

Cryptocommerce with its ideal realization of a impartial framework of rules can provide secure arrangements. But we still rely on the legal system to insulate us from the rules of biology. Both systems will co-adapt, each constraining the other without either one emerging as dominant.

Blockchain-based arbitration is just like traditional arbitration except it takes place on blockchains, such as Ethereum. The arbitration agreement forms part of the smart contract, arbitrators are selected using random numbers extracted from the blocks in the blockchain and the award is also embedded in a self-executable smart contract.

There is currently no regulation in transnational blockchain-based arbitration. Any such regulation faces a number of serious challenges, such as how to determine the applicable jurisdiction in a blockchain-based arbitration. This article seeks to address such challenges by

suggesting some possible guidelines.

How we can peacefully transition into cryptoccommerce by Using DApps like Kleros

Decentralized applications (“DApps”), such as Kleros Court, have emerged. These DApps use blockchain-based decision-making and blockchain-based arbitration to solve commercial disputes.

The cornerstone of any justice system is that no one shall be punished without the benefit of due process. Accordingly, the primary objective of any regulation must be to ensure that due process prevails in any type of blockchain-based arbitration available to the public.

Due process is a fundamental plank of international arbitration. The New York

Convention on the Recognition and Enforcement of Foreign Arbitral Awards (“the New York Convention”) enshrines this concept. Article V(1) (b) of the New York Convention may sanction a lack of due process by refusing to recognize and enforce an award. However, such a sanction is futile in the case of awards rendered via self-executable smart contracts, since enforceability is automatic.

When considering the “*regulability*” of DApps dealing with dispute resolution, it is useful to consider the “Pathetic Dot Theory” or “New Chicago School Theory” elaborated by Lawrence Lessig in 1998. This theory postulates that we, the pathetic dots, are regulated, or more precisely, constrained by four forces. These are the law, social norms, the market and technical infrastructures.

These constraints interact in a very peculiar manner as regards due process in blockchain-based arbitration DApps. First, there is a jurisdictional challenge inherent to the

decentralized nature of the applications, which limits the effects of national and international laws in safeguarding due process in blockchain-based arbitration. Then, whilst social norms provide for due process when upholding fairness and equality as regarded principles in society, there is no real or immediate sanction imposed by society in the case of blockchain-based arbitration.

In the absence of any real pressure coming from the law or social norms, it is the market and the technical architecture that seem to be the preponderant forces in setting boundaries over the development of this type of technology. It would be logical for the market to opt for arbitration DApps that ensure the prevalence of due process in the arbitrations administered by them. This logic relies on the Natural Law theory, according to which certain rights pre-exist

legislation since they are based on reasons for action that can be, and often are, sound as reasons alone and therefore normative for reasonable people addressed by them. The market exerts substantial pressure on developers to code due process compliant protocols for DApps in an attempt to attract users.

Alongside market forces, it is important to recognize the influence of the architecture of DApps and understand if and how Lex Cryptographia may safeguard the fundamental right of due process. Lex Cryptographia can be defined as a set of rules administered through smart contracts and decentralized organizations. By developing complex systems of smart contracts, blockchain technology can be used to establish or code self-executable rules among the individuals participating in a blockchain network. Smart contracts have the potential, therefore, to rewrite the rules of the game.

Some commentators contend that the ineffectiveness of the law in regulating blockchain networks will allow for the emergence of the Lex Cryptographia ecosystem. This offset, when observed in the realm of fundamental rights, implies that it would no longer be the State that ensures the protection of fundamental rights within the blockchain, but the technology itself.

Several fundamental rights can also be enforced within the Lex Cryptographia ecosystem. It also explains the paradigm that occurs when two rights collide. This paradigm is founded on the contradiction between the freedom of speech of an individual vis-à-vis the privacy rights of another individual. Blockchains may be ecosystems in which freedom of speech would prevail over privacy due to the decentralized and immutable innate qualities of the technology.

In the case of due process, however, the

paradigm does not apply in light of the shared interests of the parties to have the right to present their case. The right that could oppose or contradict the right to due process could be the right to an efficient process. When analyzed with care what may *prima facie* appear as a contradiction could in turn be a complementary right. Due process is in fact linked to the right of the parties to an efficient process, i.e., it is not a matter of sacrificing one for the other, but rather upholding both rights in careful balance in order to assure that the parties have an equal and effective right to fully present their case. In this regard, “due process and efficiency can be seen as the two sides of the same coin.

Lex Cryptographia allows for effective self-executable, immutable, rules of conduct and thus may be entirely compatible and even ideal for safeguarding due process in arbitrations conducted via DApps.

By analyzing the way Kleros Court works under due process legal standards it may be possible

to develop a series of guidelines (soft law) that, if embedded in code Lex Cryptographia, could ensure due process.

Kleros Court

Kleros Court is a decentralized application built on top of Ethereum that works as a decentralized third party to arbitrate disputes in a fast, inexpensive, reliable and decentralized way

The Kleros Court Handbook on Decentralized Justice states "...compliance [with] due process requirements is a built-in feature of the protocol [since] stages such as proper notice of the parties, the composition of the jurors tribunal, exchange of evidence and comments of the parties are executed automatically by smart contracts.

Kleros Court interacts with an arbitrable smart contract, i.e. a smart contract that contains an

arbitration clause in which the parties agree to submit their disputes to arbitration in Kleros Court.

A Kleros Court arbitration can be summarized as follows

- **Request for arbitration:** the claimant completes a simple form explaining its claim and Kleros Court's interface sends an email to the respondent notifying it that a dispute has been raised.
- **Appointment of arbitrators:** an email is sent to each juror's inbox in the following terms: "You have been selected as a juror on a website quality dispute. Download the evidence here. You have three days to submit your decision". The jurors are selected randomly from a pool of almost 3,000 candidates. They will never know each other, but they will collaborate to settle the dispute.

- In order to be selected jurors have to stake pinakion (PNK).[15] The more tokens they stake, the more likely it is that they will be selected. In order for the random selection of jurors to be resistant to manipulation, the random numbers used to select jurors are drawn from numbers for a block in the blockchain known as blockhashes.
- **Taking of evidence:** in order to create a standard way for smart contracts to share with Kleros Court information and documents or files, Kleros Court's developers have created a specification called "Evidence standard-1497". This specification sets forth the criteria that other smart contracts should follow in order to be compatible with the Kleros Court DApp. If smart contracts adhere to the standard, jurors from Kleros Court will be able to access the information and context shared by the smart contract from which a dispute has arisen.

- **Voting:** the smart contract should provide for the options that the jurors may vote on and the result of each option. For example:
- “Reimburse Claimant” transfers funds to the claimant’s address;
- “Give Respondent one extra week to finish the website” advances the timers for how long the respondent has to finish the website one week, i.e. blocks the claimant from creating new disputes during this time (the smart contract might state that if this option has been chosen once, it cannot be selected in further disputes); or
- “Pay Respondent” transfers funds to the Respondent’s address

To incentivize jurors to vote for the most reasonable option, jurors whose vote is not coherent with the group will not receive their arbitration fees and furthermore they will lose some tokens. Once there is a decision on the

dispute, tokens are unfrozen and redistributed among jurors. The redistribution mechanism is inspired by the concept of Schelling Point (also known as Focal Points) developed by the game theorist Thomas Schelling.

- **Appeals:** if a party believes that the award is unfair, it can appeal the decision. Awards can be appealed several times, only each time the number of jurors would be doubled and an additional juror would be added. The appealing party would have to pay the costs of the appeal which will increase substantially on every appeal (Cost of Appeal = Arbitrator's fees x Number of Jurors. The increasing costs are designed to deter parties from appealing unreasonably.

Findings and conclusions

Certain requirements of due process, such as the basic notice requirement and the opportunity

for parties to present evidence to support their case, are in fact built into the architecture of Kleros Court DApp. This provides a clear example of how the rule of law can be translated to Lex Cryptographia and efficiently regulate the behavior of users of blockchain technology. However, certain areas of due process regulation need improvement.

While the notice of the arbitration does not necessarily have to comply with a specific formality, courts tend to assess the fulfillment of the notice requirement based on the conduct of the parties and on whether the party alleging the lack of proper notice had the opportunity to participate in the arbitration and present its case. Considering that proceedings conducted through blockchain-based arbitration DApps are conducted virtually, swiftly and with little interaction between the parties, the assessment of the conduct of them may be complex. It is recommended, therefore, to have evidence of the notice delivery and receipt (when possible) so there is proof in the record pointing towards

the adequacy of the notice.

As regards the content of the notice, the parties shall be notified of the proceedings and of the arbitrator's appointment. The notice should contain the names of the appointed arbitrators, since this will provide the parties with the fair opportunity to justifiably object to their appointment.

From the above, the following guidelines in relation to the notice requirements should be considered to ensure due process:

- After the drawing of the jurors has taken place, a notice of the proceeding and the selection of jurors shall be sent to the parties, containing the names of the selected jurors.
- Parties shall have the opportunity to object to the selection of a jury that may be considered biased. The objection can be resolved by the non-objected jurors. If jurors

find the objection to be justified a new draw shall occur for the substitution of the biased juror. If there is no objection to the juror selection, the proceeding shall continue as stated.

- In order to discourage the parties from raising groundless objections, parties can be penalized if the objection is found to be groundless by the other jurors.
- In the unlikely event that all jurors are objected, a new draw will take place and an “extra draw fee” can be charged to the objecting party or parties proportionally. Just like in the case of appeals, the “extra draw fee” could increase exponentially with every additional draw.
- Notice has to be delivered to the address included by the parties within the original contract.
- Preferably, an acknowledgement of receipt

shall be sent to Kleros Court and the opposing party once the respondent has opened the notice. Upon such date the terms for the proceeding can start.

- If the first email is not opened within a day a second email shall be sent. If the respondent does not open this second notice within a day then the terms for the proceeding shall start.

Moreover, parties should be granted an equal opportunity to present their case. International precedent suggests that a breach of due process occurs under the following circumstances: (i) when a party is prevented from submitting crucial evidence; (ii) when a party is prevented from receiving evidence from an opposing party; (iii) when an arbitral tribunal declares inadmissible the submission filed by a party after the closing of the proceedings while relying on a subsequent submission filed thereafter by the other party; and (iv) when a party is denied the right to comment on or

respond to evidence and arguments from the opposing party.

While the Kleros Court architecture already allows the parties to submit evidence to support their respective cases, it does not provide for sequential evidence periods that would ensure the parties an opportunity to respond to the evidence and arguments submitted by the opposing party.

The following guidelines in relation to the equality of arms should be considered to ensure due process:

- The evidence period shall be divided into the following sequential sub-periods of equal length:
- Claimant's evidence submission.
- Respondent's response to Claimant's evidence submission.

- Claimant's rebuttal.
- Respondent's surrebutal.
- The last two periods are subject to the parties' agreement.
- All evidence shall be accessible for parties and jurors alike.
- Parties shall not be allowed to submit evidence outside of their respective evidence submission periods, except in the event that a piece of evidence becomes known to a party after the evidence periods have elapsed.
 - In such case, the counterparty shall have the opportunity to contest such piece of evidence.

From a review of the Kleros Court architecture and the above-suggested areas of improvement, it is evident that a set of due process guidelines

may be translated into a smart contract for developers of blockchain-based arbitration DApps to consider when developing their architecture. The codification of these guidelines and its incorporation in the design of arbitration DApps would ensure compliance with due process in the arbitration proceedings carried therein.