Auditchain

Explained in Simple Terms

A powerful platform that delivers reliable, standards-based, blockchain-enhanced, explainable artificial intelligence capabilities that you can trust and that accountants can actually use effectively explained for motivated accountants.

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"Great things are done by a series of small things brought together." *Vincent Van Gogh*

Executive summary:

- Auditchain is a set of pieces that work together [1].

- In order to understand Auditchain you need to understand that the world is changing from an analog, industrial, economy to a digital, knowledge economy and that society will operate differently.

- Auditchain augments an accountant's ability to perform work tasks and processes related to accounting, reporting, auditing, and analysis much like a calculator augments an accountant's ability to do math.

- Auditchain is effectively a scalable utility that provides powerful robust functionality to the average accountant.

- This document strives to provide an explanation of the essence of Auditchain in simple terms that are approachable to motivated accountants and other business professionals that desire to understand such things.

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[1] Auditchain, https://auditchain.finance/

As explained in the book *The Great Upheaval*[2], the world is in the midst of a "great upheaval" where the world is transitioning from an analog, industrial economy to a digital, knowledge economy. To understand Auditchain effectively the reader must understand that an analog, industrial economy works differently than a digital, knowledge economy.

What makes "digital, knowledge economy" work in the context required by financial reporting has been explained by me in other documents such as *Computational Professional Services*[3], *Essence of Accounting*[4], *Financial Report Knowledge Graphs*[5], and the *Seattle Method*[6]. That "digital" accounting, reporting, auditing, and analysis can work has been proven and I will not repeat that proof here.

I have the tendency to create over documented explanations in order to help the reader have access to all the information that I have access to in order to follow the logic of my explanations and reach their own conclusions. In this document I will try and keep explanations as terse and easy to read as possible, linking to additional explanations where a reader can go for details if they desire to do so.

The objective of this paper is to provide as non-technical as possible explanation of the essence of what Auditchain is, what it does, and why professional accountants should care. I try and connect what Auditchain is doing with what I have been doing for the past 20 years related to XBRL-based digital financial reporting.

In the spirit of full disclosure, know that I am a contract product manager for Auditchain helping them construct the Pacioli logic/rules/reasoning engine. I am also a holder of AUDT tokens. The explanations provided in this document about Auditchain are my own and not necessarily in alignment with those of the management of Auditchain. Part of the objective of this paper is to help Auditchain understand itself better. I in no way have a bias for or against Auditchain. People that know me will tell you that I "tell it like it is". But I don't ask you to believe the independence of my explanations in this document. This disclosure is more to inform the reader of the appearance of a conflict of interest, the possibility of unintentional bias on my part, and suggest that you do your own research and reach your own conclusions; and that this document might help you in that endeavor in some useful way.

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[2] Author Levine and Scott J. van Pelt, *The Great Upheaval*, https://www.amazon.com/Great-Upheaval-Educations-Present-Uncertain/dp/1421442574
[3] Charles Hoffman, CPA, *Computational Professional Services*, http://xbrlsite.azurewebsites.net/2020/library/ComputationalProfessionalServices.pdf
[4] Charles Hoffman, CPA, *Essence of Accounting*, http://xbrlsite.azurewebsites.net/2020/Library/EssenceOfAccounting.pdf
[5] Charles Hoffman, CPA, *Financial Report Knowledge Graphs*, http://xbrlsite.azurewebsites.net/2021/Library/FinancialReportKnowledgeGraphs.pdf
[6] Charles Hoffman, CPA, *Seattle Method*, http://xbrlsite.com/seattlemethod/SeattleMethod.pdf

Pieces that Make Up Auditchain

The first step in understanding what Auditchain is, is to understand the physical pieces that make up Auditchain[7]. "Auditchain" is made up of the following pieces:

- **Auditchain Labs AG**[8] ("Auditchain") is a legal entity, a corporation, based in Zug, Switzerland. It has management, a board of directors, and stockholders.

- The **Auditchain Protocol** is a formal set of computer understandable rules that are also explainable to humans that was created by Auditchain Labs AG. A protocol is defined in general terms as being a formal, official procedure that governs how some system operates. We will get to what the Auditchain Protocol does later; just know that Auditchain has defined a protocol.

- The **AUDT token**[9] is a cryptocurrency that was developed by Auditchain. A cryptocurrency is defined as a digital currency in which transactions are verified and records maintained by a decentralized system using cryptography, rather than by a centralized authority. More on the AUDT token later, just understand that Auditchain has defined a cryptocurrency. (0xB90cb79B72EB10c39CbDF86e50B1C89F6a235f2e[10] is the token ID for AUDT, first deployed May 9, 2021[11])

- The **Auditchain DAO** (Decentralized Autonomous Organization). The purpose of a DAO is to facilitate coordination. DAOs[12] are for facilitating human cooperation via collective ownership. A DAO is a community that allows its members to coordinate funds and resources toward the achievement of some specific goal. A DAO is a new mechanism to coordinate work. The Auditchain DAO uses the Auditchain Protocol and the AUDT token.

- The **Auditchain APP**[13]. The Auditchain application enables governance tasks and processes. Let me come back to this at a later time.

- The **DCARPE Alliance Association**[14] is a global organization consisting of members of the financial accounting, audit, reporting, legal, blockchain, investment, regulatory, data aggregators, academic, students, lender, standards setters, publishers, and software developer communities. The purpose of the alliance is to adopt new and existing global standards, provide education, drive technology innovation and open-source engineering, develop, launch and promote the adoption of decentralized continuous

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[7] Auditchain, Introduction, https://docs.auditchain.finance/
[8] LinkedIn, Auditchain Labs AG, https://www.linkedin.com/company/auditchain/
[9] Auditchain, *AUDT token*, https://docs.auditchain.finance/auditchain-protocol/audt-token
[10] Etherscan.io, https://etherscan.io/address/0xb90cb79b72eb10c39cbdf86e50b1c89f6a235f2e
[11] Etherscan.io,
https://etherscan.io/tx/0x7d5cea964bc25362e64058a9ff81fab4f7bc6e9046a50e146177fec1869908df
[12] DAOStack, *An Operating System for Collective Intelligence*, https://daostack.io/wp/DAOstack-White-Paper-en.pdf
[13] Auditchain, *Auditchain Application*, https://auditchain.finance/app/dashboard
[14] DCARPE Alliance Association, https://dcarpe.org/

audit, real time digital financial reporting, and other modern approaches to accounting, reporting, auditing, and analysis using the Auditchain Protocol, leveraging the AUDT token, within the Auditchain DAO.

- **Pacioli**[15] is a decentralized application[16] that was created by Auditchain Labs AG. A decentralized application, (dApp) is an application that can operate autonomously, typically through the use of smart contracts, that runs on a decentralized computing, blockchain system. A dApp is a new approach to building software applications. Pacioli is the first dApp that has been created to be part of the Auditchain DAO, follow the rules of the Auditchain Protocol, and leverage the capabilities of the AUDT token. Many other dApps will likely be created by Auditchain Labs AG, DCARPE Alliance Association members, Auditchain partners, and others.

So those are the pieces that make up Auditchain and interact with one another. Auditchain is purpose built to meet the needs of financial accounting, reporting, auditing, and analysis. But the same capabilities can also be used for tax accounting, cost accounting, other comprehensive basis of accounting (OCBOA), other forms of compliance reporting such as ESG, and even general business reporting.

Auditchain Executive Overview

The following is a narrative explanation of Auditchain which provides a high-level overview and helps to tie the Auditchain pieces together. First, I will provide this summary description of Auditchain and then I will explain important, key aspects of Auditchain to enhance your understanding of what Auditchain is and what it does. Key words are highlighted in bold.

Auditchain is a decentralized accounting, reporting, audit, and analysis **ecosystem** that enables control, reliability, trust, and therefore effective automation of tasks and processes. Auditchain is a mechanism that can be leveraged to implement modern accounting processes.

The **Auditchain Protocol** is the world's first **standards**-based **gamified incentive model**-based decentralized continuous accounting, reporting, audit, and analysis virtual machine (a.k.a. operating system, ecosystem, platform, metaverse, system). Part the Auditchain DAO is the Auditchain Protocol and the AUDT token which are owned and **governed** by its **community** of **AUDT token** holders. The community itself provides **orchestration** of the system to maximize harmony and minimize dissonance.

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[15] Auditchain, *Pacioli Logic and Rules Engine*, https://docs.auditchain.finance/auditchain-protocol/pacioli-logic-and-rules-engine
[16] Wikipedia, *Decentralized Application*, https://en.wikipedia.org/wiki/Decentralized_application

Using Auditchain, processes and tasks that relate to accounting, reporting, auditing, and analysis can be controlled within and between **enterprises**. The Auditchain protocol enables accountants, auditors, and analysts to use software created by software engineers, financial standards created by standards setters and regulators to create machine-readable controls and instantiate those machine-readable controls as **NFTs** to reliably automate tasks and processes. Value is transferred between parties, paying or receiving, AUDT. System friction is reduced, processes are better, faster, and cheaper.

The Pacioli logic/reasoning/rules engine provides a standards-based PROLOG tool than enables machine problem solving capabilities. Pacioli is both an example of and the first **decentralized application** (**dApp)** and a core foundational software application that other dApps will use to provide functionality via the Auditchain utility for accounting, reporting, auditing, and analysis.

The ecosystem has **modern software tools** that **supercharge** accountants in the performance of the processes and tasks related to compliance reporting by leveraging artificial intelligence (for example).

Trust is maximized, **provenance** is established and immutable, rules-based artificial intelligence can be used effectively by business professionals. Enterprises can **reliably** and effectively stream machine-readable knowledge graphs of financial statements with real-time assurance applied by a cohort of Certified Public Accountants (**CPAs**) and Chartered Accountants (**CAs**) and that financial and nonfinancial information can be used by Chartered Financial Analysts, (**CFAs**), data subscribers, regulators, investors and other business professionals or software developers supporting those business professionals in the performance of their work tasks and processes.

A market place results. **Royalties** are paid to the participants within the ecosystem when work is performed, NFTs are used, software is created, verification is performed, or value is provided in some other manner.

Key Aspects of Auditchain Explained

To understand Auditchain accurately and precisely the reader needs to be clear on some specific things. This section provides that clarity. In this section, key terms are defined and important aspects are explained.

Ecosystem

When you think about Auditchain you should think of a complete system as opposed to the many different silos that are part of a system. Think global supply chain as contrast to one single organization's role (a silo) within that system. Coming from the perspective of "systems thinking" helps the reader understand Auditchain and the value that Auditchain provides.

The video, *A Theory of a System for Educators and Managers*[17], discusses Dr. W. Edwards Deming's view of systems in general by looking at the education system.

The way most managers think is to take a complex system, divide it into parts, and try and manage each part as best as possible. If that is done, they believe, the system will behave optimally. That is flawed thinking. Why? Because it is possible for individual silos to operate with only it's interest in mind but break the system as a whole.

Working together is the main contribution to systemic thinking as opposed to working apart separately.

Auditchain optimizes the ecosystem as a whole and helps the individual silos within the system work optimally from the holistic perspective as opposed to optimizing any single silo of the system.

Community

Auditchain is a community of stakeholders that have a common interest in cooperating and coordinating certain specific things. Auditchain helps the members of that community to coordinate funds and resources toward a specific goal. Part of the common goal is the removal of unnecessary friction from the system. Here are the potential members of the Auditchain community as I see it:
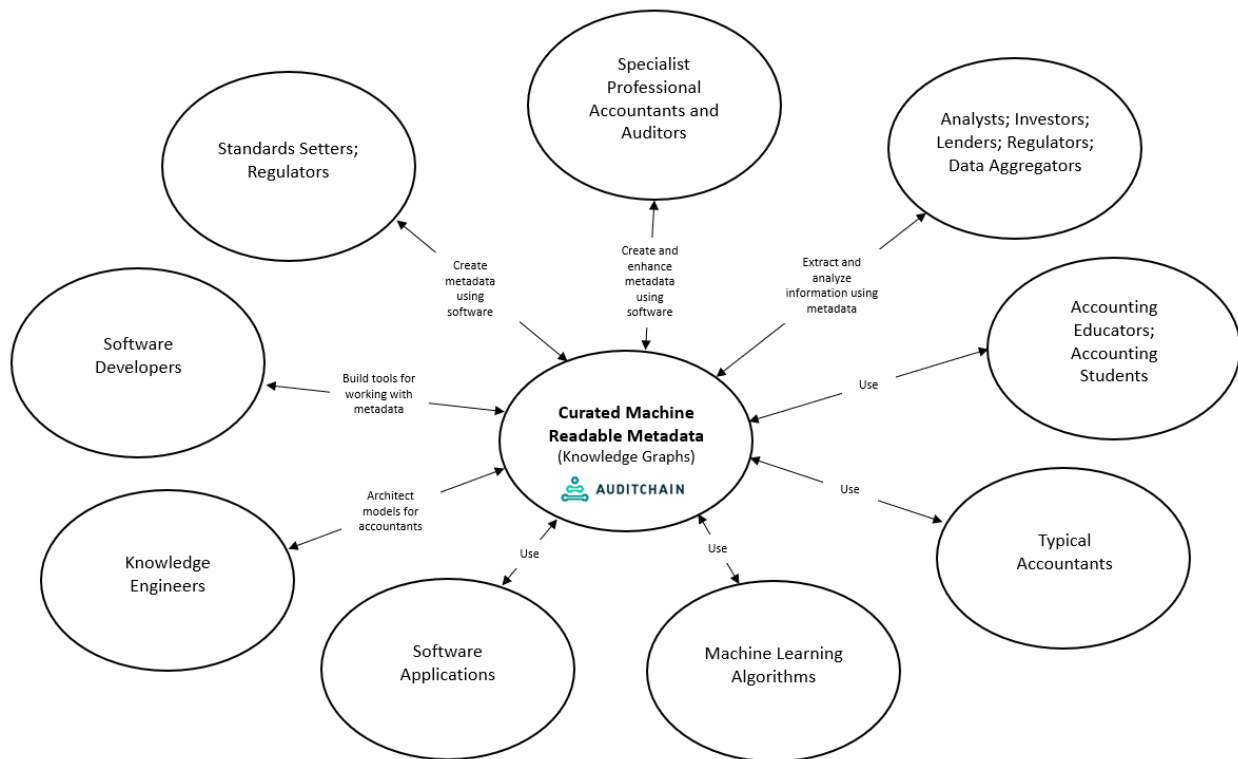
Digital works differently than analog. A perfect example of this is the Internet. If you were around before the Internet existed than you lived through the nightmare of networking computers together. The nightmare went away when everyone decided to use TCP/IP. Most people that use the Internet (i.e., everyone) probably don't even know what TCP/IP even is these days.

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[17] YouTube.com, *A Theory of a System for Educators and Managers*, https://youtu.be/2MJ3lGJ4OFo

The network affect[18] is the phenomenon by which the value or utility a user derives from a good or service depends on the number of users of compatible products. In his book *New Rules for the New Economy*[19], Kevin Kelly explains how digital works.

In his book, *Everything Is Miscellaneous*[20], David Weinberger points out that there are three orders of order:

- **First order of order**. Putting books on shelves is an example the first order of order.

- **Second order of order**. Creating a list of books on the shelves you have is an example of second order of order. This can be done on paper or it can be done in a database.

- **Third order of order**. Adding even more information to information is an example of third order of order. Using the book example, classifying books by genre, best sellers, featured books, bargain books, books which one of your friends has read; basically, there are countless ways to organize something.

Third order removes the limitations which people seem to assume exist when it comes to organizing information. Weinberger says this about the third order of order:

> "In fact, the third-order practices that make a company's existing assets more profitable, increase customer loyalty, and seriously reduce costs are the Trojan horse of the information age. As we all get used to them, third-order practices undermine some of our most deeply ingrained ways of thinking about the world and our knowledge of it."

Some say that the most valuable resource is no longer oil, now it is data. Others say that if data is the new oil, then metadata is the new gold. Auditchain has built capabilities to empower a network of accounting professionals to curate machine-readable metadata that turns the data "crude oil" into the information "gasoline" or even the knowledge and insight "high octane racing fuel" that powers your enterprise and enables effective automated machine communication of complex information.

The Auditchain community is its biggest asset. What will pull the community together is the value of the network. But to attract members, the network needs to have value. This is somewhat of a "chicken or the egg" type of problem. If the members of the Auditchain community grows so will the value of the Auditchain ecosystem.

Orchestration

An orchestra needs an orchestra leader, a conductor of the orchestra. A SWIFT Institute whitepaper, *A Critical and Empirical Examination of Currently-Used Financial Data Collection Processes and Standards*[21], discussed the notion of stakeholder harmony vs dissonance.

The paper provides excellent definitions of "harmony" and "dissonance" and explains the relationship between stakeholder harmony and information quality. Overcoming disagreements between stakeholders and even within groups of stakeholders is important. Agreement between stakeholder

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[18] Wikipedia, *Network Affect*, https://en.wikipedia.org/wiki/Network_effect
[19] Kevin Kelly, *New Rules for the New Economy*, https://kk.org/newrules/blog/
[20] David Weinberger, *Everything is Miscellaneous*, https://www.amazon.com/Everything-Miscellaneous-Power-Digital-Disorder/dp/0805088113
[21] SWIFT Institute, *A Critical and Empirical Examination of Currently-Used Financial Data Collection Processes and Standards*, https://www.swiftinstitute.org/wp-content/uploads/2016/12/SIWP-No-2013-006-SWIFT-Financial-Standards_vfinal_2.pdf

groups and within stakeholder groups contributes to harmony. Lack of agreement contributes to dissonance.

A "stakeholder" is anyone that has a vested interest. Another term for stakeholder is "constituent". A "constituent" is a component part of something.

The reward for maximizing order and minimizing dissonance and achieving a high level of industry orchestration can be seen in the SWIFT banking system or in the SABER airline ticketing system.

The conductor of the Auditchain orchestra is not Auditchain, it is the members of Auditchain that manage system governance using the tools created by Auditchain Labs AG per the feedback of system members.

Marketplace

Auditchain is a marketplace. Auditchain is pioneering the use of NFTs for accounting and disclosure controls[22]. Accountants. reporting managers, CFOs, controllers, and financial analysts will be able to use the Auditchain Protocol to write, validate and own logic-based accounting and disclosure control "assets" that substantially automate accounting, financial reporting, audit and analysis processes and tasks using a global standard syntax on the Auditchain Protocol.

Non-fungible tokens (NFTs) representing the controls are issued to the curators, and royalties are allocated between curators and validators who audit and provide assurance that the machine-readable logic works correctly. Royalties will be allocated in AUDT, the settlement and Auditchain Protocol governance token.

As more and more of the world's accountants and professionals create and contribute more and more controls to the ecosystem, members of the institution of accountancy can move from performing manual tasks to writing controls that automate internal control logic and controls over financial reporting while building a portfolio that generates passive income in the form of royalties and opportunities for liquidity.

A complete discussion about NFTs is beyond the scope of this document[23].

Work-to-Earn (W2E) Model

An article by Tatiana Revoredo, *Blockchain and the evolution of business models in the game industry*[24], that I was made aware of explains what appears to be Auditchain's "Work-to-Earn (W2E)" model. That article uses the term "play-to-work (P2W)" and discusses the model in the context of gaming; but I made some adjustments to the terminology and explain the Work-to-Earn (W2E) model this:

The "work-to-earn" (W2E) model is exactly what the name suggests: A model where users (accountants, auditors, analysts, software engineers, etc.) can work and earn tokens or cryptocurrency (i.e. AUDT tokens in this case) while working. This model (gamified incentive model) is based on science and has a very powerful psychological incentive, because it combines two activities that have driven humanity since the beginning of time: reward and work.

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[22] Coinspeaker, *Auditchain to Use NFTs for Accounting and Disclosure Controls*,
https://www.coinspeaker.com/auditchain-to-use-nfts-for-accounting-and-disclosure-controls/
[23] *Process Control NFT Creation for Novices*,
http://xbrlsite.azurewebsites.net/2021/library/ProcessControlNftCreation.pdf
[24] Tatiana Revoredo, *Blockchain and the evolution of business models in the game industry*,
https://cointelegraph.com/news/blockchain-and-the-evolution-of-business-models-in-the-game-industry

The main idea in W2E is that contributors are rewarded as they invest more time and more effort in the work ecosystem, and thus become part of the economy (tokenomics[25]), creating value for themselves, for other participants in the work ecosystem, and also for software developers. They receive an incentive/reward for their participation and work time in the form of digital assets with potential appreciation of those digital assets over time.

Along these lines, the key component in this model is to give workers "ownership" over certain "digital assets" in the work ecosystem, allowing them to increase their value by actively participating. This is where blockchain technology has become decisive for work business models.

The article provides a graphic that explains the economics generally for gaming. I have recast that general model specifically to Auditchain and this is what I came up with:

General Model for Auditchain Economics
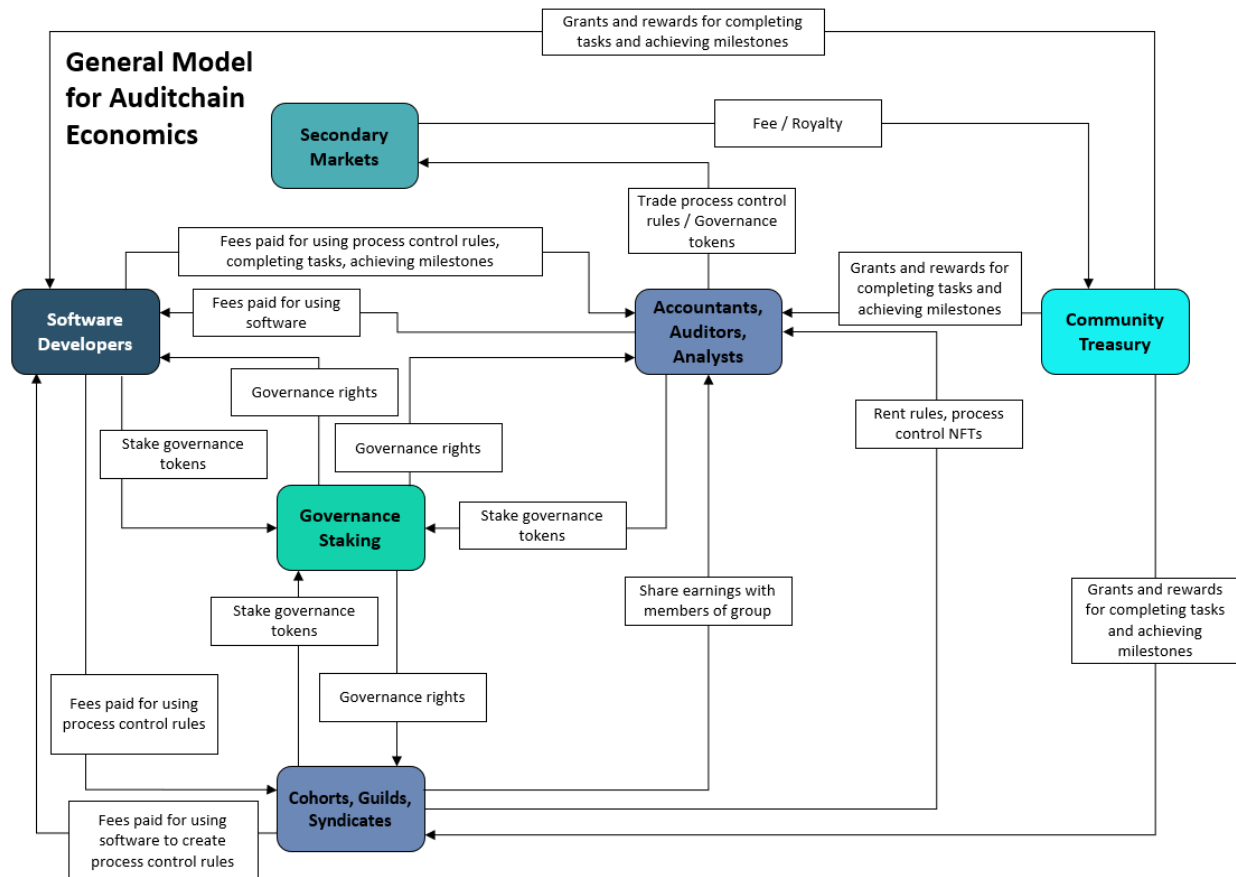
Effectively, this sort of work-to-earn model is a way of providing equity ownership, a "stake in the game" for workers. It also provides a new way to think about venture capital. This is a new way of thinking about the notion of "sweat equity".

An obvious question here is: "How does Auditchain itself earn money?" The answer to that question is transaction fees.

Reputation

Members of the Auditchain community earn a reputation and are assigned badges to indicate their experience and skills. An example of how this system might work can be seen by looking at the SAP "people" system's reputation page[26]. The reputation system is both human readable and machine readable. Another example might be something such as LinkedIn.

Governance[27]

The details of the Auditchain Protocol are explained in the Auditchain whitepaper[28]. Governance rules explain how the Auditchain Protocol works and a mechanism that the community can use to make changes to the Auditchain protocol. Explaining exactly how the Auditchain Protocol works is beyond the scope of this document, if you want these details read the Auditchain whitepaper[29].

Internal Capital Mechanism

The details of the AUDT token are likewise explained in the Auditchain whitepaper[30]. The document *DAOs, DACs, DAs and More: An Incomplete Terminology Guide*[31] explains different types of organizations. In addition, the document points out the difference between an organization that has its own internal capital mechanism and those that do not. The following graphic which is an enhanced version of the same graphic provided in that document helps you understand the utility that is available when you have your own internal capital mechanism:

Internal Capital Mechanism		
	Automation at edges	Humans at edges
Automation at center	**Autonomous agent or Artificial Intelligence** (AI)	**Decentralized Autonomous Organizations** (DAOs)
Humans at center	**Robots** (e.g. assembly line, robotic process automation)	**Distributed Autonomous Legal Entities** (DACs; Corp, Partnership, LLP, Cooperative, etc.)

DOs

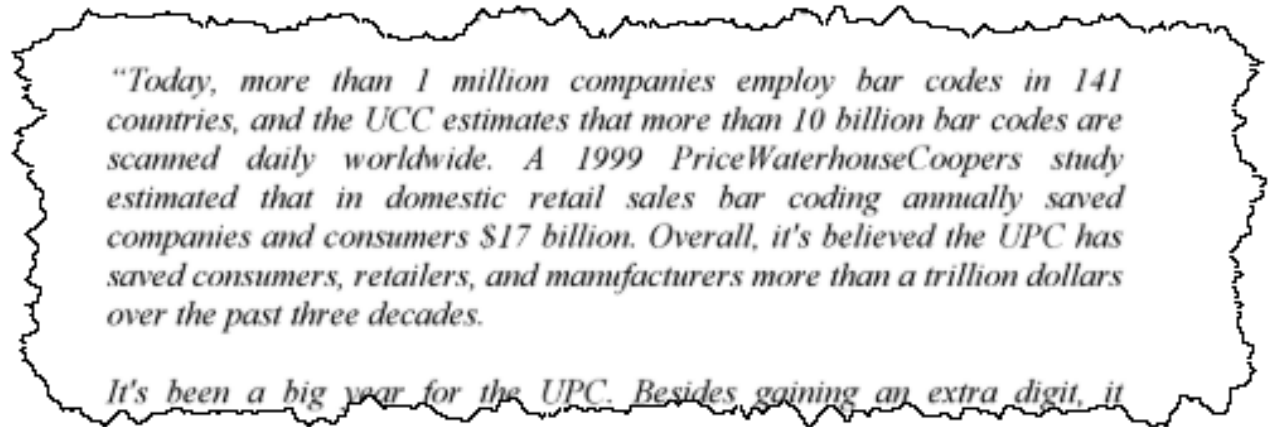| No Internal Capital Mechanism		
	Automation at edges	Humans at edges
Automation at center	**Software Daemons**	**Decentralized Applications** (DAs)
Humans at center	**Web Services** (GUIs and APIs)	**Forums**

DCs

Effectively, Auditchain has the capability to create its own economy using the AUDT token as a means to transact business.

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[26] SAP, People, Reputation, https://people.sap.com/elizabeth.milne#reputation

[27] Auditchain, *Governance*, https://docs.auditchain.finance/auditchain-protocol/governance

[28] Auditchain, *Auditchain Decentralized Continuous Audit & Reporting Protocol Ecosystem*, https://auditchain.finance/whitepaper-v1.pdf

[29] ibid

[30] ibid

[31] Ethereum Foundation, *DAOs, DACs, DAs and More: An Incomplete Terminology Guide*, https://blog.ethereum.org/2014/05/06/daos-dacs-das-and-more-an-incomplete-terminology-guide/

Standards

Standards make markets[32]. One needs to look no further than the standard ISO shipping container, the standard UPC (Universal Product Code), standard electrical outlets, standard cell phone networks, etc. to understand the value and role of standards in society.

Here is one specific example. A 1999 PWC study concluded that UPC codes save retailers in the US $17 billion per year or more than a trillion dollars over three decades. Another study quantified the savings at 6.59% of retail revenue[33].

> *"Today, more than 1 million companies employ bar codes in 141 countries, and the UCC estimates that more than 10 billion bar codes are scanned daily worldwide. A 1999 PriceWaterhouseCoopers study estimated that in domestic retail sales bar coding annually saved companies and consumers $17 billion. Overall, it's believed the UPC has saved consumers, retailers, and manufacturers more than a trillion dollars over the past three decades.*
>
> *It's been a big year for the UPC. Besides gaining an extra digit, it*

"Business is easier when you speak the same language as your customers, suppliers and partners."[34]

Obtaining the benefits of such standards is a "chicken or the egg dilemma" type of an issue as pointed out by the creators of the UPC:

> "With the standards for the UPC's format and visual representation set, the really hard part began: persuading everyone in the grocery industry to use it. According to an analysis by the ad hoc committee's consultant, McKinsey & Company, manufacturers had to mark at least three-quarters of their goods with a bar code in order for the technology to be cost effective. At the same time, at least 8,000 supermarket locations, about one-quarter of the total in operation, needed to install scanners."

The beneficiaries of such standards will be everyone. The losers if such standards are not created will likewise be everyone in terms of higher costs, less effectiveness, and less efficiency.

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[32] Standards Make Markets, http://xbrl.squarespace.com/journal/2018/12/22/standards-make-markets.html
[33] Behind the 'Beep', https://blog.matthews.com.au/behind-the-beep-how-to-use-a-barcode/
[34] GS1, About, https://www.gs1.org/about

Gamified Incentive Model

Theories help to explain things so that they can be understood. John von Neumann and Oskar Morgenstern's *Theory of Games and Economic Behavior*[35] explains the notion of game theory or gamification. Gamification[36] is defined by Wikipedia as follows:

> "Gamification is the strategic attempt to enhance systems, services, organizations and activities in order to create similar experiences to those experienced when playing games in order to motivate and engage users."

Gamification is an approach to understanding and digitizing the interactions of the members of the global financial accounting, reporting, auditing, and analysis supply chain. Gamified incentive models are a way to understand the economics of digital for CPAs, CAs, and CFAs.

Auditchain leverages these ideas and uses gamification to incentivize the members of the community individually and the system as a whole. This helps Auditchain operate as an economy or marketplace.

Problem Solving Logic Engine

I have provided versions of a graphic which you see the most current version on the following page for several years which summarizes the "Components of a Knowledge Based System" which is a good ole fashioned rules-based expert system as some people refer to it.

That graphic is the basis for Pesseract[37] which is a working proof of concept which a software engineer and I created to figure out how to construct an expert system for creating financial reports. Fundamentally, that graphic shows all the pieces you need to create such an expert system. Pesseract has within it what is essentially a special purpose problem solving logic engine. But Pesseract had limitations.

Auditchain has learned from the Pesseract working proof of concept and recreated the problem-solving logic capabilities the right way in a software application they are calling Pacioli. Pacioli is a special purpose problem solving logic/reasoning/rules engine built on top of the general-purpose problem-solving language PROLOG.

Auditchain supplements those basic knowledge-based system components and enhances the expert system by adding mechanisms that increase trust, provenance, coordination, and economic interactions within a market.

Pacioli is driven by machine-readable rules. Those rules describe information that a regulator or standards setter desires to be disclosed, guide the creator of a report to create that report consistent

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[35] John von Neumann and Oskar Morgenstern, *Theory of Games and Economic Behavior*, https://www.google.com/books/edition/Theory_of_Games_and_Economic_Behavior/jCN5aNJ-n-0C
[36] Wikipedia, *Gamification*, https://en.wikipedia.org/wiki/Gamification
[37] Pesseract, http://pesseract.azurewebsites.net/
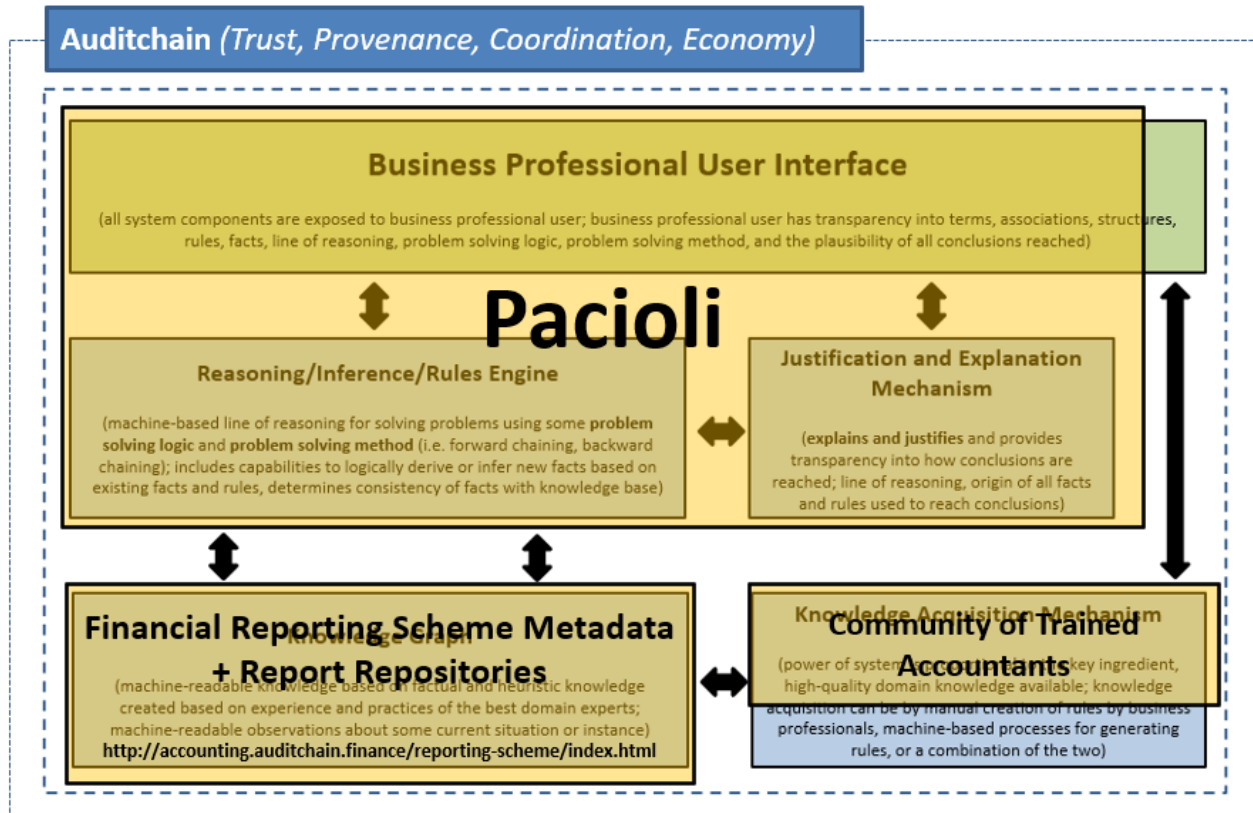
with that description, enables the creator of a report to verify that the report is created consistent with that description, and enables analysts extracting information from such reports to do so effectively.

Components of a Knowledge Based System
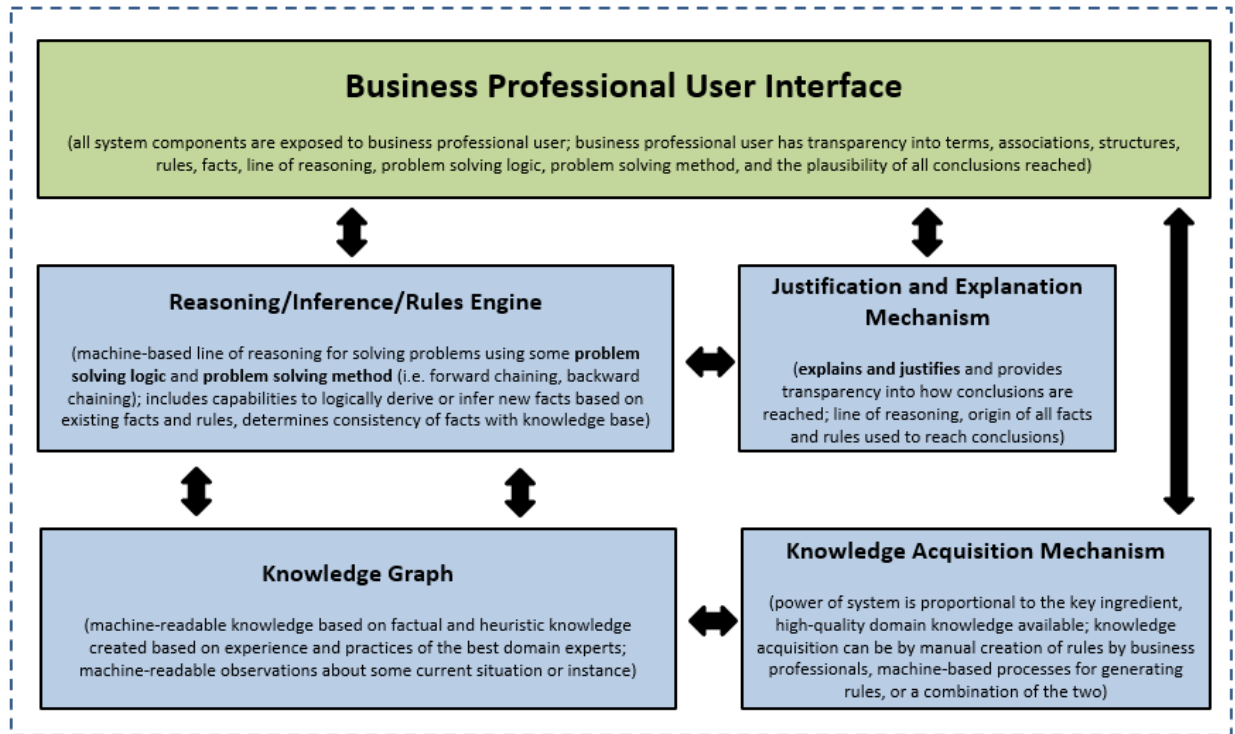
Enhanced Knowledge Based System

These enhancements enabled by Auditchain and Pacioli are, perhaps, not necessary for some use cases; but they do offer very significant, compelling benefits for other very important use cases. "Trust" is enhanced by Auditchain helping you understand who created and stands behind rules and helps make certain the rules have not been tampered with or inadvertently changed. "Provenance" or also know as an audit trail is provided for information so you know where the information came from and there is a chain of custody for information. "Coordination" is achieved by using standards to enable interoperability between software applications. An "economy" is provided in the form of a market place and a complete monetary system that the members of the market control.

Decentralized Applications (dApp)

Decentralized applications or dApp is a new approach to creating cloud-based software applications. Decentralized applications (dApps) are applications that run on top of blockchain networks[38]. Although dApps can appear similar to web applications in terms of graphical user interface and user experience (GUI, UX), their back-end processes are different. While typical web applications use centralized servers, decentralized apps avoid centralized servers to transact in a distributed and peer-to-peer fashion as opposed to using the central HTTP protocol to communicate.

Just think of dApps as a new approach to creating Web 3.0 cloud-based software applications.

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[38] *What Are Decentralized Apps?*, https://www.gemini.com/cryptopedia/decentralized-applications-defi-dapps

Opensource Software

Opensource software is software with source code that anyone can inspect, modify, and enhance. Programmers who have access to a computer program's source code can improve that program by adding features to it or fixing parts that don't always work correctly.

Core foundational software within Auditchain is open source and open to inspection by anyone so that they can see that software is working as it is intended to work.

Sure, members will build on top of this opensource software and then not make some proprietary modifications available to other members. That is expected and desirable. Opensource is about balancing cooperation and competition. Members of Auditchain compete where value add opportunities are highest, not at the level of fundamental interoperability.

What is opensource and what is proprietary will be worked out between the members of the Auditchain community of stakeholders.

Multiple Technical Architectures

Multiple enterprise information technology architectures are a fact of life that will likely not change any time soon. Fads, trends, politics, arbitrary preferences, misinformation, and different standards exist and will continue to exist.

Auditchain does not impose any specific information technology architecture onto an enterprise except when it interacts with the Auditchain community. Enterprises interact with Auditchain using global standards. Within the Auditchain community, standards and opensource software are employed to eliminate the integration hairball that would otherwise exist. Making minor sacrifices in certain truly unimportant areas leads to significant benefits in other areas.

All three primary problem-solving logic paradigms[39] are supported, logic is carefully managed to make sure information is bidirectionally transferable between all technical approaches, and mechanisms exist (or will exist) to interact with all necessary.

Processing information is consciously engineered to be safe, reliable, flexible where necessary, and powerful.

Burying Complexity

Auditchain is consciously, intentionally, and deliberately creating a platform that is as simple as possible.

A *kluge* is a term from the engineering and computer science world that refers to something that is convoluted and messy but gets the job done. Elegance is the quality of being pleasingly ingenious, simple, neat. Elegance is about beating down complexity.

Complexity can never be removed from a system, but complexity can be moved. The *Law of Conservation of Complexity* states: "Every application has an inherent amount of irreducible complexity. The question

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[39] Implementing Knowledge Graphs, http://xbrl.squarespace.com/journal/2021/9/20/implementing-knowledge-graphs.html

is who will have to deal with that complexity: the application user, the application developer, or the platform developer that the application runs on?"

Irreducible complexity is explained as follows: A single system which is composed of several interacting parts that contribute to the basic function and where the removal of any one of the parts causes the system to effectively cease functioning.

For example, consider a simple mechanism such as a mousetrap. That mousetrap is composed of several different parts each of which is essential to the proper functioning of the mousetrap: a flat wooden base, a spring, a horizontal bar, a catch bar, the catch, and staples that hold the parts to the wooden base.

If you have all the parts and the parts are assembled together properly, the mousetrap works as it was designed to work.

But if you remove one of the parts of the mousetrap then the mousetrap will no longer function as it was designed; it will simply not work. That is irreducible complexity: the complexity of the design requires that it can't be reduced any farther without losing functionality.

Simplistic and simple are not the same thing.

Simplistic is dumbing down a problem in order to make the problem easier to solve. Simplistic ignores complexity in order to solve a problem which can get you into trouble. Simplistic is over-simplifying. Simplistic means that you have a naïve understanding of the world, you don't understand the complexities of the world. Removing or forgetting complicated things does not allow for the creation of a real-world solution that will actually work.

Simple is something that is not complicated, that is easy to understand or do. Simple means without complications. An explanation of something can be consistent with the real world, consider all important subtleties and nuances, and still be simple, straight forward, and therefore easy to understand and use.

Exchange of Complex Information

A key to employing "digital" in accounting, reporting, auditing, and analysis in the enterprise is that information exchange needs to work effectively, predictably, reliably, safely, and correctly. XBRL is the global standard for the exchange of business information. Auditchain leverages and enhances that global standard.

Auditchain has worked to create a proven, good practices, standards-based pragmatic approach to creating provably high quality XBRL-based general purpose financial reports where report creators are permitted to modify the report model. Auditchain enhances the XBRL standard by adding the features of trust, provenance, coordination, and an economy.

The objective is seen not as some regulatory mandate but rather an opportunity to understand and leverage the power of digital. When complex information, like financial information, can be effectively exchanged then opportunities open up that make seemingly magical things possible. (But don't tell anyone that it really is not magic, it was really just rolling up our sleeves and doing the hard work to make this actually work.)

Auditchain's efforts literally supercharge what can be achieved using artificial intelligence.

Scalability

Auditchain is scalable. While what Auditchain provides is enterprise ready, functionality can be scaled down or scaled up to meet the needs of large enterprises, small and medium size organizations (SMEs), and even micro-organizations such as the mom-and-pop store down the street.

When you think about it, many times you have large organizations such as regulators interacting with smaller organizations like a small business that needs to report to that regulator. Or, organizations have departments that must interact with the corporate office.

Think of a not-for-profit that has 5,000 chapters that then needs to pull all those chapters together and produce a consolidated financial report that must be submitted to the federal government.

The thing about accounting is that it is accounting. Not rocket science. Accounting in every organization globally is driven by the same industry standard good practices double entry booking model which was invented in 1211, documented in 1494 by Luca Pacioli, and was responsible, many say, for the large enterprise to even exist.
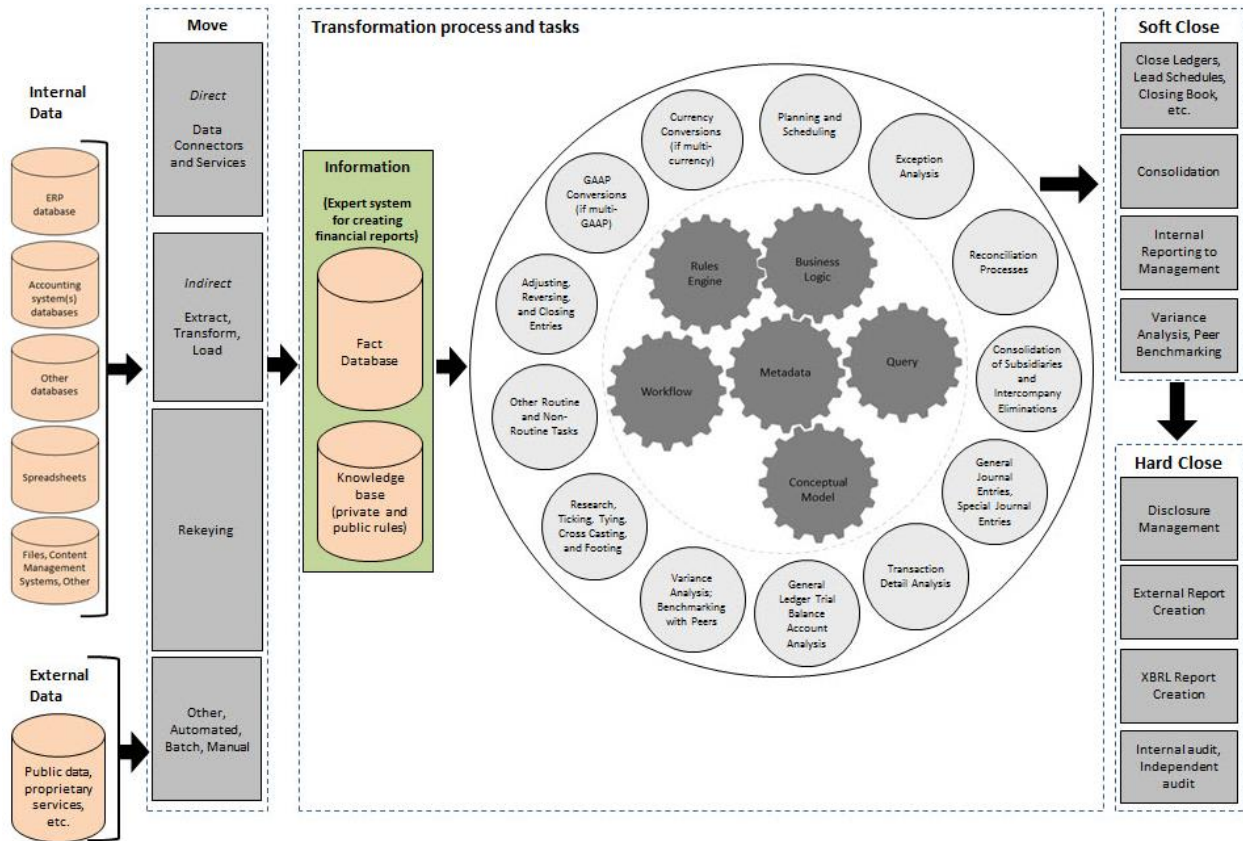
Auditchain removes the repetitive, mechanical, mundane, even gruesome and grueling tasks and processes from the responsibility of humans freeing up accountants, auditors, and analysts to do what they do best: judgement, analysis, creativity, non-routine tasks, unstructured tasks, politics, compassion, innovation, improvising.

The initial investment to create a scalable system along the lines of what Auditchain has created is very high and therefore smaller organizations could never do this for themselves. Well, with Auditchain you don't have to because Auditchain is simply a utility that you can use within your modern accounting processes.

Utility for Accounting, Reporting, Auditing, Analysis

You can think of Auditchain as somewhat of a utility where you have rooftop solar panels on your home and the meter that measures the flow of power between the electric grid works both ways, called net metering, and also measures what you contribute back to the electric grid from your rooftop solar panels. The score is kept using AUDT tokens.

Auditchain provides leverage to anyone with an internet connection. There is no way smaller accounting firms can compete with the resources of accounting firms like the globally oriented Big 4 with billions of dollars to invest and hundreds of thousands of employees.

Auditchain changes that dynamic. While Auditchain welcomes the Big 4 as members; the biggest beneficiaries will be smaller firms. Auditchain provides a new way of working, the ability to form cohorts or groups of accountants to perform accounting, reporting, auditing, and analysis tasks and processes.

Decentralized, but also Centralized

Auditchain has a strong preference for a decentralized system and that is what they are pursuing. However, they recognize that we live in a centralized world.

Centralized systems of accounting were originally invented in ancient Mesopotamia and have existed for thousands of years. Decentralized systems have appeared with the advent of blockchain and related technologies and are in the infancy of their evolution.

I suspect that Auditchain expects decentralized systems and centralized systems to co-exist, to be tightly intertwined, to complement each other, and to learn from each other's experiences, mistakes, and innovations.

The right balance between centralized and decentralized systems will be figured out and struck by Auditchain.

Moonshot

Should Auditchain be thought of as a "moonshot"[40]? Well, so here is the thing about moonshots. Moonshots are things that *seem impossible*. But remember, the United States said that it wanted to put a man on the moon. Then, they did exactly that.

Moonshots are not impossible things; they are things that just seem impossible. Moonshots are challenging but can be achieved. Auditchain could achieve this moonshot.

What Auditchain is attempting is novel, useful, and very complex[41]. This is not an incremental innovation or a disruptive innovation; what Auditchain appears to be doing is foundational and transformational. Accountants, auditors, and analysists don't need to build the system; all they need to do is be able to use the system that Auditchain provides.

Sensemaking

Sensemaking[42] is the process of determining the deeper meaning or significance or essence of the collective experience for those within an area of knowledge. Sensemaking is a tool. You can use sensemaking to construct a map you can share with others. Sensemaking is the art of analyzing, understanding, clarifying, untangling, organizing, and synthesizing.

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[40] Cambridge Dictionary, Moonshot, https://dictionary.cambridge.org/us/dictionary/english/moonshot
[41] Incremental, Disruptive, and Foundational Technologies, http://xbrl.squarespace.com/journal/2018/10/28/incremental-disruptive-and-foundational-technologies.html
[42] Sensemaking, http://xbrl.squarespace.com/journal/2021/11/18/sensemaking.html

For the past 20 years of so I have been engaged in sensemaking in the financial reporting area of knowledge. The results of that sensemaking are summarized in the documents I mentioned at the beginning of this document.

What could be better is having a global master plan for XBRL-based digital general purpose financial reports[43]. There already exists a de facto good practices standard general purpose XBRL-based financial report[44]. The point here is that while XBRL-based reporting works, it could even be made to work better in the future. Whether a formal global standard as opposed to only a de facto industry standard is necessary is not clear.

Auditchain appears to be embracing my sensemaking[45]. Others have also. The coming years should be interesting.

Lean Six Sigma

Processes and tasks are controlled and quality is kept very high by using Lean Six Sigma principles, philosophies, and techniques. Lean Six Sigma[46] is a discipline that combines the problem-solving methodologies and quality enhancement techniques of Six Sigma[47] with the process improvement tools and efficiency concepts of Lean Manufacturing[48]. Born in the manufacturing sector, Lean Six Sigma works to produce products and services in a way that meets consumer demand without creating wasted time, money and resources.

Specifically, Lean[49] is 'the purposeful elimination of wasteful activities.' It focuses on making process throughout your company faster, which effects production over a period of time. Six Sigma[50] works to develop a measurable process that is nearly flawless in terms of defects, while improving quality and removing as much variation as possible from the system. For additional details, please refer to Lean Six Sigma[51].

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[43] Global Master Plan for XBRL-based Digital Financial Reporting, http://xbrl.squarespace.com/journal/2021/12/31/global-master-plan-for-xbrl-based-digital-financial-reportin.html
[44] De Facto Good Practices Industry Standard Digital Financial Report Metamodel, http://xbrl.squarespace.com/journal/2021/10/20/de-facto-good-practices-industry-standard-digital-financial.html
[45] Answers: Simple but Wrong; Complex but Right, http://xbrl.squarespace.com/journal/2022/1/7/answers-simple-but-wrong-complex-but-right.html
[46] Wikipedia, *Lean Six Sigma*, https://en.wikipedia.org/wiki/Lean_Six_Sigma
[47] Wikipedia, *Six Sigma*, https://en.wikipedia.org/wiki/Six_Sigma
[48] Wikipedia, *Lean Manufacturing*, https://en.wikipedia.org/wiki/Lean_manufacturing
[49] YouTube.com, *Lean Six Sigma in 8 Minutes*, https://youtu.be/s2HCrhNVfak
[50] YouTube.com, *Six Sigma in 9 Minutes*, https://youtu.be/4EDYfSl-fmc
[51] Charles Hoffman, CPA, *Lean Six Sigma*, http://www.xbrlsite.com/mastering/Part01_Chapter02.K_LeanSixSigma.pdf

Auditchain Infographic

This is an infographic created by Auditchain[52].
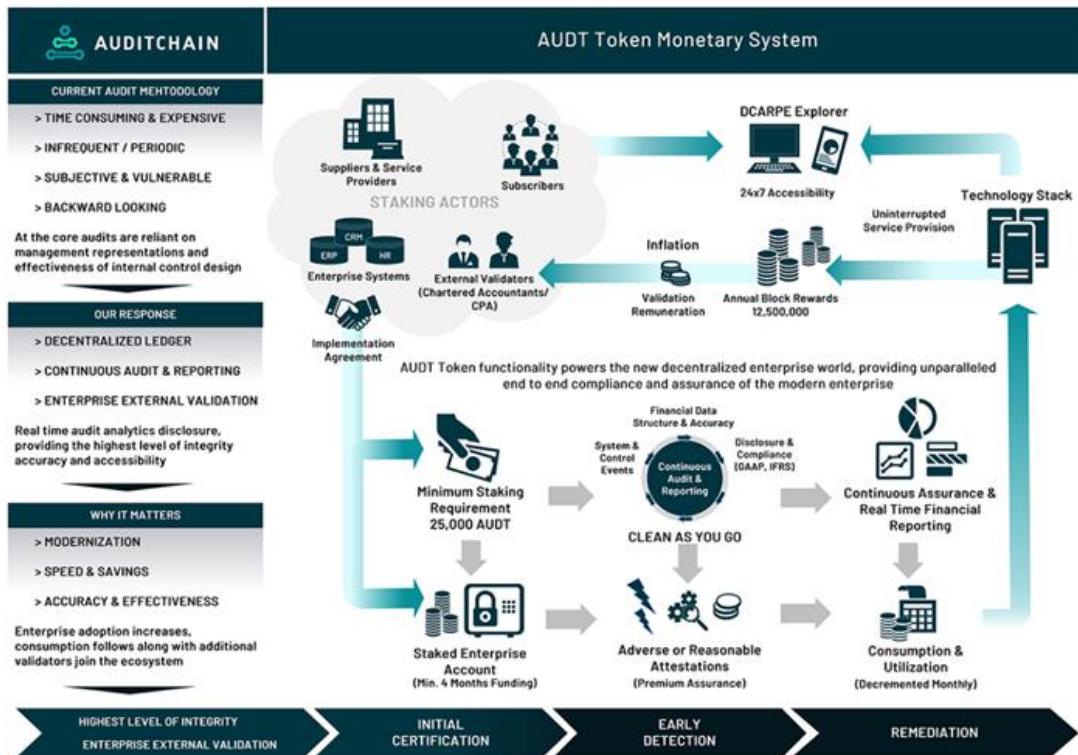
Accounting Oracle Machine

An oracle[53] is a person or agency considered to provide wise and insightful counsel or prophetic predictions. An oracle machine[54] can be conceived as a Turing machine[55] connected to an oracle. The oracle, in this context, is an entity capable of solving some computational problem[56], which for example may be a decision problem[57] or a function problem[58].

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[52] Auditchain, https://blog.auditchain.finance/auditchain-releases-additional-details-of-its-audt-token-economy-a2ff4b4c1996

[53] Wikipedia, *Oracle*, https://en.wikipedia.org/wiki/Oracle

[54] Wikipedia, *Oracle Machine*, https://en.wikipedia.org/wiki/Oracle_machine

[55] Wikipedia, *Turing Machine*, https://en.wikipedia.org/wiki/Turing_machine

[56] Wikipedia, *Computational Problem*, https://en.wikipedia.org/wiki/Computational_problem

[57] Wikipedia, Decision Problem, https://en.wikipedia.org/wiki/Decision_problem

[58] Wikipedia, Function Problem, https://en.wikipedia.org/wiki/Function_problem
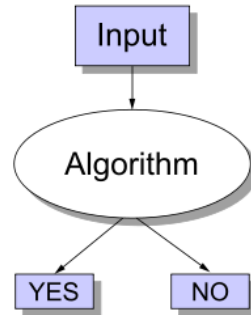
Creating something like an accounting oracle machine certainly seems conceivable. Computability theory[59] and computational complexity theory[60] seem to provide information about some of the possibilities here. The information in the area of accounting, reporting, auditing, and analysis can be organized using the Cynefin Framework[61].
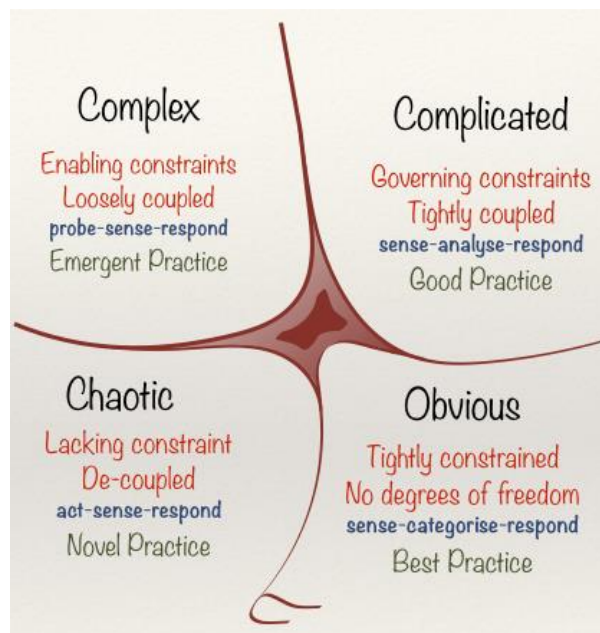
The hard part about creating something like an accounting oracle machine is not the computation part; the hard part is more about pulling all the machine-readable rules together effectively and efficiently. This is expensive and time consuming and is not something that any one organization can really do.

But a coordinated group could pull this off and do so effectively and efficiently. The tools of the information age can be brough to bare to help make this happen.

Building an accounting oracle machine is about giving accountants the capabilities to organize the information represented by logic gates[62] that make up the machine-readable knowledge graph that drives the oracle.

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[59] Wikipedia, Computability Theory, https://en.wikipedia.org/wiki/Computability_theory
[60] Wikipedia, Computational Complexity Theory, https://en.wikipedia.org/wiki/Computational_complexity_theory
[61] Wikipedia, *Cynefin Framework*, https://en.wikipedia.org/wiki/Cynefin_framework
[62] Wikipedia, *Logic Gates*, https://en.wikipedia.org/wiki/Logic_gate#Universal_logic_gates
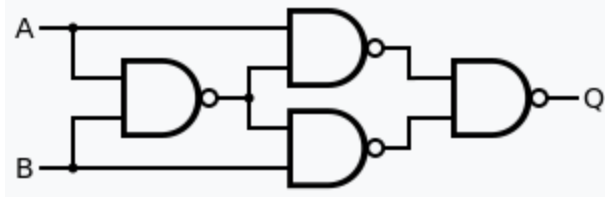
Do issues exist? Certainly, there are. Not every piece of information is disputed, for example "Assets = Liabilities + Equity" is really not up for discussion. But there are areas where multiple perspectives jostle for prominence, the leaders of different factions argue with one another, and dissonance rules the day. However, a good conductor can get the orchestra into harmony.

Achieving this harmony can be hard in some cases, but in the area of accounting, because it is a profession with clear rules in most cases; something like an accounting oracle machine is quite possible.