Building and Running an Auditing Solution on Blockchain

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Who am I?

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Agenda

- Understand blockchain use case for auditing
- WikiChangeTracker - Blockchain based audit trails solution
- Technical Deep Dive
- Demos
- Q/A

What is blockchain?

- A ledger is a write only database most commonly used in accounting

- The digital distributed ledger creates the same copy of the data across all the participating nodes

- All new transactions are encrypted and then broadcast across the blockchain network to be added to the system

- Participants in the blockchain verify the transaction is valid and then writes it to the ledger

- This is the technology originally designed to power the bitcoin currency

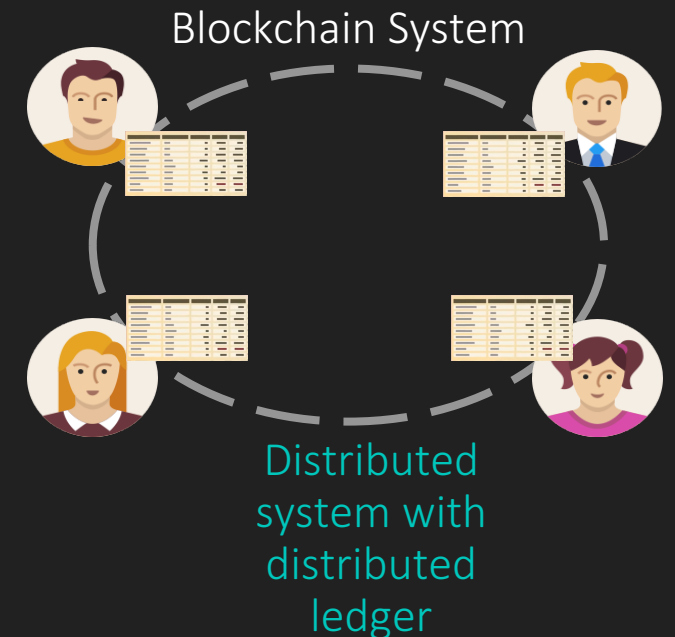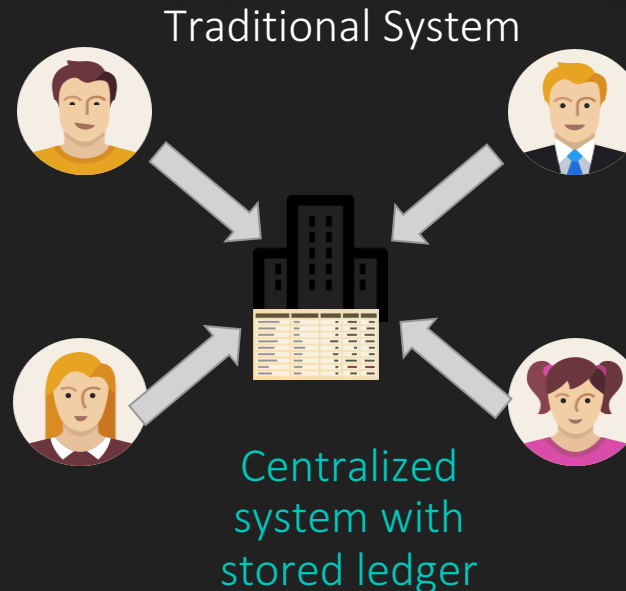| FROM	TO	PROPERTY	VALUE
Alex	Katie	Payment	$500
Jim	Sally	Payment	$300
Alex	Garth	Asset	Car
Katie	Tony	Payment	$100
Molly	Paula	Message	I like tea

Example ledger
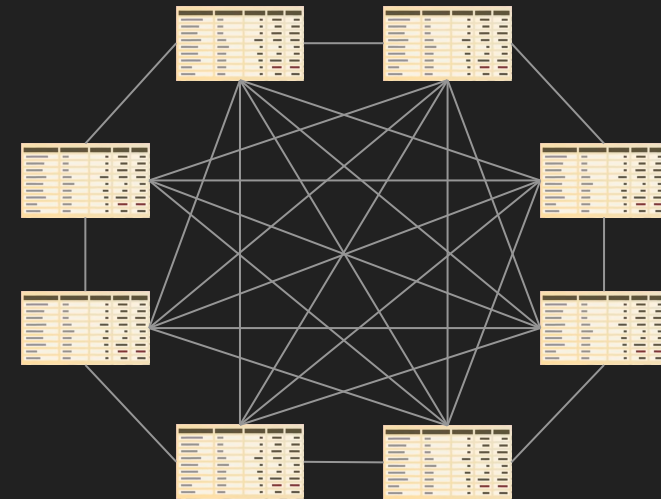
Entire network has same ledger

Decentralized: What does it mean to be decentralized?

- Traditional ledgers are centralized and use 3rd parties and middlemen to approve and record transactions

- Blockchain safely distributes ledgers across the entire network and does not require any middleman

- The technology maintains multiple replicas like p2p torrent file sharing

Traditional System

Blockchain System

Centralized system with stored ledger

Distributed system with distributed ledger

Auditing

"*Auditing*" is the process of conducting an independent examination of an organization's accounts, books and/or documents in order to determine whether the organization's financial statements present a fair view of the business. It is based on a set of pre-determined guidelines, normally the International Accounting Standards, or GAAP (generally accepted accounting principles).

Auditing | Pain Points

- **Bias:** Client is responsible for paying the auditor so an inherent bias may emerges.
- **Cooking the books:** Client may present the auditor exaggerated (or false) figures to inflate the company's true value.
- **Reasonable assurance:** Based on sampling auditor will verify a certain number of accounts with the trading parties and determine the accuracy of the balance using a sample of previous accounting entries.
- **Complexities**: Organization internal processes are overly complicated and may lead to delay in the audit process.

Trouble Enough For All
Fraud cases hit every big-time auditor.

Auditor	Case
Andersen	Enron
Ernst & Young	Global Settlement with RTC/FDIC
Ernst & Young	Cendant
Deloitte & Touche	Global Settlement with RTC/FDIC
Andersen	Baptist Foundation
Ernst & Young	Merry-go-round
Price Waterhouse	BCCI
Coopers & Lybrand	Barings Bank
KPMG	Rite Aid
Ernst & Young	AIB Group
Anderson	Sunbeam
Coopers & Lybrand	Maxwell Communications
KPMG	Tricontinental
Ernst & Young	Depco
Andersen	Colonial Realty
Andersen	Waste Management
KPMG	Orange County
KPMG	Oxford Health Plans

Auditing with Blockchain| Potential Use Cases

- Traceable audit trails

- Automated audit processes

- Authentication of transactions

- Tracking ownership of assets

- Registry and inventory system for any asset, ranging from raw materials to intellectual property

WikiChange Tracker | Architecture

Architecture Diagram
WikiChangeTracker
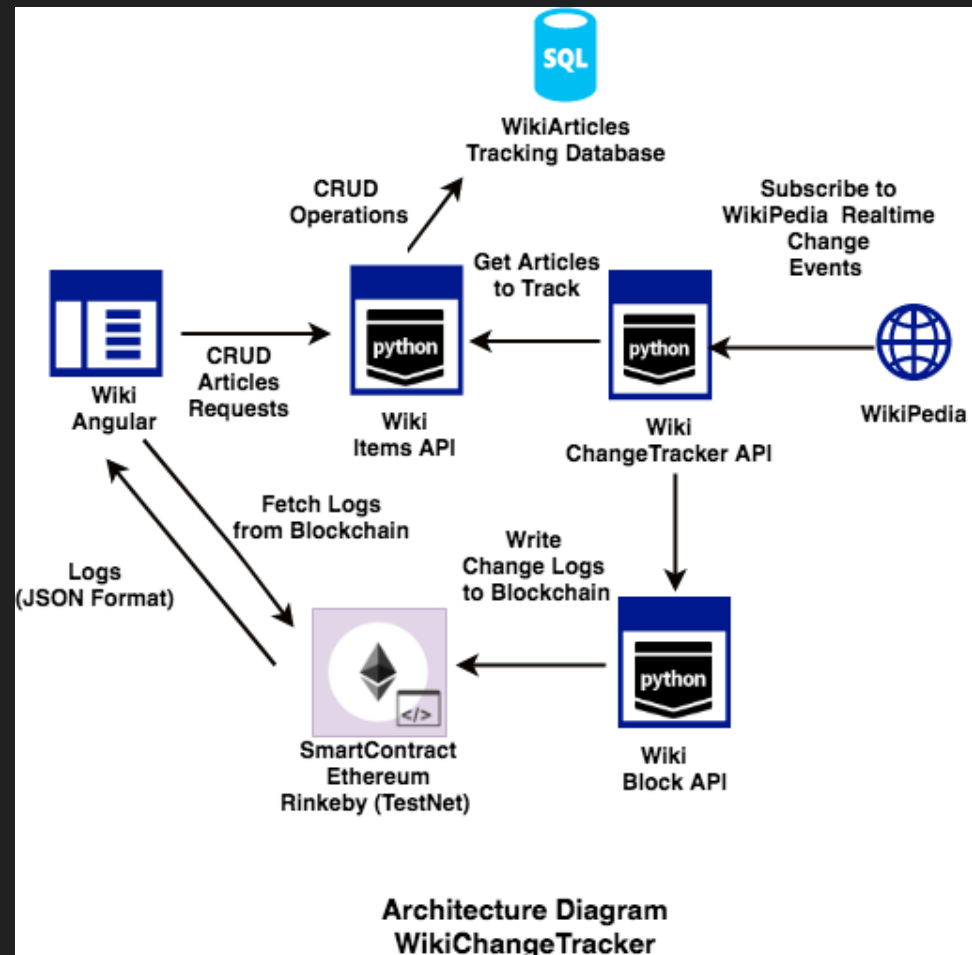
WikiChange Tracker | DEMO

WikiChangeTracker | https://github.com/razi-rais/eth-wikipedia-changetracker

razi-rais / eth-wikipedia-changetracker

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<> Code ⓘ Issues 10 Pull requests 0 Projects 1 Wiki Insights Settings

Wikipedia change logs tracker backed by Ethereum blockchain   Edit

ethereum blockchain blockchain-demos wikipedia tracking smart-contracts solidity Manage topics

175 commits | 1 branch | 0 releases | 3 contributors | MIT

Branch: master ▾ | New pull request   Create new file Upload files Find file Clone or download ▾

razi-rais Delete docker-compose (broken).yml   Latest commit ca7b08b just now

Contract	Initial commit - adding projects	2 months ago
Documentation	Add files via upload	2 days ago
DocumentationImages	Add files via upload	2 days ago
WikiBlockApi	Added comment	2 days ago
WikiChangeAngular	Adding links to contract and transactions.	2 days ago
WikiChangeTracker	Added Dockerfile for WikiChangeTracker	10 days ago
WikiItemsApi	Dockerfile for WikiItemsApi	10 days ago
.gitignore	Fix for WikiChangeTracker not loading, adding .gitignore to root folder.	2 months ago
LICENSE	Initial commit - adding projects	2 months ago
README.md	Update README.md	2 days ago
WikiChangeTracker.pyproj.user	Initial commit - adding projects	2 months ago
WikiChangeTracker.sln	updated JSON return by /GetArticles api	2 months ago
az-win2016-eth-with-tools.json	Create az-win2016-eth-with-tools.json	2 months ago

▤ README.md

About

The purpose of the Wikipedia Changetracker app is to allow users to save the URL of Wikipedia pages and track the changes to those pages. All of the watched pages will show up on the user's dashboard with an indication and list of the most recent changes, since the page has been tracked by our app. We are utilizing Wikipedia's APIs in order to check all of the latest edits to articles.

The project is composed of an Angular front end, python API projects, an Azure SQL backend, and an Ethereum Blockchain. Here is a breakdown of the folder structure of the project:

- The **Contract** folder contains the Solidity contract for the blockchain. We recommend using Remix the Solidity IDE (https://remix.ethereum.org) if you would like to test out how to deploy contracts.
- The **WikiBlockApi** project interacts with the blockchain and helps keep track of the recording of updates and raising events from the blockchain.
- The **WikiChangeAngular** project is the front end Angular project that users will interact with.
- The **WikiChangeTracker** pulls all of the articles users are interested in from the SQL database and checks to see if they correlate with any of the recent updates to Wikipedia as a whole.
- The **WikiItemsApi** has a GET for getting articles by User Id that the WikiChangeTracker pulls from. It also has a POST for saving Wikipedia pages to users which is utilized by the front end project.

The SQL database will keep all of the user information, article information (URL and title), and the association of users to their articles (which articles belong to which users). The Blockchain will keep track of all the updates that have occurred to a particular article and has an event system implemented which will be raised when an new update to a certain article a user is interested in is changed.

This project and documentation was created by Razi Rais, Crystal Tenn, and Viktor Dikov.

App Walkthrough

- **App Walkthrough** - Simple walkthrough of the app as an end user. Displays the purpose and usage of the application with screenshots.

Setup Instructions

- **Setup** - Setup instructions are provided for both Windows and Mac/Linux.

Architecture Diagram

Architecture Diagram
WikiChangeTracker