Ethereum Master Thesis

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1 Abstract

Our design includes

2 Introduction

$$RIPEMD_{256} \tag{2.1}$$

3 Problem Statement

3.1 OK

How an entity can manage the energy consumed by a complex system of energy meters. The system should be able to bill and perform accounting on the metering data, based on an accounting model The system must be transparent, distributed, decentralized, easy-to-use and secure. Anyone in the network should be able to verify the validity transactions. It also needs to be scalable at reasonable cost.

4 Blockchain Basics

4.1 Blockchain Fundamentals

4.1.1 Cryptographic Hash Functions

4.1.2 Transaction

A transaction is a bunch of data

4.1.3 Block

A block is a group of Transactions

4.1.4 Blockchain

A blockchain is a series of blocks linked to its previous one by referencing a hash pointer

4.2 Ethereum

4.2.1 EVM state machine

4.2.2 Transactions in Ethereum

4.2.3 Gas

4.2.4 Transaction Fees - Scalability

5 Blockchain Scalability

6 Smart Contract Security

7 State of the Energy Market

8 Design and Implementation

8.1 Business Logic

Explain company structure

8.2 Smart Contracts

Explain the Smart Contracts suite

```
pragma solidity ^0.4.16;

contract TestContract {

  string private myString = "foo";
  uint private lastUpdated = now;

  function getString() view external returns (string, uint) {
    return (myString, lastUpdated);
  }

  function setString (string _string) public {
    myString = _string;
    lastUpdated = block.timestamp;
  }
}
```

8.3 Monitoring Server

Explain monitoring server

8.3.1 REST API

Explain rest api usage

8.3.2 Python Client

Explain python implementation of rest api

8.3.3 web3.py interaction

Explain how web3.py interacts with monitoring server and sends data to Smart Contracts

9 Conclusion

Final remarks include.