Blockchain and smart contracts – an introduction

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Blockchain

Distributed Ledger
- Asset tokenization
- Data mutualization

Cryptocurrencies

Smart contracts
Blockchain characteristics

- Each transaction can be allocated to an identifiable person
- Name of person is not public (private key)
- Accuracy of transaction is guaranteed through signature
- Syntactic accuracy is secured by protocol of network
- Sequence of blocks reflects chronological nodes of blockbuilding
Blockchain design

- All transactions are in principle “public”
- Network is decentralized without intermediaries and central controller
- Changes of the blockchain protocol need the consent of all knots
- Split of blockchain is possible ("fork")
Smart contracts

Technology allowing the exchange of digitally referenced goods

Self-executing and automated computer “routine” according to programmed code

No personal involvement and no intermediaries (except “oracle”)

Legal issues related to conclusion and proper execution of smart contracts

Need for special dispute settlement procedures
Smart Contracts

Juliet Beckwith
Legal Counsel, Swiss Re

28 February 2018
University of Zurich
How a blockchain works

Blockchain keeps track of who owns what, and who owned what in the past

FULL HISTORY OF ALL PAST TRANSACTIONS
The B3i Blockchain
Blockhain Insurance Industry Initiative (B3i)

- **Vision:** Efficiency / Standards
- **Membership:**
  - currently 15 members
  - new joiners expected 2018
- **Current Focus:** P&C Property Cat XL prototype
- **Outlook:**
  - Pipeline of use cases
  - Industry collaboration

www.b3i.tech
Blockchain in the (re)insurance sphere

Transaction flow across multiple layers of counterparties: enabled by Smart Contracts
What is a “smart contract”? 

- The automation or partial automation
- In code
- On a blockchain
- Of certain “if this, then that” elements of a (contractual) relationship between/among parties
- “You will do this for me, I will do that for you”.

Generally includes:

- All nodes on the blockchain update to reflect the new state of the distributed ledger

After the “then that” occurs:
Essential Components of a Contract

- Offer
- Acceptance
- Intention to create legal relations
- Consideration
Offer & Acceptance: Time & Date Stamp

### Contracts Overview

<table>
<thead>
<tr>
<th>Contract</th>
<th>Status</th>
<th>Written Line Response</th>
<th>Last Status Change</th>
<th>Inception Date</th>
<th>Expiration Date</th>
<th>Broker</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Contract, Aegon only</td>
<td>Signed Contract (Active)</td>
<td>11-Oct-2017 at 11:18+02:00</td>
<td>01-Jan-2017</td>
<td>31-Dec-2017</td>
<td></td>
<td>broker7</td>
<td></td>
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<tr>
<td>Test</td>
<td>Draft</td>
<td>09-Oct-2017 at 16:15+02:00</td>
<td>01-Jan-2017</td>
<td>31-Dec-2017</td>
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Consideration
Intention to Create Legal Relations
Smart Contract as a Legal Contract

Parties' intent may be reflected, but still incomplete

- Indemnities
- Representations and Warranties
- Regulatory Provisions
- Governing Law
- Disputes

Vulnerabilities

- Human error
- Machine error
- Smart contract coding error
- Cyber attacks
Legal Contract + Code
Dispute Resolution
Dispute Resolution

Disputes (prior to an (allegedly) erroneous “then that”):

- Value of smart contract code is increased efficiency
- But (one) cost of such efficiency:

  less time to dispute before position deteriorates

Recommendation

- Coding: Include a “stop the presses” function
- If triggered by a party to the relevant legal agreement, suspends operation of the smart contract.
Termination of Contract

Blurred lines
Pressing end key does not terminate the paper contract

Actions
Notice of termination to be served as well as effecting termination of the automated process.
Mistake

Rectification?
Remedies: more questions than answers

• Which parties?
• How? – Immutable?
• When?

Putting the Parties back in the position they should have been in had the contract been properly performed?
## IP on the Blockchain

<table>
<thead>
<tr>
<th>Registry Use Cases</th>
<th>Use Cases</th>
<th>What</th>
<th>When</th>
<th>Irrefutable Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Log</td>
<td></td>
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<tr>
<td></td>
<td>Time Stamp</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Identification</td>
<td></td>
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<tr>
<td></td>
<td>Evidence of Ownership</td>
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<td></td>
<td>Provenance</td>
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</tbody>
</table>

### IP asserted per smart contract

- Complex
- Traditional contracts - better address ambiguity

### Use Cases

- Risk of ambiguity
- Indemnities for TP Liability
- Detail
- Adduce Evidence
Proprietary Aspects of the Blockchain

Collaboration
- emphasis on information sharing
- open dialogue
- no proprietary interest

Proprietary Aspects
- Break away from ‘new’ collaboration culture

Speed
- Registrations cause delays
- Exponential development
# The Summing Up: Pros & Cons of Smart contracts

<table>
<thead>
<tr>
<th><strong>PROS</strong></th>
<th><strong>CONS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Security</td>
<td>• Risk of (human) coding errors</td>
</tr>
<tr>
<td>• Cheaper (?) &amp; Quicker</td>
<td>• Self-sufficiency : unlikely</td>
</tr>
<tr>
<td>• Automatic execution eliminate intermediaries.</td>
<td></td>
</tr>
<tr>
<td>• Forces standardization</td>
<td>• Uncertain legal status</td>
</tr>
<tr>
<td>• reduces disputes</td>
<td>• Use - currently - unregulated.</td>
</tr>
<tr>
<td>• Suited to straightforward standardised tasks</td>
<td>• Requires programming skills</td>
</tr>
<tr>
<td>• Suited to non-bespoke transactions</td>
<td>• smart contract technology still in infancy.</td>
</tr>
<tr>
<td>• Increased certainty - provides</td>
<td>• Limited use – finance sector has more opportunities</td>
</tr>
<tr>
<td>• outcome certainties (if no dispute)</td>
<td></td>
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