EIP 792

The standard for Arbitra(tion/ble) smart contracts.

A Primer on Blockchains

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- Are distributed data stores that can be used to store any sort of data (e.g. Bitcoin stores balances for a bunch of addresses.).
- Can be edited as long as certain rules are followed (e.g. No double spending, no spending of others' funds, etc.).
- Guarantee provable data integrity, commonly through different consensus protocols based on `cryptography + economics = cryptoeconomics`.

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- Have their own address to which you can send `TX`s with some input data and value and have some logic executed on-chain.
- Guarantee provable data and state transition integrity through the chain they live on, in our case, Ethereum.

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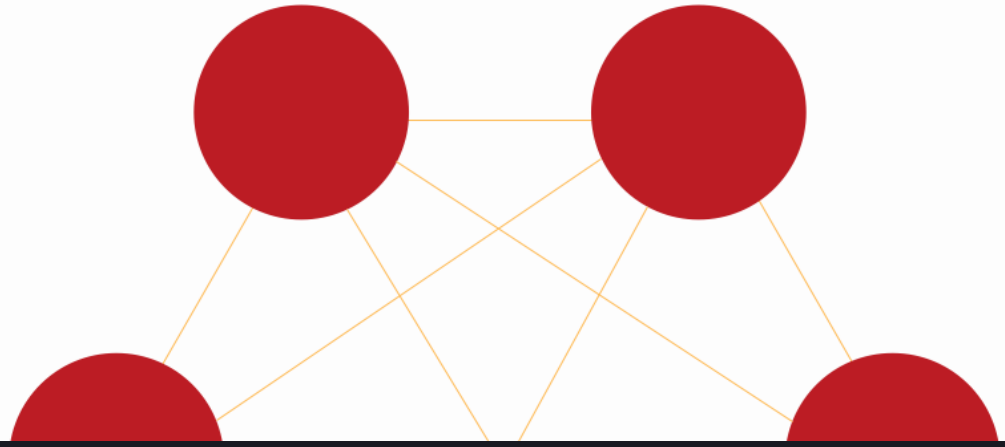
Smart Contracts Back Ends:

- Leave most of the heavy lifting for the front end, because computation is expensive and slower than on the client.



EIP 792 Arbitrator: Interface

```
contract Arbitrator {
    function createDispute(
        uint _choices, bytes _extraData
    ) public requireArbitrationFee(_extraData) payable returns(uint disputeID) {};

    function arbitrationCost(bytes _extraData) public view returns(uint fee);

    function appeal(
        uint _disputeID, bytes _extraData
    ) public requireAppealFee(_disputeID,_extraData) payable {
        emit AppealDecision(_disputeID, Arbitrable(msg.sender));
    }

    function appealCost(uint _disputeID, bytes _extraData) public view returns(uint fee);

    function appealPeriod(uint _disputeID) public view returns(uint start, uint end) {}

    function disputeStatus(uint _disputeID) public view returns(DisputeStatus status);

    function currentRuling(uint _disputeID) public view returns(uint ruling);
}
```

EIP 792 Arbitrator: Types and Events

```
contract Arbitrator {
    enum DisputeStatus { Waiting, Appealable, Solved }

    event DisputeCreation(uint indexed _disputeID, Arbitrable indexed _arbitrable);

    event AppealPossible(uint indexed _disputeID, Arbitrable indexed _arbitrable);

    event AppealDecision(uint indexed _disputeID, Arbitrable indexed _arbitrable);
}
```

EIP 792 Arbitrable: Interface and Events

```
contract Arbitrable {
    event Ruling(Arbitrator indexed _arbitrator, uint indexed _disputeID, uint _ruling);

    function rule(uint _disputeID, uint _ruling) public onlyArbitrator;
}
```

Evidence Standard:

Link

Composed Arbitrable Contracts:

Link

EIP 792 Arbitrator: Simple Example

Centralized Arbitrator: Set Up

```
contract CentralizedArbitrator is Arbitrator {
    struct Dispute {
        Arbitrable arbitrated;
        uint choices;
        uint fee;
        uint ruling;
        DisputeStatus status;
    }

    address public owner = msg.sender;
    uint arbitrationPrice;
    uint constant NON_PAYABLE_VALUE = (2 ** 256 - 2) / 2;
    Dispute[] public disputes;

    modifier onlyOwner {require(msg.sender == owner, "Can only be called by the owner."); _;}

    constructor(uint _arbitrationPrice) public {arbitrationPrice = _arbitrationPrice;}
}
```

EIP 792 Arbitrator: Simple Example

Centralized Arbitrator: Setters and Getters

```
contract CentralizedArbitrator is Arbitrator {
    function setArbitrationPrice(uint _arbitrationPrice) public onlyOwner {
        arbitrationPrice = _arbitrationPrice;
    }
    function arbitrationCost(bytes _extraData) public view returns(uint fee) {
        return arbitrationPrice;
    }
    function appealCost(uint _disputeID, bytes _extraData) public view returns(uint fee) {
        return NON_PAYABLE_VALUE;
    }
    function disputeStatus(uint _disputeID) public view returns(DisputeStatus status) {
        return disputes[_disputeID].status;
    }
    function currentRuling(uint _disputeID) public view returns(uint ruling) {
        return disputes[_disputeID].ruling;
    }
}
```

EIP 792 Arbitrator: Simple Example

Centralized Arbitrator: Creating and Ruling Disputes

```
contract CentralizedArbitrator is Arbitrator {
    function createDispute(uint _choices, bytes _extraData) public payable returns(uint disputeID)  {
        super.createDispute(_choices, _extraData);
        disputeID = disputes.push(DisputeStruct({
            arbitrated: Arbitrable(msg.sender),
            choices: _choices,
            fee: msg.value,
            ruling: 0,
            status: DisputeStatus.Waiting
        })) - 1;
        emit DisputeCreation(disputeID, Arbitrable(msg.sender));
    }

    function giveRuling(uint _disputeID, uint _ruling) public onlyOwner {
        DisputeStruct dispute = disputes[_disputeID];
        require(_ruling <= dispute.choices, "Invalid ruling.");
        require(dispute.status != DisputeStatus.Solved, "The dispute has already been ruled.")

        dispute.ruling = _ruling;
        dispute.status = DisputeStatus.Solved;
        msg.sender.send(dispute.fee);
        dispute.arbitrated.rule(_disputeID, _ruling);
    }
}
```