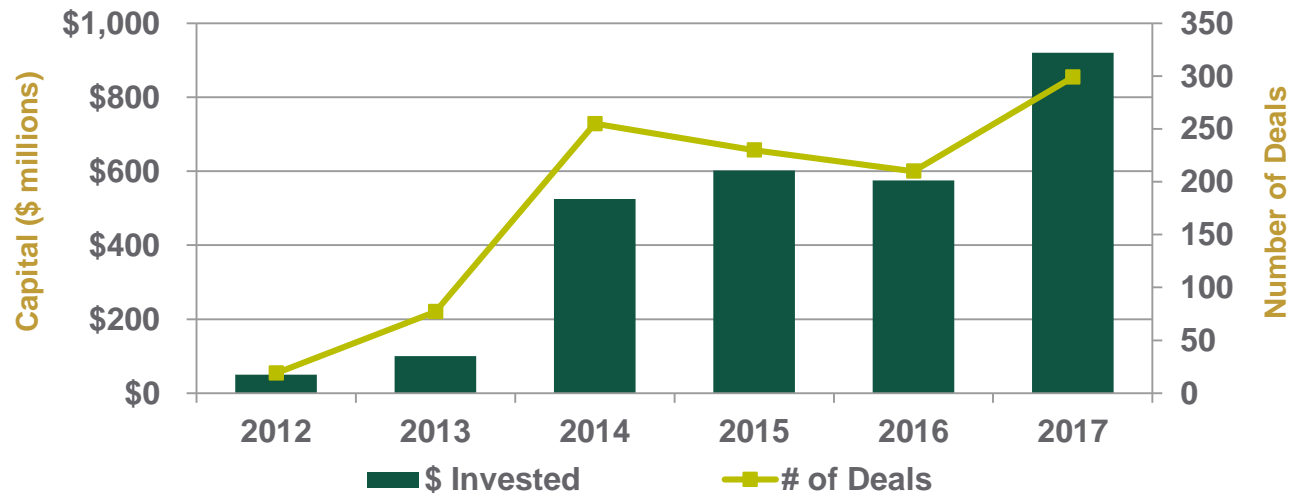
THE NEXT EVOLUTION

“Don’t let bitcoin greed blind you to the potential of blockchain technology” - The Guardian



VC Investment in Blockchain and Related Startups

“Blockchain is an incorruptible digital ledger of economic transactions that can be programmed to record not just financial transactions but virtually everything of value”



Source: Crunchbase News

BLOCKCHAIN IN THE NEWS

Canadian Regulators Approve Country's First Blockchain ETF

BLOCKCHAIN IN HEALTHCARE CANADA

Major Canadian Bank Files Patent To Make Credit Scores 'Transparent' Via Blockchain

Government of Canada Pilots Ethereum Blockchain to Increase Transparency

Canadian Securities Exchange launching blockchain-based clearing house, challenging TMX

Northern Trust Partners With PwC To Make Real-Time Equity Audits Via Blockchain

WHAT IS BLOCKCHAIN?

Blockchain is a shared digital ledger of transactions recorded and verified across a network of participants in a tamper-proof chain that is visible to all. This is the technology underlying Bitcoin and other cryptocurrencies

A Database

- A database of transactions, between two or more parties, with copies of the database replicated across multiple locations or nodes

Detailed Blocks

- Each block contains details of the transaction such as the seller, the buyer, the price, the contract terms, and other relevant details

Network Validation

- Validated by the entire network via encryption by combining the common transaction details with the unique signatures of two or more parties. The transaction is valid if the result of the encoding is the same for all nodes and is added to the chain of prior transactions (as long as the block is validated)
- ✓ *Using this technology, participants can transfer value across the Internet without the need for a central third party*
- ✓ *Transactions are not anonymous, but they are pseudonymous: a transaction record is created, but identifying information is encrypted, and no personal information is shared*

Distributed ledger TECHNOLOGY IS NOT NEW

Not all distributed ledgers are blockchains

Blockchains are a specific type of distributed ledger that uses a structure called a Merkle Tree.

KEY CONCEPTS

1



Distributed Ledgers

A group of replicated nodes that store transactions (block); secure and tamper-proof.

2



Cryptography

Encryption ensures confidentiality, integrity, authentication, and non-repudiation.

3



Consensus

Secured through consensus - “mining” for public blockchains, other mechanisms for private ones.

4

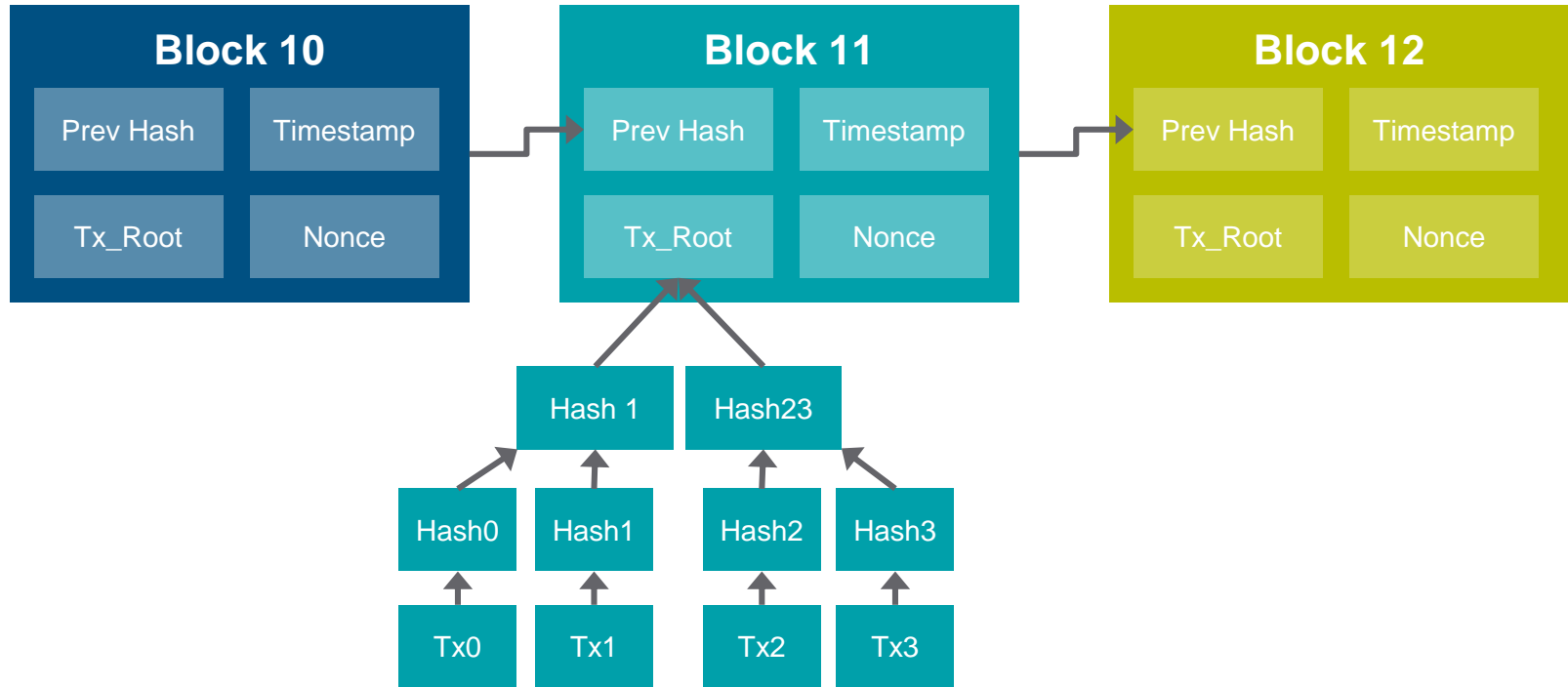


Smart Contracts

Pre-written, replicated logic/code that can automatically update ledger.

HASHING

A one-way signature using a simple algorithm



- “Add all the digits” 1234” =10
- Impossible to reverse, but not unique
- Modern algorithms – MD5, SHA – 0 , SHA-256

SMART CONTRACTS

They're not contracts and they're not that smart, but they are:



A trusted, shared process

Potentially huge gains in operational efficiency.



A path to automation

Eliminating reconciliation and the attendant negotiations eliminates a LOT of friction.

PUBLIC VS. PRIVATE BLOCKCHAINS

	Private Blockchain	Public Blockchain
Access	Authorized access only	Open Access
Regulation	Supports regulation (AML/KYC, etc.)	Anonymous, outside legal framework; designed to resist central authority
Validation	Pre-selected trusted validators	Anonymous, fully decentralized validators
How can it be used?	Enterprise-level systems	Permissionless innovation, open-access applications

BENEFITS OF BLOCKCHAIN



Cost Savings



Increased accuracy and reduced settlement risk



Irrevocable and tamper-resistant transactions



Near-instantaneous clearing and settlement



Reduces systemic risks (e.g., credit, liquidity)



Better security and efficiency in transactions



Consensus in a variety of transactions



Enables effective monitoring and auditing

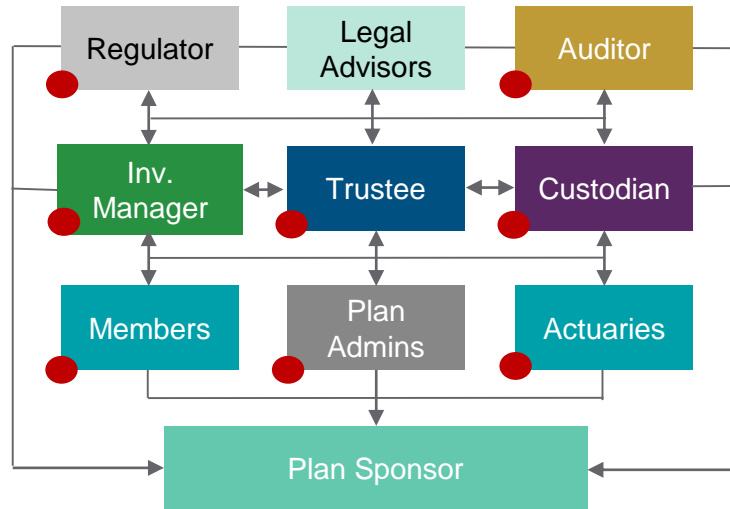


Ability to define and store tangible & intangible assets

PLAN ADMINISTRATION BLOCKCHAIN

A collaborative platform delivering efficiency, security, and transparency

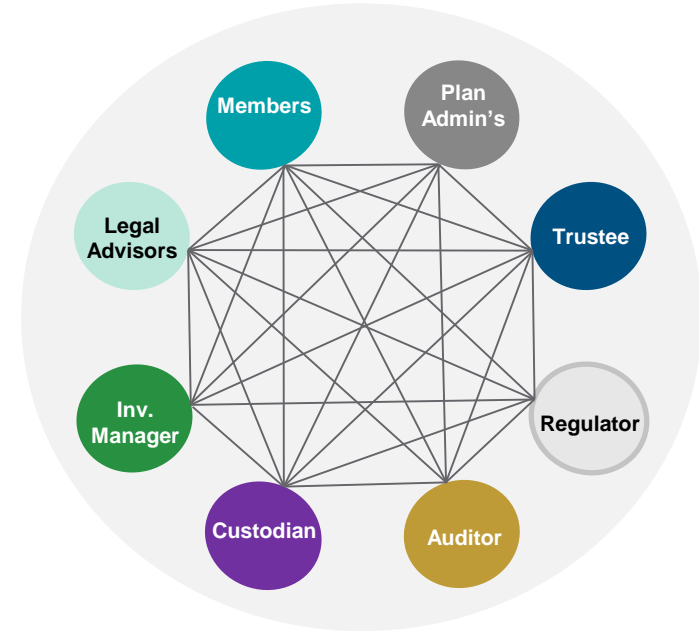
Traditional Structure



● = Entity has a full or partial copy of data

- Time consuming legal and administrative processes
- Lack of transparency and efficient market practices
- Lengthy and fragmented investment activities
- Personal Information data is disjointed
- Manual, paper, no “golden copy”
- Multiple delivery means of data and file types

Potential Blockchain Structure



- Administration on a single platform
- Real-time insight and transparency to all parties
- Compliant with current local regulations
- Personal information centralized with real time updates (Address, banking, beneficiary, etc...)
- Paperless, digital signatures, on record
- No delivery of information. Information is accessed by entering the Blockchain



INTEGRATED PLATFORM → INTEGRATED BENEFITS

Plan Admin's

Efficiency improvement
with no reconciliation

Establishment of secure
digital participant
identities

Members

Tracking of retirement
account

Single account

Control of data



Actuaries

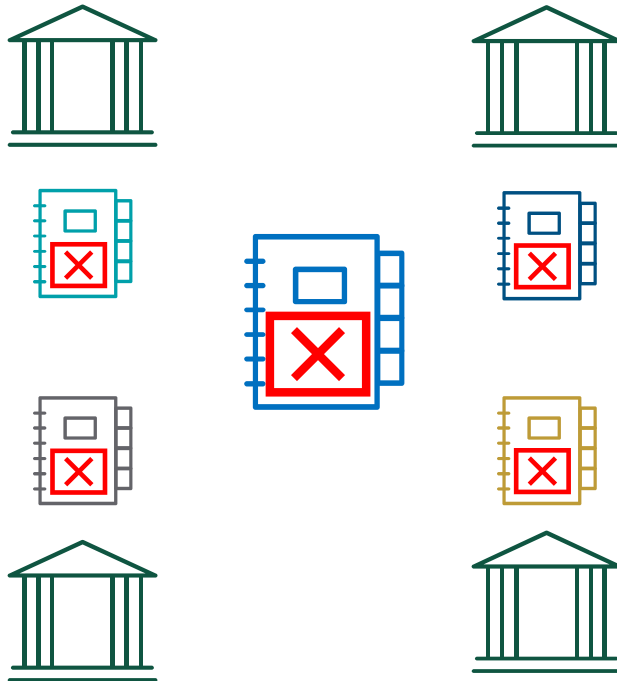
Access to trusted
records for calculating
funding status and other
liabilities

Auditor

Real-time audit and
access to truth

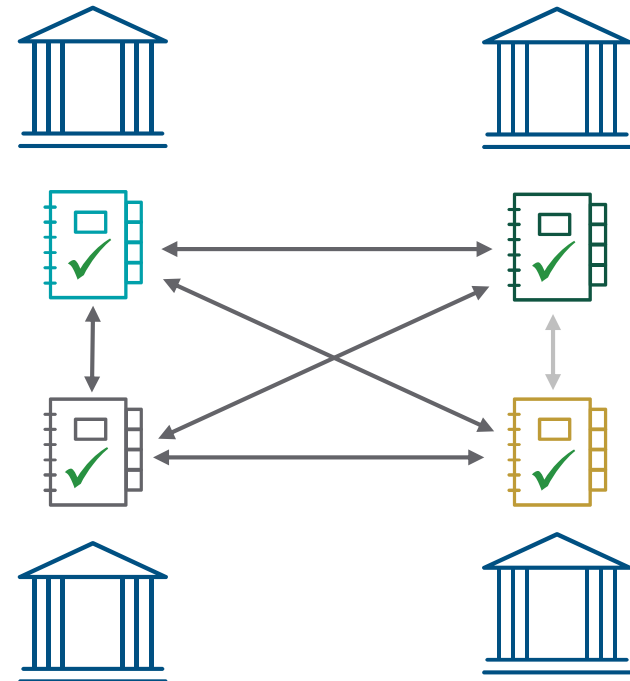
WHY CHOOSE PRIVATE EQUITY?

Individual Ledgers



- Multiple ledgers/data sets
- “Weakest link” security
- Trust is contractual, not factual
- Costly to process, reconcile and maintain

Shared/Distributed Ledgers



- Single, synchronized data set
- Encryption for consistent security
- Trust based on fact
- Lower costs and no reconciliations

KEY FEATURES OF RELEASE

New functionality to expand the value of the ecosystem



Document Management

- Upload and share documents
- Directly view documents in the immutable record
- Full audit trail of document activity



Fund Level Data

- Client Fund Summaries
- Fund Level commitments
- Total commitments
- General Partner information



View Investor Register

- Commitments drawn, undrawn and total
- Commitments, contributions & Investor transfers
- Percentage ownership by Investor



Access Controls

- Customizable user-based roles
- Permissioned access to different records
- User Administration services

POTENTIAL BLOCKCHAIN APPLICATIONS IN EXISTING MARKETS

Cash securities (equities, repo, leveraged loans): 11-12bn annual global cost savings

- **Cut settlement times and reconciliation costs:** Using a blockchain-based system can significantly shorten trade settlement time, in some cases from days to just hours. It also helps lower capital requirements, OpEx and custody fees in the process. Additional savings if blockchain is applied in other capital markets such as FX, OTC derivatives and commodities.



Anti-money laundering compliance: 3-5bn annual global cost savings

- **Increase transparency and efficiency:** Storing account and payment information with blockchain could improve data quality and reduce the number of falsely identified “suspicious” transactions.



Real estate title insurance: 2-4bn annual US cost savings

- **Improve efficiency and reduce risk:** By recording property records in a blockchain, title insurers would have easier access to the information they need to clear a title. The fact that the ledger is tamper-proof could help lower real estate fraud in emerging markets.



POTENTIAL BLOCKCHAIN APPLICATIONS IN NEW MARKETS

The Sharing Economy - Lodging: 3-9bn increase in US booking fees through 2020

Ease identity and reputation management. Blockchain can securely store and integrate users' online transaction and review history with identification and payment credentials—making it easier to establish trust between parties.



Internet of Things (IoT): 50 billion devices due to come online by 2020

Used in tracking billions of connected devices: Enable the processing of transactions and coordination between devices, allow for significant savings to IoT industry manufacturers. This decentralized approach would eliminate single points of failure, creating a more resilient ecosystem for devices to run on.



Smart grid: \$2.5-7bn new US market for distributed power

Enable transactions in a decentralized power market: Blockchain can connect local power generators (think: neighbors with solar panels) to consumers in their area, enabling distributed, real-time power markets. A blockchain-enabled market could also increase grid security and spur adoption of smart grid technologies..



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