1. Business Events and Classic Transactions

The purpose of this section is to explain the notion of business events and classic transactions and show how rules that explain those business events and classic transactions can be represented in machine readable form. Most of this information was initially accumulated in my document *Accounting Basics (Brainstorming)*[1].

1.1. Overview

Accounting is a logical system for telling a story about the state of some economic entities assets, liabilities, and equity and the performance of that economic entity. We put information into an accounting system which then is used to get this story out of the system.

Why do we "post transactions to an accounting system"? Why can't the information from a business event be turned into transaction information and the information then just end up in the right financial statement accounts?

For probably 10 years, I have been trying to figure out how to get information into an accounting system correctly even if you are not a trained bookkeeper or accountant. During that time, I have run across several clues. Those clues include:

- The **Resource-Event-Agent (REA) Model**[2] which is an approach to conceptualizing the semantics of economic exchanges and conversions such as accounting transactions or business events. REA is an ISO standard.
    - **Resources**: Economic resources or claims are objects that are under the control of an economic agent. Economic resources/claims may things such as goods, services, rights, obligations, claims.
    - **Event**: Economic events are the events, transactions, circumstances, and other phenomena which change economic resources from production, exchange, consumption, and distribution.
    - **Agent**: Economic agents are identifiable parties which obtain, use, or dispose of economic resources.
- **Algorithmic Contract Types Unified Standard** (ACTUS)[3] has the same idea that I have for financial contracts that I have for business events. ACTUS uses the notion of machine-readable smart contracts to represent financial contracts which relate to financial institutions.
- The book ***The Joy of Accounting***[4] by Peter Frampton and Mark Robilliard in PART 2 discusses the notion of "Classic Transactions" and the book provides a

[1] Charles Hoffman, CPA, Accounting Basics (Brainstorming), http://xbrlsite.azurewebsites.net/2022/library/AccountingBasics.pdf

[2] Understanding the Resource-Event-Agent (REA) Conceptual Model, http://xbrl.squarespace.com/journal/2016/9/27/understanding-the-resource-event-agent-rea-conceptual-model.html

[3] ACTUS, https://www.actusfrf.org/about

[4] Amazon, *The Joy of Accounting*, https://www.amazon.com/Joy-Accounting-Game-Changing-Approach-Makes/dp/1735312924/

list of about 15 such classic transactions. More information is provided about these classic transactions later.

- Workday has this notion of "**work tags**"[5]. Worktags are informal keywords or "tags" assigned to business events. That is an informal approach that I am leveraging more formally.

What I am noticing from REA, ACTUS, and the notions "business events" and "classic transactions" as basically patterns. Note that patterns can be leveraged in order to explain and simplify things.

What all these approaches are doing is defining canonical or prototypical business events and how each of those business events is represented within an accounting system and where the information ends up in a financial report.

Accounting already has this idea. Think of, say, the accounts receivable subsidiary ledger. That is a "special ledger" for sales on account. Every transaction in the accounts receivable subsidiary ledger has the same pattern, that is what makes it "special".

By way of contrast, the "general ledger" is used for transactions that are not "special". General ledgers do have patterns, but the pattern is more general.

It is easier to generate a properly created accounting transaction for the accounts receivable ledger because what goes on is more specific and reduced to the business events of selling something to a customer (invoice) or collecting a payment from a customer (depositing a check).

You can think of the accounts receivable subsidiary ledger as a "template", a pattern. Payables, fixed assets, inventory, purchases, payroll all have their own "templates".

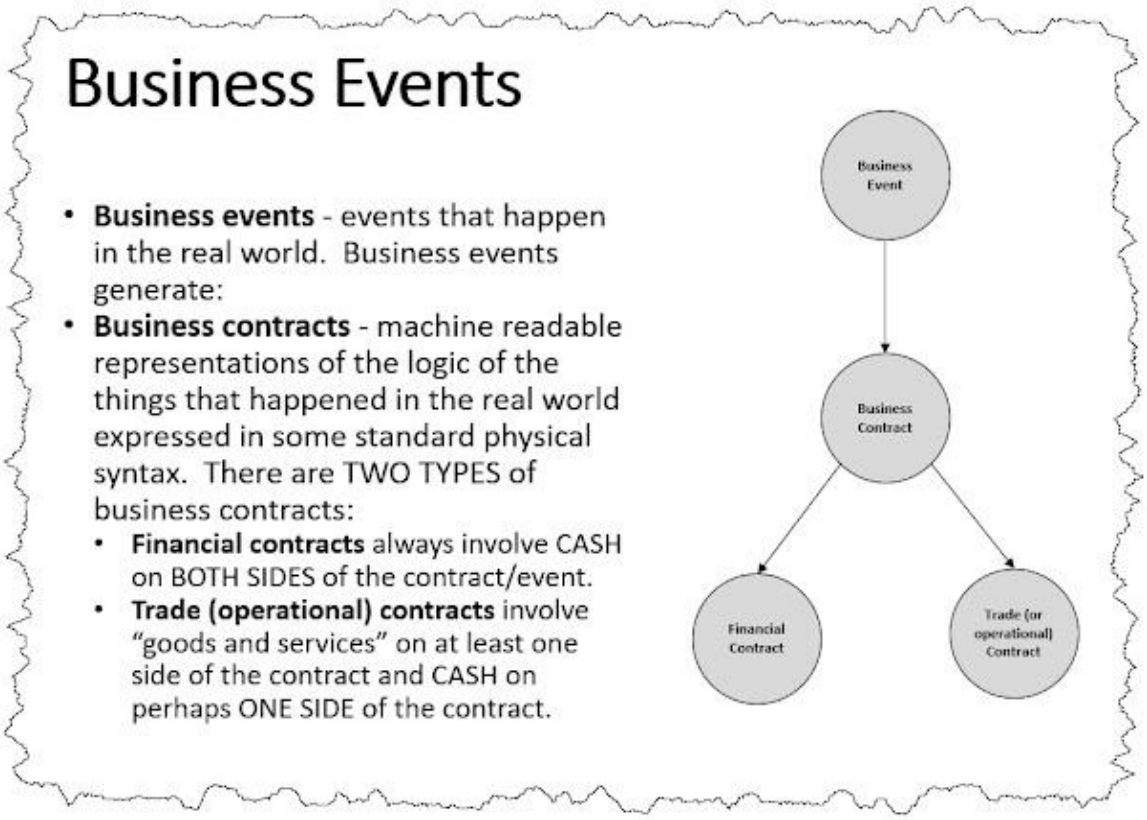
You can think of what I am observing as creating additional subledgers or "templates" for as many noticeable patterns of business events in order to minimize what a bookkeeper or accountant needs to flow through a general ledger which is harder to get right.

What is my point here? My point is that if you can identify the patterns of classical transactions or business events that occur and you create machine readable rules that contain this information, then accounting systems can be more helpful to bookkeepers and accountants entering transactions into such systems, reducing the costs of transaction entry and increasing the quality of the transactions by reducing errors.

Remember the 1-10-100 rule. Put simply, the 1-10-100 rule states that it costs exponentially more to identify and correct data entry errors than to fix a system to avoid making the error in the first place. Also, if an error goes undetected it can cost exponentially more to deal with ramifications of the error.

The point of putting information about business events and classic transactions into machine readable form is to assist accountants in getting transactions posted correctly at the point of transaction entry so that information within an accounting system is always of high quality and can be reliably used to make business decisions.

[5] Workday, *Tales of the Cloud: The Story of Worktags*, https://blog.workday.com/en-us/2012/tales-of-the-cloud-the-story-of-worktags.html



1.2. Accounting is a Closed System

Accounting is a closed system. The double entry bookkeeping model is explained by basic mathematics[6]. In a very basic version of that system which makes the nature of accounting of a closed system obvious is, say, where:

- All reported values are nominal values
- All reported values are a single currency
- A single reporting style (standard form) is used by every reporting entity
- Only simple business events exist
- Only single economic entities report
- No other real-world complexities exist within the system

Thinking of this system in simple terms he helpful to help someone more clearly see that accounting is, in fact, a closed system. But the real world is more complicated, but in that real world, accounting is still a closed system. In the real world you have:

- Nominal value, fair value, amortized cost, net present value, etc.
- Multiple currencies
- Many different reporting styles (customizable)

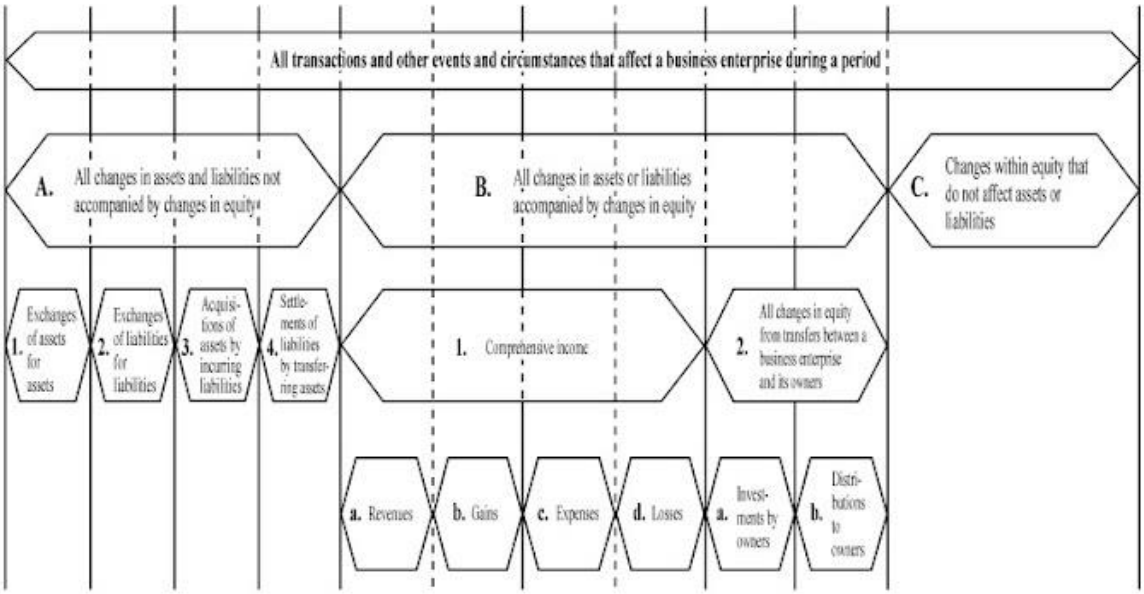
[6] David P. Ellerman, *The Mathematics of Double Entry Bookkeeping*, https://ellerman.org/wp-content/uploads/2012/12/DEB-Math-Mag.CV_.pdf

- Both simple and more complex business events
- Consolidated economic entities and reporting groups
- Other real-world complexities

Any inequality, inconsistency, or contradiction within the accounting system means that some sort of error has occurred within the system which must be fixed. An error can be unintentional (i.e. mistake) or intentional (i.e. fraud).

1.3. Events, Circumstances, and other Phenomenon That Impact a Business

You may or may not have seen the following graphic in SFAC 6 which was published by the FASB[7]:



That graphic above breaks down the fundamental types of business events that ultimately result in accounting transactions. Those broad groups include;

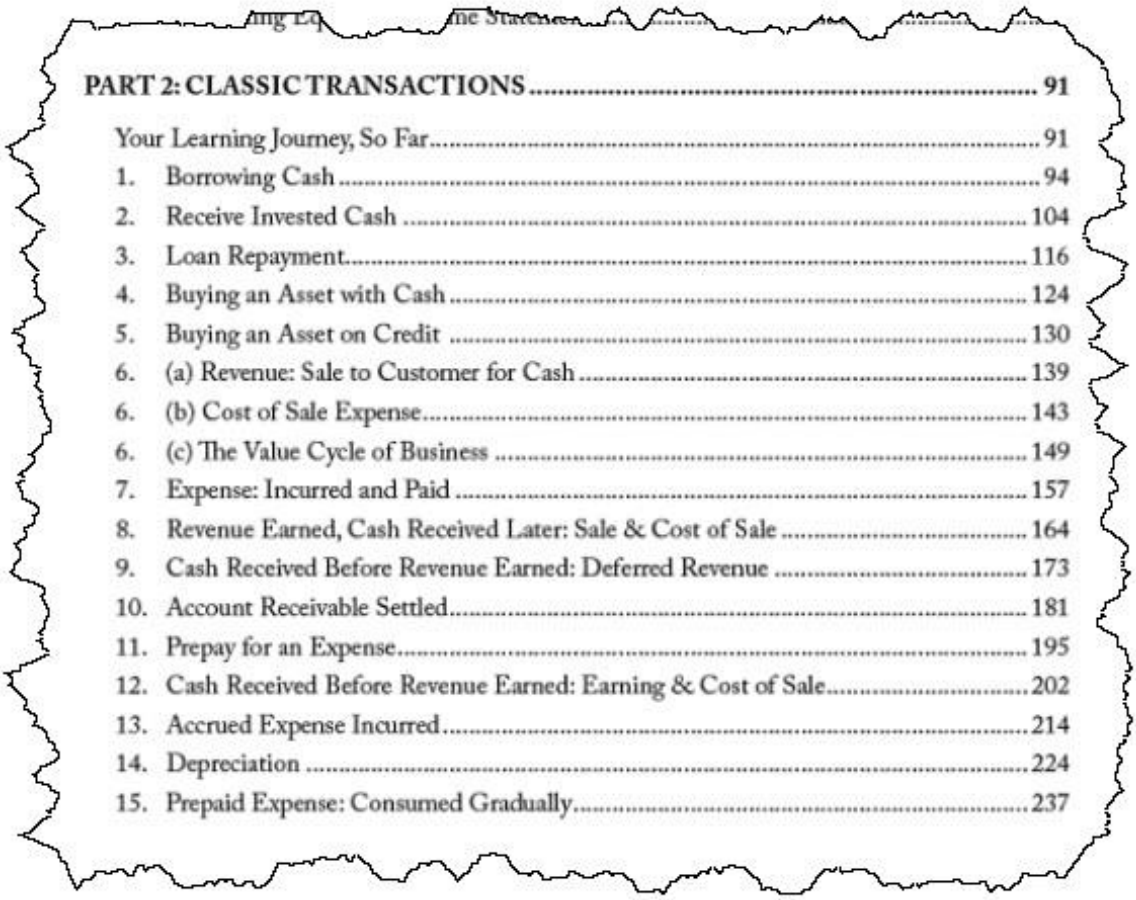
- Exchange of assets
- Exchange of liabilities
- Asset for liability
- Liability for asset
- Asset for revenue (gain)
- Liability for expense (loss)
- Move comprehensive income to equity
- Asset to equity
- Liability to equity

[7] FASB, *SFAC 6 Elements of Financial Statement*, page 21, https://www.fasb.org/Page/document?pdf=aop_CON6.pdf&title=CON%206%20%28AS%20AMENDED%29

What the diagram shows are the categories of "all transactions and other events and circumstances that affect a business enterprise during a period". The graphic then breaks down those transactions, events, and circumstances into categories. The categories relate to the 10 elements of a financial report that SFAC 6 defines: Assets, Liabilities, Equity, Comprehensive Income, Investments by Owners, Distributions to Owners, Revenues, Gains, Expenses, Losses.

1.4. Connacol Classic Transactions

And this graphic below is from the table of contents of the book *The Joy of Accounting*[8] which is described by it's authors Peter Frampton and Mark Robilliard as "game-changing".



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So, I don't know whether I should use the term "**Classic Business Events**" or "**Classic Transactions**" or some combination of those terms yet.

What have I done? Well, what I have done is created a prototype of six "classic transactions" of "classic business events". For each of those I:

1. Gave each event/transaction a specific name, for example "Acquire Inventory On Account" is one Business Event.

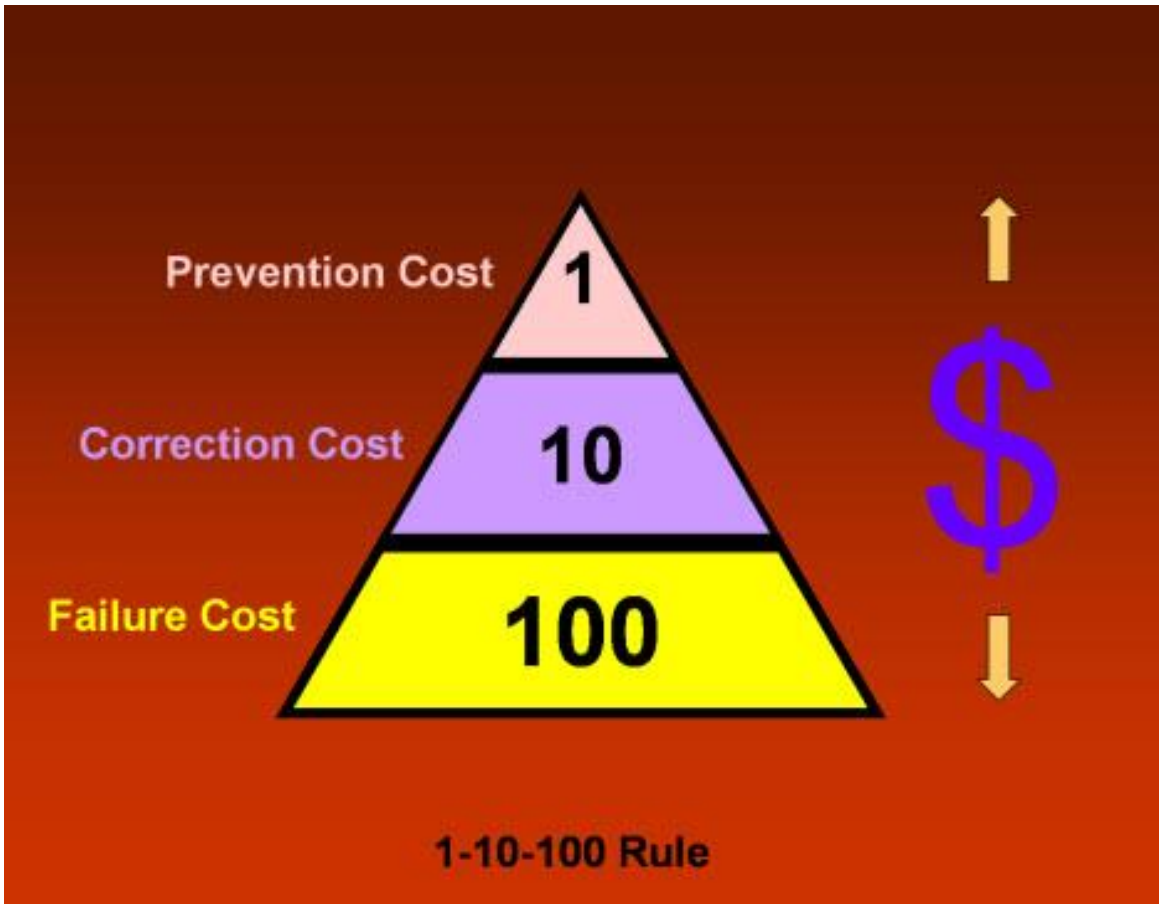
[8] Amazon, The Joy of Accounting, Peter Frampton and Mark Robilliard, https://www.amazon.com/Joy-Accounting-Game-Changing-Approach-Makes/dp/1735312924/

2. I represented information about each specific business event and the accounting transactions associated with that business event in machine readable form using global standard XBRL.

Why would I do that?

Well, as Benjamin Franklin said, "An ounce of prevention is worth a pound of cure."

Another way to say the same thing is the 1-10-100 rule[9]. Put simply, the 1-10-100 rule states that it costs exponentially more to identify and correct data entry errors than to fix a system to avoid making the error in the first place. Also, if an error goes undetected it can cost exponentially more to deal with ramifications of the error.



And so why is that important? Well, because now I understand how to build an accounting system that leverages expert systems functionally to augment the skill of accountants.

[9] Total Quality Management, 1-10-100 Rule, https://totalqualitymanagement.wordpress.com/2009/02/25/what-is-1-10-100-rule/

1.5. Business Events Prototype

I created a prototype set of business events was represented using the XBRL technical syntax[10].

The following graphic is a human readable version of that same XBRL-based version of the machine readable information[11]:

The transactions related to a business event is posted to some account. The following is a prototype MINI financial reporting scheme[12] that has all the accounts necessary to capture transactions for those business events:

[10] Business Events Prototype, http://xbrlsite.azurewebsites.net/2023/reporting-scheme/mini/classic-transactions/events.xsd

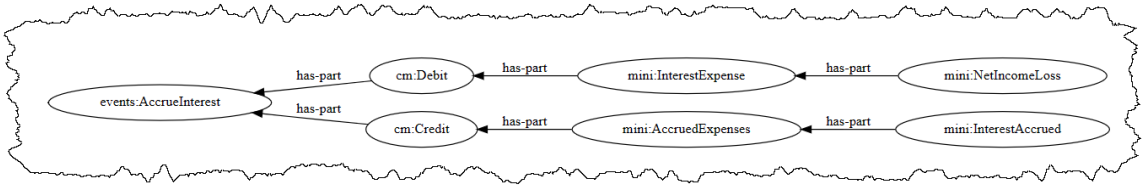
[11] Business Events Prototype, Human Readable Rendering of Machine Readable Information, https://auditchain.infura-ipfs.io/ipfs/QmYaLsKfBDo79UcchVjexSwkyFaSQgqgdANaabZXetkuyK/typeSubTypeGraph.html

[12] MINI Financial Reporting Scheme, http://xbrlsite.azurewebsites.net/2023/reporting-scheme/mini/base-taxonomy/mini_ModelStructure2.html

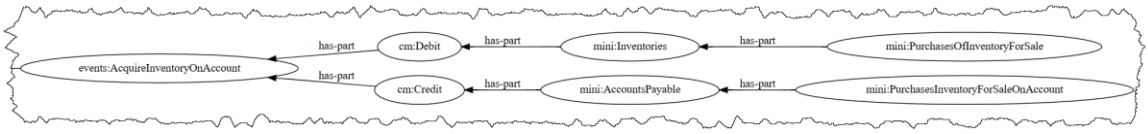
Line		Object Class	Period Type	Balance	Report Element
1	1102 - Statement - Balance Sheet	Network			http://xbrlsite.com/mini/role/level4/BalanceSheet
2	**Balance Sheet [Hypercube]**	Hypercube			mini:BalanceSheetHypercube
3	**Balance Sheet [Line Items]**	LineItems			mini:BalanceSheetLineItems
4	Assets [Roll Up]	Abstract			mini:AssetsRollUp
5	Current Assets [Roll Up]	Abstract			mini:CurrentAssetsRollUp
6	Cash and Cash Equivalents	Concept (Monetary)	As Of	Debit	mini:CashAndCashEquivalents
7	Receivables	Concept (Monetary)	As Of	Debit	mini:Receivables
8	Inventories	Concept (Monetary)	As Of	Debit	mini:Inventories
9	Current Assets	Concept (Monetary)	As Of	Debit	mini:CurrentAssets
10	Noncurrent Assets [Roll Up]	Abstract			mini:NoncurrentAssetsRollUp
11	Property, Plant and Equipment	Concept (Monetary)	As Of	Debit	mini:PropertyPlantAndEquipment
12	Noncurrent Assets	Concept (Monetary)	As Of	Debit	mini:NoncurrentAssets
13	Assets	Concept (Monetary)	As Of	Debit	mini:Assets
14	Liabilities and Equity [Roll Up]	Abstract			mini:LiabilitiesAndEquityRollUp
15	Liabilities [Roll Up]	Abstract			mini:LiabilitiesRollUp
16	Current Liabilities [Roll Up]	Abstract			mini:CurrentLiabilitiesRollUp
17	[illegible] Payable	Concept (Monetary)	As Of	Credit	mini:AccountsPayable

Then, I created an initial prototype of each transaction which would be posted to an accounting system for a business event. The following are four examples of classic transactions[13] from the prototype set of 15 business events[14].

event:AccruedInterest: Machine readable[15]; Human readable[16]



event:AcquireInventoryOnAccount: Machine readable[17]; Human readable[18]



event:AcquireLongTermDebt: Machine readable[19]; Human readable[20]

[13] Classic Transactions, Machine Readable, http://xbrlsite.azurewebsites.net/2023/reporting-scheme/mini/classic-transactions/ct.xsd

[14] Business Events, Machine Readable, http://xbrlsite.azurewebsites.net/2023/reporting-scheme/mini/classic-transactions/events.xsd

[15] event:AccruedInterest, Machine Readable XBRL, http://xbrlsite.azurewebsites.net/2023/reporting-scheme/mini/classic-transactions/ct-AccrueInterest-rules-def.xml

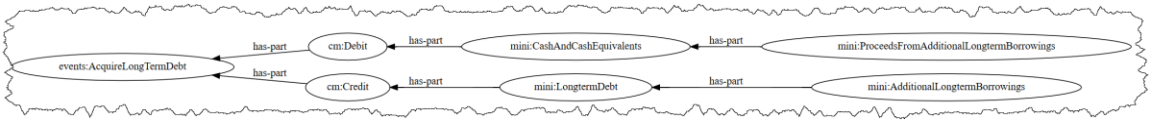
[16] event:AccruedInterest, Human Readable, https://auditchain.infura-ipfs.io/ipfs/QmQRWKDVrtrUtEkhdkdri6wVL7MR2YgwZxGPMBbuCasmcE/typeSubTypeGraph.html

[17] event:AcquireInventoryOnAccount, Machine Readable, http://xbrlsite.azurewebsites.net/2023/reporting-scheme/mini/classic-transactions/ct-AcquireInventoryOnAccount-rules-def.xml

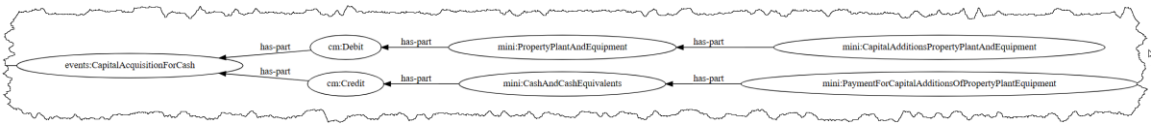
[18] event:AcquireInventoryOnAccount, Human Readable, https://auditchain.infura-ipfs.io/ipfs/QmQbc7dhp1gHkkmAVY3ewxTbvsi753j6pP32euzJtza6tL/typeSubTypeGraph.html

[19] event:AcquireLongTermDebt, Machine readable, http://xbrlsite.azurewebsites.net/2023/reporting-scheme/mini/classic-transactions/ct-AcquireLongTermDebt-rules-def.xml

[20] event:AcquireLongTermDebt, Human Readable, https://auditchain.infura-ipfs.io/ipfs/QmeUpRZknYiUc1XpGRpijBtN7ACdmRbEbioCATMzTQfSdv/typeSubTypeGraph.html



event:CapitalAcquisitionForCash: Machine readable[21]; Human readable[22]



A second prototype of business events[23] and classic transactions[24] was created that provides the same information in a different way. The biggest difference is that I defined a set of XBRL arcroles[25] that were used to more specifically define the machine readable rules that enables better functionality possibilities within software.

The arcroles defined include:

- event-debit (Indicates which an account which relates to a business event that is posted as a DEBIT.)
- event-credit (Indicates which an account which relates to a business event that is posted as a CREDIT.)
- account-rollforwardgroup (Indicates which roll forward grouping of an account a transaction relates to.)

Note that at this time all of these are working prototypes that have not been fully tested and that have not yet been implemented in software applications. The second prototype is best and the final result will likely be in that direction.

1.6. Audit of Transactions

What is becoming increasingly evident is the utility of business event and classic transaction machine readable information in an audit. By simply mapping a chart of accounts to the classic transactions accounts; software can then be enabled to look for odd and unusual transaction patterns within an accounting system. This has not been rigorously tested as of this time, but it has been prototyped against a prototype accounting application created in Microsoft Access.

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[21] event:CapitalAcquisitionForCash, Machine Readable, http://xbrlsite.azurewebsites.net/2023/reporting-scheme/mini/classic-transactions/ct-CapitalAcquisitionForCash-rules-def.xml

[22] event:CapitalAcquisitionForCash, Human Readable, https://auditchain.infura-ipfs.io/ipfs/QmS8ByHuZi39c6h3Vzmsr4m6pndv3BhhKknrUfxY3ukej8/typeSubTypeGraph.html

[23] Business Events Prototype 2, Machine Readable, http://xbrlsite.azurewebsites.net/2023/reporting-scheme/mini/classic-transactions2/events.xsd

[24] Classic Transactions Prototype 2, Machine Readable, http://xbrlsite.azurewebsites.net/2023/reporting-scheme/mini/classic-transactions2/ct.xsd

[25] Business Events XBRL arcroles, http://xbrlsite.com/seattlemethod/cm/be-arcroles.xsd