What Mutual Distributed Ledgers (aka blockchains) Might Mean for Insurance

Professor Michael Mainelli
18 November 2015
Special – City of London’s leading commercial think-tank
Services – projects, strategy, expertise on demand, coaching, research, analytics, modern systems
Sectors – technology, finance, voluntary, professional services, outsourcing

- Independent Publisher Book Awards Finance, Investment & Economics Gold Prize 2012 for *The Price of Fish*
- British Computer Society IT Director of the Year 2004 for PropheZy and VizZy
- DTI Smart Award 2003 for PropheZy
- Sunday Times Book of the Week, *Clean Business Cuisine*
- £1.9M Foresight Challenge Award for Financial Laboratory visualising financial risk 1997
Z/Yen in Finance Research

- Distributed ledgers (1995-present)
- LIBOR and FX surveillance (2007-present)
- PropheZy and VizZy – automation & visualisation of compliance monitoring (2002-present)
- Avatars for Big Data (2010-2012)
What Does A Distributed Ledger Do?

♦ Validate – “a trust model for timestamping”
♦ Safeguard – “a set of rules for updating state via blocks”
♦ Preserve – “a shared state”

**Persistent & Pervasive**

InterChainZ Research

Types of keys
- Chain creator “I have added data”
- Chain Co-Validator “I have confirmed the data”
- Chain Viewer “I need to view all or part of the chain”
### InterChainZ

#### ChainZf

- **My email**: [ZYen Group](https://zyen.com)
- **Import/Export Chain**

#### My 9 links in the Chain

**Created** | **Account** | **FileHash** | **File Name** | **File Type** | **File Size** | **Hash** | **Proof**
--- | --- | --- | --- | --- | --- | --- | ---
2015-12-01 12:12:02.974 | 88c96b28-dc89-11e4-ae45-00153e05280f | 218765812851 | | | | | 

#### All 4 links in the Chain

**Created** | **Account** | **FileHash** | **File Name** | **File Type** | **File Size** | **Hash** | **Proof**
--- | --- | --- | --- | --- | --- | --- | ---
2015-12-02 11:32:27.878 | 88c96b28-dc89-11e4-ae45-00153e05280f | 218765812851 | | | | | 

### Links (10)

<table>
<thead>
<tr>
<th>Linked</th>
<th>Account Code</th>
<th>Link Code</th>
<th>Geolocation</th>
<th>File</th>
<th>Message</th>
<th>FileHash</th>
<th>ChainHash</th>
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</thead>
<tbody>
<tr>
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<td>a0a3b014-de8e-11e4-947a-001518c69d24</td>
<td>Lat:51.483817, Long:-0.10475690909090999</td>
<td>Link/File/MFS.birt certificate.front.jpg</td>
<td>218765812851</td>
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<td>Link/File/142652533385.jpg</td>
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<td>d011-11e4-9035-00153e05280f</td>
<td>doesn't work</td>
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</tbody>
</table>
### InterChainZ Deal Room

#### Add a new file to the ledger

<table>
<thead>
<tr>
<th>File</th>
<th>Choose file</th>
<th>No file chosen</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>+</strong> Add File</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Import / Export Functions

- ![Export to file](image)
- ![Import from file](image)
- ![Push to network](image)
- ![Pull from network](image)

#### Files in the Ledger

<table>
<thead>
<tr>
<th>Is Mine?</th>
<th>Created</th>
<th>Owner</th>
<th>File Name</th>
<th>Hash</th>
<th>File Type</th>
<th>File Size</th>
<th>Public Key</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>Oct. 1, 2015, 12:45 p.m.</td>
<td><a href="mailto:hub@zyen.com">hub@zyen.com</a></td>
<td>GFCI_18_18.0 9.15.pdf</td>
<td>3e264767a7e5b68915476e3e93b5e8de</td>
<td>application/pdf</td>
<td>3Mb</td>
<td>30819f300d09267c3a6165</td>
<td>7538cbe6b816c3a6165</td>
</tr>
<tr>
<td>✓</td>
<td>Oct. 6, 2015, 12:45 p.m.</td>
<td><a href="mailto:hub@zyen.com">hub@zyen.com</a></td>
<td>Sample_Video_File.mp4</td>
<td>790b061dc7f69f300d09267c3a6165</td>
<td>video/mp4</td>
<td>4Mb</td>
<td>30819f300d09267c3a6165</td>
<td>3162282c4f94c3a6165</td>
</tr>
</tbody>
</table>
InterChainZ File Detail

GFCI_18_18.09.15.pdf

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return to ledger</td>
<td></td>
</tr>
<tr>
<td>Download File</td>
<td></td>
</tr>
<tr>
<td>Verify File Hash</td>
<td></td>
</tr>
<tr>
<td>Prove File Ownership</td>
<td></td>
</tr>
<tr>
<td>Download Private Key</td>
<td></td>
</tr>
</tbody>
</table>

- **Created**: Oct. 1, 2015, 12:45 p.m.
- **File Owner**: hub@zyen.com
- **File Hash**: 3e264767a70dd6aaaf31a6c6e9449ee0a2aaf659666476e02f0dde624b2b68f5
- **File Type**: application/pdf
- **File Size**: 3Mb
- **File Name**: GFCI_18_18.09.15.pdf
- **Public Key**: 30819f300d6069f2a864886f70d01101050003818d0038018902818100ae4f58b6ef6f9cc9159fa0f354cb0aff901a2e858ec9bf1b8a15916a51fda72fc23ff969017191b038d08bd394eefd7d96274427fbeb9790f1eb185c6f50fa0249fc26cfe01c20bf2332b2b9acb856779153f03c75bf5cc0dbbeec2f9ad184dc264a4c9504fc0347e1e6280eb86b60203a12a8d41208e609c3aca7be5262d020301001
- **Signature**: 7538cbe6b85635a32ae2bd4f99f69a3c19b7996087c5c4f9a4b0292e304b36c34f9435dd1d536b07db4ba45f9bbed1b198576578b733f04e3a9c8d0b4f6ab76435a310623ad24f1e3d8de3ae10978db36e2fb1639d1e0e453e3dcc7ae1e5516dc3f719f7a5b0ede76789c0b0c0580912d4323c4ffa5642e69b5104ab724ddd
- **Check Signature**: ✅
Blockchains - Buzz or Hype?


♦ 2013 – Bitcoins – Silk Road, FBI, Alderney


♦ 2015 - Blockchains
  ➢ January – IBM-Samsung
  ➢ February – Bank of England research agenda
  ➢ March – UK budget for standards, Barclays
  ➢ April – UBS, BNY Mellon, Goldman Sachs
  ➢ May – USAA, NASDAQ, Honduras land registry, Isle of Man
  ➢ May - A fine (sic) of having arrived – Ripple $700,000
  ➢ August - Sign of the Tines – Bitcoin forking hell
  ➢ September – Blythe Masters, Goldman Sachs
  ➢ October – Economist Special, FT Special
Possibly Distributively Ledgerable

<table>
<thead>
<tr>
<th>Area</th>
<th>Possible Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial instruments, records, models</td>
<td>Currency, private and public equities, certificates of deposit, bonds, derivatives, insurance policies, voting rights associated with financial instruments, commodities, derivatives, trading records, credit data, collateral management, client monies segregation, mortgage or loan records, crowd-funding, P2P lending, microfinance, (micro)charity donations, account portability, airmiles &amp; corporate tokens, etc.</td>
</tr>
<tr>
<td>Public records</td>
<td>Land and property titles, vehicle registries, shipping registries, satellite registries, business license, business ownership/incorporation/dissolution records, regulatory records, criminal records, passport, birth/death certificates, voting ID, health and safety inspections, tax returns, building and other types of permits, court records, government/listed companies/civil society, accounts and annual reports, etc.</td>
</tr>
<tr>
<td>Private records</td>
<td>Contracts, ID, signature, will, trust, escrow, any other type of classifiable personal data (e.g. physical details, date of birth, taste) etc.</td>
</tr>
<tr>
<td>Semi-private/semi-public records</td>
<td>High school/university degrees and professional qualifications, grades, certifications, human resources records, medical records, accounting records, business transaction records, locational data, delivery records, genome and DNA, arbitration, genealogy trees, etc.</td>
</tr>
<tr>
<td>Physical keys</td>
<td>Key to home, hotel, office, car, locker, deposit box, mail box, Internet of Things, etc.</td>
</tr>
<tr>
<td>Intellectual property</td>
<td>Copyrights, licenses, patents, digital rights management of music, rights management of intellectual property such as patents or trademarks, proof of authenticity or authorship, etc.</td>
</tr>
<tr>
<td>Other records</td>
<td>Cultural, historical events, documentary (e.g. video, photos, audio), (big) data (weather, temperatures, traffic), SIM cards, archives, etc.</td>
</tr>
</tbody>
</table>
Justification for RAG status

1) Multiple data formats
2) Negative Londonisms, e.g. Declaration, onerous data requirements
3) Paper usage, photocopying and scanning, duplication
4) Negative Londonisms, e.g. LPANS, Bureau queries
5) Manual mismatch clearing, data duplication
5a) ACORD XML
6) Lack of structured data, no written data or ‘Net of RI’
7) Lack of structured data. three days to settle monies
8) Lack of structured data, duplication across carriers
9) and 10) Lack of audit trail and granularity, signed data only

NB: Relates to Lloyd’s business only. This diagram does not include known issues such as: oversight, approval, audits and complaints
Future Operating Model
London Market – Key Interactions

Optional Channels

Policy Holder
Risk query, claims, Policy

Local Broker
E.g. Quote request
Declaration
Claims Advice
Premium Payment

Regional Broker

Surplus Lines Broker

Approved Broker
Face-to-face negotiation (as required)

London Market Carrier(s)
Non Service Hub Activities

Service Hub
Message Hub (TMEL)

Customer Interactions
Customer Services
Broker Services

e-Placing Services
Data services
Structure Data Capture
Document Repository
Claims Services
Carrier Services
Bureau Services
Carrier Interactions

Broker Authorised:
Direct Policy, Claims Advice, Premium Payment, Endorsements etc.
Direct access to Carrier via Hub

Justification for RAG status
1) and 2) Easier access to central services
3) Placing avoiding paper with single contract version and no re-keying of data; enhance trading floors
4) and 5) Easier access to central services (ACORD) to avoid duplicative processes and rekeying data
6) Data provided to Lloyd’s and IUA in ACORD XML for consistency, audit trail and automated reporting
7) Written as well as signed data provided to regulators, full audit trail

NB: Brokers primarily interact with broker and market services, NOT carrier or Hub services

* Encourage Data Standards adoption, don’t enforce a new Londonism

Key:  Inefficient process Sub-optimal process Efficient process 1 Process sequence

Local Broker Interaction
Any direct interaction would either be where local broker is a subsidiary of the Approved Broker, or where local broker has been approved in its own right

Regulators and Tax Authorities

Lloyd’s

Data feed

Data feeds

** 13 **
London Markets

Distinguished brand name but...

♦ Losing global market share for decades
♦ Poorly connected to growing markets
♦ Poor distribution channels
♦ Expensive & manual
London Markets – Ideal For Mutual Distributed Ledgers?

<table>
<thead>
<tr>
<th>Level</th>
<th>Idea</th>
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</thead>
<tbody>
<tr>
<td>Foundation</td>
<td>Mutualise Connective Technology</td>
</tr>
<tr>
<td>Ground Floor</td>
<td>Deal Rooms, Indicative Prices</td>
</tr>
<tr>
<td>Upper Floor</td>
<td>Payment Market</td>
</tr>
<tr>
<td>Surrounds</td>
<td>ID</td>
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<tr>
<td>Environments</td>
<td>Community</td>
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</table>

[“Clustering & Technology In Global Insurance: A Right Royal Exchange Of Viewpoints” (10 October 2013, Old Library) - http://www.zyen.com/PDF/Clustering%20And%20Technology%20In%20Global%20Insurance.pdf]
When Would We Know Our Commerce Is Working?

“Get a big picture grip on the details.”

Chao Kli Ning

Thank you!