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# Distributed Ledger Technology In Post-Trade & Settlements

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***18 May 2017, London***





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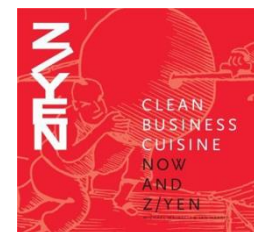
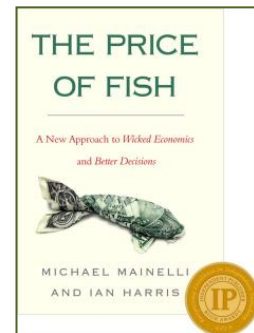
# Z/Yen



The Global  
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- ◆ 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



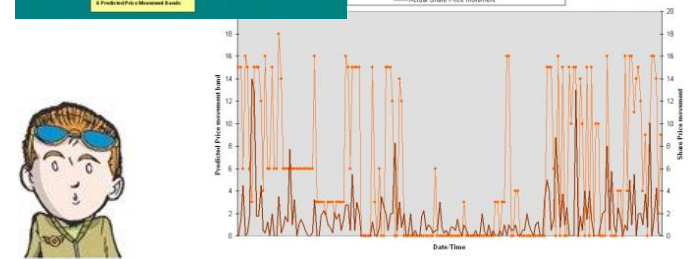
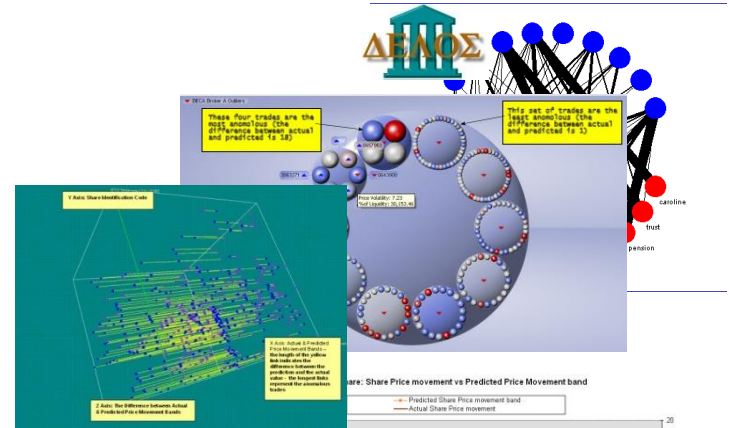
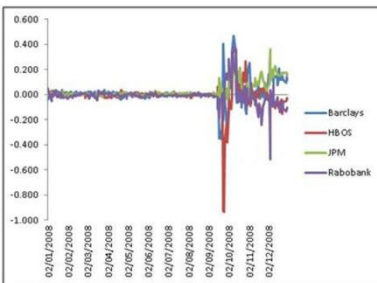
- Independent Publisher Book Awards Finance, Investment & Economics Gold Prize 2012 for ***The Price of Fish***
- British Computer Society **IT Director of the Year** 2004 for PropheZy and VizZy
- DTI **Smart Award** 2003 for PropheZy
- *Sunday Times* Book of the Week, ***Clean Business Cuisine***
-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



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# Z/Yen Fintech Research

- ◆ Distributed ledgers (1995-present)
- ◆ LIBOR and FX surveillance (2007-present)
- ◆ PropheZy and VizZy – automation & visualisation of compliance monitoring (2002-present)
- ◆ Prediction markets and bubbles (1998-present) – [www.extzy.com](http://www.extzy.com)
- ◆ Market intelligence – Ministry of Defence, e.g. Vision 2020 (1994-present)
- ◆ Avatars for Big Data (2010-2012)
- ◆ Financial Laboratory Club visualising risk (1997-1998)



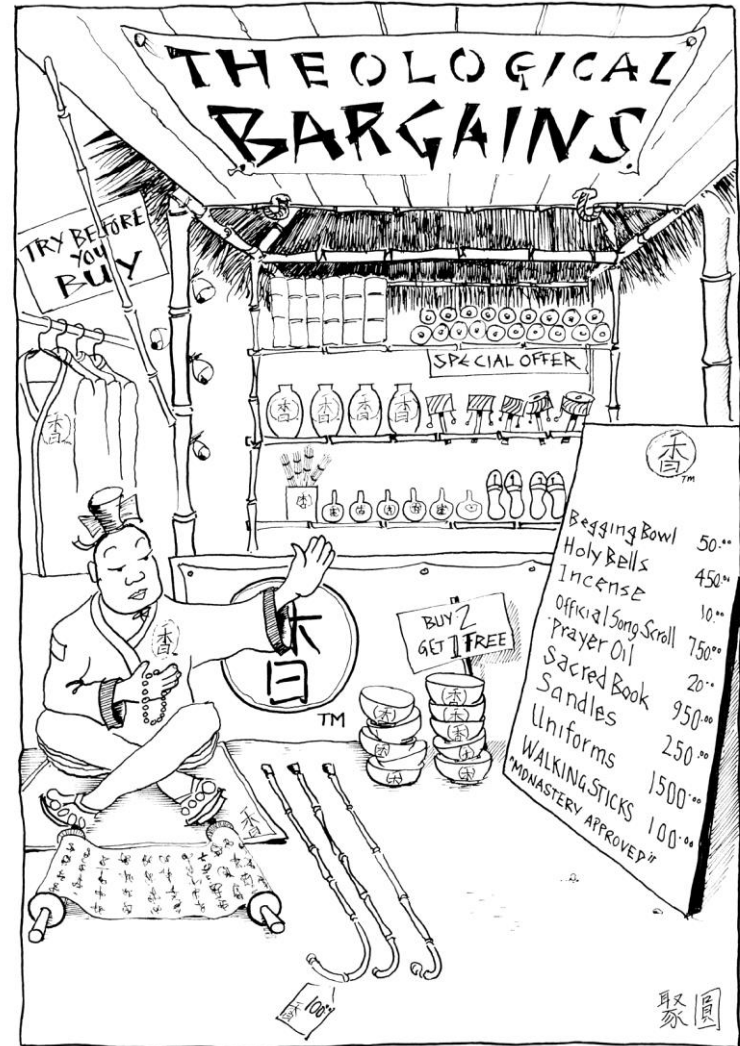
Rank	Name	Portfolio
1	Michael Young	2424.0
2	John Hands	2127.54
3	Lee Harris	2277.84
4	David Laid	2028.63
5	Lorraine Clegg	2149.39



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# Outline

- ◆ Ledgers & databases
- ◆ Mutual distributed ledgers (aka blockchains)
- ◆ What relevance to post-trade & settlements?
- ◆ What lessons have we learned?



“Get a detailed grip on the big picture.”  
*Chao Kli Ning*





# Mutual Distributed Ledger Timeline

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- ◆ 1976 – Diffie-Hellman, Merkle, RSA
- ◆ 1990 – Mondex, Digicash, Flooz
- ◆ 1995 – Z/Yen Stacks & Sleeves
- ◆ 1996 – Ricardo payment system
- ◆ 1998 – Wei-Dai b-money, Bitgold
- ◆ 1999 – LOCKSS & CLOCKSS
- ◆ 2000 – Gnutella
- ◆ 2004 – Ripple
- ◆ 2007 – Estonia
- ◆ 2009 – Bitcoin
- ◆ 2012 – Term ‘blockchain’ used
- ◆ 2013 – Silk Road, FBI, Alderney coin, Fintech ‘born’
- ◆ 2014 – Regulators – Jersey & Alderney, Isle of Man, FATF, ECB, State of New York
- ◆ 2015 – IBM-Samsung, Bank of England research agenda, UK budget for cryptocurrency standards, Barclays, UBS, BNY Mellon, Goldman Sachs, USAA, NASDAQ, Honduras land registry, Channel Islands Standards for MDLs, Fine (sic) Sign of having arrived – Ripple \$700,000, Sign of the Times – Bitcoin forking hell, Economist Special, FT Special
- ◆ 2016 – UK government, Digital Assets, R3, DAO, MetroGnomo, SafeShare Insurance, XLRAS
- ◆ 2017...

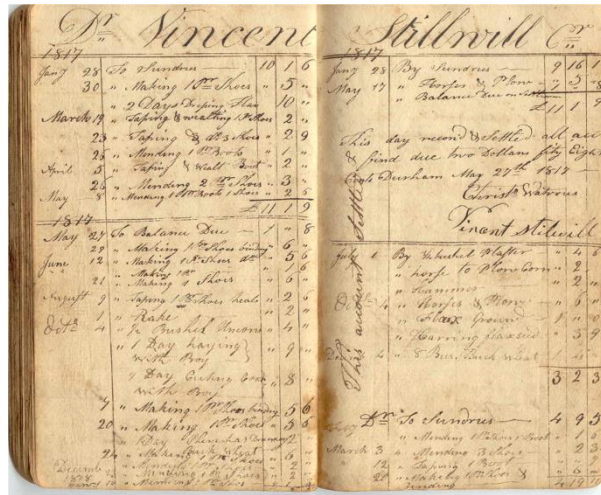




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# What Is A Ledger?

“A ledger is a book, file, or other record of financial transactions.”



**Accounts for Demo**  
CASH ACCOUNT From 01/03/2003 to 29/03/2004

Date	Payee	Reference	Category	Actual (gross) Amount	Recon Balance (gross)	Admin. fund split OST net	Non OST	Sink. fund split OST net	Non OST	Balance (net)
25 MAY	Mr J Citizen	Lot 1 levy pa	Deposit	500.00	500.00	0.00	500.00	0.00	0.00	500.00
26 MAY	Local Insurance	Insurance	Ar	-269.00	231.00	0.00	-269.00	0.00	0.00	231.00
31 MAY	(netbank)	Oovt Debit Tr	Dovt Debit Tr	-2.52	228.48	0.00	-2.52	0.00	0.00	228.48
31 MAY	(netbank)	Account Ser	Account Ser	-5.00	223.48	0.00	-5.00	0.00	0.00	223.48
31 MAY	(netbank)	Interest	Bank Interest	0.52	224.00	0.00	0.52	0.00	0.00	224.00
3 JUN 03	Clarks Grounds	Grounds Maint	Grounds Maint	-30.00	194.00	0.00	-30.00	0.00	0.00	194.00
10 JUN 03	Electrical Engineer	Replace light	Building Maint	-22.60	171.40	0.00	-22.60	0.00	0.00	171.40
11 JUL 03	Levy credit trans	Lot 1 credit	Levy credit tr	0.00	171.40	0.00	-250.00	0.00	250.00	171.40
10 OCT 03	Leahy	Terror Payou	Bank Transf	1000.00	1171.40	909.09	0.00	0.00	0.00	1080.49
10 OCT 03	Officers Upstand	Broken Pain	Fencing	-120.00	1051.40	0.00	0.00	0.00	-120.00	960.49
16 OCT 03	Mr P D Jakeson	Lot 1 levy pa	Deposit	400.00	1451.40	0.00	0.00	363.64	0.00	1324.13
6 NOV 03	Mr P D Jakeson	Lot 1 levy pa	Deposit	25.00	1476.40	0.00	0.00	22.73	0.00	1346.86
11 NOV 03	Mr P D Jakeson	Lot 1 levy pa	Deposit	5.00	1481.40	0.00	0.00	4.55	0.00	1351.41

[SOURCE: [https://en.wikipedia.org/wiki/Tally\\_stick](https://en.wikipedia.org/wiki/Tally_stick)]

[SOURCE: <http://www.rootsweb.ancestry.com/~nygreen2/wpeF7.jpg>]

[SOURCE: <https://en.wikipedia.org/wiki/Ledger>]



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# Terminology Evolving

- ◆ **ledger** – a record of transactions
- ◆ **distributed** – divided among several or many, in multiple locations
- ◆ **mutual** – shared in common, or owned by a community
- ◆ **mutual distributed ledger (MDL)** - a record of transactions shared in common and stored in multiple locations
- ◆ **mutual distributed ledger technology** – a technology that provides an immutable record of transactions shared in common and stored in multiple locations
- ◆ **blockchain** - “a transaction database shared by all nodes participating in a system based on the Bitcoin protocol”
- ◆ **smart ledger** – MDL with embedded, executable code



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# MDLs Are Database Technologies

	<b>Centralised Databases</b>	<b>Distributed Databases</b>	<b>Mutual distributed ledgers (unpermissioned)</b>	<b>Mutual distributed ledgers (permissioned)</b>
<b>Storage</b>	Single master	Multiple copies		
<b>Definition of data</b>	Multidimensional, typically using some approximation to the relational database design of Codd		Specialised single dimensional, e.g. ownership, amount	
<b>Participation</b>	Closed		Open, new nodes can be freely added	New nodes added subject to agreement by core participants
<b>Rights, e.g. updating of entries</b>	Governed by separate data base management system		Built into the ledger protocol	Configuration file determines all node rights to decrypt/update
<b>Validation of data</b>			Uses 'proof of work' or some weighted voting schema such as 'proof of stake'	Typically based on confirmation by core participants
<b>Reconciliation of data</b>	Only necessary when data is moved.	Iterative, trading off consistency against availability		
<b>Robustness</b>	Historically vulnerable to server failure	Resilient, continues to update even with partial node availability		





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# Post Truth



[Ken Tindell mashup - 14 May 2015 <https://twitter.com/kentindell/status/598865133247569920>]



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# Post Trade



[www.dilbert.com, Friday, 17 November 1995]

[Internet (1976 for me), databases (Oracle, Ingres, DBII, relational/hierarchical/distributed), web (SGML, Gopher), 'Internal Internets' (i.e. intranets), social media (SixDegrees)...]



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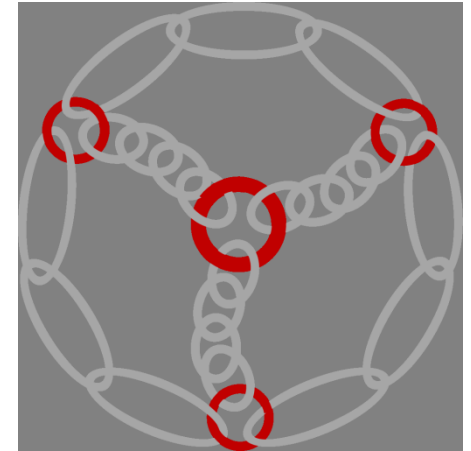
# Ledgerage

Area	Possible Applications
Financial instruments, records, models	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 & corporate tokens, etc.
Public records	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.
Private records	Contracts, ID, signature, will, trust, escrow, any other type of classifiable personal data (e.g. physical details, date of birth, taste) etc.
Semi-private/semi-public records	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, clinical trials, etc.
Keys	accounts, home, hotel, office, car, locker, deposit box, mail box, Internet of Things, etc.
Intellectual property	Copyrights, licenses, patents, digital rights management of music, rights management of intellectual property such as patents or trademarks, proof of authenticity or authorship, etc.
Other records	Cultural, historical events, documentary (e.g. video, photos, audio), (big) data (weather, temperatures, traffic), SIM cards, archives, geostamping, etc.



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# Ledger Thrills!



InterChainZ - Credit Validator Use Case | Credit Validator | Service User | Logout

Add Data to Ledger

- + Add New Company
- + Add Company Data

Import / Export Functions

- Export to file
- Import from file
- Push to network
- Pull from network

Show 10 entries | Search:

Row Height	Row Hash	Created	Entry Type	Category	Company	File Name	File Hash	Content	File Type	File Size
1	0000532118...	06-08-2015 09:43:18	Identity		DDNewCo 815	DDNewCo 815.txt	46ba9a69eb...	✓	text/plain	43b
2	0000950d0d...	06-08-2015 09:43:35	Company Data		DDNewCo 815	DDNewCo2815 Activity.docx	6eb3213ef84...	✓	application/vnd.openxmlformats-officedocument.wordprocessingml.document	19Kb
3	0000b271bd...	06-08-2015 09:43:46	Company Data		DDNewCo 815	DDNewCo2815 Credit Data.docx	e18ac405dd...	✓		
4	0000374eb7...	06-08-2015 09:43:55	Company Data		DDNewCo 815	DDNewCo2815 Documents.docx	ab62a6d7d4...	✓		
5	00006d7015...	06-08-2015 09:44:03	Company Data		DDNewCo 815	DDNewCo2815 Financials.docx	4978648e1a...	✓		
6	00008b04fa8...	06-08-2015 09:44:19	Company Data		DDNewCo 815	DDNewCo2815 People.docx	d82aa2d517...	✓		
7	0000355752...	06-08-2015 09:44:29	Company Data		DDNewCo 815	DDNewCo2815 Vitals.docx	2071867178...	✓		
8	0000085a50...	06-08-2015	Identity		DDABC815	DDABC815.txt	b68023b3a6...	✓		

InterChainZ - Credit Validator Use Case | Credit Validator | Service User | Logout

DDNewCo2815 Credit Data.docx

Return to ledger | Download File | Verify File Hash | Verify Signature | Download Public Key

Row height: 3

Row hash: 0000b271bd21d13cb091556391dd77dfacc9c262715e7f0cde440ab0f459d1c

Previous Row: 0000950d0dca5c7f54a8d898c8fa7c8783b309abb4487a0686653b30ed75d728

Created: 06-08-2015 09:43:46

Entry Type: Company Data

Category:

File Hash: e18ac405dde1cbde1dd3400e13b97e11053792717e597790f2b66f2308491a0c

File Type: application/vnd.openxmlformats-officedocument.wordprocessingml.document

File Size: 26Kb

File Name: DDNewCo2815 Credit Data.docx

Geo Location: (51.5151230, -0.0910970)

Public Key: 30819f30d06092a864886f70d010101050003818d0030818902818100c951b14d4499e0044dbefdb928a5f62a8a699f79e00298866f307af5d605f16fedb65354990cb6c4ef421e2e029acf3e8172982cb7eb707cd2de396736d7928413dd211b52e838109df93093d1a378b6f82977c764191587b84f507abdf3a70e291196fad0388bc601e752310686a367e4b069316e541798b2510a126eb0203010001

Signature: c4a1511c3b89b660a9380a21e604f5b97e58e3eca1d08a568b7cf91b259778c5addf7820d7aeb581330eb2f20b871d5e196125be45e562de25ae91554acbc025d11f1190f195a15143ec288756821bfa0f070ae3e81e601ab5f6b813a28ec9c7f7a28c5b911754cadf0c4e0647af49636330b588450bf853894cec77

Nonce: 163749

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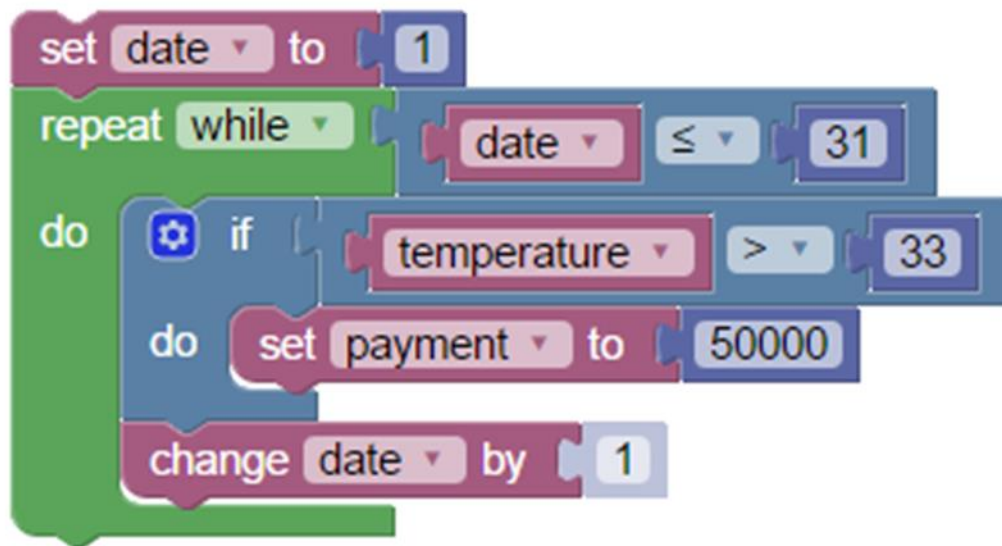


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# Smart Contracts & Straight-Through Processing

## Smart contract:

“legal contract terms implemented as executable computer code”



```
Language: JavaScript ▼  
  
var Count, date, payment, tempera  
  
date = 1;  
while (date <= 31) {  
  if (temperature > 33) {  
    payment = 50000;  
  }  
  date = (typeof date == 'number'  
};
```





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# Follower Syndicate In Code

```
set % underwriting to 0
set # Insurers >= 7% to 0
if A u/w% ≥ 7
do change # Insurers >= 7% by 1
if B u/w% ≥ 7
do change # Insurers >= 7% by 1
if C u/w% ≥ 7
do change # Insurers >= 7% by 1
set Total u/w% to A u/w% + B u/w% + C
if Total u/w% ≥ 20
do if # Insurers >= 7% ≥ 2
do set % underwriting to Total u/w% × 0.03
```

Language: Python

```
from numbers import Number

__Insurers_3E_7_25 = None
_25_underwriting = None
A_u_w_25 = None
B_u_w_25 = None
C_u_w_25 = None
Count = None
D_u_w_25 = None
Total_u_w_25 = None

_25_underwriting = 0
__Insurers_3E_7_25 = 0
if A_u_w_25 >= 7:
    __Insurers_3E_7_25 = (__Insur
if B_u_w_25 >= 7:
    __Insurers_3E_7_25 = (__Insur
if C_u_w_25 >= 7:
    __Insurers_3E_7_25 = (__Insur
Total_u_w_25 = (A_u_w_25 + B_u_w_
if Total_u_w_25 >= 20:
    if __Insurers_3E_7_25 >= 2:
        _25_underwriting = Total_u_w_
7

if false:
    pass
```



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# Some Of Our MDL Research

RESEARCH REPORT

Report prepared for the City of London Corporation, ESRC and Recipco by Z/Yen  
Published December 2011

Summary Findings  
**Capacity Trade and Credit: Emerging Architectures for Commerce and Money**

DECEMBER 2011

**Chain Of A Lifetime:**  
How Blockchain Technology Might Transform Personal Insurance

December 2014  
A Long Finance report prepared by Z/Yen Group

The Journal of Financial Perspectives: FinTech

Article:  
**Sharing ledgers for sharing economies: an exploration of mutual distributed ledgers (aka blockchain technology)**

EY Global Financial Services Institute Winter 2015 | Volume 3 - Issue 3

Professors Michael Mainelli & Mike Smith  
Z/Yen Group

**From Slips To Smart Contracts**  
Intelligent Technology In The London Wholesale Insurance Market

A Long Finance report prepared by Z/Yen Group  
January 2017

Sponsored by the London Market Group

SWIFT INSTITUTE

SWIFT Institute Working Paper No. 2015-007

**THE IMPACT AND POTENTIAL OF BLOCKCHAIN ON THE SECURITIES TRANSACTION LIFECYCLE**

MICHAEL MAINELLI  
ALISTAIR MILNE

PUBLICATION DATE: 09 MAY 2016

The views and opinions expressed in this paper are those of the authors, SWIFT and the SWIFT Institute have not made any editorial review of the paper. Therefore the views and opinions do not necessarily reflect those of either SWIFT or the SWIFT Institute.

**Chain Reaction:**  
How Blockchain Technology Might Transform Wholesale Insurance

July 2016  
A Long Finance report prepared by Z/Yen Group  
Principal authors: Michael Mainelli and Bernard Manning

Sponsored by

**The Missing Links In The Chains?**  
Mutual Distributed Ledger (aka blockchain) Standards

pwc

STATES OF ALDERNEY

November 2016

**A Wholesale Insurance Executive's Guide To Smart Contracts**

A Long Finance guide prepared by Z/Yen Group  
January 2017

Sponsored by the London Market Group



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# Application: MetroGnomo – Timestamping & Datalogging



MetroGnomo **BETA**  
Open-Source Distributed Timestamps

Home About News

Stamp it! Check Stamp Retrieve File  
Register View Live Ledger Host Receiver

Obtaining Proof Of Existence

Home About Press Contact us

Last Metro Time  
2016-01-24 19:20:36.105496

Last Timestamp  
14s ago

Average Duration  
14s

MetroGnomo **BETA**  
Open-Source Distributed Timestamps

Home About News

View Live Ledger

Current Time  
2016-03-26 11:17:33 AM

Last Metro Time  
2016-03-26 12:15:01.964577

Last Timestamp  
153s ago

Average Duration  
201s

Timestamp Time (s)

Average Timestamp Duration (s)

Show 10 entries

UUID	Metro Time	RowHash	TableHash	Tag
902053a5 -5b2c-477 e-95cb-90 47577ef57 8	2016-03-26 1 2:15:01.96457 7	47d450e098d7167fe1c078648733707 8ac1b9e0928c286fb704e522d599d0e 6	321db23d0697a4a2342c1f864c8085010 daee2f937fc36fa4be17e7e67319	2016-03-26T12:15:01+00:00@timeapi.org

Search:

RowHash	TableHash	Tag
450ff4031de277cebdbadd67838d8 418b24ad998093fc1ecb9d4ce2a85c	4eb384a98d13c03592881cc0f3cdbe10c50 e2d4659fe9b629bfb36d01b97709	186.223.80.46
df44895a0a225ab9a938a41993192 2650b00b7e6a143d8894101810b2	6ec8845f38c3b1647ac8faf2f652318be585 aad7d42338ec8aaf7ce09e490d53	The+secular+cooling+hat+must+someday+overtake+our+planet+has+already+gone+far+in+deed+with+our+neighbor.
07f194e5ba0d3eb88859e90904f0 c055bf6e208cbf5774dde2cd2a885	772f534b6ca60d138ab7e87780c0dc16c84 dc089728bc808967eb5c0ed88aff	63+Jackson+Blvd, Northleach,+MT,+61794
64850903867119b0702b09ead9fa0 5680b00b7e6a143d8894101810b2	c9364abae46b5062756e20703b79874337 4aca5c3e2a32281e6289d290a4e31c	Jackson+Ave
4b05eccd2aef68cb8cf4c18e40305 9492bf9ab8ebd48020bc3783d580da	ce7c928eddb0a2e3d6a1c0300e7110f75eb 38319dab8c4e8d1cc7be91bce72f1	San+Martin

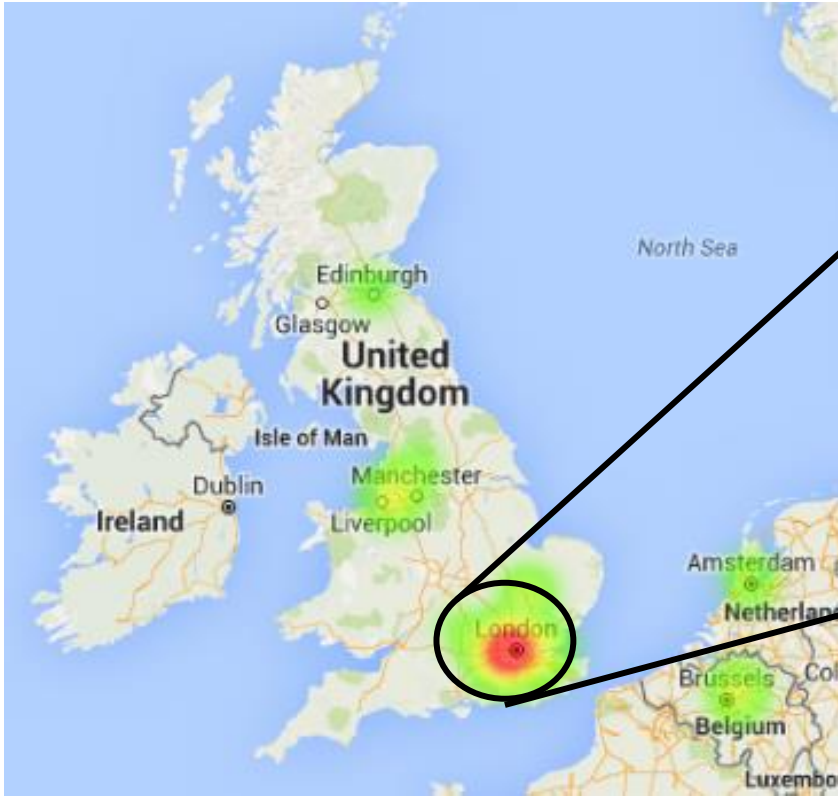
0165e888-4a74-49fb-8c0 c-cb55cc4f417f	2016-01-24 19:20:26.909764	cbc804ae874c8872a6115e2fa43f437f3 d404d2e3d0945872ebfb809f1585d2	b7242a18e501cf4fd7647ef5a5385058ba26 e592fd82bfb800ef0daa4bafade	elizabethmiller@test.com
--	----------------------------	---	---	--------------------------





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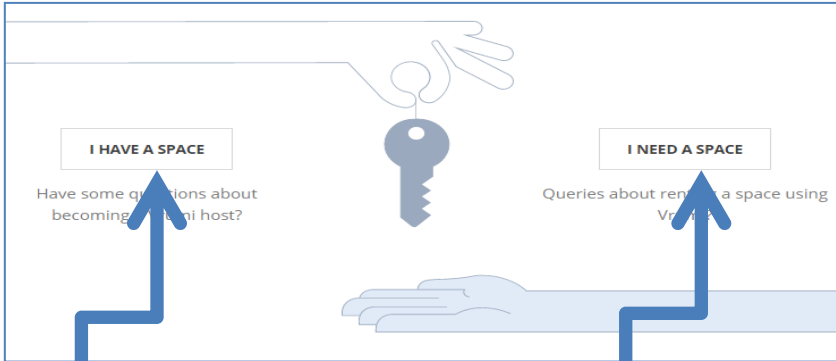
# Application: Clinical Trials





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# Application: Sharing Economy Broker and Underwriter



Current Time	Last MetroTime	Last Timestamp	Average Duration
2016-03-14 10:19:35 AM	2016-03-14 11:19:29.784195	7s ago	32s

Timestamp Time (s)

Average Timestamp Duration (s)

UUID	MetroTime	RowHash	TableHash	Tag
08b99219 10804492 759e8c abc929e5 0c	2016-03-14 11:19:29.784195	ce59779bd1ce9a30840f3cd307344184 8792ce659983820ca86e6a08a999565e	23ae304a68e00c7c15ba421ad315667a e05c0d33ed8e0afa1694639130de3f6e	SafeShare: File Hash: c1c1e5dd5697ead5e21503e02b 0d12880c80c1a845ef26a59f0c8784a00517
08b87206 10100428 f899015 60616488 3d	2016-03-14 11:19:09.434935	9986e36ba40b7ec1cdd015434cad9c9 9044eab6498620c2e47f66c74fa56098e	q2092ed3107f630e4f43d92f6005ee4 5ee1c135010f58b5834d9f9e991d8	SafeShare: File Hash: 21164ebcc6aee91b1270d10949b 13017c1f01f937ad0e190d2e70376ee050f1
546809e7 499442b 90ac744 70d4e280 db	2016-03-14 11:18:59.218019	e7e3c7345edc8a48d32036920de7afe4 1ea192268f632978090ec42230c9c8aeb	0ba2806330c59c0f945a77f9ba30d0e0 2c1efaed02170798d1483f0915c53c	SafeShare: File Hash: c091223a20dd07f99a3998e0db0f 2d70652140e63887230302284c0ea522fa7
1ce10457 485444c 9420b58 3c4d0c7e 7	2016-03-14 11:18:51.466876	ed0830d309088618e50045847781565e c899482226ecfcc0d80228f31ae5560c1	0b7776d3a09020a620e930f2392a2811 3372680801070522c57899ac9867076	SafeShare: File Hash: c0f1c1635910f25940621c6e3180 08e13c8493050e9159920eeaf490f625780

### EVIDENCE OF INSURANCE

**THIS DOCUMENT IS ISSUED AS EVIDENCE OF INSURANCE. IT DOES NOT CONSTITUTE A LEGAL CONTRACT OF INSURANCE**

The Master Policyholder has procured Insurance under a Master Policy in respect of persons who are members of the Master Policyholder. This document is issued to you as evidence that your name has been applied as a person insured under the Master Policy.

The coverage provided is in accordance with the terms and conditions contained in the Master Policy. The Master Policy is available for inspection upon application to the Master Policyholder.

The details that follow are those shown in the Master Policy as applicable to you. In the event of any discrepancy between the details contained in this document and those shown in the Master Policy then those shown in the Master Policy shall prevail.

Master Policy No: BW0137215 Evidence No: 33  
Unique Master Reference: B1282BW0137215

- Name and address of the Member: Ian Johnson, 1 Park Lane, London, W1 1AA  
Address of Premises: 1 Palace Mews, London, w8 5jn
- Effective from 18th February 2016 to 1st February 2017, both days inclusive  
Operative Time This insurance operates during the period of any booking made through the Vrumi website (being either a single booking or multiple bookings running continuously on the same day at the same property).
- This Evidence of Insurance is underwritten with certain UNDERWRITERS AT LLOYD'S, LONDON. Novae Syncoates Limited  
Percentage: 100%
- Coverage
 

Section one - Buildings	GBP 500,000
Section two - Content	GBP 75,000
Section three - Accident to Domestic Staff	GBP 5,000,000
Section four - Legal Liability to the Public	GBP 2,000,000
- In the event of a claim under the Evidence of Insurance, please notify:  
Adjusting Associates LLP  
Telephone: 01443 226513  
Facsimile: 01443 226995  
Email: claims@adjustingassociates.com  
Emergency 24/7 Out of Office Number: 01724 761378  
Claims in writing should be directed to:  
Adjusting Associates LLP  
Unit 2, Sovereign Court  
Sterling Drive  
Llantrisant  
Phoncia, Cynon Taff  
CF72 8LX

Signed and dated this 16th day of February 2016

By *Antwan Sigwalt* (Master Policyholder)

Host details				Property details			Period of cover				Policy cancelled	Reason for cancellation	Premium	IPT	
First Name	Surname	Unique Reference	Address	Postcode	Address	Postcode	Date	Time	Date	Time					
John	Smith	VR0001	123 Bank Street	EC2V 5AY	54 Woodhill Lane	W17 RQ						No		£2.00	£0.19
												Select			£-





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# Application: Reinsurance Claim Payment Data Sharing



InterChainZ - Insurance Use Case RC Smith Insurance Serv

Automobile Loss Notice.pdf has been added to the ledger.

## Add Data to Ledger

+ Add New Entity

+ Add Entity Data

## Import / Export Fu

Export to file

Push to network

Show 10 entries

Row Height	Row Hash	Created	Entry Type	Company	File Name	File
11	0000439b3b...	15-12-2015 16:43:05	Company Data	RC Smith Insurance	Vehicle or Equipment Certificate of Insurance.pdf	10
12	00005cb10a...	15-12-2015 16:43:25	Company Data	RC Smith Insurance	Florida Personal Auto Application.pdf	c1
13	0000967c8d...	15-12-2015 16:44:28	Company Data	RC Smith Insurance	Vehicle or Equipment Certificate of Insurance.pdf	10
14	0000998c12...	15-12-2015 16:45:10	Company Data	RC Smith Insurance	Florida Auto Insurance Identification Card.pdf	cb
15	000083ae2fa...	15-12-2015 16:46:18	Company Data	RC Smith Insurance	Florida Insurance Supplement, Credit Report Disclosure Information PD	60

ft.com > companies > financials >

## Insurance

Home UK World Companies Markets Global Economy Lex Comment

Energy Financials Health Industrials Luxury 360 Media Retail & Consumer Tech Tele

May 16, 2016 4:47 pm

## Reinsurers turn to blockchain technology

Oliver Ralph, Insurance Correspondent

Share Author alerts Print Clip

Comments



Blockchain, the technology behind the bitcoin currency, is making a further move into London's insurance market through the launch of a claims record system for



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# Application: GeoGnomo – Geostamping



<b>GeoGnomo Code</b> <input type="text" value="1,India,Quebec,Juliet,6,India,Mike,Kilo,Quebec,"/> <b>Level</b> <input type="text" value="20"/> <a href="#">Get Latitude and Longitude</a>	<b>Latitude</b> 47.2639950349 <b>Top Neighbor Code</b> N/A <b>Bottom Neighbor Code</b> 1,Juliet,6,India,Mike,Kilo,Quebec,Hotel,Alpha	<b>Longitude</b> 0.0000339739 <b>Left Neighbor Code</b> 5,Romeo,November,Quebec,November,Uniform,Victor,Romeo,Victor <b>Right Neighbor Code</b> 1,Juliet,6,India,Mike,Kilo,Quebec,Juliet,8
---	---	---

(Latitude: 47.2647, Longitude: -0.0009)

**Latitude (Decimal Degrees)**

**Longitude (Decimal Degrees)**

**Altitude/Depth(optional)**  
 meters

**Level: 5**

[Use my current location](#) [Get GeoGnomo Code](#)

Click any location on the map or enter the latitude & longitude (Latitude: 53.696706, Longitude: -9.744873)

**Bottom Neighbor Code:**  
N/A

**Left Neighbor Code:**  
Foxtrot,4, Mike

**Right Neighbor Code:**  
Foxtrot,5, Victor

**Triangle Details**

**Point A (Latitude, Longitude):**  
(50.353157, -3.6)

**Point B (Latitude, Longitude):**  
(50.353157, 0.0)

**Point C (Latitude, Longitude):**  
(49.370815, -3.428571)



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# Ongoing Research Into 'Digital Vellum'

## ◆ Usable

- visualisation, apps, XML partial matching engines
- key structures, sprites (smart contracts)

## ◆ Mutual - validate

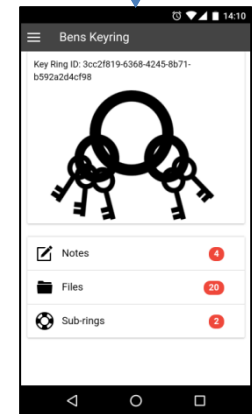
- validation methods – NPL timing project
- 'genetic splicing' and integrity

## ◆ Distributed - safeguard

- surveillance – support vector machines
- transmitting & receiving, high volumes, multiple transmitters

## ◆ Ledger - preserve

- immutability and standards
- partial data holding, long-term data storage

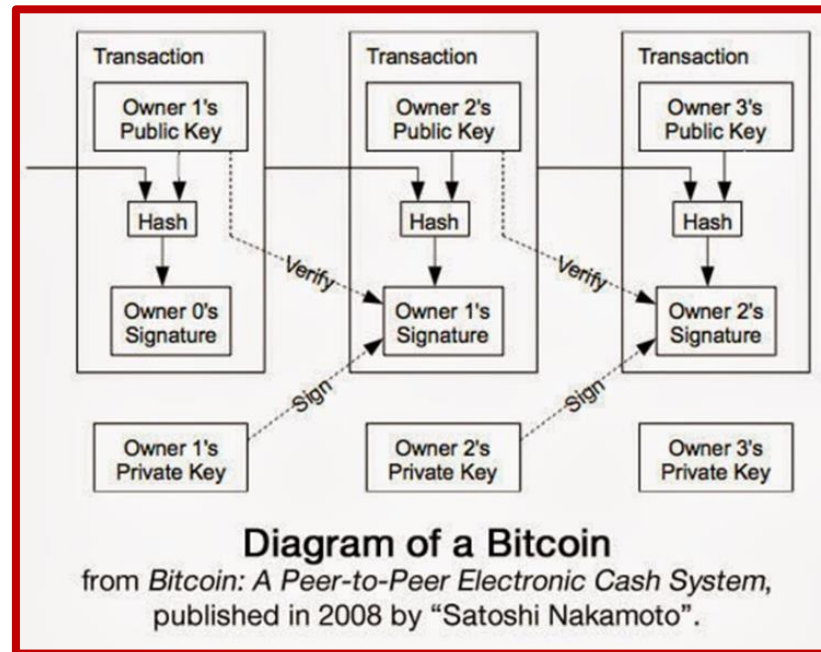




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# Reducing Natural Monopolies

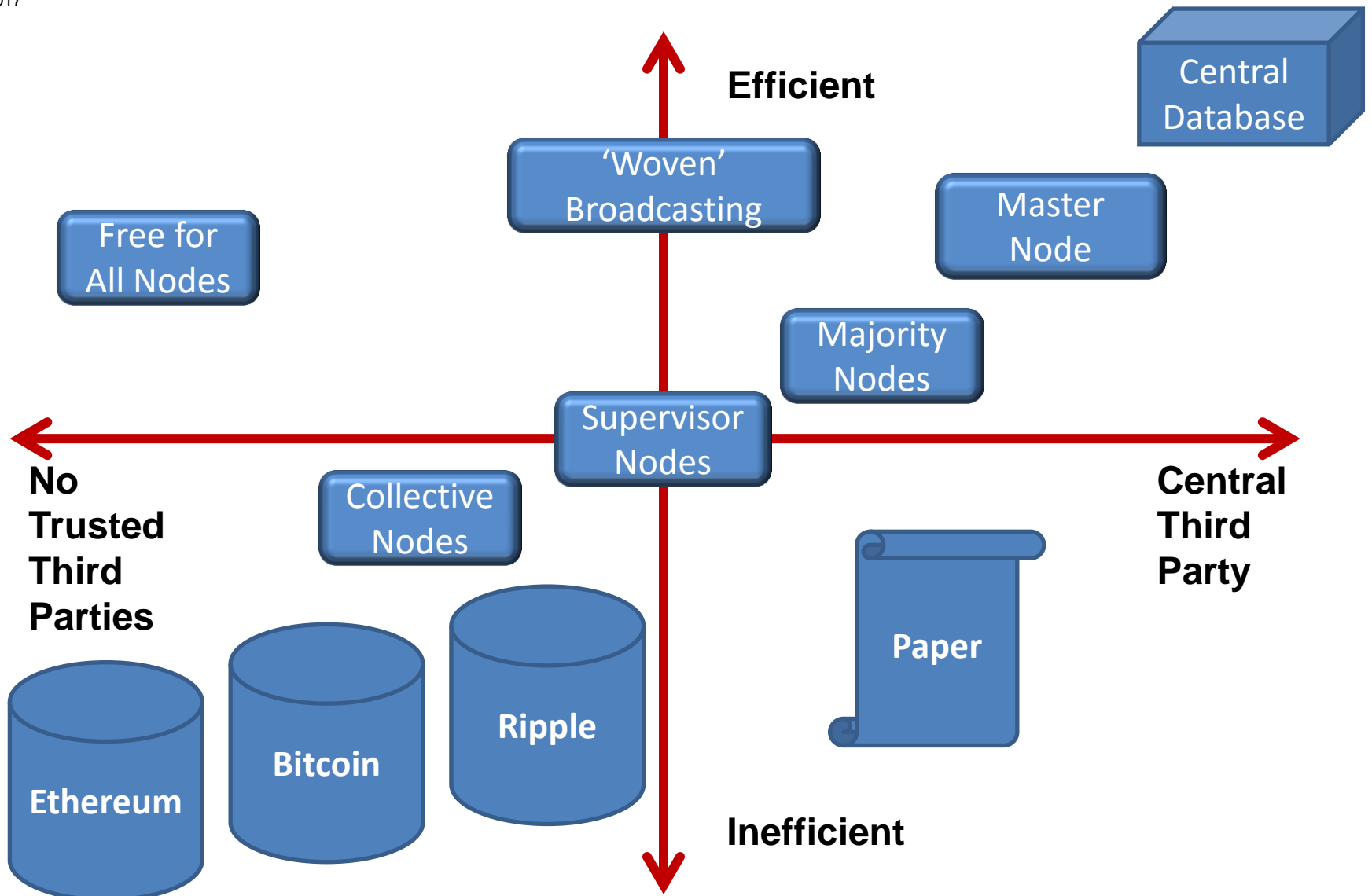
- ? Validate – “a trust model for timestamping”
- ✓ Safeguard – “a set of rules for updating state via blocks”
- ✓ Preserve – “a shared state”





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# Mistrust Costs Coins







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# Identity, Document, and Agreement Exchanges

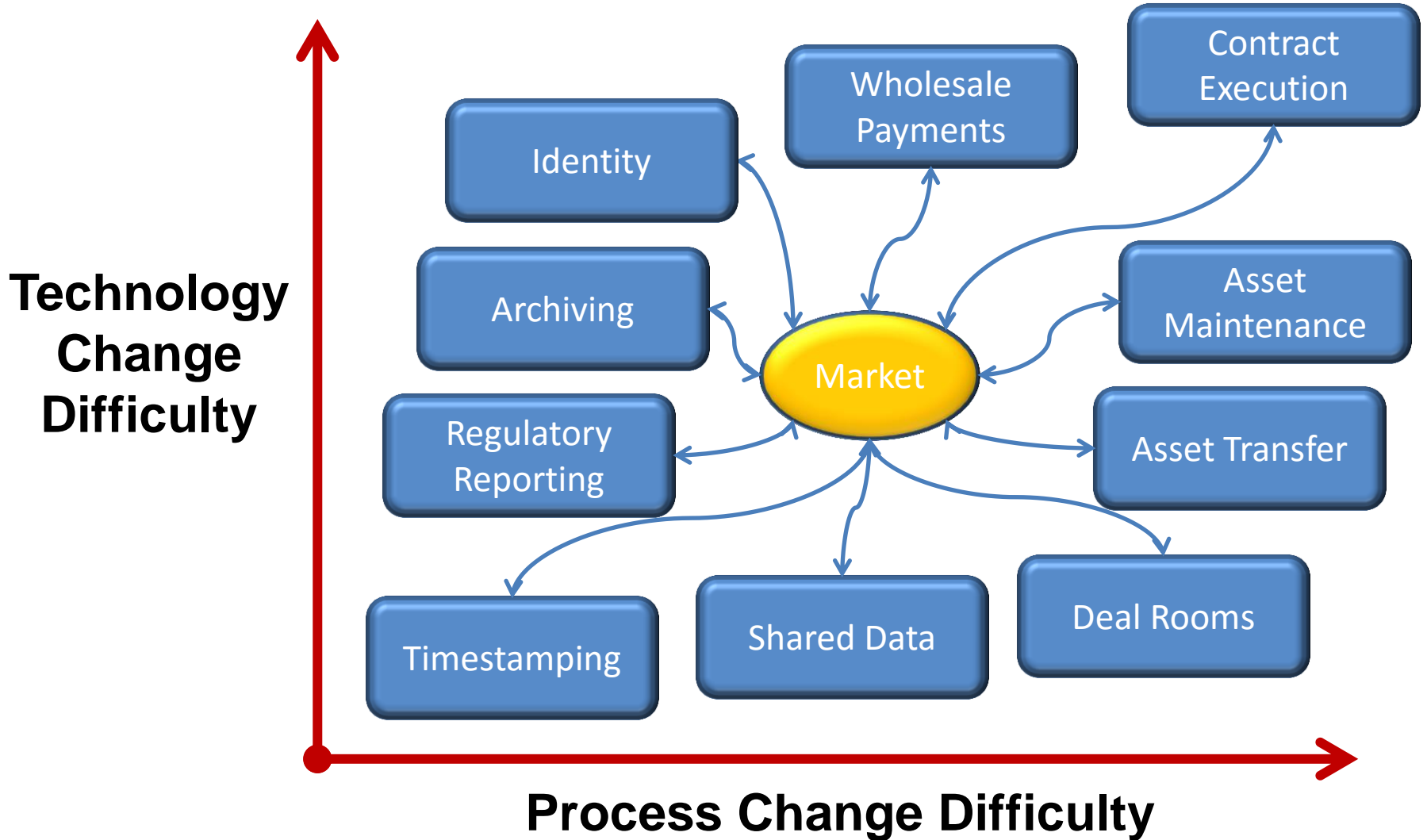
- ◆ Registries – ships, aircraft, artworks, tax, ...
- ◆ Identity for anti-money laundering, know-your-customers, and ultimate beneficial ownership
- ◆ Trade reporting, consolidated tapes, SMR vaults, legal entity identifiers, ...
- ◆ Personal insurance blockchains and smart wholesale insurance contracts
- ◆ Persistent P2P exchanges, corporate voting, accounting registries
- ◆ Multi-entity contracting, trade documents, virtual contract companies
- ◆ Chain-of-custody, provenance





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# Too Smart By Half?





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# High Costs In Global Securities Markets?

- ◆ Only estimates, e.g. from Oliver Wyman
  - one figure \$17bn-\$24bn per annum globally just on post trade processing of securities trades
  - higher estimates of \$40bn-\$45bn when including collateral management, custodian services
  - circa \$100bn per year, adding also various reporting, risk-management and regulatory functions
  - just securities, also currencies, commodities and derivatives
- ◆ Little information on breakdown of costs
  - e.g. how much is reconciliation that could be solved by bilateral data sharing, not MDL?



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# Myths Of Real-time Settlement

- ◆ Some prominent supporters of MDL or ‘blockchain in securities settlement’ claim this is about making settlement real time. They are confused:
  - delayed settlement (T+2) is a design choice reflecting deeply embedded practices, e.g. access to leverage and liquidity;
  - shifts to real-time settlement economise on the commitment of cash and collateral, but this benefit is not large, e.g. interest rate benefits of tying up cash or collateral overnight or for two days are minor.
- ◆ Real-time settlement is perfectly achievable without MDL - more important benefit from applying MDL in securities settlement is from greater certainty of final settlement time.



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# SWIFT Report Conclusions

- ◆ Ambitious claims for mutual distributed ledgers and lots of initiatives working on 'proof of concepts'
- ◆ Few easy wins:
  - MDLs and associated standardisation of data lowers switching costs and potential for exploiting market power, so there will be resistance from incumbents
  - Honouring the full promise of mutual distributed ledgers (and other FinTech) for existing infrastructure will not come automatically, easily, or cheaply







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# Real Work Needs Identity

**InterChainZ - Identity Validator Use Case**

Identity Validator | Service User | Logout

**Add Data to Ledger**

+ Add New Entity

+ Add Entity Data

**Import / Export Functions**

Export to file

Push to network

Show 10 entries

Row Height	Row Hash	Created	Entry Type	Category	Company	File Name
1	0000f428915...	06-08-2015 09:37:41	Identity		EW715	EW715.t
2	00000150d3e...	06-08-2015 09:38:05	Company Data		EW715	EW715G eport.pdf
3	0000ebbbb48...	06-08-2015 09:38:16	Company Data		EW715	EW715ID df
4	000090d2124...	06-08-2015 09:38:29	Company Data		EW715	EW715S ySheet.p
5	000092bb08b...	06-08-2015 09:38:41	Company Data		EW715	EW715U .pdf
6	0000c10a4ca...	06-08-	Company		EW715	EW715Whole File.pdf

**EW715WorldCheckreport.pdf**

Return to ledger | Download File | Verify File Hash | Verify Signature | Download Public Key

Row height	7
Row hash	0000befadd83449914c49265d53bde73ce1ad31528982359f2451c85cda8675f
Previous Row	0000c10a4cad3135d4898a2c1cbca1fa2afb1277b4f51910a1331f31f99db5c9
Created	06-08-2015 09:39:03
Entry Type	Company Data
Category	
File Hash	8d0c994bec2f7c45432e7e077996dcef0536988679a174c8ef136988731695e2
File Type	application/pdf
File Size	203Kb
File Name	EW715WorldCheckr
Geo Location	(51.5151230, -0.091
Public Key	30819f300d06092a8e5f7b3ac46d1d9a8bc84733344c9227bb
Signature	
Nonce	


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**Please note**

(1) General Legal Notice  
(2) Category Legal Notice  
(3) Reported Link Legal Notice

**Bens Keyring**

Key Ring ID: 3cc2f819-6368-4245-8b71-b592a2d4cf98




Notes: 4  
Files: 20  
Sub-rings: 2

Printed: 10-10-2013 10:06 UTC

Windsor	
INDSOR	Anne Elizabeth Alice Louise INDIVIDUAL
INDSOR	Louise INDIVIDUAL
INDSOR	Beatrice Elizabeth Mary INDIVIDUAL
	Alexandra INDIVIDUAL
	Elizabeth Alexandra Mary POLITICALINDIVIDUAL

**KRING**



Notes (0) +

Files (2) ±

Copy to subring



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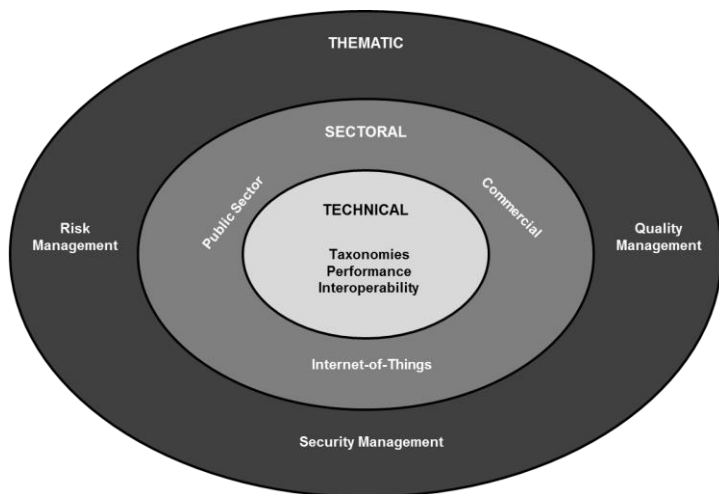
# Real World Standards & XML Matter

**LONG FINANCE**

**The Missing Links In The Chains?**  
Mutual Distributed Ledger (aka blockchain) Standards

**pwc** **STATES OF ALDERNEY** **CARDANO**

November 2016



**MetroGnomo BETA**  
Open-Source Distributed Timestamps

Home About News Stats

**ACORD**

VEHICLE OR EQUIPMENT CERTIFICATE OF INSURANCE Date: 17/08/2016

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

This form is used to report coverages provided to a single specific vehicle or equipment. Do not use this form to report liability coverage provided to multiple vehicles under a single policy. Use ACORD 25 for that purpose.

Producer: Ben's Insurance Broker  
 Contact Name: Ben Morris  
 Contact Phone: 1234 543456  
 Contact Fax: 01234 588735  
 Contact Email: zen@noemail.com  
 Producer Customer ID: 349587349857

INSURER(S) AFFORDING COVERAGE  
 Insurer A: Insurance R Us  
 Insurer B:

NAIC #  
 39593845987

DESCRIPTION OF VEHICLE OR EQUIPMENT  
 Year: 2010  
 Make / Manufacturer: Lamborghini  
 Description: A lovely car

Save

**MetroGnomo BETA**  
Open-Source Distributed Timestamps

**Metro Forms**

All forms currently stored on the MetroGnomo ledger are listed below. Or [Click here to create a new one](#). (You will need a Metro ID)

Metro Form	Created
<a href="#">Vehicle Or Equipment Certificate of Insurance</a>	Aug. 17, 2016, 1:18 p.m.
<a href="#">record</a>	Aug. 18, 2016, 4 p.m.
<a href="#">record</a>	Aug. 18, 2016, 4 p.m.
<a href="#">MRM Test Form</a>	Aug. 19, 2016, 1:07 p.m.
<a href="#">Ben Test</a>	Aug. 25, 2016, 11:47 a.m.
<a href="#">SafeShare</a>	Sept. 1, 2016, 11:22 a.m.



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# Real World Economics Matter

Factor	Bitcoin	Ethereum	Custom
Speed – transactions per second	7 tps	20 to 30 tps	>10,000 tps per single transmitter; unlimited transmitters
Storage	Fixed	Fixed	Fixed or Variable
\$/transaction	\$0.10 to \$2.50 to \$xx,xxx	\$0.20 to \$5.00 to \$xx,xxx	<\$0.000001
Validation time	circa 10 minutes	circa 15 seconds	<0.0001 second



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# Vision 1: Flame

## Disruptive Technological Transformation

- ◆ Has occurred in many industries
  - media, news, televisual
  - travel and hotel reservations
  - telecommunications
  - music
  - retail supply chain ...
- ◆ FinTech: is finance facing an 'Uber moment'?
- ◆ Cryptocurrency adherents - finance without financial intermediaries





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## Vision 2: Sloth Adaptation Of Current Processes

- ◆ Institutional landscape remains broadly the same as today (six Cs)
  - custodians, central securities depositories, central banks, central counterparties, correspondent banks, commercial banks
- ◆ Continuing evolution toward automated and standardised processes
  - payments and securities processing
  - 'business as usual' not a transformation





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# Ivy Theory Of Technology Deployment



“Learn the rules like a pro, so you can break them like an artist.”

— Pablo Picasso





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# Closing Thoughts

- ◆ Mutual distributed ledgers help communities share information across time and space, less vulnerable to natural monopolies
  - ◆ Mutual distributed ledgers provide persistent and permanent ‘contract’ utilities:
    - safeguarding transactions
    - preserving transactions & data
  - ◆ Mutual distributed ledger technology will displace much messaging and shared data functions
- ... try one out ... [www.MetroGnomo.com](http://www.MetroGnomo.com)

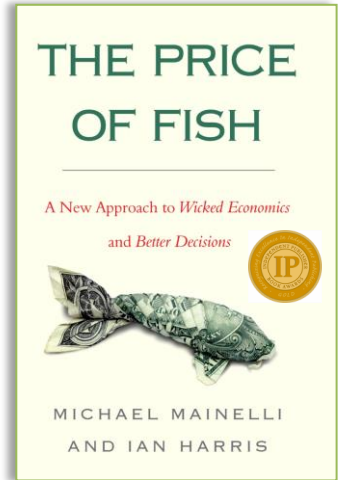


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# When Would We Know Our Commerce Is Working?



“Get a big picture grip on the details.”  
*Chao Kli Ning*



**Thank you!**

