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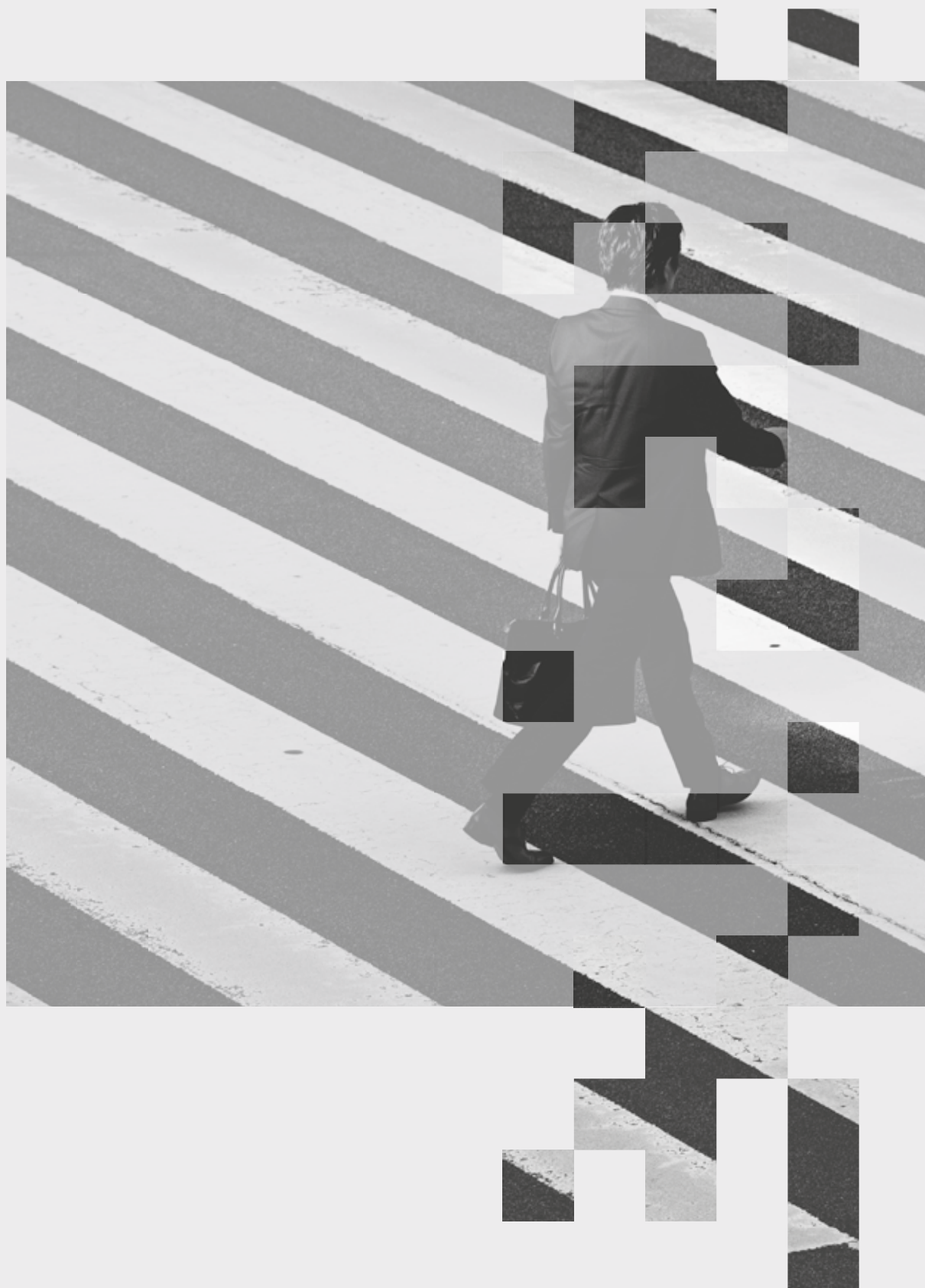
CLYDE  
CODE

CONNECTED  
CONTRACTING:  
SMART PARAMETRIC  
INSURANCE



## Smart contracts are a new way of doing old business

**Lee Bacon**  
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## BACKGROUND

Insurance is one of the foundations of trade and commerce, its practice dating back hundreds of years. Today, insurance, both in terms of how it is written and how it is purchased, is being transformed by the digital revolution. The Internet of Things, distributed ledgers and big data, among other developments, herald an array of new possibilities for insurers and policyholders alike.

Contracting is an area where the practice of insurance is ripe for revolution. Managing paper-based insurance policies often requires costly, manual administration, creating inefficiencies for both insurers and their insureds.

Seeking to address this, leading law firm Clyde & Co, in collaboration with Clause, a leading provider of technological infrastructure for smart legal contracting, have developed an adaptable commercial insurance agreement capable of using data about the real world to automate the agreement's operation. This 'connected contract' is believed to be the first off-the-shelf commercial insurance contract of its type (see box: What is a 'connected contract'?).

While this case study, detailed below, is an example of a particular type of insurance agreement, the principles behind it can be applied to other types of contracts.

The partnership between Clyde & Co, via its Clyde Code<sup>1</sup> smart contracts and blockchain consultancy, and Clause has created a new category of technology-enabled transactional legal services.

To find out how this smart parametric insurance contract or connected contracts more broadly can help your business, please contact:



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<sup>1</sup> <https://www.clydeco.com/clydecode>



# OPPORTUNITIES AND CHALLENGES IN MANAGING PARAMETRIC INSURANCE AGREEMENTS

Traditional first party property damage and third party liability coverage responds to loss events. Thus it can be difficult to provide certainty as to the full range of financial risks that companies are exposed to. In addition, traditional policies can be slow to pay out because of the need for a post-claim reconciliation of the event trigger and claim, which can result in poor customer satisfaction.

Insurance businesses may therefore turn to parametric insurance solutions to address traditional operational challenges and fill any gaps in coverage.

Parametric insurance requires an insurer to pay a policyholder when agreed upon measures of external events are met, whether or not actual

losses have been incurred. The most common types of parametric insurance provides cover against weather that is unfavourable to a business and catastrophic events such as the magnitude of an earthquake. Cover is therefore associated with a clear index mechanism and not subjective assessment of actual loss or damage.

## WEATHER LOSS STATISTICS<sup>2</sup>

Weather-related economic loss-events have **TRIPLED** since the **1980s**

**2017** was in the top five of years with the most natural catastrophes with events causing estimated losses of **USD 335 BILLION**

Weather impacts all commercial activities with **70%** of companies exposed to "**SEVERE WEATHER RISK**"

Every year, general weather variability is estimated to cost **USD 630 BILLION** for the US alone, or 3.5% of GDP

The benefits of parametric insurance are the speed of payment and the ability of policyholders to tailor payments to cover losses that traditional insurance contracts do not cover. However, managing parametric insurance can involve significant administrative resources thus

negating many of its advantages. Reducing the costs of administering parametric coverage increases the willingness of participants to adopt the product and its ability to provide commercial benefits.

<sup>2</sup> <http://bit.ly/UN-How-Much-Does-Climate-Change-Cost>  
<http://bit.ly/AGCS-Weather-Risk-Report>  
<http://bit.ly/HBR-Severe-Weather-Threatens-Businesses>

# THE CONNECTED PARAMETRIC INSURANCE CONTRACT

To improve the operations of parametric insurance, Clyde Code and Clause developed a connected parametric insurance contract which operates on the Clause platform. The contract insures solar energy producers against the risk of a shortfall in expected energy generation due to unfavourable weather in the form of lower than anticipated solar activity.

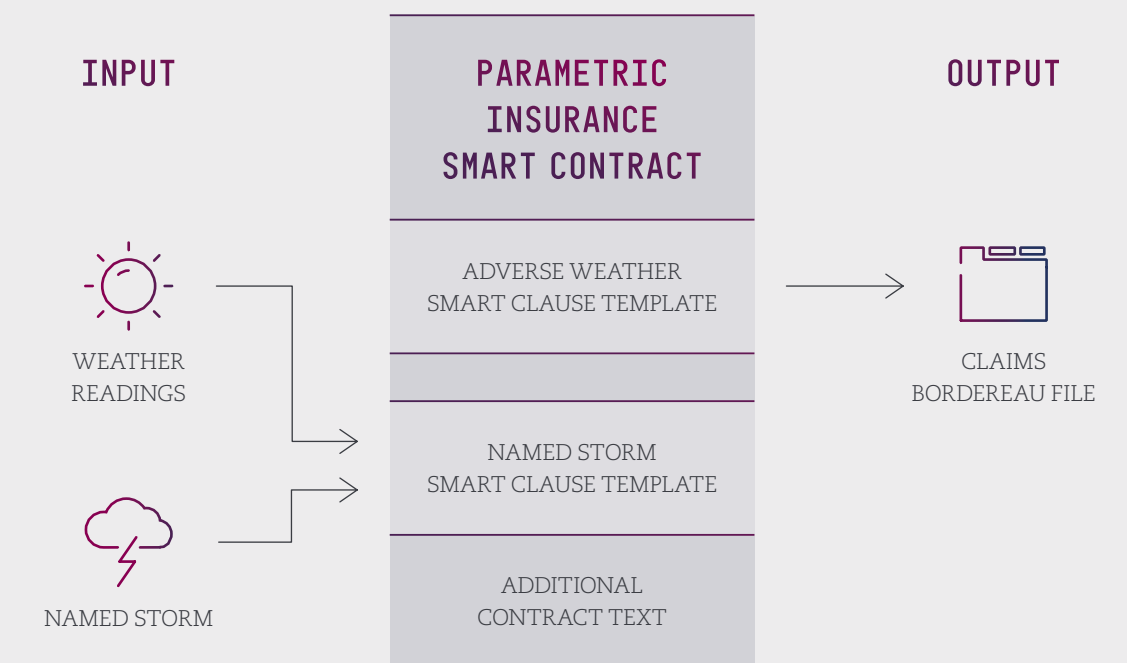
## WHAT IS A 'CONNECTED CONTRACT'?

- A connected contract is a legally binding agreement that is in digital form and connected to external software systems and sources of data
- The benefits of connected contracts include reducing administrative costs and creating new business models by enabling the performance and operations of contracts to be automatically managed and/or executed
- Connected contracts can be operationalised by inserting a Smart Clause® template into the contract document in a similar way to an e-signature block
- A Smart Clause is a provision of a contract rendered in a computational form. Party names, quantifiable terms and other variables are rendered so they can be connected to external data and software. Doing so enables the digitisation and automation of the parties' obligations. Smart Clause templates are created using the open source Accord Project<sup>3</sup> stack (see following page). A Smart Clause may be added to an existing agreement alongside traditional, prose provisions.
- Blockchain technology may enhance the operations of connected contracts when buyers, sellers and other stakeholders seek to share data and computational resources across a distributed network

The connected parametric insurance agreement automates the performance and operations of the legally binding policy. Under the terms of the contract, the insurer is generally required to pay the energy company for each day there is bad weather. However, payments are not required to be made during the time that the producer is within the vicinity of a storm that is named by the National Weather Service<sup>4</sup>. Payments are also subject to limitations that prevent payments for more than a number of consecutive and total days, or above a policy limit.

The agreement responds to weather data to automate performance of the policy by receiving weather data, calculating potential claims obligations, and producing an exportable claims bordereau. The following figure provides a high-level depiction of the general relationship between the data inputs, connected agreement and output claims file.

**FIGURE 1:  
CONNECTED PARAMETRIC INSURANCE CONTRACT PROCESS FLOW**



<sup>3</sup> [www.accordproject.org](http://www.accordproject.org)

<sup>4</sup> [www.weather.gov](http://www.weather.gov)

The following is the legal template text of the Smart Clauses in the connected parametric insurance agreement with the clause variables in bold brackets.

NAMED STORM SMART CLAUSE TEMPLATE

4.2. If during any hour during the Coverage Period the centre (or “eye”) of a Named Storm passes within a **{{detectionRadius}}**km radius of the Primary Reporting Location then neither Bad Weather Hours nor Good Weather Hours shall be calculated or deemed to occur for the duration of the Named Storm. The duration of the Named Storm shall (a) commence **{{offsetDuration}}** prior to the time that the centre (or “eye”) of the Named Storm passes within a **{{detectionRadius}}**km radius of the Primary Reporting Location (provided it has been designated a ‘named storm’ by the National Weather Service), and (b) continue for the time period of **{{offsetDuration}}** after the centre (or “eye”) of the “named storm” is no longer within a **{{detectionRadius}}**km radius of the Primary Reporting Location.

ADVERSE WEATHER SMART CLAUSE TEMPLATE<sup>5</sup>

Between

- (1) **{{insurer1}}** (Insurer 1);
- (2) **{{insurer2}}** (Insurer 2); and
- (3) **{{insured}}** (the Named Insured).

Policy terms and conditions

In consideration of the payment of the Premium and reliance upon all statements, representations and warranties made and information furnished to the Insurer, including the statements made in the Application and all attachments and materials submitted therewith and subject to all the provisions of this Policy, the Named Insured and the Insurer agree as follows:

1. Definitions

Bad Weather Hours Deductible: **{{deductibleDays}}** Bad Weather Days.

Coverage Period: the period commencing on the Inception Date and ending **{{policyPeriod}}** later.

Good Weather Days: subject to Clause 4.2 of this Policy, any Day following the Inception Date where the weather data is more than or equal to **{{badWeatherValue}}**, as reported by the Reporting Agency for the Primary Reporting Location.

Inception Date: 00:00:00 on **{{policyStartDate}}**.

Policy Limit: Up to a total of **{{capPolicyValuePaid}}** in the aggregate, being amount payable under this Policy for up to a maximum of **{{capPolicyDaysPaid}}** Bad Weather Days in excess of the Bad Weather Days Deductible during the Coverage Period, calculated in accordance with Clause 4.1 hereunder.

Premium: means **{{premiumValue}}** plus all applicable taxes (including, for the avoidance of doubt, insurance premium tax) payable in respect thereof.

Primary Reporting Location: means **{{insuredGeoLocation}}**.

2. Insuring clause

2.1. Subject to and in accordance with the other terms, limitations, exclusions and conditions of this Policy, including for the avoidance of doubt the Policy Limit and the payment of the Premium to the Insurer in accordance with Clause 3, the Insurer will insure the Named Insured in respect of up to **{{capPolicyDaysPaid}}** Bad Weather Days above the Bad Weather Days Deductible occurring during the Coverage Period.

[...]

4. Insured losses and named storms

4.1. The Insurer shall, in accordance with Clause 6.2 below, pay the Named Insured an amount equal to **{{dailyPayoutValue}}** Day for each Bad Weather Day in excess of the Bad Weather Days Deductible up to a maximum limit of **{{capConsecutiveDaysValue}}** for any consecutive **{{capConsecutiveDaysPaid}}** Day period and subject always to the Policy Limit and the other terms, limitations, exclusions and conditions of this Policy.

<sup>5</sup> Abridged legal text

A bordereau is ‘a detailed report of insurance premiums or insurance losses’.<sup>6</sup> In this example, the bordereau file generated provides detailed daily data about the weather and claims entitlement of the insured on a monthly basis. Importantly, the claims bordereau also lists the daily claims decision based upon the legally binding terms of the parametric insurance agreement. The following figure is a truncated representation of the bordereau:

FIGURE 2: CLAIMS BORDEREAU

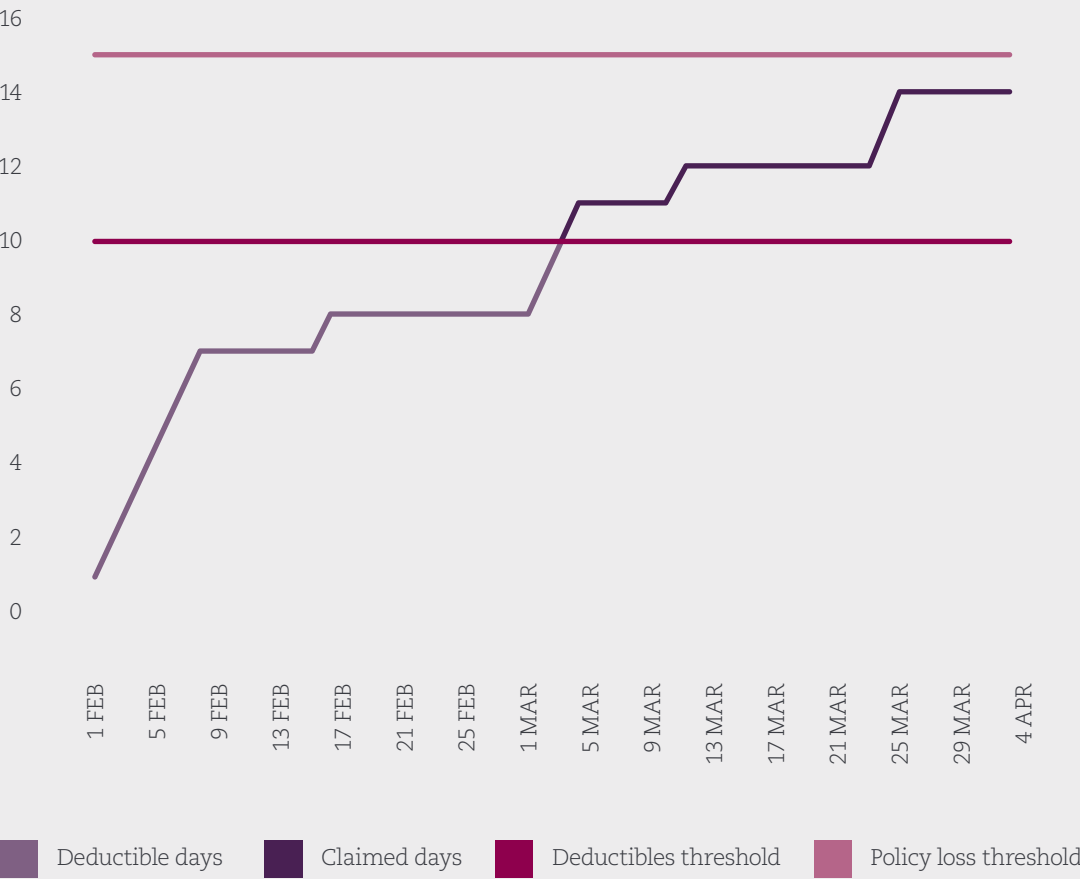
Date	Measurement	Adverse Day?	Named Storm?	Decision	Deductible Days Remaining	Days Paid Count	Claim Value
FEB 1	63	TRUE	FALSE	Adverse weather day taken from deductibles	9	0	
FEB 2	68	TRUE	FALSE	Adverse weather day taken from deductibles	8	0	
FEB 3	73	TRUE	FALSE	Adverse weather day taken from deductibles	7	0	
FEB 4	75	TRUE	FALSE	Adverse weather day taken from deductibles	6	0	
FEB 5	82	TRUE	FALSE	Adverse weather day taken from deductibles	5	0	
FEB 6	76	TRUE	FALSE	Adverse weather day taken from deductibles	4	0	
FEB 7	85	TRUE	FALSE	Adverse weather day taken from deductibles	3	0	
FEB 8	91	TRUE	FALSE	Consecutive day cap reached	3	0	
FEB 9	85	TRUE	FALSE	Consecutive day cap reached	3	0	
FEB 10	95	TRUE	FALSE	Consecutive day cap reached	3	0	
FEB 16	98	TRUE	FALSE	Adverse weather day taken from deductibles	2	0	
MAR 1	96	TRUE	FALSE	Adverse weather day taken from deductibles	1	0	
MAR 2	93	TRUE	FALSE	Adverse weather day taken from deductibles	0	0	
MAR 3	85	TRUE	FALSE	Adverse weather day paid	0	1	\$10,000
MAR 10	97	TRUE	FALSE	Adverse weather day paid	0	2	\$10,000
MAR 23	99	TRUE	FALSE	Adverse weather day paid	0	3	\$10,000
MAR 24	97	TRUE	FALSE	Adverse weather day paid	0	4	\$10,000

<sup>6</sup> <http://bit.ly/bordereau-explained>

This data may also be displayed in an easy-to-read, analytics dashboard. The following figure shows the one-month claims data associated with a connected insurance agreement for an insured that had a total of 14 claimable bad weather days. The terms of the agreement permits claims for 7 consecutive days, has a 10-day Deductibles Threshold, and an overall Policy Loss Threshold limit of 15 days.

By displaying data in graphical form, users are able to visualise and dynamically analyse contract data in real-time directly from the contract. When applied across a corpus of agreements, this has the potential to have transformational business benefits.

FIGURE 3: CLAIMS DATA



ACCORD PROJECT:  
AN OPEN SOURCE STACK FOR SMART LEGAL CONTRACTS

- The connected parametric insurance agreement is built using open source libraries for smart legal contracts developed through the Accord Project<sup>7</sup>. The Accord Project is a non-profit initiative that develops an open source technology stack for smart legal contracts for use by transactional attorneys, business and finance professionals, technology providers, and other contract users.
- The Accord Project was initially established by Clause to provide and maintain a techno-legal foundation for smart legal contracts than can be applied across technology infrastructures. The Project’s members include over 50 of the world’s most prominent global law firms (including Clyde & Co) and leading technology providers such as IBM, R3 and Digital Asset.
- Smart legal contracts are distinct from decentralised applications that operate using blockchain technology, which are often confusingly referred to as ‘smart contracts’. Smart legal contracts do not need to use blockchain “smart contracts” to automate or otherwise digitise their operations. However, in the appropriate circumstances, smart legal contracts may be enhanced by using blockchain technologies. For example, data about the performance and operations of a contract may be stored on a shared blockchain network. In addition, the computation that automates compliance with the terms of a contract may be run on a blockchain to enhance visibility and trust, or code may be executed using a distributed ledger to perform a digital asset transfer pursuant to a smart legal contract.
- These varying implementations can be accomplished from a single template without redrafting, demonstrating the importance of a common foundation.

<sup>7</sup> [www.accordproject.org](http://www.accordproject.org)



# ACCURACY, VISIBILITY AND HEIGHTENED COMPLIANCE

Due to the particular challenges of parametric insurance, the successful operationalisation of connected contracts brings many benefits to both policyholders and insurance companies. These benefits include:

- enhancing the automation and accuracy of payment calculations;
- increasing the visibility of weather data and business analytics related to the performance of a parametric insurance agreement;
- creating an audit trail of contract performance and claims obligations; and
- reducing the overall administrative cost from manually managing policies.

In addition, the data produced by a connected parametric insurance contract can feed into other platforms to trigger reinsurance recoveries or to manage the transmission of power from the insured to its customers under a take or

pay system. A connected parametric insurance contract can also be integrated with distributed ledger technologies, provides the additional benefits of interoperability and standardisation in distributed ledger networks. Given the efficiencies of automated processing, and the in-built audit and bordereau functions, the use of such connected contracts can enhance existing risk transfer and also facilitate new business models. By displaying data in graphical form, users are able to visualise and dynamically analyse contract data in real-time directly from the contract. When applied across a corpus of agreements, this has the potential to have transformational business benefits.



**Getting smart contracts technically right and legally compliant demands some quite hybrid advisory skills. Traditional lawyers may struggle with the coded elements, while coders may struggle in turn with some of the broader legal issues.**

Artificial Lawyer



## WHAT'S NEXT FOR CONNECTED INSURANCE CONTRACTS?

**This collaboration involved the enhancement of a specific component of a parametric insurance contract. A connected parametric insurance contract can also automate or streamline actions such as:**

- Payments and currency conversions
- Premium adjustments based upon insured's loss ratios and credit rating
- Periodic renewal quotes
- Allocations among co-insurers and coverage limits for entities

Clause enables any type of commercial legal agreement, including any type of insurance and reinsurance agreement, to simplify and automate a wide range of contract operations and connect to a wide variety of business systems and sources of data. Clause can be quickly adapted to virtually any enterprise IT environment.

## ABOUT CLAUSE

Clause provides the technology infrastructure for connected contracts to increase the value and improve the management of agreements. Connected contracts enable any type of commercial legal agreement, including any type of insurance and reinsurance agreement, to simplify and automate a wide range of contract operations and connect to a broad range of business systems and sources of data.

For further information, please contact:  
[sales@clause.io](mailto:sales@clause.io)

## ABOUT CLYDE & CO AND CLYDE CODE

Clyde & Co is a global law firm with a pioneering heritage and a focus on its core sectors of insurance, energy, trade and commodities, transport, and infrastructure. The firm has a presence in every global region, including the Americas, UK and Europe, the Middle East and Africa, and Asia Pacific. Clyde Code is the firm's consultancy supporting companies on all aspects of smart contracts, distributed ledger technologies and tokens. Clyde Code's legal and technical specialists work together to bridge the legal and technical gap to advise across the spectrum, from smart contract creation and enhancement to verification and enforcement.

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Clyde Code is a first-of-its-kind partnership covering both technical and legal aspects of smart contracts

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