Process Control NFT Creation for Novices

A guide for professional accountants to earning passive income by digitizing your accounting, reporting, and auditing knowledge; traversing from novice to beginner to competent to proficient to expert

By

Charles Hoffman, CPA (Charles.Hoffman@auditchain.com)

Contributors

David Eichner, CPA (david@icansoftware.com)

Daniel Montoya (danielmontoya.contacto@gmail.com)

October 15, 2021 (DRAFT)

http://xbrl.squarespace.com

1. Introduction

The volume of information, the pace of information, the complexity of information are all increasing because of technology. The same technologies that are responsible for these increases in the volume, pace, and complexity of information offers a solution to that problem.

Old technologies are making it increasingly difficult to keep up with today's fast paced information exchange. New technologies such as structured information, knowledge graphs, artificial intelligence, and digital distributed ledgers offer significant and compelling opportunities to make accounting, reporting, auditing, and analysis tasks and processes more efficient and effective.

The beneficiaries of such standards-based approaches 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.

The Auditchain Protocol is the world's first standards-based gamified incentive model based decentralized continuous accounting, reporting, audit, and analysis platform/ecosystem. The Protocol is owned and governed by its community of AUDT holders. Using Auditchain, proof of assurance (PoA) can be provided on this financial and nonfinancial business information.

The Auditchain protocol enables accountants, auditors, financial analysts to use software created by developers, financial standards created by standards setters and regulators to create machine-readable process controls and instantiate those machine-readable controls as NFTs to reliably automate tasks and processes.

Trust is maximized, provenance is established and immutable, rules-based artificial intelligence can be used effectively by business professionals to control processes. 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.

Royalties are paid to the participants within the ecosystem when work is performed, process control NFTs are used, software is created, verification is performed, or value is provided in some other manner.

The Auditchain Protocol is a new mechanism for the community interested in the financial reporting supply chain for exchanging value.

1.1. About this Book

This book explains the standard process control NFTs and how you can create those NFTs to both drive modern accounting processes and earn passive income in the form of royalties.

Traditionally, accountants struggled to achieve accuracy and efficiency by completing accounting, reporting, auditing, and analysis tasks using spreadsheets and other contemporary tools that tended to be operated using manual effort. That manual work tended to be billed by the hour which meant that you were limited by the number of hours you could contribute to work.

Process Control NFT Creation for Novices changes all of that. Now, professional accountants can scale their accounting knowledge. You can create machine readable information that can be scaled globally and earn royalties while you sit on the beach or undertake whatever activities that you might want to pursue. Software developers will use these process control NFTs to create rules based artificial intelligence (e.g. good ole expert systems) that will drive modern accounting.

Intrigued? Want to start getting those royalty checks? Well, then keep reading.

1.2. Assumptions about the Reader

In writing this book, we are making the following assumptions about the reader:

- **You have a good, working knowledge of financial accounting, financial reporting, and auditing**. We are not going to define most of the fundamental accounting terms that are used in this book. We assume you understand this basic financial accounting jargon.

- **You are open to change**. You recognize that your accounting skills can always be improved and you are open to considering making such changes. We are not going to try and sell you.

- **You need a little help with the technology aspect of the change**. While you do understand the accounting aspects you will need to deal with; you could use some guidance in the area of technology.

- **You are currently a novice with respect to NFTs**. We get that you are a novice. We will turn you into a beginner, then make you competent, eventually proficient, and eventually you will become an expert after you put in your 10,000 hours.

1.3. About the Authors

David and Charlie are both Certified Public Accountants. They worked together installing and enhancing accounting systems at the CPA firm that was then called Knight, Vale, and Gregory (KVG) in Tacoma, Washington.

Charlie is credited as being the "father of XBRL" which he started to develop when at KVG. Charlie brought the idea of what was to become XBRL to the AICPA. Charlie received the AICPA Special Recognition Award in 2006 for his efforts in helping to create XBRL. Prior to his involvement with XBRL, Charlie served as an auditor for what was then Price Waterhouse, as financial officer for a number of companies, and as an accounting software implementation consultant. In 1997, Charlie was the recipient of the AICPA Innovative User of Technology award. He was named by Accounting Technology as one of the one hundred most influential people in the accounting profession. Charlie also served in the U.S. Coast Guard.

David used to work on nuclear submarines when he was in the U.S. Navy. After his service he went back to school and earned an accounting degree from the University of Washington. David went to work at KVG here he met Charlie, they created a department that implemented accounting systems for KVG's clients and when RSM purchased KVG and decided to spin off that department, David started ICAN Software Solutions[1]. David works with Microsoft Dynamics, Acumatica, QuickBooks, Xero, and a handful of other software vendors. David also creates accounting systems modules.

Daniel is an experienced auditor and internal control consultant, gaining experience with Deloitte and RSM. For more than 5 years he has performed financial statement audits for clients in financial services industry. He is also an experienced consultant and software developer. Skilled in audit, IAS, risk assessment, internal control testing, substantive procedures, CUAE, and preparation of financial statements under Mexican NIF and IFRS.

---

[1] ICAN Software Solutions, https://icancloudapps.com/

1.4. Start Here!

This book will teach you everything you need to create accounting, reporting, auditing, and analysis process control NFTs. This book is best read linearly from beginning to end. But it has also been laid out so that you can use it as a quick reference.

We are trying to keep this book as simple as possible. As such, we will describe important information. We will also point you to additional details should you be interested in digging in deeper.

We will also summarize general details now that provide excellent background information for those who truly want to master standard XBRL process control NFTs. These individual resources are also referenced in specific sections of this document. Here is the list of generally helpful information you will definitely want to have a good look at:

- *Essence of Accounting*
- *Computational Professional Services*
- *Financial Report Knowledge Graphs*
- *Method Overview*
- *Mastering XBRL-based Digital Financial Reporting*
- *The XBRL Book: Simple, Precise, Technical*
- *New Rules for the New Economy*

All of these resources can be found on Charlie's blog[2].

So, let's get to it. We will start by providing you with a general overview of modern accounting processes.

2. Modern Accounting

We are transitioning from the industrial age to the information age. Many refer to this as the Fourth Industrial Revolution. Modern accounting is about doing accounting, reporting, auditing, and analysis better, faster, and cheaper by using the tools and technologies of the information age.

Unprecedented automation will be achieved. Human-machine collaboration will be realized, much like how a human uses a calculator to augment their ability to do math.

---

[2] Charlie's XBRL Blog, http://xbrl.squarespace.com

Most of these tools have been developed and perfected over the past 75 years. Many things are coming together to offer opportunities to do old tasks in new ways. We won't take the time to explain all the things that have changed, there are plenty of other resources that provide that information. But if you understand those tools, then you understand all too well what is happening not only in the area of accounting, but in literally every domain.

We do want to take the time to point out the most important and what tends to be often misunderstood information age technologies.

2.1. Everything is Connected Complements of Web 3.0

The easiest way to understand Web 3.0 is to compare and contrast to Web 1.0 and Web 2.0.

In Web 1.0, users passively referred to human readable web pages in order to get information. The majority of Web 1.0 users generally did not create content.

Whereas in Web 2.0, users began creating more content via the social media applications that were provided.

Web 3.0 is not yet clearly defined but there are some clear patterns that are being seen which include:

- The semantic web; content is not only readable by humans, but also readable by machines.

- Artificial intelligence will be prominent; this includes good old fashion expert systems (i.e. rules-based systems) and machine learning (i.e. pattern-based systems).

- Blockchain, cryptocurrencies, and digital distributed ledgers enabling unprecedented trust, provenance, and transparency.

- Machine to machine connectivity enabled by a semantic web (first bullet), artificial intelligence, and digital distributed ledgers.

- Ubiquity where every device is connected to the web and everything can be accessed from anywhere.

Again, this is just a quick overview to help set your perspective. The take away here is this: **change is inevitable**. Accounting processes will not be getting a "get out of change" pass.

2.2. Financial Report Knowledge Graphs

Associated with the semantic web is the notion of a knowledge graph. Knowledge graphs and financial reports as knowledge graphs are explained in detail in *Financial Report Knowledge Graphs*[3].

Effectively, a knowledge graph is machine-readable logical information for some area of knowledge. The area of knowledge we are concerned with is financial accounting, reporting, auditing, and analysis.

Process control NFTs are rules that help keep a financial report knowledge graph a properly functioning logical system that is provably consistent, complete, and precise.

2.3. Lean Six Sigma

Lean Six Sigma[4] is a discipline that combines the problem solving methodologies and quality enhancement techniques of Six Sigma[5] with the process improvement tools and efficiency concepts of Lean Manufacturing[6]. 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 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 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.

Modern accounting will leverage the principles, philosophies, and techniques of Lean Six Sigma to control processes. The objective is to have processes that are Sigma Level Six, which is 99.99966% correct.

See Lean Six Sigma[7] for more information on these principles, philosophies, and techniques.

---

[3] Charles Hoffman, CPA, *Financial Report Knowledge Graphs*, http://xbrlsite.azurewebsites.net/2021/Library/FinancialReportKnowledgeGraphs.pdf
[4] Wikipedia, *Lean Six Sigma*, https://en.wikipedia.org/wiki/Lean_Six_Sigma
[5] Wikipedia, *Six Sigma*, https://en.wikipedia.org/wiki/Six_Sigma
[6] Wikipedia, *Lean Manufacturing*, https://en.wikipedia.org/wiki/Lean_manufacturing
[7] Lean Six Sigma, http://www.xbrlsite.com/mastering/Part01_Chapter02.K_LeanSixSigma.pdf

2.4. Auditchain

Auditchain is a standards-based gamified incentive model based decentralized continuous accounting, reporting, audit, and analysis platform/ecosystem[8].

Auditchain is owned and governed[9] by its community of AUDT holders. Auditchain effectively provides orchestration as a service for the accounting, reporting, auditing, and analysis supply chain.

Auditchain has announced that they will be using NFTs as accounting and disclosure controls and that accountants will be paid royalties for creating those NFTs[10].

> "Accountants. reporting managers, CFOs, controllers, and financial analysts will now 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 using a global standard syntax on the Auditchain Protocol."

> "Non-fungible tokens 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."

Auditchain has released their testnet which is one step closer to them launching their mainnet. Pacioli is a rules/logic/reasoning engine that understands things like the logical theory describing a financial report and can process the process control NFTs to make sure everything is operating as expected. In a press release[11], Auditchain stated:

> "The Alpha version of Pacioli will feature a library of financial reporting process controls that are not only standardised for the US GAAP and IFRS financial reporting schemes but will be audited and converted into NFTs for the purposes of providing proof of

---

[8] Auditchain, *Accounting, Reporting, Auditing, and Analysis in a Digital Environment*, https://docs.auditchain.finance/auditchain-protocol/knowledge-base#accounting-reporting-auditing-and-analysis-in-a-digital-environment

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

[10] Auditchain to Use NFTs for Accounting and Disclosure Controls, https://www.coinspeaker.com/auditchain-to-use-nfts-for-accounting-and-disclosure-controls/

[11] Auditchain protocol launches on testnet, https://www.cityam.com/auditchain-protocol-launches-on-testnet/

assurance to auditors in the European Union who are now required under CEAOB guidance to include XBRL based machine-readable logic and data as well as human readable financial statements within the scope of an audit engagement."

I have contributed all the machine-readable accounting rules that I have used[12] to verify XBRL-based financial reports submitted to the SEC using US GAAP and IFRS to Auditchain[13]. Auditchain says they will be publishing my process controls:

"Auditchain also reported that Charles Hoffman, CPA, who helped create the XBRL global standard syntax for financial reporting, was recently appointed as a Product Manager for Auditchain. Mr. Hoffman's appointment included the contribution of all of the controls created by him over the years which are now the basis of the XBRL based US GAAP Reporting Scheme and are used by most companies who file financial reports with the SEC and ESMA. The first set of NFTs on the Auditchain Protocol will feature all of the controls created by Mr. Hoffman."

In this document we explain NFTs, we help you understand how to create them, and we help you understand how you can make passive income from these process control NFTs that will be enabling modern accounting processes.

3. Factual Overview of Process Control NFTs

This section provides basic terminology and jargon for modern accounting including NFTs, major ideas, factual information about thinking in this area of knowledge.

Essence of Accounting[14] provides excellent background information which is helpful in getting the best understanding of this section.

The best way to understand process control NFTs is to see what the process control NFTs actually do and why. Our focus right now is

---

[12] Quarterly XBRL-based Public Company Financial Report Quality Measurement (March 2019), http://xbrl.squarespace.com/journal/2019/3/29/quarterly-xbrl-based-public-company-financial-report-quality.html

[13] Auditchain to Use NFTs for Accounting and Disclosure Controls, https://www.coinspeaker.com/auditchain-to-use-nfts-for-accounting-and-disclosure-controls/

[14] Charles Hoffman, CPA, Essence of Accounting, http://xbrlsite.azurewebsites.net/2020/Library/EssenceOfAccounting.pdf

financial reporting and financial analysis NFTs right now because those are the types of process control NFTs that currently exist.

3.1.   Digital Financial Reports

As pointed out in the previous section, financial reports are knowledge graphs. Those knowledge graphs could take the form of a number of technical formats including the semantic web stack, a graph database, PROLOG, maybe even a relational database.

Today, information in those financial report knowledge graphs tend to be stored in databases, electronic spreadsheets, content management systems, and other places and financial reports are either automatically generated or more typically manually pieced together. The resulting general purpose financial reports usually ending up in a format such as HTML, Microsoft Word, PDF, or some other document format that is focused on the presentation of financial information which is not readable and is certainly not reliably understandable by a down-stream computer-based process.

Enterprises could, theoretically, reliably and effectively stream a high-quality machine-readable XBRL-based global standard financial report knowledge graph which is precise, complete, consistent, and provably correct general purpose financial statement.

Further, an entire record-to-report process could be automated effectively. From transaction to trial balance; trial balance to report writer; report writer to report.

To do this reliably you need a few things:

1. You need some **physical technical format** to move information from point to point in the process, preferably a standard format as opposed to a proprietary format.

2. You need the right **financial report level**[15] of machine-readable logical information to verify the quality of the information in that physical format, controlling the process.

3. You need some sort of **method**[16] for actually achieving what you are trying to achieve; preferably a method that is proven to work effectively, based on best practices, is reliable and repeatable.

---

[15] Financial Report Levels, http://xbrl.squarespace.com/journal/2021/4/5/financial-report-levels.html

[16] Method Overview, http://accounting.auditchain.finance/framework/MethodOverview.pdf

You also need to use some sort of financial reporting scheme which lets you know what is permissible and what is not permissible per that financial reporting scheme. We will look at financial reporting schemes next.

3.2. *Financial Reporting Schemes*

Accountants are familiar with the notion of a financial reporting scheme[17]; but they might not be as familiar with the organization of information that relates to a financial reporting scheme in a form that is useful to machines such as computers.

Auditchain provides a landing page that has a starter set of financial reporting schemes[18]. The two financial reporting schemes that make the most sense to accountants are US GAAP and IFRS.

Let's look at that set of financial reporting schemes in order to help you understand the role of each. We will work up to IFRS and US GAAP. Here is a summary:

- PROOF (machine readable financial reporting scheme model followed by all other financial reporting schemes)
- MINI Financial Reporting Scheme
- XASB Financial Reporting Scheme Good Practices Prototype
- Personal Financial Statements (PFS)
- Financial Reporting Framework for Small- and Medium-sized Enterprises (FRF for SMEs, AICPA)
- Not-for-Profit Financial Reporting (US GAAP)
- International Public Sector Accounting Standards (IPSAS)
- International Financial Reporting Standards (IFRS)
- U.S. Generally Accepted Accounting Principles (US GAAP)

---

[17] Comparison of Financial Reporting Schemes, http://xbrlsite.azurewebsites.net/2020/master/ElementsOfFinancialStatements.pdf

[18] Financial Reporting Schemes, http://accounting.auditchain.finance/reporting-scheme/index.html

3.2.1. PROOF

The PROOF financial reporting scheme[19] is a distillation of all important logical patterns found in all other financial reporting schemes[20]. Part of the PROOF is the PROOF BASELINE which implements US GAAP, IFRS, Australian IFRS, and UK GAAP and compares each implementation with the PROOF[21].

The PROOF is basically the most sophisticated implementation of an XBRL-based financial report in the smallest "package" that will help you get your head around XBRL-based financial reporting.

3.2.2. MINI

The MINI financial reporting scheme[22] is a relatively small financial reporting scheme that is interesting for two reasons. First, a version of this reporting scheme is used to test the entire record-to-report process[23]. Second, it is still relatively small and easy to get your head around. Third, this MINI example ties a lot of the fundamental ideas and features of accounting together.

While this is not how economic entities actually report, it is how reporting might be implemented internally within an enterprise to have the highest level of control over that accounting process.

Trust me when I say that this MINI is very interesting and worth digging into in detail; it offers a lot.

3.2.3. XASB

Because I don't have control over the US GAAP or IFRS XBRL Taxonomies and because the US GAAP and IFRS have so many flaws in terms of XBRL taxonomy creation; to avoid the constraints of the US

---

[19] PROOF, http://accounting.auditchain.finance/reporting-scheme/proof/documentation/Index.html

[20] Understanding Proof, http://xbrlsite.azurewebsites.net/2020/master/proof/UnderstandingProof.pdf

[21] PROOF Comparison, http://xbrl.squarespace.com/journal/2020/12/19/mechanism-for-understanding-xbrl-based-financial-report-sema.html

[22] MINI, http://accounting.auditchain.finance/reporting-scheme/mini/documentation/Index.html

[23] *Effective Automation of Record to Report Process (Iteration #4)*, http://xbrlsite.azurewebsites.net/2021/prototypes/recordToReport/

GAAP and IFRS XBRL taxonomies I created my own personal financial reporting scheme and called if XASB[24].

This XASB financial reporting scheme is quite large, looks like a financial reporting scheme that you can create financial reports with, but was created using good practices (best practices) that are prescribed by my method[25].

This XASB financial reporting scheme is excellent for testing, experimentation, and a good example of how to actually create a base XBRL taxonomy.

3.2.4. Personal Financial Statements

This PFS is a working prototype XBRL taxonomy[26] that is used to communicate the idea that every group creating an XBRL taxonomy does not need to re-invent the wheel. This also offers a starter set for actually creating a commercially usable version of this XBRL taxonomy.

3.2.5. Not for Profit

This Not for Profit is a working prototype XBRL taxonomy[27] that is used to communicate the idea that every group creating an XBRL taxonomy does not need to re-invent the wheel. This also offers a starter set for actually creating a commercially usable version of this XBRL taxonomy.

3.2.6. FRF for SMEs

This FRF for SMEs is a working prototype XBRL taxonomy[28] that is used to communicate the idea that every group creating an XBRL taxonomy does not need to re-invent the wheel. This also offers a starter set for actually creating a commercially usable version of this XBRL taxonomy.

---

[24] XASB, http://accounting.auditchain.finance/reporting-scheme/xasb/documentation/Index.html

[25] Method Overview, http://accounting.auditchain.finance/framework/MethodOverview.pdf

[26] Personal Financial Statements, http://accounting.auditchain.finance/reporting-scheme/pfs/documentation/Index.html

[27] Not for Profit, http://accounting.auditchain.finance/reporting-scheme/nfp/documentation/Index.html

[28] FRF for SMEs, http://accounting.auditchain.finance/reporting-scheme/frf-sme/documentation/Index.html

3.2.7. IPSAS

This IPSAS is a working prototype XBRL taxonomy[29] that is used to communicate the idea that every group creating an XBRL taxonomy does not need to re-invent the wheel. This also offers a starter set for actually creating a commercially usable version of this XBRL taxonomy.

3.2.8. IFRS

This IFRS-FULL is a working prototype that supplements the IFRS-FULL XBRL taxonomy[30].

3.2.9. US GAAP

This US GAAP is a working prototype that supplements the US GAAP XBRL Taxonomy[31]. This is the best starter set of all the other working prototypes of XBRL taxonomies for different financial reporting schemes.

3.3. Components of Financial Reporting Scheme

If you look at each of the working prototype financial reporting schemes that we have represented in machine readable form you notice similarities or patterns.

An obvious question you might have might be why would different financial reporting schemes do things differently? The answer to that question is silo thinking, unconsciousness of what they are actually doing, and a lack of a world-class understanding of the XBRL technical specification.

But, what if you avoided silo thinking; if you became conscious of what you were really doing, and leveraged those who had a world class understanding of XBRL; then how might you create a best practices or good practices based XBRL taxonomy? If you wanted to implement an XBRL taxonomy within your enterprise; how would you do this in order to be the most effective and have the most reliable result?

This is exactly what we tried to do. Here are the components of a good practices XBRL-based financial reporting scheme. We will cover this

---

[29] IPSAS, http://accounting.auditchain.finance/reporting-scheme/ipsas/documentation/Index.html

[30] IFRS, http://accounting.auditchain.finance/reporting-scheme/ifrs-full/documentation/Index.html

[31] US GAAP, http://accounting.auditchain.finance/reporting-scheme/us-gaap/documentation/Index.html

information by using the PROOF[32] which is the most sophisticated but also the smallest XBRL taxonomy. All, or any, of these are parts of process control NFTs.
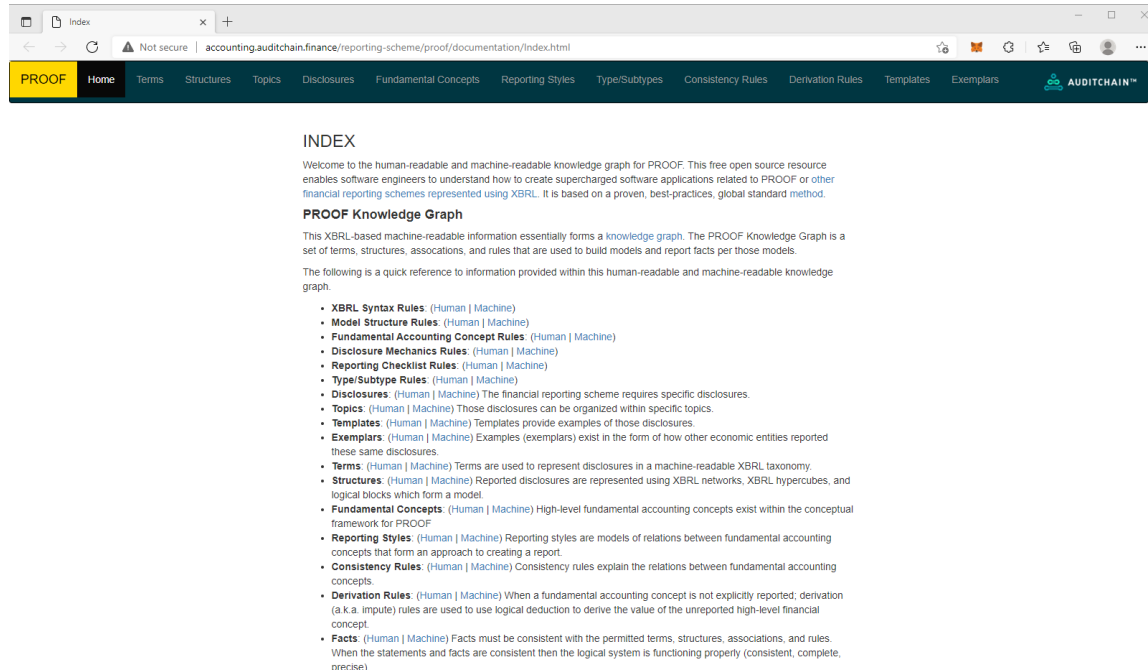
We will briefly discuss each category of pattern in this section. In later sections, we will build on this base and expand your understanding.

Again, any of these things might be a process control NFT. Some are clearly necessary process control NFTs. Others, maybe not so much.

3.3.1. Terms

Every financial reporting scheme as terms[33] which that financial reporting scheme defines.

---

[32] Proof, http://accounting.auditchain.finance/reporting-scheme/proof/documentation/Index.html

[33] Terms, http://accounting.auditchain.finance/reporting-scheme/proof/documentation/Terms.html

You can think of these terms as a controlled vocabulary that is used by the financial reporting scheme. Each term is described in documentation and references to authoritative literature and unauthoritative interpretations provided to help you understand the term.

3.3.2. Structures

Terms can be organized into structures[34]. For example, the terms "Assets" and "Liabilities" and "Equity" are organized within the structure "Balance Sheet".

A structure can be an NFT.

---

[34] Structures, http://accounting.auditchain.finance/reporting-scheme/proof/documentation/Structures.html

3.3.3. Topics

The volume of disclosures can be quite large so we use the notion of a topic[35] as a way to characterize disclosures.

Topic Name	Chapter
▦ Basis of Presentation	958
▦ Cash and Cash Equivalents	958
▤ Cash Flow Supplemental Information	958
▤ Commitments	958
▤ Contingencies	958

The FASB and IASB each offer sets of topics that can be used to characterize and organize disclosures. Alternatively, anyone can create their own set of topics or add one or more topics to what the FASB and/or IASB provide.

3.3.4. Disclosures

A disclosure[36] is simply something that is disclosed within a financial report.

Disclosure Name	Exemplars
▦ Assets Roll Forward	3
☰ Assets Roll Up	3
▦ Balance Sheet	3
▦ Basis of Reporting	3
☰ Cash Flow Statement	3
Changes in Equ	3

A disclosure is a unit of information, not where some economic entity arbitrarily chooses to present that information. Understanding the distinction between the representation of information and the

---

[35] Topics, http://accounting.auditchain.finance/reporting-scheme/proof/documentation/Topics.html

[36] Disclosure, http://accounting.auditchain.finance/reporting-scheme/proof/documentation/Disclosures.html

presentation of information is a crucial distinction that you must make. This will be explained further later. For now, just begin to recognize that our focus at this time is with the representation information and not on the presentation of that representation.

3.3.5. Fundamental Concepts

Every financial reporting scheme has a set of fundamental accounting concepts[37] into which that financial reporting scheme is organized. For US GAAP, SFAC 6 defines the high-level layer of those concepts: Assets, Liabilities, Equity, Comprehensive Income, Investments by Owners, Distributions to Owners, Revenues, Expenses, Gains, Losses.

Fundamental Accounting Concept Name	Required
▦ Assets	YES
▤ Balance Sheet Date	NO
▦ Comprehensive Income (Loss)	YES
▦ Current Assets	YES
▦ Current Liabilities	YES
▤ Document Type	YES

While each financial reporting scheme might define a different set of fundamental concepts, they might provide a set that is more or less complete, they might even have different definitions of the terms; each has the notion of these high-level financial accounting concepts.

3.3.6. Reporting Styles

Financial reports are not forms. As such, economic entities can organize information using different subtotals and other intermediate line items within their financial reports. Reporting styles is a mechanism for handling this inherent flexibility.

---

[37] Fundamental Accounting Concepts, http://accounting.auditchain.finance/reporting-scheme/proof/documentation/FundamentalAccountingConcepts.html

Reporting Style Code	Count
⚏ PROOF-NET-IS02-CF1	1
⚏ PROOF-BSU-IS02-CF1	1
⚏ PROOF-NET-IS01-CF1	1
⚏ PROOF-BSU-IS01-CF1	1

The very best example of reporting styles is US GAAP. That set is the most complete with over 90% of economic entities covered.

Very, very important note!!! I have some better approaches to organizing reporting style information that has not yet been documented. While what you see now works; there are better ways to get the same result that decreases maintenance effort.

3.3.7. Types/Subtypes

Type/subtype[38] information is critically important to creating financial reports correctly. It is easy to pick the wrong concept when you have, say, 17,000 concepts like the US GAAP XBRL Taxonomy does. Type-subtype associations helps here.

Type	Subtype Count
📄 CurrentAssets	7
📄 CurrentLiabilities	11
▦ Dimensions	2
📄 Expenses	13

Note that type-subtype information is similar to what others call "wider-narrower" or "general-special" associations. This also relates to what is commonly called "anchoring".

---

[38] Type-subtype, http://accounting.auditchain.finance/reporting-scheme/proof/documentation/TypeSubtype.html

3.3.8. Consistency Rules

Financial reports are rich with associations between financial concepts. When those concepts are used, you don't want to have inconsistencies or other conflicts within your financial statements. Consistency rules[39] help with this, keeping your information consistent and eliminating contradictions.

Consistency Rule	Code
▦ Assets = LiabilitiesAndEquity	BS01
▦ Assets = (CurrentAssets + NoncurrentAssets)	BS02
▤ ComprehensiveIncomeLoss = (NetIncomeLoss + OtherComprehensiveIncome)	IS04
▪ Equity = (EquityAttributableToControllingInterests + EquityAttributableToNoncontrollingInterests)	BS05
▦ Liabilities = (CurrentLiabilities + NoncurrentLiabilities)	BS03
LiabilitiesAndEquity = (Liabilities + Equity)	BS04

The ultimate example of a consistency rule is the accounting equation itself: Assets = Liabilities + Equity.

3.3.9. Derivation Rules

As stated earlier, economic entities creating financial reports have flexibility. Different intermediate totals and subtotals are provided; or sometimes not. For example, many economic entities don't report total noncurrent assets or noncurrent liabilities. If they are not reported, derivation rules[40] are used to derive that information using the rules of logic.

---

[39] Consistency rules, http://accounting.auditchain.finance/reporting-scheme/proof/documentation/Consistency.html

[40] Derivation rules, http://accounting.auditchain.finance/reporting-scheme/proof/documentation/Derivation.html

Derivation Rule | **Code**

if (Assets = 0 and not(NoncurrentAssets = 0) and not(CurrentAssets = 0)) then (Assets = NoncurrentAssets + CurrentAssets) else (Assets = Assets) — **BS-Impute-606**

if (Liabilities = 0 and not(CurrentLiabilities = 0) and not(NoncurrentLiabilities = 0)) then (Liabilities = CurrentLiabilities + NoncurrentLiabilities) else (Liabilities = Liabilities) — **BS-Impute-14**

if (LiabilitiesAndEquity = 0 and not(Assets = 0)) then (LiabilitiesAndEquity = Assets) else (LiabilitiesAndEquity = LiabilitiesAndEquity) — **BS-Impute-...**

Also, these derivation rules help data aggregators and others extracting information from XBRL-based reports do so effectively.

3.3.10.   Templates

Rather than configuring every disclosure from scratch, templates are a pre-configured version of a disclosure that economic entities creating reports can modify which makes report creation easier and keeps the quality of reported disclosures high.

Template Label | **Star Rating**

Assets Roll Forward — 5
Assets Roll Up — 5
Balance Sheet — 5
Basis of Reporting — 5
Cash Flow Statement — 5
Cash Flow Statement Alternative 2 — 5

Any disclosure could have one or more templates that help economic entities create reports correctly.

3.3.11.   Exemplars

An exemplar[41] is similar to a template in that an exemplar is an example of a disclosure. What differentiates an exemplar from a template is that exemplars are examples that come directly from the reports of other economic entities that have represented a disclosure.

---

[41] Exemplars, http://accounting.auditchain.finance/reporting-scheme/proof/documentation/Exemplars.html

Exemplars for Disclosure	Count of Exemplars
Assets Roll Forward	3
Assets Roll Up	3
Balance Sheet	3
Basis of Reporting	3
Cash Flow Statement	3
Changes in Equity	3
Comprehensive Income	3

Each exemplar is an example that can literally be imported directly from some other XBRL-based financial report (this is as contrast to the current contemporary approach of copy/paste to "leverage" disclosures from other reports).

3.4. Fundamental Accounting Concepts

So here is something that I created that will be turned into NFTs, I call it the *Fundamental Accounting Concepts*[42]. But this resource is not yet a process control NFT. What you see is a set of XBRL files that can be used to cross check and verify XBRL-based financial reports to be sure that there are no inconsistencies or contradictions within an XBRL-based financial report for these high-level financial report line items that form a shell for every financial report.

We want to provide this as an example, explain the flaws with the approach that we are using, and then show you how to fix the flaws.

3.4.1. Information Represented

The information represented by the fundamental accounting concepts continuity cross checks includes the following.

- **Terms**[43]: These are the terms that make up the fundamental accounting concepts such as "Assets", "Liabilities", "Equity", "Revenues", "Net Income (Loss)"; you get the idea.

---

[42] Fundamental Accounting Concepts,
http://accounting.auditchain.finance/fac/Index.html

[43] FAC Terms, http://accounting.auditchain.finance/fac/Terms.html

- **Consistency rules**[44]: These are the rules that explain the relations between the terms such as "Assets = Liabilities + Equity".

- **Derivation rules**[45]: These are the rules that explain how exactly to derive unreported high-level facts from a financial report such as "If the fact 'fac:NoncurrentAssets' is not reported but the fact 'fac:CurrentAssets' is reported and the fact 'fac:Assets' is reported; THEN you can derive fac:NoncurrentAssets using the rule fac:NoncurrentAssets = fac:Assets - fac:CurrentAssets" using the rules of deductive reasoning.

- **Mappings-US GAAP**[46]: When an XBRL-based financial report is created, sometimes different concepts can be used to represent what conceivably could be considered the same fact. Mappings from those many concepts to the fundamental accounting concepts helps software figure this out. Without these mapping rules, software will not be able to extract information from reports correctly. For example, sometimes the FAC concept "fac:CostOfRevenues" might be reported using the US GAAP XBRL Taxonomy concept "us-gaap:CostOfRevenue" or maybe "us-gaap:CostOfGoodsAndServicesSold" or maybe even "us-gaap:CostOfServices" or "us-gaap:CostOfGoodsSold". You get the idea.

- **Mappings-IFRS**[47]: This works exactly like the US GAAP mappings described above; but these mappings are for IFRS XBRL taxonomy concepts.

- **Reporting styles**[48]: These reporting styles are used to configure the set of consistency rules and the set of derivation rules that should be used for a specific economic entities financial report. For example, some economic entities report using a classified balance sheet, others use an unclassified (order of liquidity) balance sheet. Income statements might be multi-step and include gross profit or single-step and don't include that concept.

---

[44] FAC Consistency Rules,
http://accounting.auditchain.finance/fac/RulesConsistency.html
[45] FAC Derivation Rules,
http://accounting.auditchain.finance/fac/RulesDerivation.html
[46] FAC Mappings-US GAAP, http://accounting.auditchain.finance/fac/Mappings-USGAAP.html
[47] FAC Mappings-IFRS, http://accounting.auditchain.finance/fac/Mappings-IFRS.html
[48] FAC Reporting Styles,
http://accounting.auditchain.finance/fac/ReportingStyles.html

Reporting styles help software sort out reported information and help report creators to create those reports correctly.

- **Key financial ratios**[49]: These key financial ratios help financial analysts, investors, and regulators analyse the information that financial reports contain. Standard ratios that map to standard terms that are used to compute those ratios. For example, the current ratio is "fac:CurrentAssets" divided by "fac:CurrentLiabilities".

And so there you have it, that pretty much explains the fundamental accounting concepts and the relations between those concepts.

3.4.2. Flaws

So, look at the fundamental accounting concepts and you can start to see potential flaws in what you see. For example,

- How do you know that a term is correct? Or rule? Or ratio? Or mapping?
- Who created the term, rule, ratio, mapping?
- Has the term, rule, ratio, mapping been changed? How do I know?
- Should there be multiple sets of fundamental accounting concepts, say one for each financial reporting scheme; or should there only be one set of fundamental accounting concepts which are then mapped to different financial reporting schemes? What are the pros and cons of each approach?
- Will these important consistency checks always be available or does the web site go down from time-to-time?
- Who maintains the terms, rules, mappings, ratios?
- Financial reporting schemes change; who will add new terms, rules, mappings, ratios?
- What if I think I find an error; who will fix the error or determine if it really is an error?

That is only a handful of the things that need to be considered relative to these fundamental accounting concepts.

---

[49] FAC Key Financial Ratios,
http://accounting.auditchain.finance/fac/RulesKeyRatios.html

3.4.3. Creating something better

While those fundamental accounting concepts relations continuity cross checks can, and in fact do, work[50] when expressed using XBRL as they are; they can work even better.

You can create something better when you reduce risk. What sorts of risk am I taking about? See the next section.

3.5. Reducing Risk that Something Goes Wrong

All of these things can work great if everything magically goes right. But consider what exactly can go wrong. Suppose someone changes a rule unintentionally or perhaps even maliciously. Suppose a server goes down somewhere, what then. What if an accountant interprets a law incorrectly and writes machine readable rules that are incorrect?

We need just a little bit more.

3.5.1. Clarity

Today, accounting standards are written in books, perhaps "e-books". The only way inconsistencies, ambiguity, and other problems in the accounting standards written and therefore the rules that help accountants understand what is permitted and what is not permitted is for a human to read the book.

But what if accounting, reporting, and auditing rules were written in format, machine-readable form and computers could help the financial reporting supply chain detect and remove inconsistencies, ambiguity, and other undesirable characteristics of these important financial reporting schemes.

Think computational professional services[51]. Think algorithmic regulation[52]. Think smart regulation[53].

---

[50] Quarterly XBRL-based Public Company Financial Report Quality Measurement (March 2019), http://xbrl.squarespace.com/journal/2019/3/29/quarterly-xbrl-based-public-company-financial-report-quality.html

[51] Charles Hoffman, CPA, *Computational Professional Services*, http://accounting.auditchain.finance/library/ComputationalProfessionalServices.pdf

[52] Tim O'Reilly, *Open Data and Algorithmic Regulation*, https://beyondtransparency.org/chapters/part-5/open-data-and-algorithmic-regulation/

[53] Smart Regulation, http://xbrl.squarespace.com/journal/2012/11/12/smart-regulation-graphic-shows-the-big-picture.html

3.5.2. Trust

What if all rules were created by reliable accounting professionals and those rules were reviewed by other reliable accounting professionals? What if the entire community agreed on the rules? What if fair governance were created to manage the rules.

3.5.3. Provenance

What if there was a record that showed the entire history of a rule or a set of rules that you could access to better understand the rule.

3.5.4. Immutability

What if information could never be changed, guaranteed. There was a reliable record of every addition and revision and there was a system in place that guaranteed the information was reliable.

3.5.5. Assurance

What if third party assurance was provided not on a statistical same or 2% or 10% of transactions; assurance was provided by checking 100% of transactions using artificial intelligence[54].

What if the current conflict of interest that existed between auditor and audit client went away. What if the current broken audit system[55] were fixed? Is a botched audit rate of 20%[56] acceptable? Traditional audit is doomed to say the least.

3.5.6. Transparency

What if investors had unprecedented transparency into the quantitative and qualitative information that exists in financial reports. What if you could bypass the presentation games that public companies play, burying information, and find the information you really need?

If clarity, trust, provenance, immutability, assurance, and transparency all increased the capital markets would very likely function even better than they do currently.

---

[54] AI Assisted Audits are Here, http://xbrl.squarespace.com/journal/2019/6/12/ai-assisted-audits-are-here.html

[55] Fortune: Audit is Broken, http://xbrl.squarespace.com/journal/2020/7/21/fortune-auditing-is-broken.html

[56] POGO, Botched Audits: Big Four Accounting Firms Fail Many Inspections, https://www.pogo.org/investigation/2019/09/botched-audits-big-four-accounting-firms-fail-many-inspections/

4. Conceptual Overview of Process Control NFTs

In this section we want to break down the phrase "process control NFTs" and help you understand precisely what that means. To achieve this and provide you with a conceptual overview, we will define individual terms, add a few other terms, and then tie everything together within a conceptual overview.

4.1. Systems

A *system*[57] is a cohesive conglomeration of interrelated and interdependent parts that is either natural or man-made. A system is a system, rather than some random set of parts, if the parts of a system work together as opposed to working apart separately. The aim of any system must be stated and managed.

A very important thing to understand about systems is that you can have a "closed system" and you can have an "open system". Closed systems can be controlled whereas open systems cannot be controlled.

Why is understanding whether a system is open or closed important? It is important to understand the difference between the reliability and predictability (i.e., tolerance for error) that you get from open versus closed systems and how much effort it takes to manage that control. Systems need to be controlled. Rework is expensive.

4.2. Processes

A *process* is a systematic series of actions or steps that are taken in order to achieve a particular result. Processes are all the related activities (parts) inside a system that work together to make the system function.

---

[57] *Systems Theory*, http://xbrl.squarespace.com/journal/2019/12/29/systems-theory-method-to-my-madness.html
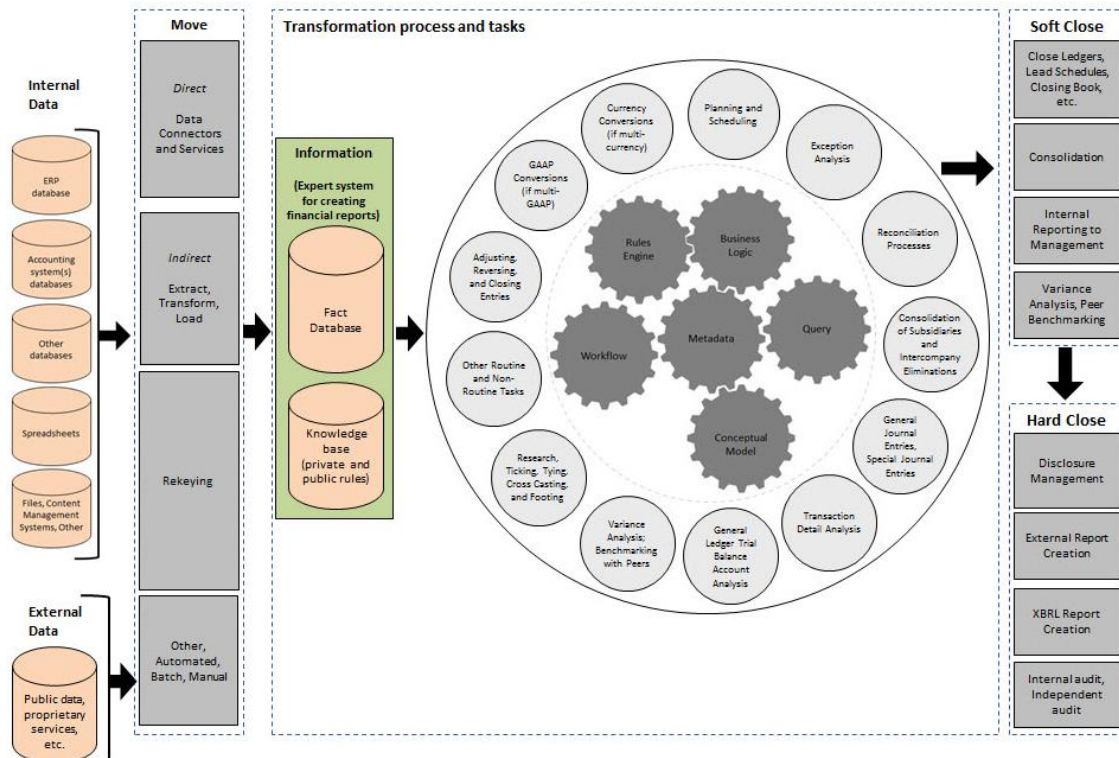
Don't make the mistake of thinking about systems as silos. Rather, think in terms of a supply chain. For example, consider the global standard ISO intermodal shipping container[58] and how that standard impacts the delivery of goods around the world by truck, ship, train and how that might work if the global standard shipping container did not exist.

Another example is the Universal Product Code (UPC) and how the UPC enables efficiency for the retail industry[59]. 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[60]. GS1 US, the organization that manages the global standard UPC code puts it succinctly when they say:

---

[58] Standards Make Markets, http://xbrl.squarespace.com/journal/2018/12/22/standards-make-markets.html

[59] Reading Between the Lines - How the Grocery Industry Coalesced Behind the UPC Bar Code, http://econintersect.com/b2evolution/blog1.php/2014/11/29/reading-between-the-lines-how-the-grocery-industry-coalesced-behind-the-upc-bar-code

[60] Behind the 'Beep', https://blog.matthews.com.au/behind-the-beep-how-to-use-a-barcode/

"Business is easier when you speak the same language as your customers, suppliers and partners."[61]

Other examples of standards helping industries and supply chains include HL7 for healthcare, MP3 for music, JPEG for photography, the ISO shipping container for logistics to name only a few. Standards for professional services just makes sense.

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.

[61] GS1, About, https://www.gs1.org/about

4.3. Controls

If a process cannot be controlled then the process simply cannot repeatedly and reliably output high-quality. If process output is not high-quality, automation cannot possibly be effective.

So, control of a process is necessary in order for the process to be effective. How do you control a process? You control a process using rules. Manual processes are controlled by rules that are read by humans. Automated processes are controlled by rules that are readable by both machines (i.e., to execute the process) and humans (i.e., to make sure the rules are right).

Who creates these machine-readable rules that are used to control processes that yield effective automation? Accountants must create these rules because the rules tend to be accounting oriented. Technical rules tend to relate to syntax and such technical rules can be hidden from business professionals. What is left is the business logic and accounting rules that are used to control information and control process workflow. As such, the creation of machine-readable rules must be "self-service". Business professionals must be empowered to create, adjust, maintain, and otherwise manage the rules that are used to control and therefor effectively automate processes. Once you have the machine-readable rules, you need software that can process the rules; this is sometimes called a rules engine or reasoning engine or a semantic reasoner. We will get to that in a bit, but first let's be sure you have some critically important background understanding.

Controls are actions taken to make sure permissible things happen and impermissible things don't happen. There tend to be two types of controls: preventative and detective.

Preventive controls are designed to keep impermissible things from happening. Preventive controls can be used to guide the processing within a system. **Detective controls** are designed to detect impermissible things that have happened. Another type of control is a corrective control.

4.4. Rules

The Merriam-Webster dictionary defines anarchy[62] as "a situation of confusion and wild behavior in which the people in a country, group,

---

[62] Anarchy definition, Merriam-Webster, http://www.merriam-webster.com/dictionary/anarchy

organization, community, etc., are not controlled by rules or laws."
Rules prevent information anarchy[63].

Rules enable a knowledge bearer to describe information they are providing and verify that the information provided is consistent with that description. Rules enable a knowledge receiver to understand the description of information provided by the knowledge bearer and likewise verify that the information is consistent with that description. Rules document what is permitted and what is not permitted within a system.

Rules guide, control, suggest, or influence behavior. Rules cause things to happen, prevent things from happening, or suggest that it might be a good idea if something did or did not happen. Rules help shape judgment, help make decisions, help evaluate, help shape behavior, and help reach conclusions.

Rules arise from the best practices of knowledgeable business professionals. A rule describes, specifies, defines, guides, controls, suggests, influences or otherwise constrains some aspect of knowledge or structure within some problem domain.

Don't make the mistake of thinking that business rules are completely inflexible and that you cannot break rules. Sure, maybe there are some rules that can never be broken. Maybe there are some rules that you can break.

It helps to think of breaking rules as penalties in a football game (soccer for you Americans). The point is that the guidance, control, suggestions, and influence offered by rules are a choice of business professionals. The meaning of a rule is separate from the level of enforcement someone might apply to the rule.

Rules can be imperative (procedural) or declarative. The *Business Rules Manifesto*[64] Article 4 says that it is best if rules are declarative.

4.5. Quality

The Harvard Business Review article by Thomas Redman, *Bad Data Costs the U.S. $3 Trillion Per Year*[65], makes mention of the author calls

---

[63] *Understanding that Business Rules Prevent Anarchy*, http://xbrl.squarespace.com/journal/2016/7/15/understanding-that-business-rules-prevent-anarchy.html

[64] Business Rules Manifesto, Article 4, https://www.businessrulesgroup.org/brmanifesto.htm

[65] Thomas C. Redman, *Bad Data Costs the U.S. $3 Trillion Per Year*, https://hbr.org/2016/09/bad-data-costs-the-u-s-3-trillion-per-year

"*the hidden data factory*" where U.S. organizations waste $3 trillion correcting errors made by others in the same organization.

Essentially this describes what George Labovitz and Yu Sang Chang came up with in 1992 called the "1-10-100 Rule" and is widely used as a tool to describe efficiency. In summary:

- ▪ **$1**: Verifying and correcting information at the start is the least expensive way to make sure your information is clean and accurate. This is ***prevention cost***.

- ▪ **$10**: Identifying and cleaning information after the fact is time consuming and resource intensive. This is ***correction cost***.

- ▪ **$100**: Bad information may flow between sources, creating a waste of time and resources. This is ***failure cost***.

Said another way, "An ounce of prevention is worth a pound of cure."

4.6. NFTs

NFTs (non-fungible tokens[66]) are all the rage these days; but understanding exactly what an NFT is can be challenging. This article, *7 Things You Should Know about NFTs*[67], is a good place to start learning about NFTs.

Understanding NFTs is easier when you understand the characteristics of an NFT. This article, *What Are NTFs and How Do They Work*[68] points out these characteristics:

- • **Non-interoperable**: NFTs are unique and unlike fungible tokens which are all the same basically and any one is just as good as any other; NFTs are not interchangeable.

- • **Indivisible**: NFTs cannot be divided into smaller denominations.

- • **Indestructible**: NFTs are stored on the blockchain and can never be destroyed.

- • **Verifiable**: Because NFTs exist on a blockchain they can be traced back to the original creator.

This video, *Could Enjin SUPERCHARGE Gaming NFTs?!*[69] (at minute 6:50) points out three aspects of determining value of an asset:

---

[66] YouTube, NFTs, https://youtu.be/X_AugmQpwho

[67] *7 Things You Should Know about NFTs*, https://academy.binance.com/en/articles/7-things-you-should-know-about-nfts

[68] *What Are NTFs and How Do They Work*, https://www.coindesk.com/what-are-nfts

[69] *Could Enjin SUPERCHARGE Gaming NFTs?!,* httpts://youtu.be/4ozLTBG83eE?t=410

- **Rarity**: How scarce is it?

- **Provenance**: Where did it come from?

- **Quality/Utility**: How good is the asset or how good does the asset serve your specific needs?

Machine-readable metadata can be turned into an NFT. What is an example of machine-readable metadata? All the rules that I have created for US GAAP and IFRS can be turned into NFTs. Why? Because the rules are useful in verifying an XBRL-based financial report has been correctly created.

4.7. Process Control NFTs

In simple terms, a process control NFT is a declarative rule that has been verified to be correct in terms of technical format business report logic, and financial accounting logic by a cohort of accountants who then stand behind the rule. That rule is formalized and placed in a distributed ledger to explain the provenance of the rule, to be certain that the rule has not been tampered with or manipulated in any way, and therefore can be trusted by accounting professionals, software applications operated by accounting professionals, financial analysts, standards setters, regulators, and others.

5. Procedural How-to Steps to Creating NFTs

This section provides the reader with the "how-to", the procedural steps to creating process control NFTs.

So how exactly to you create a process control NFT? That is the focus of this section. We will literally walk you through the details of the process of creating an NFT for the tip of the financial accounting pyramid: the accounting equation[70]. Perhaps later we will tackle other important accounting equations every business owner should know[71].

---

[70] Wikipedia, Accounting Equation,
https://en.wikipedia.org/wiki/Accounting_equation

[71] Intuit, *8 accounting equations every business owner should know*,
https://quickbooks.intuit.com/r/bookkeeping/7-accounting-formulas-every-business-should-know/

5.1. Overview

First, we will provide an overview of each step in the process. Subsequent sections will provide details related to each step. Here is an overview of the process for creating a process control NFT:

1. **Stake**: You have to stake to be able to create an Auditchain NFT. This is simply staking a certain level of AUDT tokens which enables you to be considered.

2. **Specific knowledge**: Figure out what you want to create an NFT for. What specific knowledge to you want to represent as an NFT?

3. **Express knowledge using XBRL**: Express the specific knowledge you want to represent using XBRL.

4. **Verify your NFT**: Verify that both the technical syntax and the logic of the knowledge represented is correct.

5. **Submit your NFT to Auditchain**: You submit your NFT to Auditchain.

6. **Proof of Assurance issuance**: Proof of Assurance (PoA) is issued by a cohort of auditors that independently verify both the technical format and the logic of your NFT. This proof of assurance includes testing your NFT against existing financial report knowledge graphs to verify that it works as expected.

7. **Publish**: After proof of assurance is received and your NFT is formally approved, your NFT will be officially published.

8. **Production use of NFT**: Your NFT goes into production and you start receiving royalties as does the cohort that issued the PoA.

So now let's look into each step in more detail by actually creating an NFT. We will use the accounting equation as the knowledge we want to represent as an NFT.

5.2. Stake

First, you have to have some skin in the game. You don't get to participate unless you do. Not a lot of skin, but something.

To start, you need a Web3 wallet[72] such as Metamask[73].

---

[72] Web3.js, *Web3 Wallet API*, https://web3js.readthedocs.io/en/v1.5.2/

[73] Metamask.io, A crypto wallet & gateway to blockchain apps, Download, https://metamask.io/

After you get your wallet installed, you need to get some AUDT tokens[74]. AUDT is the native settlement and governance utility on the Auditchain Protocol. Currently, the prices for an AUDT token is about $.15. Note that the AUDT token contract ID is:

0xb90cb79b72eb10c39cbdf86e50b1c89f6a235f2e

I am not sure what the staking amount that you need to make is right now. But, say it is 1,000 AUDT which is the amount that a validation node operator needs to stake; that would set you back about $150.

You might even want to become a node operator.

5.3. Specific Area of Knowledge

After you get your wallet, obtain enough AUDT tokens to stake and then execute that stake; then you have to figure out what financial reporting scheme or other area of knowledge that you want to create an NFT for.

See the section Financial Reporting Schemes.

---

[74] Auditchain, *AUDT Token*, https://docs.auditchain.finance/auditchain-protocol/audt-token

In our case, we are going to create an NFT for the accounting equation[75]. The accounting equation has three terms that are related as such: "Assets = Liabilities + Equity".

We now understand what we want to represent, now we need to represent it in the global standard XBRL technical format.

5.4. Express Knowledge Using XBRL (Manually)

After you know what you want to represent, you have to have a way to represent that knowledge in the XBRL global standard syntax completely and correctly. There are a lot of different ways to achieve this including something as simple of writing all the XBRL in a basic text editor. Yes, that can work. However, to do that you have to have a lot of knowledge with respect to the technical rules of the XBRL technical syntax.

Another alternative, which we will use here, is a very basic cloud-based tool for representing financial reporting logic in the XBRL technical syntax. That tool is called Luca[76] and currently it is freely available.

There is a bunch of information that explains how to use Luca provided on my blog in the post, Cloud-based Luca[77]. This 11-minute YouTube video, *LUCA Basics, Accounting Equation*[78], will walk you through what I am about to cover below. Consider watching that video. There is also a document[79] that walks you through the exact same details. There is one significant difference which I will make clear in my explanation below.

To express any information in XBRL you need to represent the following logical information and generally it helps to do this in the following order:

- Base information
- Terms
- Labels
- References

---

[75] Wikipedia, *Accounting Equation*, https://en.wikipedia.org/wiki/Accounting_equation

[76] Luca, http://Luca.yaxbrl.com

[77] Cloud-based Luca, http://xbrl.squarespace.com/journal/2021/8/31/cloud-based-luca.html

[78] *LUCA Basics, Accounting Equation*, https://www.youtube.com/watch?v=Uz8ZVXkNiSE

[79] Accounting Equation, Documentation, http://xbrlsite.azurewebsites.net/2021/luca/AccountingEquation-Tutorial.pdf

- Structures

- Associations

- Rules

- Facts

You will see what information each of these categories contains as we enter the information, which we will do next. In this section you will enter information manually. It is not a lot of information, so don't worry. In the next section we show you how to speed this process up by importing process control NFT information from Excel. You can also use an API to directly pump information into Luca and have it generate XBRL for you.

To start, go to Luca, press the green "Create New Report" button, and enter the following into the form which is displayed:

A new report will be created for you and you can start creating your accounting equation NFT.

5.4.1. Base information

Click on the "Base information" option in the left hand area of your screen. The Base information summary form will be shown and you will see no records. Click the "Add" button on that summary form. The Base information entry form will be shown and you should enter this information:

The following is the base information you want to enter:

What you just entered is your NFT's XBRL file information. Next, we are going to grab another XBRL taxonomy and use that to create your NFT.

Press the green "Save" button to save the information you entered on that first form. Notice that an entry appears on the base information summary form. Press the "Add" button again, and now we want to enter the following information.

What that information does is point to an existing base XBRL taxonomy that Auditchain provides that contains fundamental accounting concept information. You want to import that taxonomy, so you enter what you see above into the Luca application.

Then, press the green "Save" button again.

Note that if you want to look at the information in that FAC XBRL taxonomy, you can use this HTML rendering[80]. Alternatively, you can load the XBRL taxonomy schema[81] using any off-the-shelf XBRL tool.

5.4.2. Terms

Currently, the Luca tool does not have an interface for showing terms from another taxonomy, so we are going to have to enter them. Don't worry, there are only four terms, so this will be easy.

To do this, press "Terms" and then "Add" on the terms summary form. The term entry form will be shown, enter this information to add the term Assets:

---

[80] FAC XBRL Taxonomy HTML,
http://accounting.auditchain.finance/fac/fac_ModelStructure.html
[81] FAC XBRL taxonomy schema, http://accounting.auditchain.finance/fac/fac.xsd

Add		✕
Prefix	fac	⌄
ReportElementCategory	Concept	⌄
StandardLabel	Assets	
ReportElementName	Assets	
Datatype	Monetary	⌄
BalanceType	Debit	⌄
CalendarPeriodType	Instant	⌄

Save Cancel

Save that information by pressing the green button. Then, press "Add" again and repeat the information entry process for Liabilities (be sure to make sure Liabilities is a credit):

Now, repeat the same process for Equity (don't forget to save, and also make sure Equity is a credit):

There is one additional term we need to enter that might not be so obvious. We need a way to hang the other three concepts to a set of relations. To do that, add what you see below:

Don't worry if you don't understand all the information that you are entering, there will be plenty of time to learn those details. Right now please focus on the physical steps so that you can understand the process. Details will be filled in later.

5.4.3. Labels

Good NFTs provide documentation for all their terms. That documentation is entered as labels. You probably have a good feel for the application interface by now. Enter document for the terms Assets, Liabilities, and Equity from what you see in the following three screen shots:

Add

ReportElementName	fac:Assets ⌄
Language	English ⌄
LabelRole	Documentation ⌄
Label	Assets represents what a company owns. ✓

Save **Cancel**

Add

ReportElementName	fac:Liabilities ⌄
Language	English ⌄
LabelRole	Documentation ⌄
Label	Liabilities represents what a company owes to third parties. ✓

Save **Cancel**

Add

ReportElementName	fac:Equity ⌄
Language	English ⌄
LabelRole	Documentation ⌄
Label	Liabilities represents what a company owes to its owners. ✓
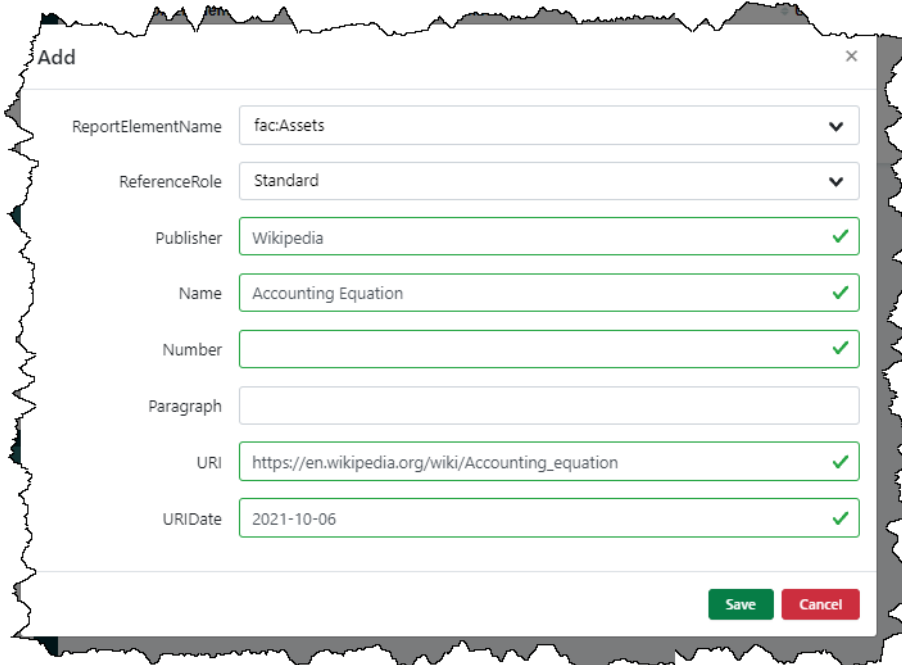
Save **Cancel**

5.4.4. References
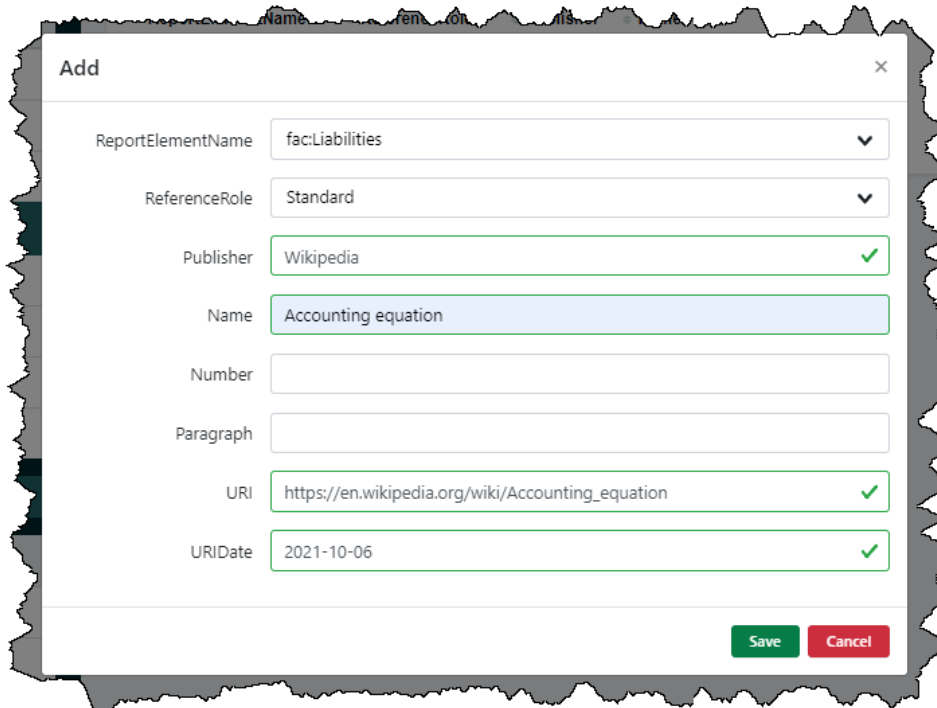
Additional document can be entered using references to other information resources. Let's enter references to Wikipedia for each of the three terms:

5.4.5. Structures

The accounting equation has one structure, balance sheet. We will enter that as follows:

5.4.6. Associations

The accounting equation has three associations that define the balance sheet structure and would be entered like what follows:

5.4.7. Rules

The accounting equation has one rule that is entered as follows:

5.4.8. Facts

While the NFT does not really use any facts, we do want to enter facts to test the XBRL taxonomy to be sure that it is working correctly. Here are the three facts you should enter; we calculated the values from the Wikipedia page:

Edit row   ×

ReportingEntityAspect	nft1 | http://somescheme/id
CalendarPeriodAspect	2021-12-31
Concept	fac:Assets
FactValue	16100
Units	United States Dollar
Rounding	INF
FactID	
Sequence	1

Edit dimensions

Save   Cancel

Add ✕

ReportingEntityAspect	nft1 | http://somescheme/id ⌄
CalendarPeriodAspect	2021-12-31 ✓
Concept	fac:Liabilities ⌄
FactValue	9100
Units	United States Dollar ⌄
Rounding	INF ⌄
FactID	
Sequence	2

Edit dimensions

Save **Cancel**

Add ✕

ReportingEntityAspect	nft1 | http://somescheme/id ⌄
CalendarPeriodAspect	2021-12-31 ✓
Concept	fac:Equity ⌄
FactValue	7000
Units	United States Dollar ⌄
Rounding	INF ⌄
FactID	
Sequence	3

Edit dimensions

Save **Cancel**

5.4.9. Generate NFT

The next step is to generate the NFT. Press the green "Generate Report" button on the main form and you see this form. You can look at the files if you want. When ready, press the "Download All" button at the bottom left that will generate a ZIP archive you can download.

5.4.10. Check Your Work

You should check your work by running it through an XBRL processor to see that everything works correctly. We generally use several XBRL processors to be sure everything is working correctly because sometimes there are inconsistencies between XBRL processors.

If you are using XBRL Cloud[82], your validation results might look something like this:

---

82 XBRL Cloud, https://www.xbrlcloud.com/

The UBmatrix XPE 4.0 XBRL processor provides additional information about the XBRL Formula validation results:

You can view your work by using a technical oriented tool such as UBmatrix Taxonomy Designer:
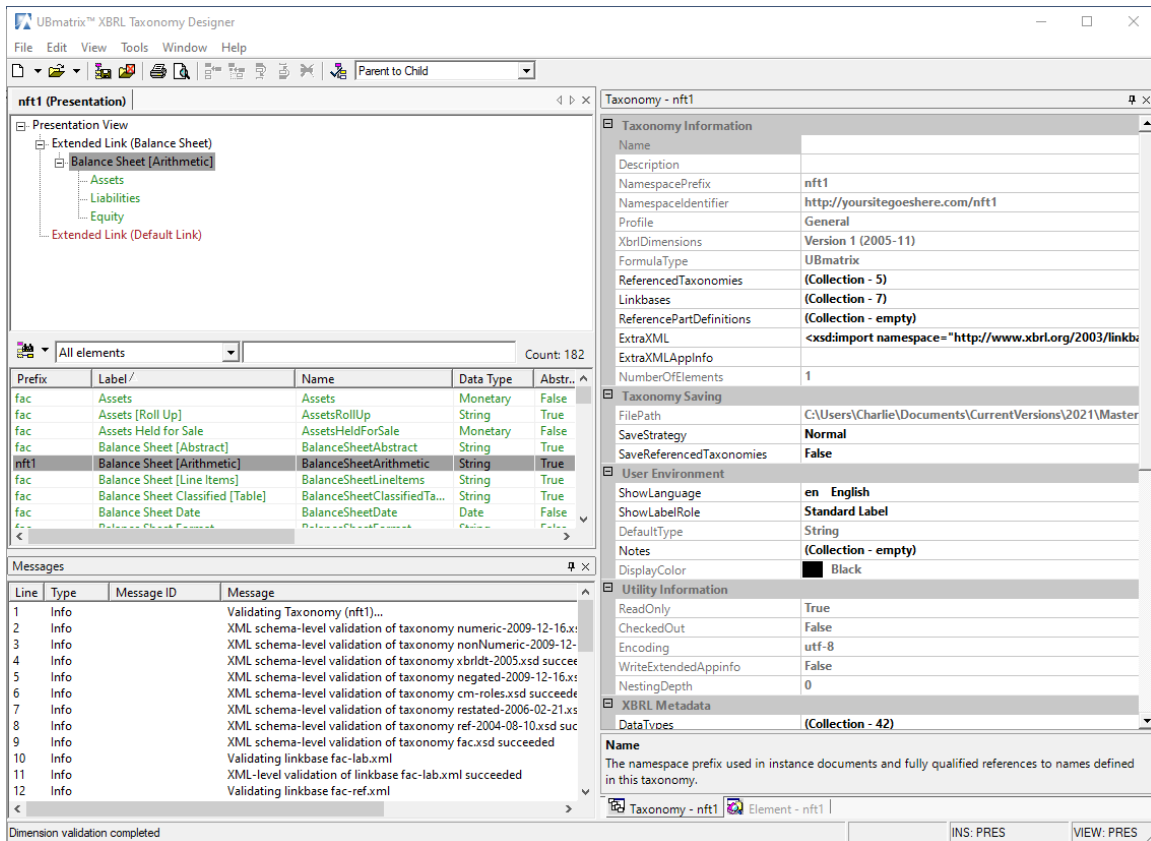
You can download a free version of Pesseract[83] which is a working proof of concept digital financial report tool.

---

83 Pesseract, http://pesseract.azurewebsites.net/
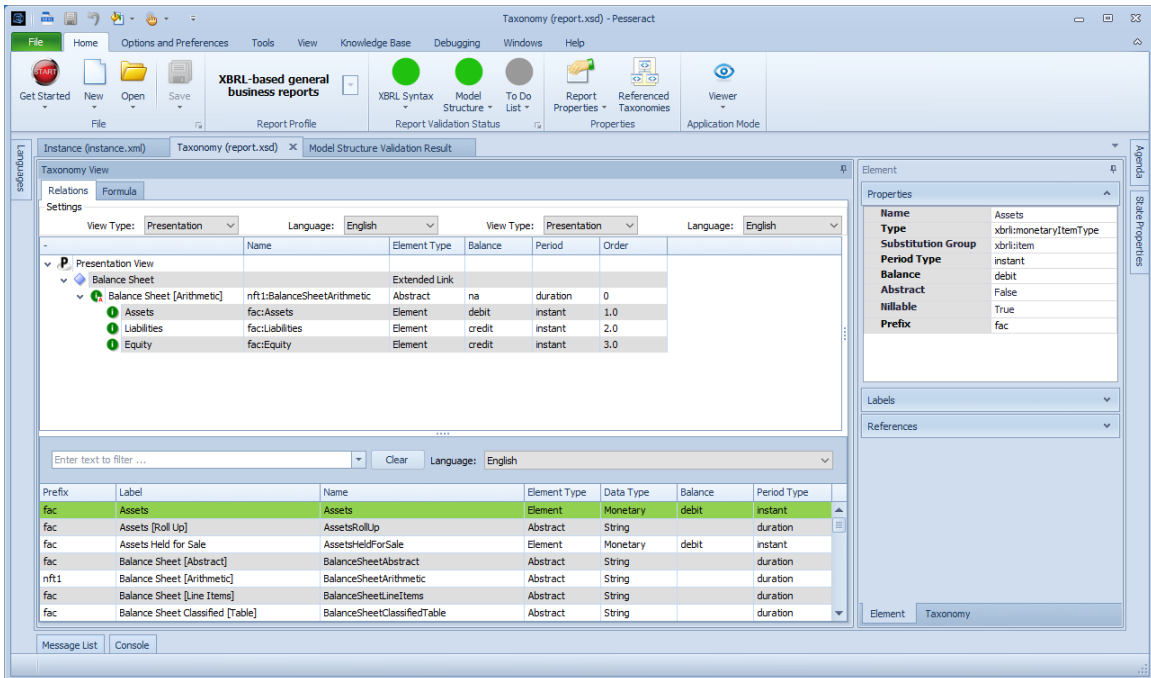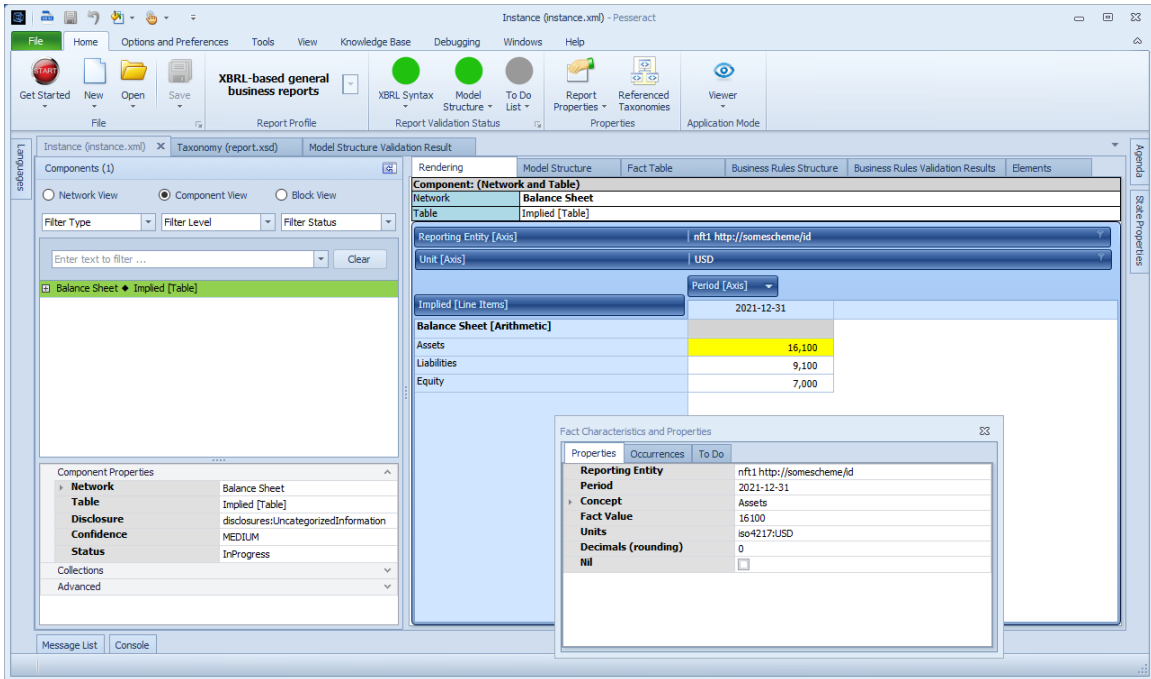
If this is a bit confusing and complicated; it is not you. Software tends to be overly technical at this stage of the evolution of XBRL-based reporting. That will change. Software will get easier and easier to make use of. But for now it is worth the struggle with the software that exists because it lets you participate in the process of creating process control NFTs.

So, hang in there!

You can also check your work using Auditchain's Pacioli Power User Tool[84]. Simply upload your ZIP archive you received from the preceding step.
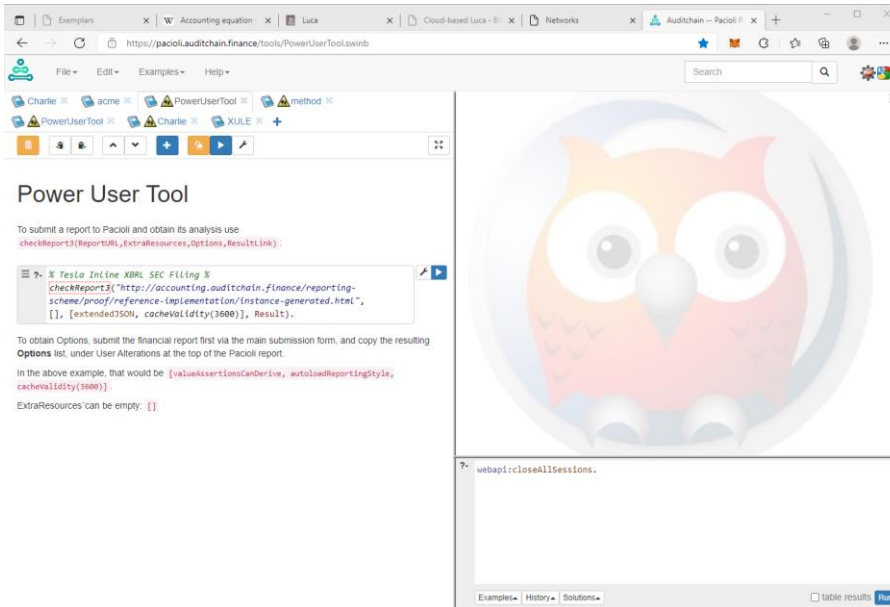
Pacioli will generate a verification report which is still more complicated than it really needs to be:

---

[84] Pacioli Power User Tool,
https://pacioli.auditchain.finance/tools/PowerUserTool.swinb

Eventually, the Luca software application and the Pacioli software application will simply exchange API calls. Luca will send the ZIP file full of XBRL (or the individual files, it does not matter) to Auditchain's Pacioli application. Pacioli will run the appropriate verification processes. Pacioli, through another API call, will return the verification results to Luca and the Luca software application will display those results to the user of the Luca software application. It really can be that simple! Eventually, we will get there.

To further consolidate your knowledge, we recommend that you work through additional tutorials[85].

5.5. *Express Knowledge Using XBRL (Excel Import)*

Rather than entering information that will become the knowledge within your process control NFT like you did in the last section; you can import that information from Excel. In this section we walk through that step.

Import works the same for each section of report information. So, we will walk you through that process once and you simply repeat that step for each report section.
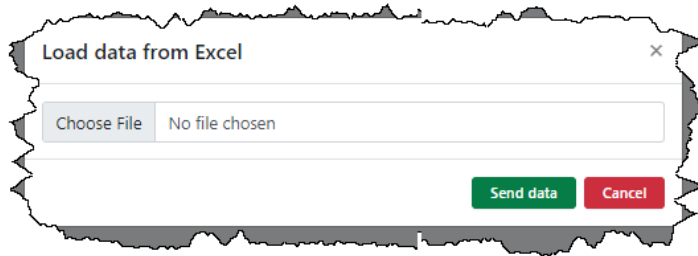
First, you need to grab the Excel spreadsheets you will be using to import your process control NFT information[86]. Once you have that, unzip it and put the Excel files where you can get to them. Go to the main form of the Luca application and press any of the sections in the "Enter report information" area, for example "Base information". You will see the summary information for that section. There, you will see an icon that looks like this:

That is the import icon. Press that, and you will see a form that looks something like this:

---

[85] Updated Luca Tutorials,
http://xbrl.squarespace.com/journal/2021/10/11/updated-luca-tutorial-documentation-learn-about-digital-fina.html

[86] Process Control NFT Excel Import Spreadsheets,
http://xbrlsite.azurewebsites.net/2021/luca/nft1-import.zip

Press "Choose File" and a dialog box will open that will let you select a file from your computer. Select the appropriate Excel import file. That's it. So, lets import some information!

5.5.1. Base information

Base information to import: (nft1-baseinformation.xlsx)

Code	NamespacePrefix	NamespaceIdentifier	SchemaLocation	DefaultLanguage	TaxonomyDescription
Local	nft1	http://yoursitegoeshere.com/nft1	report.xsd	en	This is the NFT taxonomy.
Import	fac	http://www.xbrlsite.com/fac	http://accounting.auditchain.finance/fac/fac.xsd	en	FAC taxonomy on Auditchain

5.5.2. Terms

Terms to import: (nft1-terms.xlsx)

Category	StandardLabel	Prefix	ReportElementName	DataType	BalanceType	PeriodType
Concept	Assets	fac	Assets	Monetary	Debit	Instant
Concept	Liabilities	fac	Liabilities	Monetary	Credit	Instant
Concept	Equity	fac	Equity	Monetary	Credit	Instant
Abstract	NFT 1 [Set]	nft1	NFT1Set			

5.5.3. Labels

Labels to import: (nft1-labels.xlsx)

Term	Language	LabelRole	Label
fac:Assets	en	Documentation	Assets represents what the company owns.
fac:Liabilities	en	Documentation	Liabilities represents what the company owes to third parties.
fac:Equity	en	Documentation	Equity represents what the company owes to its owners.

5.5.4. References

References to import: (nft1-references.xlsx)

ReportElementName	ReferenceRole	Publisher	Name	Number	Paragraph	URI	URIDate	Sequence
nft1:Assets	Standard	Wikipedia	Accounting Equation			https://en.wikipedia.org/wiki/Accounting_equation	2021-10-06	1
nft1:Liabilities	Standard	Wikipedia	Accounting Equation			https://en.wikipedia.org/wiki/Accounting_equation	2021-10-06	2
nft1:Equity	Standard	Wikipedia	Accounting Equation			https://en.wikipedia.org/wiki/Accounting_equation	2021-10-06	3

5.5.5. Structures

Structures to import: (nft1-structures.xlsx)

NetworkIdentifier	NetworkTitle	Sequence
NFT1	01-NFT 1	1

5.5.6. Associations

Associations to import: (nft1-associations.xlsx)

StructureType	NetworkIdentifier	AssociationFromName	AssociationRole	AssociationToName	CalculationPolarity	PreferredLabelRole	Sequence
Presentation	NFT1	nft1:NFT1Set	Parent-Child	fac:Assets			1
Presentation	NFT1	nft1:NFT1Set	Parent-Child	fac:Liabilities			2
Presentation	NFT1	nft1:NFT1Set	Parent-Child	fac:Equity			3

5.5.7. Rules

Rules to import: (nft1-rules.xlsx)

RuleType	RuleCode	Rule	Structure	Concept	Sequence	Commentary
ConsistencyRule	BS1	$Assets = ($Liabilities + $Equity)	BalanceSheet	report:Assets	1	

5.5.8. Facts

Facts to import: (nft1-facts.xlsx)

ReportingEntityAspect	CalendarPeriodAspect	ConceptAspect	FactValue	Units	Rounding	Sequence
GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442	2021-12-31	fac:Assets	16100	iso4217:USD	INF	1
GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442	2021-12-31	fac:Liabilities	9100	iso4217:USD	INF	2
GH259400TOMPUOLS65II | http://standards.iso.org/iso/17442	2021-12-31	fac:Equity	7000	iso4217:USD	INF	3

Yes, obviously it would be an excellent feature to be able to import all the information at once from all the files in that ZIP archive. We are working on that.

5.5.9. Generate NFT

Generate the NFT just like before. Open "Generate report" and press "Download All" which is in the lower left corner of the form.

(If you wanted to grab the set of files that I generated from this process, use this link[87].)

5.5.10. Check your work

Remember to check your work! We will not go over this again, refer to the "Check your work" section of the previous section where you entered the information manually.

5.6. Submit your NFT for Verification

The next step is to verify your NFT for verification by verifies on Auditchain. To become a verifier, you need to stake 25,000 AUDT (about $3,750). A cohort of three verifiers will sign off on your NFT or tell you that it does not pass the required verification process.

After your NFT has been verified you will be able to submit the report to Auditchain as an NFT.

---

[87] Download generated NFT, http://xbrlsite.azurewebsites.net/2021/luca/nft1-all-reports.zip

5.7.   Submit your NFT to Auditchain

To do...

5.8. Proof of Assurance Issuance

To do….

5.9. Publish your NFT

To do…

5.10. Production Use of NFT

Once your NFT is published, software vendors will be able to use your NFT to meet their process control needs.

Analysis of https://xbrlsite.azurewebsites.net/2021/reporting-scheme/proof/reference-implementation/instance.xml

Report URL: https://xbrlsite.azurewebsites.net/2021/reporting-scheme/proof/reference-implementation/instance.xml

Analysis ID: QmWMaiS2a3Bpg2oxitPs27XKSpoafwUxc6QFaXHnH4d3wJ

Pacioli Analysis ID: QmWs6WN1phMNY2BxZERqa53Z2H4qNMwrwNov1Wn2sZRTEn

Analysis Metadata: https://ipfs.infura.io/ipfs/QmWMaiS2a3Bpg2oxitPs27XKSpoafwUxc6QFaXHnH4d3wJ/AuditchainMetadataReport.json

DASHBOARD	STATE				
BALANCE SHEET	NET ASSETS	COMPREHENSIVE INCOME STATEMENT	COMPREHENSIVE INCOME STATEMENT	COMPREHENSIVE INCOME STATEMENT	>

Concept	2019-12-31	2020-12-31
Balance Sheet [Line Items]		
Assets [Roll Up]		
Current Assets	0	500
Noncurrent Assets	0	3000
Assets	0	3500
Liabilities and Equity [Roll Up]		
Liabilities [Roll Up]		
Current Liabilities	0	0
Noncurrent Liabilities		

6.   Strategic Considerations Related to Process Control NFTs

Consider something for a moment. What if Auditchain is right about process control NFTs? What if modern accounting practices are adopted globally?   What if elegant easy to use software is created that accountants can actually use to make accounting, reporting, auditing, and analysis better, faster, and cheaper?

What does that mean to you as an accountant? What is your strategy related to dealing with process control NFTs?

Metacognitive relates to the awareness of one's own thought process. This relates to "thinking about thinking". This relates to self-knowledge.

This section provides you with metacognitive and strategic considerations related to process control NFTs.

6.1. Cherry Picking Strategy

It is very likely that the first process control NFTs will be created for the to prominent financial reporting schemes: US GAAP and IFRS. XBRL taxonomies already exist for both of those financial reporting schemes.

If you get in early a cherry picking strategy can be employed. Another term for this is "picking the low hanging fruit".

6.2. Reverse Engineering

A very good way to learn is to reverse engineer something that already exists. I have been creating what will become these NFTs for about five years and used what I created to understand XBRL-based financial reports that are submitted to the SEC[88].

The best version of that currently is provided as a set of fundamental accounting concepts and relations between those concepts[89]. That is basically what you need to learn, all laid out for you. That is what Auditchain converts into NFTs. I even made some free open source software available[90].

6.3. Niche Strategy

Perhaps a lot of people are thinking about US GAAP and IFRS financial reporting schemes. But there are other financial reporting schemes such as:

- International Public Sector Accounting Standards (IPSAS)
- State and local government financial reporting (GAS)
- Not for profit financial reporting
- Personal financial reporting
- FRF for SMEs (published by AICPA)

There are many other financial reporting schemes and if you use a niche strategy you might corner the market in one of these niche areas.

---

[88] Quarterly XBRL-based Public Company Financial Report Quality Measurement (March 2019), http://xbrl.squarespace.com/journal/2019/3/29/quarterly-xbrl-based-public-company-financial-report-quality.html

[89] Fundamental Accounting Concepts, http://accounting.auditchain.finance/fac/Index.html

[90] Free Open Source Tool for Creating Quality XBRL-based Digital Financial Reports, http://xbrl.squarespace.com/journal/2020/12/8/free-open-source-tool-for-creating-quality-xbrl-based-digita.html

6.4. Specialization Strategy

Both US GAAP and IFRS have specialized accounting activities such as financial reporting by banks, financial reporting for broker dealers, financial reporting for real estate investment trusts, financial reporting for insurance companies.

Focusing on a specific specialized area of knowledge within the broader accounting area of knowledge can be a good strategy.

6.5. Certified to Support Auditchain Method

Auditchain offers a certification that provides acknowledgement that you can properly follow the best practices-based Method[91] supported by Auditchain. This program takes about six to twelve months to complete to be certified in XBRL-based digital financial reporting and you are qualified to implement record-to-report processes within the enterprise.

---

[91] Method Overview,
http://accounting.auditchain.finance/framework/MethodOverview.pdf