

# Brehon Arbitration Protocol (Draft)

A third party arbitration protocol for smart contracts

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## Abstract

Brehon (named after the private law system in ancient Ireland) is a third-party arbitration solution for smart contracts on the Ethereum network. This arbitration solution could enable any smart contract to be arbitrated if the parties involved raise a dispute about the intent and execution of the smart contract.

Human arbitration allows for the creation of more complex smart contracts with the safety and enforceability of real world contracts.

## Process

Brehon enables smart contracts to utilize the benefit of third-party arbitration.

The arbitrator (the “Brehon”) will have enumerated powers defined in the smart contract (e.g., the ability to release funds). Within the confines of these powers, the arbitrator will resolve disputes raised by the parties to the contract.

Parties to smart contracts will also have the option of including multiple Brehons to allow for an appeal process within the smart contract (for example an m-of-n tie breaker mechanism).

The Brehon’s fee can also be included in the smart contract. Alternatively, Brehons may provide their services as an insurance/subscription/retainer model.

## Enforceability

The Brehon enforces his decision only by controlling the funds deposited in the contract, including sureties deposited by the parties before the contract commences, which can include the Brehon's fees for service.

## Provider model

The provider or the insurance model works on the actuarial analysis of the smart contracts by the Brehon. A Brehon may offer blanket coverage to his subscribers based on the amount of risk their contracts carry (and the subscriber's actuarial profile). In addition a Brehon may also offer standardized contracts to ease friction in the whole process (and to reduce fees).

This is implemented as a smart contract which can directly interface with the Brehon protocol.

## Hybrid model

The Brehon protocol can also be used in concert with traditional contracts, either between the parties, or between either party and a Brehon or other arbiter.

## Binary vs Non-Binary outcome

The outcome of a dispute can be either binary (where the decision goes in the favor of one party or the other, for instance a betting contract). Or it could be a non-binary decision where the judgment may be given partially in the favor of one party.

## Fees and Compensation

The dispute resolution fees can be either fixed or contingent on performance.

### Fixed fees:

Brehons can be paid fixed fees for [arbitrating contracts, i.e., being party to the contract], for [resolving disputes, i.e., giving a judgement, regardless of satisfaction by the parties],

### Contingent fees:

In a binary outcome, the fee is paid to the Brehon(s) who gave the correct resolution. In a non-binary outcome the fee is awarded in proportion to the accuracy of the judgment rendered.

## Business applications

Brehon arbitration protocol enables Smart contracts to take advantage of human judgment while maintaining the benefits and security of a decentralized cryptographically verified data structure such as the blockchain.

### Financial applications

Smart Contracts represent the future of finance. Smart contracts provide the ability to perform trustless financial transactions over the Internet, and billions of dollars worth of assets are currently managed on the blockchain. However, smart contracts do not yet include every benefit of traditional contracts.

One significant missing feature is the ability of a human third party to step in and fix not only unintentional mistakes (e.g., in the code or formal structure of the contract) but also disputes regarding the performance of either party.

By employing the Brehon protocol, financial smart contracts can rely upon the same safeguard of intelligent interpretation as that of a traditional contract.

A Brehon facilitated smart contract will provide more security at lower cost, and resolve disputes without resorting to expensive litigation or drastic technological measures (such as a hard fork of the blockchain).