

SIGNALS & TELEMETRY ANNEX K TO RBF's THE WORLD GAME BOOK



RBF's World Game Book / Simulation: Utopia or Oblivion? Annex K: Signals, Telemetry Annex

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Foundation Technology Internet, Net of \$, DeFi, Fintech, Structured Data

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TITLE: The Heart Beacon Cycle Time - Space Meter

SUBTITLE: Signals & Telemetry Annex K for RBF's "The World Game"

Patent Application Type: Adaptive Procedural template

QUOTE: "There is only one revolution tolerable to all men, all societies, all political systems: Revolution by design and invention". Richard Buckminster Fuller author of The World (Peace) (simulation) Game book, futurist, environmentalist:

QUOTE: "Only a crisis - actual or perceived - produces real change. When that crisis occurs, the actions that are taken depend on the ideas that are lying around. That, I believe, is our basic function: to develop alternatives to existing policies, to keep them alive and available until the politically impossible becomes the politically inevitable." Milton Friedman Nobel Prize winning Economist who described a GDP Gross Domestic Product commodity RWA Real World Asset based K% rule to monetize a currency, implement GDP based rules automated inflation control to manage the global economy.

QUOTE: "The world desperately needs a universal time chain (blockchain) with a distributed time-stamping server with globally recognized immutability to preserve digital truth." "A provable and immutable global time chain is urgently needed, not to replace human conscience but to protect and preserve it." The global economy has begun to degenerate from a relatively free form of capitalism into a digital feudal system,"

Foundation Technology trinity for Signals & Telemetry Time Chain Annex K:

- EPOCH (s) = Time intervals, cycles ex: Blockchain, AI chain = TIME Chain
- SPACE (ex: IRS memo #1421 "Bitcoin transaction akin to land acquisition"
- SYNTAX (data elements mapped to symbols for A.I. / man - machine interface)

THESIS: All artifacts internet, net of money are formed using:

- 1) Epoch time cycle intervals ex: created by silicon microchip oscillations
- 2) Syntax parsed, processed during epoch time cycle intervals

All things internet, internet of money, blockchains (time chains) are formed by unicast, multicast, anycast protocols. Programmable money's improvements are in cryptography. Blockchains are formed by unicast, multicast, anycast and workflow filters. Programmable money's improvements are in cryptography. Web 3.0 is based on the original internet TCP/IP structure that has not changed because it cannot change.

Participant incentive: avoid duplication of DoD / NATO decades of work in concert with ISO, ITU, IEEE, DoD / NATO maps data element OPSCODE brevity codes to (Mil

standard 2525C, D) symbols supporting A.I. man - machine interface requiring consensus, concurrence among an engineering system of systems.

An invention may be an improvement to an existing invention. USPTO 13/573,002's basis for invention is US Army CECOM Communication - Electronics Command's "Greatest Invention" a system of systems structured data digital dashboard geo-temporal - spatial synchronization, standardization program matching brevity codes to symbols, symbol sets critical for A.I. Artificial Intelligence man - machine interface used for OOTW Operations Other Than War following a German Army suggestion circa 2003.

TERRA Trade Reference Currency TRC: TERRA Trade Reference Currency TRC: currency backed by RWA Real World Assets / commodities / commodity basket / index based featuring demurrage fees / charges to support supplier to consumer logistics of goods. The Terra TRC Trade Reference Currency is a global complementary currency designed to provide an inflation-resistant international standard of value; to stabilize the business cycle on a global level; and to realign stockholder's interests with long-term sustainability. Economist Bernard Lietaer Source: <http://lietaer.com/2010/01/terra/>

French Money of Peace: Le Fédériste" "L'Europa monnaie de la paix" Money of peace" proposed January 1st 1933

PRECEDENT: BRICS / Eurasian Economic Union Commodity Basket backed currency / "new global reserve currency based on Real World Assets, commodities" "The matter of creating the international reserve currency based on the basket of currencies of our countries is under review" Source: Fintech Magazine

Question: what constitutes foundation tech for #DeFi / programmable \$\$\$? Teams are forming to win the DeFi Distributed Finance / programmable \$\$\$ - money IP Intellectual Property wars. The winning team will prove that their IP intellectual property filings establishes / established foundation technology. What is foundation technology given SCOTUS 2014 "Alice in Wonderland" ruling? The internet and now the internet of money Web 3.0 is described with memes, metaphors, made up words, terms.

Answer: Supreme Court SCOTUS Alice in Wonderland Precedent: Packets, frames, layers, blocks, shards, graphs, hash graphs "bots", "motes", ... or Satoshi's traversing the net, stored in a blockchain cube are abstractions, abstract ideas, terms. The afore mentioned terms are non-existent, fictitious, imaginary metaphorical fabrications are non - compliant with US Supreme Court SCOTUS Alice Corp Vs CLS Bank 2014 ruling "claims may not direct towards abstract ideas". Physical is the opposite of abstract.



Fig B: Nobel Prize winning Economist Milton Friedman “only a crisis brings real change”

FOCUS QUOTE: “Only a crisis - actual or perceived - produces real change. When that crisis occurs, the actions that are taken depend on the ideas that are lying around. That, I believe, is our basic function: to develop alternatives to existing policies, to keep them alive and available until the politically impossible becomes the politically inevitable.”

Milton Friedman Nobel Prize winning Economist who described a GDP Gross Domestic Product commodity RWA Real World Asset based K% rule to monetize a currency, implement GDP based rules automated inflation control to manage the global economy.

Thomas Edison's Monetary option: Edison, Henry Ford proposed a currency based on the value of a basket / index of crop commodities in 1922. Edison believed that crops held their value over time. “I want to cast the variable out of money. This gold money is not good enough. It's a fiction” Source: (*New York Times* 1922).

Source: Journal of the History of Economic Thought Volume 28 , Issue 3 , September 2006 , pp. 295 - 308 Copyright © The History of Economics Society 2006
DOI: <https://doi.org/10.1080/10427710600857773>

Source: Beale, W. T. M. Jr., Kennedy, M. T., and Winn, W. J. (1942) Commodity Reserve Currency: A Critique, *Journal of Political Economy*, 50 (4), pp. 579–94.

Source: Boyle, David (Ed) (2002) *The Money Changers: Currency Reform from Aristotle to E-cash* (London: Earthscan).Google Scholar

USE CASES

1 Supreme Court SCOTUS **US SC 573 US 134 2347** Alice Corp Vs CLS Bank compliant, conformant physical meme i.e., cryptocurrency blockchain Digital Ledger Technology DLT programmable money for a programmable economy multi use meme

2 Foundation technology for programmable money / economy i.e., Syntax Lexicon Namespace derived from NATO / DoD brevity OPS CODE FFIRN, FFUDNS structured data exchange mapped to symbols for A.I. Big Data. Establishes a consistent, universal syntax structured data exchange library – lexicon using UTZ time stamping data by organization <Org_ID>. data class type, resource type to form a universal syntax, code, date element </tag> Rosetta Stone given all things internet are formed using 1. time epoch cycles 2. syntax as instructions

3 Distributed Autonomous Organization DAO Trade Federation common signaling, telemetry, symbol, and data element sets forming a foundation technology framework including structured data exchange to assist DAO's stay synchronized, stochastically harmonized across UTZ zones.

4 Tether, untether to autonomous DAO Distributed Autonomous Organization i.e., trade federations using agile, adhoc NetOps as an option to formal merger, acquisition. Support federations: from Latin: foedus, gen.: foederis, covenant characterized by a union of partially self-governing states or regions under a central government.

5 Micro to macro-cycle system of systems data updates at agreed upon times observing agreed durations i.e., stock, commodity, currency trade epochs. Discrete time interval start, stop, TTL Time To Live trade windows commands embedded in </108> heartbeats, heartbeat messages.

6 Algorithmic regulation / Algorithmic stable coin support: firefly inspired heartbeat synchronization algorithm in stocks, currency exchanges is a segue to algorithmic regulation. Improving temporal trade parity between Bitcoin, crypto & conventional stock exchanges by using the firefly-heartbeat algorithm to take trade speed samples among trade populations across time zones to establish consensus among disparate trade protocols, optimal trade speed / frequency price discovery as a statistical mean.

7 The "Grail" A synchronized, common, shared situational awareness view filtered, prioritized events drawn from a system of systems heartbeat message event bus sync delta epoch updates Universal Time Zone UTZ proposal using via improvement to the University of Bologna / Hungary's . China's firefly inspired heartbeat synchronization algorithm by matching firefly synchronization pulse to closest OPTEMPO epoch cycle.

8 Support economist Milton Friedman's K% rule where a CBDC, federal, world currency is derived from sampling lead GDP economic indicators across a global event message bus sync delta data, event changes updating for example, a RWA Real World Asset based commodity Real World Asset RWA index backed currency.

9 Establish, maintain Ecologically sustainable economic econometric epoch time cycles supporting universal standard measures, meters, metrics sync delta cyclic update temporal changes describing linear sequential, geo-spatial temporal intensity radius hop count econometric metrics and meters where closer is shorter, closer is cheaper, less CO2 carbon dioxide credits as environmental control in SLA Service Level Agreements

10 Data over wired, wireless energy power lines SLA service level agreement where closer = cheaper given closer involves maintenance of electrical, data infrastructure

USE CASE: Climate change impact on food production: given food, fertilizer shortages (wheat, sunflower, soybean...), energy, fuel prices and looming fuel rationing, it logically follows that the world has no other options than to organize both micro (local) and macro (global) economies observing space - time conservative SLA Service Level Agreements where closer = cheaper given closer = less fuel, C02, time resources used to produce, ship.. Demurrage fees incentivize conservation of resources, commodities i.e., discounts for locally produced, consumed goods and commodities. It is TIME..

USE CASE: Provide signaling, telemetry, data element syntax lexicon support for economist Milton Friedman's K% rule where a FEDCOIN / WORLDCOIN currency is supported from sampling lead economic indicators i.e., commodity RWA Real World Assets measurable, tangible, tokenized assets across a universal event bus applying the firefly-heartbeat algorithm tracking changes, updating q statistical mean value index. Nobel Prize winning economist Milton Friedman described an "economic heartbeat" in his K% rule where the Treasury increases the money supply increases and decreases pegged to increases, decreases in GDP index volume.

USE CASE: Leverage DOD / DARPA / NATO's decades of work developing system of systems engineering best practice that involves development of over 300 message, structured data exchange spreadsheet templates of pre-packaged OPS CODE brevity codes organized in sets to support pre-defined, situation specific workflows, smart contracts in logistics, finance, and probability and statistically likely situation awareness, situation specific action – reaction supporting Artificial Intelligence and machine learning. Leverage DOD / DARPA / NATO's decades of work developing system of systems engineering best practice that involves development of over 300 message, structured data exchange spreadsheet templates of pre-packaged OPS CODE brevity codes organized in sets to support pre-defined, situation specific workflows, smart contracts in logistics, finance, and probability and statistically likely situation awareness, situation specific action – reaction supporting Artificial Intelligence and machine learning.



USPTO 13/573,002 CLAIMS:

1. A systemic, adaptive, procedural template method used to improve synchronization in metrics, metering using </Org_ID>, {"URN"} XML data tags in signaling during heartbeat micro-cycles prior to data fusion center entry consisting of iterative heartbeat cycle metrics, meters reporting where state meta data heartbeat snapshot recalculations are performed at off site connectors that are signaling relays performing recalculation, syntax processing during macro-cycle epochs reconciling dissimilar standards, data syntax formats that are then reported signaled, news casted, beacon broadcasted to applique overlay graphics displays. Syntax code language parsed, processed during silicon chip generated time cycles forms all things internet, internet of money. Claim describes the military's network centric operations systems of systems method of collecting state meta data sync delta heartbeat snapshot data during operational micro-cycles that is then summed, aggregated, disseminated and displayed during macro-cycles as part of situation awareness system of systems engineering procedures.
2. A systemic, adaptive procedural template used to improve signaling, synchronization using TCP/IP heartbeat time stamping occurring during micro-cycles of state meta data prior to data fusion center entry among metrics, metering processes comprised of TCP/IP heartbeats, heartbeat messages signaled during micro-cycles scheduling instructions, commands, processes, procedures, algorithms, telemetry instructions for example, to master-controller processes i.e., block, start, stop, pause, resume, set Time To live TTL i.e., stock market high frequency flash trade, currency, interest rates, tax rates, time banking, cloud computing commodity exchanges, big data, electrical micro-grid, fungible goods, real time bidding, many use cases. Time stamping and applying descriptive data type tags to heartbeat state meta data after data is collected and queued, stored in temporary structures or entered into database instantiations after the fact is problematic. All internet supported devices including high frequency stock, currency, commodity etc., flash trade master controllers receive heartbeats. Heartbeats are silicon chip created intervals, epochs, time cycles used to (not) process syntax.
3. A systemic adaptive procedural template method improving stochastic networks harmonization through use of timing, synchronization intrinsic to TCP/IP heartbeat / heartbeat message signaling using set, scheduled, epochs in micro-cycles in combination with firefly insect signaling stochastic harmonization algorithms where firefly protocol sample means are matched with closest heartbeat sync delta micro-cycle report values to recalculate statistical averages, means signaled through off site connector conversion, recalculation gateways that news-cast, beacon broadcast to subscribers monitoring macro-cycle reports that heretofore would not exist without following the Heart Beacon Cycle procedural template as guides for reporting thus improving temporal harmonization in metrics and metering of stochastic telecommunication mesh fabrics grid control planes over wide areas in cases involving issues in terms of consistency, reliability, traceability, positive organizational identification, temporal transaction fidelity, event, alert predictability, data analytics, network forensics real rime bidding, stock market exchange floor server co-location

verses servers distantly located, fluctuations in interest rates, currency exchanges, double payment adjudication, fungible good trading stochastic harmonization, electrical power micro-grids, cloud computing, "big data" use cases.

4. A systemic adaptive procedural template method using time stamping and signaling intrinsic to TCP/IP heartbeat, heartbeat sync delta snapshot message signaling to improve dynamic, adaptive organization change management using XML <ORG_ID> network service interface NSI templates updating self-organizing process templates i.e., directory service, reporting, map, network, system of systems effecting changes in directory structures database MIB i.e., network subnet joins, moves, splits drops, adds as alternatives to mergers, acquisitions effecting changes responsive to leader's actions, decisions i.e., mission-aware networking, network centric operations improving agile, ad hoc organizational business operations course of actions selection by organizations registered for more than one <ORG_ID> improving reaction to change.

5. A systemic adaptive procedural template method improving search engine methods using heartbeat, beacon signaling, <ORG_ID>, , <class_types>, Paul Revere, water drop in pond meme metric recalculations occurring at off site connectors, conversion relay gateways where detection of trigger point function recalculations of state meta data set aggregations are used to detect threshold fluctuations by resource , , quantity, availability duration etc., further used to improve geo-spatial temporal descriptive mapping methods, changes in clusters of objects, entities, artifacts i.e., location, epoch time stamp geo-spatially, temporally, used to locate, search, then group into virtual collections using <data_tags> i.e., in spatial econometric, volumetric operations within network mesh fabrics triggering news-casting invitations to join equitably metered federated group arbitrage events, activities that are triggered by internet search operations improving collaboration, metrics and metering in for example, commodity, fungibles trading, resource pooling, crowd sourcing, economics. Summary: Physical linear – sequential "Paul Revere" meme used given TCP/IP internet "hops" are abstractions ineligible for patent protect. Water drop in pond physical metaphor describes geospatial temporal intensity in omni-directional, circle, radius type situations. Naval sonar meme describes geo-spatial temporal intensity metrics, meters.

6. A systemic adaptive procedural template method used to improve handicapped / information alerts, events, methods reliant on heartbeat timing, signaling synchronization of state meta-data improved using Paul Revere, water drop in pond memes to create, calculate radius, intensity metrics viewed as geo-spatial, temporal intensity effects i.e., visual light bar tabs i.e., stock exchange candlestick charts, audible tone, vibration-tactile situational awareness alerts by correlating tone based messaging precedence XML where lower / higher precedence settings equate to lower / higher audible tones, tactile vibrations for deaf where fewer / greater number of light tabs lit correlates, corresponds to priority, precedence further used in alert triggers of threshold fluctuations displayed in appliqu  overlay graphics as metrics, meters. Describes reuse of structured military messaging's precedence system to support for example, processing of Named Data Networking distance, interest packets by numeric precedence for example, among Internet of Everything / Things IoT, IOTE

7. A systemic, adaptive procedural template method using heartbeat signaling, time stamp record keeping processes of state meta data supported by distributed state machine algorithms described, typed by Organizational Identifiers , resources typed by Uniform Resource Name, memes to quantify, describe unused resources with unmet needs by performing recalculations of state meta-data snapshots occurring at off site connector conversion gateways where micro-cycle reports from local, micro-cycle activities are signaled, relayed to higher echelon organizations monitoring macro-cycles who are interested in for example stock market "pools" where "output" is correlated and displayed onto appliqué views of aggregate sync delta changes in macro-micro economic recalculations, stocks, commodities, currencies, interest rates, electric micro-grids, currency (Terra) exchanges, spatial econometrics, contributory economics. Claim highlights 'off site connector" that is a workflow convention as the method where for example, trade federation "A" interfaces with organization (s), nations, states.

8. A systemic, adaptive procedural template method using state meta data typed by organization, resources by Uniform Resource Name, improved using Paul Revere, Water Drop in Pond memes to quantify, describe unused resources with unmet needs in terms of proximity from source to point of use, consumption, storage etc., by performing recalculations of state meta-data snapshot artifacts occurring at off-site connector conversion gateways where micro-cycle reports from local, micro-cycle activities are signaled, relayed to macro-cycles reports of data fluctuations due to geo-spatial temporal intensity changes filtered by priority, precedence then newscast signaled to ad hoc federated group subscriptions where state meta data snapshot reports are shown in appliqué overlay data filtered value index distributed digital dashboard views

9. A system adaptive procedural template method to reuse, improve on Network Centric Warfare best practice of organizing individuals in groups spatial - temporally distributed and UTZ time zones that involves use of micro – macro cycle scheduling, , organizational, resource identifiers embedded in structured data exchanges messages

10. Systemic use of an adaptive procedural template checklist of tools, procedures to aid individuals join trade federations. Affiliated organizations are geo-spatially, temporally located in distributed, dispersed locations across time – space. Member organizations may join or leave in an adhoc, agile manner to take advantage or react to events, situations while retaining autonomy or the ability to act on one's own behalf, This process involves agile, adhoc joins, merges, drops to / from DAO federation in lieu of formal merger, and acquisition Trade federations form among local communities or among sovereign (First) nations. Off-site connector workflow object convention connects, mitigates, mediates adjusts by summation, statistical mean by numerical aggregation among federated groups providing mediation gateways with non – participating groups, alternative (cryptocurrency consensus algorithms), non-standard.

11 Electric dipole effect electric meter claim based on electric dipole effect where closer is cheaper given less infrastructure needed given energy attenuates over distances • data over energy link where energy pulses constitute a method and means to transmit data over electric wired, wireless pathways. See electric dipole effect Radio Wave

Properties / Electric, Magnetic Dipole Antenna
 LINK: <https://youtu.be/wUpOlqbHcjI?t=111>

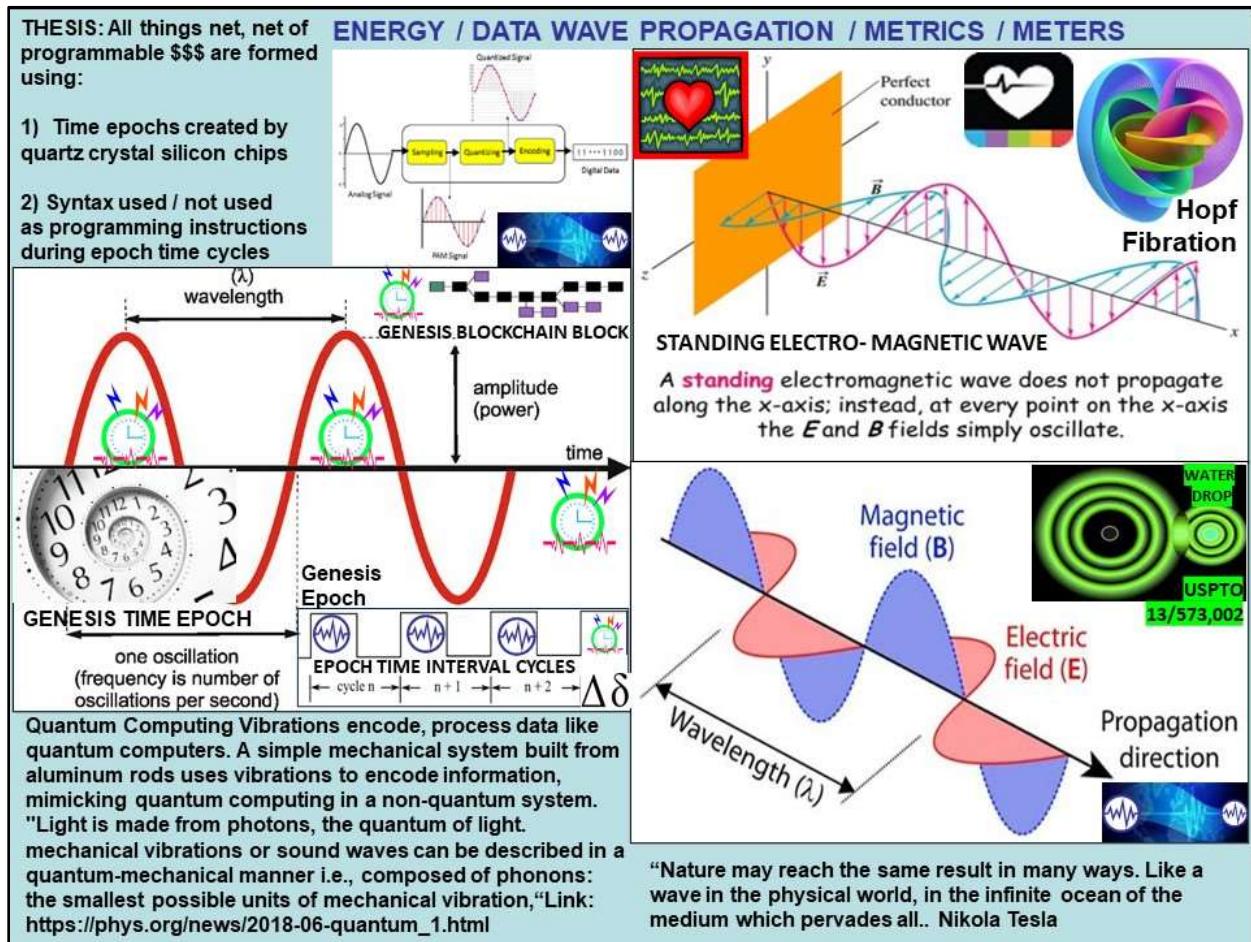


Figure C: Energy / Data propagation by waves: quantum computing emulation method



Figure E: How to change the world: stand on the shoulders of giant

APPENDIX A: SAMPLE ADAPTIVE PROCEDURAL TEMPLATE

DEFINITION: Adaptive Procedural Template = checklist of useful tools, procedures used to aid individuals join trade federations. Affiliated organizations are geo-spatially, temporally located in distributed, dispersed locations across time – space. Member organizations may join or leave in an ad hoc, agile manner to take advantage or react to events, situations while retaining autonomy or the ability to act on one's own behalf, control one's own activities, The process may involve agile, ad hoc joins, merges, drops to / from federation in lieu of formal merger, and acquisition.

1.1 PURPOSE: Establish a consistent context library / lexicon and time stamping data by organization <Org_ID> and by data class type and by resource type to form a universal syntax, code, date element, tag Rosetta Stone and reference for coders, programmers. Common time – space geo spatial temporal meters. Military OPSCODE brevity alpha- numeric codes are mapped, associated, paired with MILSTD 2525 A, B, C, D symbols and symbol sets. MIL Standard structured data exchange messages, message sets are critical to A.I. Artificial Intelligence Man - machine interaction. USPTO 13/573,002 Goal: improve geo-spatial temporal, syntactic - semantic consistency, interoperability among myriad programmable cryptocurrencies, economy protocols, algorithms, syntax libraries. 300 + message sets support A.I. workflows.

1.2 SCOPE

Trade federations form among local communities or among sovereign (First) nations. The off-site connector workflow object convention connects, mitigates, adjusts by summation, statistical mean by aggregation among federated, non-federated groups acting as format gateways among participating, non – participating groups. USPTO 13/573,002's foundation is Battlefield Digitization / Network Centric Warfare's signaling, telemetry support framework where improvement to involves establishing a foundation framework for internet, net of programmable money, description, metrics, meters, econometrics for DAO Distributed Autonomous Organizations / trade federations participating in an eco-sustainable programmable economy model with UTZ Universal Time Zone temporal synchronization, stochastic spatial – temporal harmonization

1.3 ROLES

The baseball umpire meme is the rule observer / enforcer i.e., the cryptocurrency blockchain segregated witness observer. The baseball game statistician performs data analytics e.g., time series database maintainer, the base runner delivers (code syntax) instructions via 3 x 5 cards. Base running forms blocks on blockchain that is represented by the baseball diamond when stood up on its home plate corner in 3d embodies a cube that has length, width, depth height = volume, Little League Tournament board votes on most valuable player in voting functions. The Little League tournament Baseball meme complies with SCOTUS Alice Corp V CLS Bank rul

1.4 DEFINITIONS, ACRONYMS: See Appendix B

Adaptive Procedural Templates are formed using entries linked to detailed treatises. Treatises spell out and describe definitions, acronyms and process details. Terms in internet, internet of money treatises are often abstractions – hence a baseball meme.

1.5 REFERENCES: See Appendix B

References cite documents, detailed treatises, standards body publications describing procedural steps cited by a procedural template. References refer to detailed treatises.

1.6 TRACEABILITY

The act of researching or ascertaining the origin or location of something: To ascertain the successive stages in the development or progress of for example, tracing a project's life cycle. In context with this paper's procedural template, tracking changes from micro-macro cycle across UTZ time zones across space time maintaining non-repudiation at any point, place in time in the future as provided for example, by NIST's QRNB Quantum Random Number Beacon operated by the Department of Commerce's NIST National Institute of Standards and Technology in Boulder Colorado.

1.7 POLICIES

The adaptive procedural template includes standards and policies published by standards groups describing detailed treatises according to individual use cases

1.8 STANDARDS

The adaptive procedural template will include standards and policies published by standards groups describing detailed treatises according to individual use cases, consensus algorithms, Web 3.0 standards, blockchain organization standards...

1.9 PROCESSES

Heart Beacon Cycle adaptive procedural template emphasizes protocol, software application neutral rules (algorithms) over processes coded by software vendors.

1.10 PROCEDURES

Procedures, workflow are derived from, are referential to Battlefield Digitization, Network Centric Operations, Net Enabled Operations systems engineering

EXAMPLE: Firefly inspired heartbeat synchronization message event bus algorithm – protocol, software application neutral monitors geo-spatial, temporally distributed events reported across a DAO Distributed Autonomous Organization among federated groups synchronized across time-space for common goals. Other procedures are intrinsic to algorithms / protocols such as Princeton's John Nash Equilibrium algorithms and count minimum sketch or streaming K algorithm

1.11 GUIDELINES

Example: Distributed Autonomous Organization DAO's in trade federations agree to use common components, shared processes, methods, signaling – telemetry micro-macro schedule, metrics, meters to form service level agreements used in smart contracts.

System of systems is a collection of task-oriented or dedicated systems that pool their resources and capabilities together to create a new, more complex system which offers more functionality and performance than simply the sum of the constituent systems. Currently, systems of systems is a critical research discipline for which frames of reference, thought processes, quantitative analysis, tools, and design methods are incomplete.[1] The methodology for defining, abstracting, modeling, and analyzing system of systems problems is typically referred to as system of systems engineering.

Overview: Commonly proposed descriptions—not necessarily definitions—of systems of systems,[2] are outlined below in order of their appearance in the literature:

Linking systems into joint system of systems allows for the interoperability and synergism of Command, Control, Computers, Communications and Information (C4I) and Intelligence, Surveillance and Reconnaissance (ISR) Systems:[3] description in the field of information superiority in modern military.

System of systems are large-scale concurrent and distributed systems the components of which are complex systems themselves:[4] description in the field of communicating structures and information systems in private enterprise.

System of systems education involves the integration of systems into system of systems that ultimately contribute to evolution of the social infrastructure:[5] description in the field of education of engineers on the importance of systems and their integration.

System of systems integration is a method to pursue development, integration, interoperability and optimization of systems to enhance performance in future battlefield scenarios:[6] description in the field of information intensive systems integration

Modern systems that comprise system of systems problems are not monolithic, rather they have five common characteristics: operational independence of the individual systems, managerial independence of the systems, geographical distribution, emergent behavior and evolutionary development:[7] description in the field of evolutionary acquisition of complex adaptive systems in the military.

Enterprise systems of systems engineering is focused on coupling traditional systems engineering activities with enterprise activities of strategic planning and investment analysis:[8] description in the field of information intensive systems in private enterprise.

System of systems problems are a collection of trans-domain networks of heterogeneous systems that are likely to exhibit operational and managerial

independence, geographical distribution, and emergent and evolutionary behaviors that would not be apparent if the systems and their interactions are modeled separately:[9] description in the field of National Transportation System, Integrated Military and Space Exploration. Taken together, all these descriptions suggest that a complete system of systems engineering framework is needed to improve decision support for system of systems problems. Specifically, an effective system of systems engineering framework is needed to help decision makers to determine whether related infrastructure, policy and/or technology considerations as an interrelated whole are good, bad or neutral over time.[10] The need to solve system of systems problems is urgent not only because of the growing complexity of today's challenges, but also because such problems require large monetary and resource investments with multi-generational consequences.

System-of-systems topics: The system-of-systems approach: While the individual systems constituting a system of systems can be very different and operate independently, their interactions typically expose and deliver important emergent properties. These emergent patterns have an evolving nature that stakeholders must recognize, analyze and understand. The system of systems approach does not advocate particular tools, methods or practices; instead, it promotes a new way of thinking for solving grand challenges where the interactions of technology, policy, and economics are the primary drivers. System of systems study is related to the general study of designing, complexity and systems engineering, but also brings to the fore the additional challenge of design. Systems of systems typically exhibit the behaviors of complex systems, but not all complex problems fall in the realm of systems of systems. Inherent to system of systems problems are several combinations of traits, not all of which are exhibited by every problem

Operational Independence of Elements, Managerial Independence of Elements, Evolutionary Development, Emergent Behavior, Geographical Distribution of Elements, Interdisciplinary Study, Heterogeneity of Systems, and Networks of Systems

The first five traits are known as Maier's criteria for identifying system of systems challenges. The remaining three traits have been proposed from the study of mathematical implications of modeling and analyzing system of systems challenges by Dr. Daniel DeLaurentis and his co-researchers at Purdue University.

Research: Current research into effective approaches to system of systems problems includes: Establishment of an effective frame of reference, **Crafting of a unifying lexicon**, Developing effective methodologies to visualize, communicate complex systems, Distributed resource management, Study of designing architecture, Interoperability, Data distribution policies: policy definition, design guidance and verification, Formal modelling language with integrated tools platform, Study of various modeling, simulation and analysis techniques:, network theory. agent based modeling, general systems theory, probabilistic robust design (including uncertainty modeling/management), object-oriented simulation and programming, multi-objective optimization. Study of various numerical and visual tools for capturing the interaction of system requirements, concepts and technologies. Sample Applications

Systems of systems, while still being investigated predominantly in the defense sector, is also seeing application in such fields as national air and auto transportation and space exploration. Other fields where it can be applied include health care, design of the Internet, software integration, and energy management and power systems. Social-ecological interpretations of resilience, where different levels of our world (e.g., the Earth system, the political system) are interpreted as interconnected or nested systems, take a systems-of-systems approach. An application in business can be found for supply chain resilience. Reference: Wikipedia

1.12 TEMPLATES

Checklist: minimum list of items, components, building blocks, processes, procedures agreed upon within federations to achieve consensus forming a basis for equitable trade

EXAMPLES

- Consensus Algorithms: consensus methods to establish common metrics, meters and space-time synchronization across many disparate, distributed autonomous organizations. The main method uses conventions of a Little League Baseball tournament where the environment is surveyed, and boundaries form a 360-degree clock face time clock. Agents and workflow are represented by players, officials
- Method includes for example, universal meme for Bitcoin and like cryptocurrencies, Blockchain Proof of Work, Stake, POET Proof of Elapsed Time, Project Lightning Vs Segregated Witness, and Fast Internet Bitcoin Relay Engine FIBRE... Therefore, a common tool / meme is needed to help establish consensus metrics, meters and to establish a code reference syntax lexicon - library of OPSCODE brevity codes mapped to symbols and (DoD / NATO) symbol sets useful for A.I. Artificial Intelligence
- Minimum essential requirements for Trade Federations on the cryptocurrency DLT Distributed Ledger Technology blockchain (partial listing):
 - GDP Gross Domestic Product Index / statistical mean value index based TRC Trade Reference Currency demurrage fees by Economist Bernard Lietaer of Belgium
 - Geo-spatial temporal metrics, and meters i.e. storing increments of value for all things internet, internet of \$\$\$ into the “blockchain cube” fictional data structure
 - Ecologically sustainable Economic Epochs applying geospatial temporal methods and means i.e., IDMMaps - SonarHops, Ericsson Erlang time algorithms / time equations to base economic incentives, derive TRC Trade Reference Currency demurrage charges i.e., closer is cheaper given closer = less fuel, less time, demurrage fees
 - Universal lexicon OPSCODE brevity codes naming conventions for objects, events. OPSCODE brevity code syntax - symbol set lexicon of tokenized GDP Gross Domestic Product pacing items described in a syntax lexicon OPSCODE brevity code library

- Rosetta Stone syntax lexicon library needed for A.I. Artificial Intelligence man - machine interface. Symbols, symbol sets / standardized OPSCODE brevity codes
- Universal heartbeat message event / transaction QRNB Quantum Random Number Beacon non-repudiation bus, Time-space synchronized Universal Time Zone UTZ stochastic harmonization using a firefly inspired heartbeat algorithm / heartbeat message event - transaction bus comprised of a </108> system heartbeat message
- Quantum computing mediation, mitigation and techniques e.g., particle detection using liquid nitrogen vs waves at room temperature that will affect for example, transactions of HFT High Frequency Trade stock, commodities, cryptocurrencies, crypto currency synthetics, Central Bank Digital Currencies / and activities among DeFi DAO exchanges – trade federations.
- Big data sync, time – space metrics and meters descriptive framework based on geo-spatial temporal time – space stamp methods to establish time - space Epochs i.e., IDMMaps – SonarHops distance estimation service, Ericsson Erlang time equations
- Epoch time cycles are (not) used in describing sync delta cyclic changes from one epoch time cycle to the next. Paul Revere meme linear sequential and water drop in pond mem geo-spatial temporal intensity radius hop count form common, universal, shared econometric metrics and meters among distributed, federated trade units

Invention relies on System of systems type processes: collection of task-oriented, dedicated systems pooling resources, capabilities together to create a more complex system with more functionality, performance than the sum of separate systems

1.13. TOOLS

Tool selections may be inserted, removed by majority federation vote. If a superior tool is deemed an improvement, the old tool is replaced by the new at a point in time agreed upon by a majority of for example, trade federation representatives.

1.14 PROCEDURES / STEPS

Steps are adapted from military system of systems situation awareness reporting, net-centric warfare / operations or NEO Net Enabled Operations. Steps are correlated with Little League Baseball tournament operations and game play for universal understanding, and compliance with Supreme Court Alice Corp Vs CLS Bank ruling: claims may not direct towards abstract ideas. Physical = opposite of abstract

1.14.1 Begin a list of steps beginning at the number one

1.14.2 Begin a list of steps that restart at the number one

EXAMPLE: Net Centric Warfare procedural steps are cyclic, iterative

Entry Criteria: Example: Organizations agree to adopt a minimum list of procedures, processes, tools. Unsuccessful consensus on the minimum list may be resolved by member exit 3.2 Process / Procedure Map. Trade federations use stored procedures e.g., process workflows to implement business logic.

Inputs: Heart Beacon Cycle invention programming involves processes. Applications, procedures, procedure calls, workflows, algorithms and tools agreed upon by Trade Federations to support a signal and telemetry framework reporting events, transactions to facilitate reporting of data sync deltas in time window intervals, stages and uses data filtering iteration to eliminate duplicated instructions, identical source code in the system of systems signaling, systems telemetry engineering framework.

- A systematic series of actions directed to a goal ex: form, maintain federations
- A continuous action, operation, series of changes, sync deltas updating groups
- A cyclic, iterative process syncing groups in, across time-space i.e., UTC zones
- Common foundation blocks data entrees
- Organization Identifiers {"Org_ID"}
- Uniform Resource Name {"URN"} Describe Resources i.e., commodities
- Sample / distribute state meta data heartbeat snapshots @ N time epoch

Outputs: USPTO 13/573,002 aids in establishing consistency, interoperability, temporal synchronization and syntax, syntactical interoperability among myriad consensus algorithm memes, and cryptocurrency, programmable money memes, metaphors.

1.15 METHODS

Specific activities depend on the type of use case. However, all use cases are iterative and follow the design of adaptive procedural templates – see detailed treatise (s)

1.15.1 METHOD 1: A systemic, adaptive, procedural template method used to improve synchronization in metrics, metering using </Org_ID>, {"URN"} XML data tags in signaling during heartbeat micro-cycles prior to data fusion center entry consisting of iterative heartbeat cycle metrics, meters reporting where state meta data heartbeat snapshot recalculations are performed at offsite connectors that are signaling relays performing recalculation, syntax processing during macro-cycle epochs reconciling dissimilar standards, data syntax formats that are then reported signaled, news casted, beacon broadcasted to distributed organization applique overlay displays

1.15.2 METHOD 2. An adaptive procedural template used to improve signaling, synchronization, stochastic harmonization across UTZ Universal Time Zones using TCP/IP heartbeat time stamping occurring during micro-cycles of state meta data prior to data fusion center entry among metrics, metering processes comprised of TCP/IP

heartbeats, heartbeat messages signaled during micro-cycles scheduling instructions, commands, processes, procedures, algorithms, telemetry instructions for example, to master-controller processes i.e., block, start, stop, pause, resume, set Time To live TTL i.e., stock market high frequency flash trade, currency, interest rates, tax rates, time banking, cloud computing commodity exchanges, big data, electrical micro-grid, fungible goods, real time bidding, many use cases. Time stamping and applying descriptive data type tags to heartbeat state meta data after data is collected and queued, stored in temporary structures or entered into database instantiations after the fact is problematic. All internet supported devices including high frequency stock, currency, commodity etc., flash trade master controllers receive heartbeats. System Heartbeats are intervals, epoch time cycles used to (not) process syntax.

1.15.3 METHOD 3 A systemic adaptive procedural template method improving stochastic networks harmonization through use of timing, synchronization intrinsic to TCP/IP heartbeat / heartbeat message signaling using set, scheduled, epochs in micro-cycles in combination with firefly insect signaling stochastic harmonization algorithms where firefly protocol sample means are matched with closest heartbeat sync delta micro-cycle report values to recalculate statistical averages, means signaled through off site connector conversion, recalculation gateways that news-cast, beacon broadcast to subscribers monitoring macro-cycle reports that heretofore would not exist without following the Heart Beacon Cycle procedural template as guides for reporting thus improving temporal harmonization in metrics and metering of stochastic telecommunication mesh fabrics grid control planes over wide areas in cases involving issues in terms of consistency, reliability, traceability, positive organizational identification, temporal transaction fidelity, event, alert predictability, data analytics, network forensics real time bidding, stock market exchange floor server co-location versus servers distantly located, fluctuations in interest rates, currency exchanges, double payment adjudication, fungible good trading stochastic harmonization, electrical power micro-grids, cloud computing, spatial – temporal "big data"...

1.15.4 METHOD 4. A systemic adaptive procedural template method using time stamping and signaling intrinsic to TCP/IP heartbeat, heartbeat sync delta snapshots, heartbeat </108> message signaling to enable adaptive organization change management using XML <ORG_ID> network service interface NSI templates updating self-organizing process templates i.e., directory service, reporting, map, network, system of systems effecting changes in directory structures database MIB i.e., network subnet joins, moves, splits drops, adds as alternatives to mergers, acquisitions effecting changes responsive to leader's actions, decisions i.e., mission-aware networking, network centric operations improving agile, ad hoc organizational business operations course of actions selection by organizations improving action / reaction to change. Use cases: network moves, adds, joins, splits, drops used instead of merger, acquisition.

1.15.5 METHOD 5. A systemic adaptive procedural template method improving search engine methods using heartbeat, beacon signaling, <ORG_ID>, , <class_types>, Paul Revere, water drop in pond meme metric recalculations occurring at offsite connectors, conversion relay gateways where detection of trigger point function recalculations of state meta data set aggregations are used to detect threshold fluctuations by resource,

quantity, availability duration etc., further used to improve geo-spatial temporal descriptive mapping methods, changes in clusters of objects, entities, artifacts i.e., location, epoch time stamp geo-spatially, temporally, used to locate, search, then group into virtual collections using <data_tags> i.e., in spatial econometric, volumetric operations within network mesh fabrics triggering news-casting invitations to join equitably metered federated group arbitrage events, activities that are triggered by internet search operations improving collaboration, metrics and metering in for example, commodity, fungibles trading, resource pooling, crowd sourcing, economics.

1.15.6 Method 6: Physical linear – sequential “Paul Revere” meme used to represent TCP/IP internet “hops” that are abstractions ineligible for patent protection. Water drop in pond physical metaphor describes geospatial temporal intensity in omni-directional, circle, radius type situations. Naval sonar water drop in pond USPTO 13/573,002 meme explains geo-spatial temporal intensity metrics, meters using a physical metaphor. TCP/IP “ping” is an abstraction as are “packets”, “frames”, “hops”, “Satoshi’s” as data stores in a cryptocurrency “blockchain” (distributed database)

1.16.7 METHOD 7. A systemic adaptive procedural template method used to improve handicapped / information alerts, events, methods reliant on heartbeat timing, signaling synchronization of state meta-data improved using Paul Revere, water drop in pond memes to create, calculate radius, intensity metrics viewed as geo-spatial, temporal intensity effects i.e., visual light bar tabs i.e., stock exchange candlestick charts, audible tone, vibration-tactile situational awareness alerts by correlating tone based messaging precedence XML where lower / higher precedence settings equate to lower / higher audible tones, tactile vibrations for deaf where fewer / greater number of light tabs lit correlates, corresponds to priority, precedence further used in alert triggers of threshold fluctuations displayed in appliqué overlay graphics as metrics, meters. Reference: Describes reuse of structured military messaging's precedence system to support for example, processing of Named Data Networking distance, interest packets by numeric precedence. This method is effective among machine to machine (Internet of Things).

1.15.8 METHOD 8. A systemic, adaptive procedural template method using heartbeat signaling, time stamp record keeping processes of state meta data described, typed by organizations, resources typed by Uniform Resource Name, further improved through use of Paul Revere, Water Drop in Pond memes to quantify, describe unused resources with unmet needs by performing recalculations of state meta-data snapshot artifacts occurring at offsite connector conversion gateways where micro-cycle reports from local, micro-cycle activities are signaled, relayed to higher echelon organizations monitoring macro-cycles who are interested in for example stock market "pools" where "output" is correlated and displayed onto appliqué views of aggregate sync delta changes in macro-micro economics recalculations, stocks, commodities, currencies, interest rates, electric micro-grids, currency (Terra) exchanges, spatial econometrics, contributory economics. Syntax code language parsed, processed during silicon chip generated time cycles forms all things internet, internet of money.

1.15.9 Method 9: Method / Claim describes the military's network centric operations systems of systems method of collecting state meta data sync delta heartbeat snapshot

data during operational micro-cycles that is then summed, aggregated, disseminated and displayed during macro-cycles as part of Network Enabled Operations NEO situation awareness system of systems engineering best practice over time

1.15.10 Invention relies on System of systems type processes: collection of task-oriented, dedicated systems pooling resources, capabilities together to create a more complex system with more functionality, performance than the sum of separate systems

1.16 Outputs: State meta data collected from a current micro-cycle to the next and from many micro-cycles summed, aggregated to report during macro-cycle reporting periods are stored, collected in the off-site collector depicted by that corresponding workflow symbol. See detailed treatise on workflow, workflow symbols for example <https://edrawsoft.com/flowchart-symbols.php>

1.17 Verification and Validation: A comprehensive review, analysis, and testing, (software and/or hardware) performed by an objective third party to confirm (i.e., verify) that the requirements are correctly defined, and to confirm (i.e., validate) that the system correctly implements the required functionality and security requirements.

1.18 Exit Criteria: Organizations may elect to tether, untether to the Distributed Autonomous Organization based federation at their discretion (maintain autonomy) or organizations may be disconnected if they fail to observe federation rules

1.19 Metrics: Use of physical metaphors such as the water drop in pond, Paul Revere metaphor comply with Supreme Court Alice Corp Vs CLS Bank ruling claims may not direct towards abstract ideas. See USPTO application 13/573,002 main embodiment. Metrics are based on epoch time cycles

1.20 Records Control Table ELECTRONIC RECORDS MANAGEMENT

1.21 Controlled Documents Table ELECTRONIC RECORDS MANAGEMENT

EXAMPLE: World Financial Standard ISO 20022 is a multi-part International Standard prepared by ISO Technical Committee TC68 Financial Services. It describes a common platform for the development of messages in ASN.1 Abstract Syntax Notation: A single standardization approach (methodology, process, repository) to be used by all financial standards initiatives. common platform for the development of messages using: a modelling methodology to capture in a syntax-independent way financial business areas, business transactions and associated message flows a central dictionary of business items used in financial communications a set of XML and ASN.1 design rules to convert the message models into XML or ASN.1 schemas, whenever the use of the ISO 20022 XML or ASN.1-based syntax is preferred ISO 20022: <https://www.iso20022.org/about-iso-20022>

1.22 Roles: For example, the baseball umpire meme is the rule observer / enforcer i.e., the cryptocurrency blockchain segregated witness observer. The baseball game statistician performs data analytics e.g., time series database maintainer, the base runner delivers (code syntax) instructions via 3 x 5 cards. Base running forms blocks on

blockchain that is represented by the baseball diamond when stood up on its home plate corner in 3d embodies a cube that has length, width, depth height = volume, Little League Tournament board votes on most valuable player in voting functions. The Little League tournament Baseball meme roles comply with SC Alice Corp V CLS Bank rule,

1.23 TRACEABILITY: Template entries reference, point towards, link to detailed treatises. Treatises define, spell out and describe definitions, acronyms and process details. Terms in internet, internet of money treatises are often abstractions. References cite, detailed treatises, standard body publications describing procedural steps cited by the procedural template. References refer to detailed treatises. The act of researching or ascertaining the origin or location of something: To ascertain the successive stages in the development or progress of for example, tracing a project's life cycle.

1.24 POLICIES: adaptive procedural template will include standards and policies published by standards groups describing detailed treatises

1.25 STANDARDS: adaptive procedural template will include standards and policies published by standards groups describing detailed treatises according to individual use cases, consensus algorithms, Web 3.0 standards, blockchain organization standards...

1.26 PROCESSES: adaptive procedural template emphasizes protocol, software application neutral rules (algorithms) over processes coded by software vendors.

1.27 Procedures / Processes / Workflow are derived from, and are referential to Battlefield Digitization, Network Centric Operations, Net Enabled Operations and like terms. Procedures are intrinsic to algorithms / protocols such as Princeton's John Nash Equilibrium algorithms and count minimum sketch or streaming K algorithms. Invention relies on System of systems type processes: collection of task-oriented, dedicated systems pooling resources, capabilities together to create a more complex system with more functionality, performance than the sum of each separate systems

1.28 GUIDELINES: Distributed Autonomous Organization DAO's trade federations agree to use common technology framework components, shared processes, methods, signaling – telemetry micro-macro schedule, metrics, meters, algorithms. API Application Program Interfaces describing smart contract service level agreements.

1.29 TEMPLATES: Checklist: minimum list of items, components, foundation technology building blocks, processes, procedures within federations to achieve consensus.

1.29.1 EXAMPLE: TRC Trade Reference Currency: global complementary currency designed to provide an inflation-resistant international standard of value; to stabilize the business cycle on a global level; and to realign stockholder's interests

1.29.2 EXAMPLE: GDP Gross Domestic Product Index / statistical mean value index based TRC Trade Reference Currency demurrage fees by Economist Bernard Lietaer

1.30 TOOLS: Tool selections may be inserted, removed by majority federation vote. If a superior tool is deemed an improvement, the old tool is replaced by the new at a point in time agreed upon by a majority of for example, trade federation representatives.

TOOLS EXAMPLES:

Adaptive Cards Template Language: Templating enables the separation of data from layout in your Adaptive Card. The template language is the syntax used to author a template. See: Adaptive Cards Templating Three 3 major components:

The Template Language is the syntax used for authoring a template. The Designer even lets you preview your templates at design time by including "sample data". The Templating SDK's will exist on all supported Adaptive Card platforms. These SDKs allow you to populate a template with real data, on the back-end or directly on the client. The Template Service is a proof-of-concept service that allows anyone to find, contribute to, and share a set of well-known templates. Source: Microsoft:
<https://learn.microsoft.com/en-us/adaptive-cardstemplating/>

Templating enables the separation of data from the layout in an Adaptive Card. It helps design a card once, and then populate it with real data at runtime

Adaptive Cards Source: Microsoft <https://adaptivecards.io/samples/>

GitHub - pnp/AdaptiveCards-Templates: Samples on different adaptive card designs demonstrating the art of possible with them. Designs provided by the Microsoft design team and first versions targeting Viva Connections Adaptive Card Extensions (ACE) scenarios. github.com/pnp/AdaptiveCards-Templates

Samples on different adaptive card designs demonstrating the art of possible with them. Designs provided by the Microsoft design team and first versions targeting Viva Connections Adaptive Card Extensions (ACE) scenarios. -

1.31 Profiles: See Organizational Profile: for example: NIST National Institute of Standards and Technology http://nist.gov/baldridge/publications/bus_org_profile.cfm

1.32 Procedure (Steps) Steps are adapted from military system of systems situation awareness reporting, net-centric warfare / operations or NEO Net Enabled Operations. Steps are correlated with Baseball tournament operations and game play for universal understanding, and compliance with Supreme Court Alice Corp Vs CLS Bank ruling: claims may not direct towards abstract ideas. Physical = opposite of abstract

- Begin a list of steps beginning at the number one
- Begin a list of steps that restart at the number one

1.33 Entry Criteria: Organizations agree to use a minimum list of procedures, processes, tools. Unsuccessful consensus of the minimum list may be resolved by member exit. Members may join, tether, untether, dissolve membership at will.

1.34 Process / Procedure Map: System of Systems trade federations use stored procedures e.g., process workflows to implement business logic in the distributed database / blockchain. Logic filters and text tags used as code syntax is stored in a syntax lexicon “Rosetta Stone” i.e., database

1.34.1 Inputs: programming involves processes. Applications, procedures, procedure calls, workflows, algorithms, and tools agreed upon by Trade Federations to support a signal and telemetry framework reporting events, transactions to facilitate reporting of data sync deltas in time window intervals, stages and uses data filtering iteration to eliminate duplicated instructions, identical source code in the system of systems signaling, systems telemetry engineering framework.

1.34.2 Outputs: aids in establishing consistency, interoperability, temporal synchronization and stochastic harmonization among myriad consensus algorithm memes, and metaphors under constant development and change

1.35 Verification and Validation See detailed treatise (s) on Verification and Validation abbreviated as V&V) are independent procedures used to check that a product, service, or system meets requirements and specifications and that it fulfills its intended purpose. These are critical components of a quality management system such as ISO 9000.

1.36 Exit Criteria: Organizations may elect to tether, untether to the Distributed Autonomous Organization based federation at their discretion (maintain autonomy) or organizations may be disconnected if they fail to observe federation rules.

SUMMARY: structured data syntax – symbol mapping / messaging / economy, quantum computing, AI artificial intelligence. Minimum trade federation consensus checklist i.e., timing - sync schedule, OPSCODE brevity codes, UTZ event stochastic harmonization, consensus algorithm common description, measurements, metrics supporting trade federation (s), support for DAO Distributed Autonomous Organizations, parallel economies e.g., Texas gold backed currency. USPTO 13/573,002 The Heart Beacon Cycle Time - Space Meter Patent type: Adaptive Procedural Template Framework: checklist: ideas, algorithms, processes, procedures, metrics, meters, signal & telemetry structured data for consistent Eco sustainable economic time cycle epochs for programmable \$ / economy / Net, Net of Money Foundation Technology for DeFi, programmable internet of money / Web 3.0 USPTO 13/573,002 framework supports for example, Distributed Trade Federation Organizations with DoD / NATO system of systems engineering signaling, telemetry engineering, syntax OPSCODE brevity codes matched with 2525C symbol sets vital for A.I. man-machine interface, interoperability, consistency, geospatial – temporal, syntactic, symbolic consensus.

APPENDIX B: Prior Art References, Acronyms, Terms, Memes, Metaphors

ABSTRACT / ABSTRACTION:

1. existing in thought or as an idea but not having a physical or concrete existence. thought of apart from concrete realities, specific objects, an abstract idea
2. expressing a quality or characteristic apart from any specific object or instance
3. theoretical; not applied or practical: abstract science.
- 4, difficult to understand; abstruse

Alice Corp Vs CLS Bank Supreme Court precedent case requires all internet, internet of money (Bitcoin, Blockchain) related patent applications to apply physical memes. For example, the internet TCP/IP “ping” terms is an abstraction. The internet’s “hop”, “hop count” is an abstraction. SAW Concept LLC’s application is compliant with the Supreme Court internet, internet of money precedent by using a Little League Baseball tournament as a main embodiment with internet technical theme derivative use cases

Adaptive dispatch table US 7,571,430 Trimbell, et al. August 4, 2009 Adaptive dispatch table based on templates Assignee: LSI Logic Corp Inventors: Forrest Trimbell,

AMERICAN AXLE V. NEAPCO RULING Judge: "an inventive concept to instead focus on the reliance on Hooke's law and predicted that because all inventions depend to some extent on the operation of unstated natural laws, the majority's opinion would open the door to Section 101 challenges in practically every patent case. Tesla: "think of energy, frequency, and vibration" Judge Moore also took exception to the majority disregarding the use of a cardboard liner as an inventive concept to instead focus on the reliance on Hooke's law and predicted that because all inventions depend to some extent on the operation of unstated natural laws, the majority's opinion would open the door to Section 101 challenges in practically every patent case.

Source: <https://bilski.typepad.com/blog/2018/03/good-vibrations-bad-vibrations-american-axle-v-neapco-ruling.html>

Apache ZooKeeper is a software project of the Apache Software Foundation, providing an open source distributed configuration service, synchronization service, and naming registry for distributed systems. [LINK https://en.wikipedia.org/wiki/Apache_ZooKeeper](https://en.wikipedia.org/wiki/Apache_ZooKeeper)

Apache Storm is a free and open source distributed real-time computation system. Storm makes it easy to reliably process unbounded streams of data, doing for real-time processing what Hadoop did for batch processing. Storm has many use cases: real-time analytics, online machine learning, continuous computation, distributed RPC, ETL etc. Storm benchmark clocked it at over a million tuples processed per second per node. Trident is an abstraction on top of Storm providing higher-level constructs “cascading”, it batches groups of Tuples to 1) Make reasoning about processing easier 2) efficient data persistence with the help of an API that provides exactly-once semantics [LINK](#)

A.I. Artificial Intelligence / Machine Learning

Artificial intelligence (AI) syntax refers to the set of rules and principles that govern the arrangement of words and phrases in a programming language. In the context of AI and natural language processing, syntax ensures that language is structured in a systematic way, allowing for effective communication and comprehension.

In programming, syntax is crucial for writing correct and efficient code. It dictates the correct structure of sentences, including word order, sentence constituents, and the relationship between different elements in a sentence. Understanding syntax is essential for developers to write code that is readable, maintainable, and scalable.

Some programming languages are specifically designed for AI applications, while others have libraries that are used to develop AI applications.

A.I. market applications: Fortune Magazine <https://fortune.com/2023/11/28/goldman-sachs-ai-employees-wall-street/>

See: Artificial Intelligence A.I. as probability and statistic based workflow. The DoD / DARPA / NATO / ISO International Standards Organizations leverage 300+ spreadsheet message sets populated by thousands of OPS CODE brevity codes mapped to Military Standard MILSTANDARD 2525 A, B, C, D.. standard symbol sets essential to rapid action – reaction workflows responding to common scenario's, situations, smart contracts. Symbols are essential to human – A.I. machine interaction.

ATOMIC CLOCK NIST National Institute of Science and Technology timing is based on the consistent decay of radioactive material such as Cesium. Atomic clocks are constructed by locking an electronic oscillator to the frequency of an atomic transition. The frequencies associated with such transitions are so reproducible that the definition of the second is now tied to the frequency associated with a transition in cesium-133: 1 second = 9,192, 631,770 cycles of a standard Cs-133 transition

BASEBALL DIAMOND

A baseball diamond is a square, is a block. A Bitcoin block is awarded using age (time) or vectors (time / direction / velocity) or voting (tournament league board). A baseball tournament is played on baseball diamonds that are physical, tangible = not abstract.

BASEBALL COMPUTING CODE

Computing an Optimal Pitching Strategy in a Baseball At-Bat

A novel model of a baseball at-bat as a zero-sum stochastic game, in which the goal of the batter is to get on base and the pitcher aims to prevent it. The paper proposes novel representations of pitcher and batter, a deep neural network architecture for outcome prediction, and experiments using Kaggle data from MLB seasons.

Source: <https://arxiv.org/pdf/2110.04321.pdf>

Computing an Optimal Pitching Strategy in a Baseball At-Bat - arXiv.org

Every at-bat ends in one of two ways: 1) the batter is out (and, in our model, the pitcher wins), for example, after receiving the third strike, or 2) the batter gets on-base, for example, by hitting a home run. In modeling an at-bat, we assume that the goal of the batter is solely to get on base, while the pitcher aims to get the batter out.

Source: <https://www.jstage.jst.go.jp/article/jorsj>

Dynamic Programming Algorithm for Optimizing Baseball Strategies

In addition, we compute the optimal batting order, in consideration of the decision making in a game. Keywords: Dynamic programming, OR in sports, Markov perfect equilibrium, advantage of the last-batting team, optimal lineup 1. Introduction A dynamic programming (DP) approach to baseball is the main theme for this paper, and <https://community.fangraphs.com › how-game-theory-is-applied-to-pitch-optimization> How Game Theory Is Applied to Pitch Optimization

Simulation of Baseball Gaming by Cooperation and Non-Cooperation Strategies

Matías Alvarado, Arturo Yee Rendón, and Germinal Cocho 1 Computer Sciences Department, Center for Research and Advance Studies, Mexico City, Mexico

2 Complex Sciences Department, Physics Institute, UNAM, Mexico City, Mexico

Baseball is a top strategic collective game that challenges the team manager's decision-making. A classic Nash equilibrium applies for non-cooperative games, while a Kantian equilibrium applies for cooperative ones. We use both Nash equilibrium (NE) and Kantian equilibrium (KE), separate or in combination, for the team selection of strategies during a baseball match: as soon as the selection of strategies by NE or KE carries a team to stay match loosing, a change to KE or NE is introduced. From this variation of selection of strategies, the team that is losing tends to close or overcome the score with respect to the team with advantage according to the results from computer simulations. Hence, combining Nash selfish-gaming strategies with Kantian collaboration-gaming strategies, a baseball team performance is strengthened.

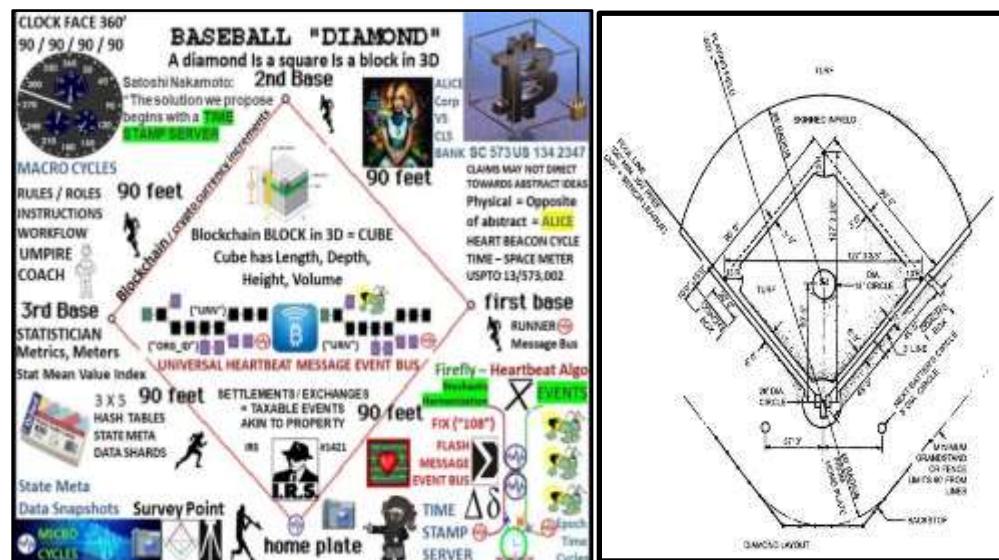


FIGURE D: SCOTUS ALICE CORP VS CLS BANK 2014 ruling compliant meme

BASEBALL TOURNAMENT RULES AND GUIDELINES

The Tournament Committee also reserves the right in its sole discretion to impose any penalties if, in its judgment, any player, manager, coach, umpire, or other volunteer conducts him/herself in any manner, on or off the field, that does not positively reflect the high standard Little League holds for sportsmanship, Tournament Rules and Guidelines citizenship, and decorum. This includes displays of unsportsmanlike conduct, "making a travesty of the game," or violating any rules, regulations, or policy contained herein during the game, at the game site, at any other location or time related to the International Tournament. The Committee also reserves the right to impose any penalty the Committee deems appropriate, if the committee determines action is necessary to correct a situation brought to its attention, regardless of the source of that information. The decision of the Tournament Committee is final and binding. Knowledge of the rules must be guaranteed before a Tournament Director is declared qualified. All Tournament Directors will undergo a thorough and instructive briefing session prior to taking on their duties, must signify that they understand the rules, and regardless of personal feelings, they are in full agreement and can interpret them properly. At the time of the District tournament meeting, it will be required that each league president or the representative in attendance signify that the league and tournament team managing personnel are knowledgeable of Tournament Rules and are in full agreement with these conditions.

SOURCE: <https://www.littleleague.org/downloads/tournament-rules-baseball/>

On optimal control, game theory, and applications. A. Bressan, B. Piccoli, Introduction to the Mathematical Theory of Control, AIMS Series in Applied Mathematics, Springfield Mo. 2007. A. Bressan, Noncooperative differential games. Milan J. of Mathematics , 79 (2011), 357-427. A. Bressan Source: <https://cim.math.psu.edu/publications/on-optimal-control-game-theory-applications>

Sabermetrics Big Data is one way baseball teams use big data to leverage game theory in baseball. Source: Game Theory Applications in Baseball - Baseball Data Science Game theory is the science of strategy. It determines how logical "players" should behave in strategic contexts and predicts the utility the "players" will reap from their actions. A "game" is any strategic set of interactions. In baseball, an example would be an (instance of) at bat. Source: <https://www.baseballdatascience.com/game-theory-applications-in-baseball/>

BITCOIN AS PROPERTY / LAND / Land Use Meme PRECEDENTS:

- Hong Kong Court ruling Bitcoin as property Equivalent share of Bitcoin's total value in the form of digital real estate, using Earth's physical land model as the reference model
- IRS memo #1421 Bitcoin purchase is akin to land purchase

Owning 1 BTC of digital real estate is equivalent to owning 1126 acres habitable land:

- 15.77 billion acres of habitable land

- 14 million coins of active supply (not lost or Satoshi's coins)
- One 14 millionth of the 15.77 billion habitable acres is 1126 acres.
- Owning 0.01 of a coin (1 million sats) is equivalent to 11 acres.

Source: Reddit: <https://lnkd.in/gbCVAX7X>

Blocks created along a blockchain items #113, 123, 126, stored in a cube 131 USPTO 13/573,002 see main graphic FIGURE 3: USPTO 13/573,002

BITCOIN / CRYPTOCURRENCY PROGRAMMABLE MONEY: a.k.a. the “Internet of Money” “Bitcoin is a language” “Bitcoin’s language is time itself” Diginomics.com

Bitcoin Time-Chain "creates a new layer of trust that we can all reference".. Bitcoin is the TIME - CHAIN that creates a BEACON of TRUTH.. economically incentivized to show truth" Bitcoin Magazine & Mark Moss .. "store of wealth = baseball card": SOURCE: <https://bitcoinmagazine.com/>

Black Sox Major League 1919 World Series Baseball game-fixing scandal: eight members of the Chicago White Sox were accused of losing the 1919 World Series against the Cincinnati Reds on purpose in exchange for money from a gambling syndicate led by Arnold Rothstein. The National Baseball Commission was dissolved, and Judge Kenesaw Mountain Landis was appointed to be the first Commissioner of Baseball and given absolute control over the sport to restore its integrity.

Philadelphia Bulletin published a poem which would quickly prove to be ironic:

Still, it really doesn't matter, After all, who wins the flag. Good clean sport is what we're after, And we aim to make our brag To each near or distant nation Whereon shines the sporting sun That of all our games gymnastic Baseball is the cleanest one!

Source: https://en.wikipedia.org/wiki/Black_Sox_Scandal

BLOCKCHAIN DISTRIBUTED LEDGER: provides a tamper-proof data structure, providing a shared public ledger open to all. The mathematics involved are impressive, and the use of specialized hardware to construct this vast chain of cryptographic data renders it practically impossible to replicate. All transactions are embedded in the bitcoin blockchain. Use of SHA-256 cryptography ensures the integrity of the blockchain applications – all transactions must be signed using a private key or seed, which prevents third parties from tampering with it. Transactions are confirmed by the network within 10 minutes or so and this process is handled by bitcoin miners. Mining is used to confirm transactions through a shared consensus system, and usually requires several independent confirmations for the transaction to go through. This process strives towards random distribution and makes tampering difficult.

BLOCH SPHERE: In quantum mechanics and computing, the **Bloch** sphere is a geometrical representation of the pure state space of a two-level quantum mechanical system (qubit), named after the physicist Felix **Bloch**. Quantum mechanics is mathematically formulated in Hilbert space or projective Hilbert space.

Blockchain Tri-lemma: The perfect blockchain includes three elements: Security, decentralization, and scalability. Finding a balance between the three is difficult and presents a problem referred to as the blockchain trilemma. Scalability and decentralization are often held back by security, but security tends to be compromised by any shifts on a network that offer scalability. Projects either choose to focus on two out of three or work on finding a solution to tackle the trilemma once and for all. Innovative ideas like sharding, side-chains and state channels are used to address the trilemma. A solution to the problem could lead to greater adoption of cryptocurrency and blockchain and a wide-spread use of the technology across industries.

BITNATION GOVERNANCE 2.0 [LINK](https://bitnation.co/) <https://bitnation.co/>

BITNATION provides the same services traditional governments provides, from dispute resolution and insurance to security and much more – but in a geographically unbound, decentralized, and voluntary way. BITNATION is powered by Cryptocurrency blockchain Distributed Ledger DLT technology – a cryptographically secured distributed public ledger. “As we like to say – BITNATION: Blockchains, Not Borders”.

BUCKMINSTER FULLER’s SPACE-SHIP EARTH: Operating Manual for Spaceship Earth relates Earth to a spaceship flying through space. The spaceship has a finite amount of resources and cannot be resupplied. Buckminster Fuller Institute [LINK](#) BFI dot Org https://en.wikipedia.org/wiki/Operating_Manual_for_Spaceship_Earth. FOCUS QUOTE: "There is only one revolution tolerable to all men, all societies, all political systems: Revolution by design and invention". Richard Buckminster "Bucky" Fuller

CASPER PoC3 Blockchain BACKBONE: Casper is a security-deposit based economic consensus protocol. Nodes, as “bonded validators”, have to place a security deposit (action called “bonding”) in order to serve the consensus by producing blocks. The protocol’s direct control of these security deposits is the primary way in which Casper affects the incentives of validators. Specifically, if a validator produces anything that Casper considers “invalid”, their deposit is forfeited along with the privilege of participating in the consensus process. The use of security deposits addresses the “nothing at stake” problem; that behaving badly is not expensive. When something is at stake, bonded validators who misbehave in an objectively verifiable manner will lose it.

CELIOMETER, GNOCCHI, PANDA: builds metering around a data structure called samples. A sample is generated each time Ceilometer measures something. It is composed of a few fields, such as the resource id that is metered, the user and project ID owning resources, the meter name, the measured value, a timestamp and a few free-form metadata. Each time Ceilometer measures something, one of its components (an agent, a pollster...) constructs and emits a sample headed for the storage component called the collector. The collector is responsible for storing samples into a database. The Ceilometer collector uses a pluggable storage system usable with any database

Ceilometer REST API allows executing various reading requests on the data store. It returns the list of resources that have been measured for a particular project, or computes statistics on metrics. Source: <https://dzone.com/articles/openstack-ceilometer>

CFTC Commodities Future Trading Commission

DIGITAL ASSETS CLASSIFICATION APPROACH AND TAXONOMY CFTC

A clear, consensus-driven approach to classifying assets and the functions they serve underpins robust markets and effective regulation. The evolving digital asset ecosystem has led many to develop proprietary taxonomies to classify digital assets and their related technology. In recognition of this progress, the Commodity Futures Trading Commission's Global Markets Advisory Council for Digital Asset Markets ("CFTC GMAC DAM") Subcommittee (the "Subcommittee") has engaged digital asset stakeholders across the broader digital asset ecosystem to build a common approach for the classification and understanding of Digital Assets ("Approach").

Approach to Classifying and Understanding Digital Assets

Definition | Digital Asset: a controllable electronic record where one or more parties can exclusively exercise control through transfer of this record and where the controllable electronic record itself is uniquely identifiable.^{2, 3, 4, 5, 6, 7} Excluded from the definition of Digital Asset are those controllable electronic records that exist in and function solely as part of a financial institution's books and records. Broadly, Digital Assets may serve a variety of economic functions such as a store of value, medium of exchange or payment, a means for investment or trading, or a utility to access other goods, governance, or other services. Within those functions, when those assets have the characteristics of regulated instruments that do not qualify as Digital Assets, a specific regulatory framework may already apply, and the Subcommittee believes that digitization does not, as a legal or practical matter, alter the functioning of the product or service, with the result that it is unnecessary to look beyond the existing classification for the regulated instrument.

Issuer:

a. Definition: the entity that issues a Digital Asset or for whom a Digital Asset is being issued by a service provider; the entity upon which the person controlling the Digital Asset may have legal claim, for the value of the asset (which necessarily varies by asset type); some Digital Assets may not have an issuing entity (e.g., a bitcoin)

b. Example: a Central Bank is the "issuer" of a central bank digital currency ("CBDC")⁹

Mechanism Underpinning Asset Value:

a. Pegged: Definition (Pegged): a Digital Asset attempts to maintain a peg if its market price is referenced to the notional value or amount (as may be applicable) of a different asset, basket of assets, index or any other variable on a consistent basis; the market price may reflect the value of a

claim on a particular backing asset or entitlement to a fixed amount of value; the value of “pegged” assets may be enabled through “backing”.

Definition (Backing): an asset or basket of multiple assets that purport to guarantee or fund redemptions of the Digital Asset (note that the assets backing a Digital Asset may consist of various asset classes that could differ from the reference asset of the pegged Digital Asset; for example, the Digital Asset may reference the US Dollar, but the backing assets may include high quality liquid assets such as US Treasuries as cash equivalents held in reserve). Example (Pegged & Backed): many Stablecoins are examples of pegged and backed Digital Assets (e.g., pegged to the price of one US Dollar and backed either 100% by cash, or by a combination of cash, cash equivalents, and other assets held in a custody account to maintain the value of the peg).

b. Unpegged: Definition: not designed to reference the value of another asset and, therefore, its price is free-floating, determined by market supply and demand for that asset. ii. Example: many Cryptoassets, such as bitcoin or ether, are unpegged.

3. Rights Conferral:

a. Definition: the attribute of a Digital Asset to provide the party (or parties) that control such Digital Asset a legally enforceable claim or rights against the issuer. For example, a monetary claim, rights to participate in future revenue distributions, or share in the losses of, or participate in other arrangements by the issuer such as voting, coupon payments, etc.

b. Example: the owner of a Tokenized Security is conferred the rights to the recurring cashflows it may pay and or any other applicable rights (e.g., voting rights).

4. Fungibility – Fungible vs. Non-Fungible:

a. Fungible: i. Definition: a Digital Asset with individual units that are interchangeable on a like-for-like basis.

ii. Example: Ether is fungible with other Ether tokens.

b. Non-Fungible: Definition: a Digital Asset with individual units that are not interchangeable on a like-for-like basis; Digital Assets could also be described as “unique” or “one of a kind”. Example: Non-Fungible Tokens representing individual pieces of art, with unique artistic features (and where price often varies due to these features), and thus cannot be interchanged with other Non-Fungible Tokens; two Stablecoins (as defined herein) from different issuers would not be fungible.

5. Redemrability – Redeemable vs. Non-Redeemable:

a. Redeemable:

- i. Definition: the ability to relinquish ownership of a Digital Asset in exchange for equivalent value in another asset class, such as money
- ii. Example: fixed income Financial Digital Assets (as defined herein) may be redeemable for their notional value upon maturity; other Tokenized Securities (as defined herein) may be redeemable for the underlying traditional security it represents.

b. Non-Redeemable:

- i. Definition: a Digital Asset where no issuer exists, or the issuing entity has no obligation to redeem the asset.
- ii. Example: Ether is not redeemable for any reference asset.

6. Nature of Record – Digital Twin vs. Digital Native: 17

a. Digital Twin:

- i. Definition: an electronic controllable record representing an asset that has been immobilized on another system of record, and reconciled with that original system of record to ensure ownership is reflected precisely. 18
- ii. Example: a Tokenized Alternative Asset (as defined herein) (such as Tokenized Real Estate as defined herein) is a Digital Twin of that alternative asset that has been immobilized on another system of record.

b. Digital Native:

- i. Definition: a Digital Asset representing the primary record of value, that is not recorded on another system of record and does not require reconciliation with another system of record.

- ii. Example: a bitcoin is a Digital Native because it is the original record of value that does not need to be recorded elsewhere to verify ownership.

Note: There may be tokenized arrangements (e.g., in the case of tokens representing a fractionalized interest in a security) that may not be wholly categorized by one of these two features. In these instances, this attribute may not be relevant. In addition to the attributes that help set out the nature of a Digital Asset, there are other attributes related to a Digital Asset's intended use case or function that may also be effective tools to understand when seeking to classify them. The Subcommittee notes that the primary objective of this document is to set out definitions. Any relevant regulatory understanding should also account for and vary based on these characteristics. These include:

- Types of users/holder types (e.g., retail vs. wholesale);
- intended end user (e.g., consumer product vs. financial product); and
- the entity that serves as the custodian (e.g., regulated depository institution), if any.

Classification of Digital Assets

A. Money or Money-Like Digital Assets

For a Digital Asset to be classified as money or a money-like Digital Asset it must meet one of the following three conditions: reliable store of value, medium of exchange, and unit of account.

Digital Money

1. Central Bank Digital Currencies (CBDC): digital tokens representing a claim on a central bank for a fixed amount of central bank money denominated in a single currency; also, a liability of a central bank, with no credit or liquidity risk. It may or may not be programmable. 19, 20, 21

a. “General Purpose” or “Retail” CBDC: a CBDC that is specifically designed for use in transactions and holdings by individuals and/or small and medium-sized enterprises;

b. “Wholesale” CBDC: a CBDC that is specifically designed for wholesale use in transactions and holdings by regulated financial institutions and could be used in the facilitation of regular financial markets functions (e.g., settlement of securities transactions).

17 The Subcommittee notes that these terms are important to the classification of Digital Assets as they provide context as to the various record-keeping approaches that may be used to record ownership.

18 Note: A Digital Twin Digital Asset can be issued after the asset it represents has been created. The Digital Twin does not need to be created at the same time.

19 BIS, Central Bank Digital Currencies: System Design & Interoperability; BIS Technology of Retail Central Bank Digital Currency, Mar 2020; BIS, Central Bank Digital Currencies, Mar 2018 Board of Governors of the Federal Reserve System, CBDC, Apr 2023 21 In some jurisdictions, CBDCs may be classified as legal tender.

The Subcommittee notes that as specific CBDC arrangements vary by jurisdiction, the attributes of a Retail CBDC and Wholesale CBDC may also necessarily vary (e.g., fungibility between the two types).

2. Bank Deposits:

a. Tokenized Deposits: digital tokens that represent an existing record of a traditional ownership claim for a bank deposit on the token-issuing bank or depository institution, for a fixed amount of commercial bank money denominated in a single currency.22

b. Deposit Tokens: transferable digital tokens issued by a licensed depository institution which evidence a deposit claim against the token-issuing bank or depository institution, for fixed amount of commercial bank money or fiat cash denominated in a single

currency. The Subcommittee notes that this definition should be considered in the context of the applicable legal framework and local regulations of a given jurisdiction. The intent of the definition drafted here is to reflect a global perspective.

3. “Reserve-Backed” Digital Currencies: a privately issued (e.g., by a financial market infrastructure provider digital token where the value of the issued token is backed by central bank reserves.

Money-Like Digital Assets

4. Stablecoins: privately-issued, money-like, digital token that aims to maintain a stable value relative to a peg specified by a reference asset(s) and designed to minimize value fluctuations relative to these reference assets(s). They are not issued by a central bank. They must also be at least fully backed by one or more assets specified under the specific regulatory framework, including: 25, 26

a. Cash: to one or a combination of fiat currencies

b. Securities: low risk, highly liquid securities such as those classified as High-Quality-Liquid Assets (“HQLA”) under the BCBS LCR30 framework (e.g., US Treasury Bills) 27 The Subcommittee notes that to meet the classification standard of a Stablecoin, the issuer should provide for the timely redemption of the Stablecoin, including during times of market-wide or issuer-specific stress (e.g., redemption demands that may exceed the available liquidity for backing assets, or other events that could potentially call into question the solvency of the issuer). In practice, the means by which this is achieved may vary. The Subcommittee also notes that Stablecoin issuers use different asset classes to maintain parity with the value of the reference asset. For issuers who hold higher-risk backing assets or no backing assets in the collateral reserve, such as Cryptoassets (as defined in Section D), the Subcommittee would not classify these as Stablecoins. This is due to the potential for incremental liquidity risk and volatility that could lead to a loss of confidence in the issuer’s ability to provide for the timely redemption of the Stablecoin. Further, this loss of confidence may lead to secondary market effects affecting the parity of the Stablecoin to the reference asset, also known as a “depegging” event. The Subcommittee would instead classify such digital assets as

Other Crypto assets.

The Subcommittee further notes that some Stablecoin issuers use algorithms to automate the processes that manage supply and demand of stablecoins in relation to the value of the underlying backing reserve. This mechanism has been commonly conflated with the “Crypto assets” category described above and as “algorithmic stablecoins,” which may not have any backing assets and purport to solely maintain a peg through use of supply and demand mechanics. 28

The Subcommittee highlights that in some Stablecoin arrangements, issuers may use an algorithm to manage their backing reserve. Such an approach in itself gives rise to the same types of risks as manual reserve management and is not a differentiated

B. Financial Digital Assets

Typical use cases include financial investment, financial return, and access to capital markets.

1. Securities (and other financial instruments):

a. Tokenized Security: a Digital Twin token that represents an underlying security or financial instruments issued on a different platform (e.g., a traditional CSD or registrar), where such representation itself satisfies the definition of a security/financial instrument under local law.

b. Security Token: a Digital Native token that satisfies the applicable regulatory definition of a security or financial instrument under local law.

2. Derivatives:

a. Tokenized Derivative: a Digital Twin token that represents an underlying derivative instrument issued and recorded on a different platform, where such representation itself satisfies the definition of a derivative under local law.

b. Derivative Token: a Digital Native token that satisfies the applicable regulatory definition of a derivative instrument under local law.

The Subcommittee highlights that traditional derivative contracts which provide exposure to an underlying Digital Asset (e.g., bitcoin futures) are out of the scope of this document and not considered here, regardless of settlement type (e.g., physically or net in cash)

c. Alternative Digital Assets

Typical use cases include representation of interest in a good or non-financial asset

1. Tokenized Alternative Assets: Digital Twin tokens representing an interest in, entitlement to, or claim on, an alternative (non-security) asset (or claim on the issuing entity for the asset, where applicable), where such representation itself satisfies the definition of such interest, entitlement, or claim under local law; these alternative digital assets may include:

a. Tokenized Physical Commodities (e.g., wheat, oil, corn);

b. tokenized Real Estate; or

c. other Tokenized Assets of Goods (e.g., carbon credits, art, intellectual property rights, and intangible, discrete assets that only exist in digital form on a programmable ledger platform). If certain activities are performed on a tokenized non-financial asset, the classification category may change. For example, in the case of Tokenized Real Estate, fractionalization may convert the Alternative Digital Asset to a Financial Digital Asset.

D. Cryptos assets (often referred to as Cryptocurrencies)

Typical use cases include a network-specific medium of exchange, unit of account for transaction fees, speculative investment, and branded store of value.

1. Platform Crypto assets: non-redeemable Digital Native tokens, with no rights conferred against the issuer (if one exists), that may be exchangeable for specified value, is hard-coded into any underlying platform and must serve one or both of the following functions:

a. Cryptographic economic incentive to maintain and secure to network or application infrastructure including preservation of processing throughput (e.g., through payment of "gas fees" or staking); or

b. universal medium of exchange of the underlying network infrastructure.
Examples of Platform Crypto assets include bitcoin or ether tokens

2. Other Crypto assets: non-redeemable Digital Native tokens, with no rights conferred against the issuer (if one exists), that are used as a speculative investment.

Examples of Other Crypto assets include "meme-coins" such as shiba inu coin.

As all Crypto assets are not pegged to the value of a reference asset, do not represent ownership or other legal claim against a company or other type of issuer, nor guaranteed by a regulated financial institution, their value is driven by market dynamics and/or supply and demand mechanics.

E. Functional Digital Assets

Typical use cases include governance or access to a specific infrastructure or app, and specific functional utility.

1. Functional Digital Assets: digital tokens that cannot be exchanged for value issued (where applicable) to provide the owner of the token with a specific utility such as:

a. Application-specific governance rights, voting weights, or decision-making authority; and

b. record of entitlement right to rewards or revenue from a specific application or community. As the Digital Asset ecosystem continues to evolve, the Subcommittee recognizes that there may be additional functions or utilities that are not contemplated at this time, and as such expects this classification category to continue to evolve over time.

F. Settlement Controllable Electronic Records

Typical use cases include digital record-keeping, in facilitation of financial transactions.

1. Settlement Tokens: digital tokens where such representation itself does not satisfy the definition of a security bank deposit, nor financial instrument under local law and is used solely to transfer or record ownership or perform other middle/back-office financial functions (e.g., collateral transfer, recording of ownership); often exists temporarily, typically for the length of the transaction it facilitates. This may be called the “books-and-records” use case, and a Settlement Token would not be considered as Digital Asset as defined herein.

G. Other Digital Assets

The Subcommittee recognizes the potential for future innovation and has retained this bucket for new developments that may arise in the digital assets ecosystem.

SOURCE: DIGITAL ASSETS CLASSIFICATION APPROACH AND TAXONOMY
RECOMMENDATIONS TO THE COMMODITY FUTURES TRADING COMMISSION
GLOBAL MARKETS ADVISORY COMMITTEE GMAC / DIGITAL ASSET MARKETS
SUBCOMMITTEE 6 March 2024 CFTC Commodities Futures Trade Committee

CHAMBER OF DIGITAL COMMERCE is the world's leading trade association representing the digital asset and blockchain industry. Our mission is to promote the acceptance and use of digital assets and blockchain-based technologies. Through education, advocacy, and working closely with policymakers, regulatory agencies and industry, our goal is to develop a pro-growth legal environment that fosters innovation, jobs and investment. [LINK](http://www.digitalchamber.org) <http://www.digitalchamber.org>

CODE FOR AMERICA city, county, state governments redesign public services in three key areas that have high impact for communities. Goal: Turn challenges into opportunities to serve communities better, transform how governments use tech. [LINK](#)

COUNT MINIMUM SKETCH ALGORITHM: streaming algorithm Find a randomized streaming algorithm whose output (as a random variable) has the desired expectation but usually high variance (i.e., noise). To reduce the variance/noise, run many independent copies in parallel and combine their outputs. Count sketch is a probabilistic data structure designed to answer the following question: Reading a stream of elements a_1, a_2, a_3, \dots , where many elements are replicas in a given time it will provide an answer to question: how many original elements have been seen Count minimum

sketch is a probabilistic data structures sacrificing certainty for space. Count minimum sketch selects 2 parameters: accuracy of the results ϵ and probability of bad estimate δ .

Cool Copper Collider (or C3 for short). This proposal calls for accelerating particles with conventional, or “normal-conducting,” radio frequency (RF) cavities—as opposed to the superconducting RF cavities used in modern colliders. <https://lifeboat.com/blog/2022/10/a-retro-collider-design-for-a-higgs-factory>

DISCOVERY MACHINE ARTIFICIAL INTELLIGENCE / MACHINE LEARNING

Discovery Machine® leverages a wide range of AI techniques from knowledge acquisition (KA) to machine learning (ML) to develop “intelligent constructs” for training, decision support and automation. Discovery Machine®’s highly acclaimed, patented knowledge capture methodology works in conjunction with our patented visual modeling tools to enable the agile production of intelligent constructs. Discovery Machine®’s AI overcomes the limitations of ML imposed by sparse data environments by capturing the mental models trapped in the heads of your organization’s subject matter experts (SME) to bias and direct learning. Discovery Machine® is headquartered in Williamsport, Pennsylvania (the home of Little League). Discovery Machine® has a vibrant team of software and knowledge engineers working on several Department of Defense (DoD) projects. Source <https://discoverymachine.com/>

Distributed Autonomous Organization DAO was created by a military think tank RAND Corporation circa 2001. This term is being reused by organizations describing cryptocurrency blockchain technology. USPTO 13/573,002 reuses and improves upon military Network Centric Warfare best practice of organizing individuals in groups geospatially distributed across distances and UTZ time zones i.e., micro – macro cycle scheduling, use of organizational, resource identifiers via structured data exchanges is improved through use of algorithms which are essentially workflow rules and , math.

DASH: Unlike Bitcoin nodes, Master nodes receive payments for their service to the network – similar to demurrage charges in the Trade Reference Currency TERRA TRC. Dash includes decentralized funding, decentralized governance, decentralized storage. Dash's governance system, visit <https://dash.org>. Dash features: - InstantX:

Masternodes instantly lock transactions to solve the problem of lag time in transactions

- Self-Budgeting: To solve the problem of lack of funding for development, Masternodes can direct funds right from the blockchain to support development.
- Self-Governance: To solve the problem of making governance decisions on the future of the currency, Masternodes can vote on what development occurs.

DEMURRAGE FEE: "the (carrying) costs for (holding) currencies/commodities," or "international maritime shipping delay penalty fees." The TRC is a demurrage-charged currency. A demurrage charge acts much like a parking or rental fee, incurring a cost over time to its holder. The cost for holding onto the TRC currency is estimated at 3.5%-4% per annum. This demurrage charge insures the currency's use mainly as a trading device: it would not be

hoarded but always tend to remain in circulation. It would thereby strongly activate commercial exchanges and investments wherever it circulates, the opposite of a conventional currency.

DEMMURAGE FEE / SATOSHI: The Satoshi represents one hundred millionths of a bitcoin because bitcoin has increased in value exponentially, smaller denominations are needed to facilitate smaller transactions. Small denominations make bitcoin transactions easier to conduct and, can act as demurrage fees to for example, move real world assets / commodities from point a to point n within trade federations.

DHS goal: "A national common operating picture for critical infrastructure". A congressional directive states "nothing less than network centric homeland security akin to network centric warfare". This Interoperability challenge exists to this day to develop a common syntax library / Rosetta Stone among disparate systems to form an integrated, synchronized, situational awareness system of systems. Syntax / symbol source libraries that need a common reference format include a partial list:

- Named-Data Networking NDN <Content> Centric Networking (XML tags)
- OASIS TOSCA YAML document indent data encoding scheme
- GITHUB code, syntax library, Java Script OS ("tag") convention

DISTRIBUTED EVENT PROCESSING

A distributed event processing system consists of one or more nodes (machines), and can execute a directed acyclic graph (DAG) of operators called a dataflow (or query), over long-running high-event-rate data sources. An important component of such a system is cost estimation, which predicts or estimates the "goodness" of a given input, i.e., operator graph and/or assignment of individual operators to nodes. Source: IEEE <https://ieeexplore.ieee.org/document/5767926/>

DISTRIBUTED STATE MACHINE

In many distributed applications, processes synchronize with one another in a complex way and execute for a long period of time. Atomic transactions are inadequate for designing reliable applications with these characteristics, because transactions restrict the types of synchronization than can be specified. An alternative approach that exploits behavior specified in a hierarchical finite-state machine (FSM) model is proposed. A set of general conditions that ensures the correctness of recovery is identified. These general conditions permit combinations of different types of recovery methods to be used in a recovery. They also enable one to enhance recovery efficiency by exploiting permutation and substitution of operations allowed by the behavior specification. In Zeebe.io — a horizontally scalable distributed workflow engine I explained that Zebee is a super performant, highly scalable and resilient cloud-native workflow engine. Source: IEEE: <https://ieeexplore.ieee.org/document/235125>

ECO INCENTIVES: Ecologically sustainable economic transactions need to be incentivized among the world's Ecological and Economic system of systems.

DECISION POINT: Economic #RESET is a mathematical certainty. Do we RESET the global system of systems as is or will we re-engineer using NATO system of systems engineering standing on the shoulders of giants

1. **CLIMATE CHANGE: IF / WHEN:** Climate Change causes a drop in crop commodity food production by 20–25 % while population continues to grow, THEN it follows that this condition will become a matter of national security. It's TIME to implement an Ecologically Sustainable Economic Heartbeat ELSE face > greater chaos by not leveraging proven system of system structured data exchange methods. An ecologically sustainable economic heartbeat is needed. Why wait until crisis?
2. **CLIMATE CHANGE: IF** climate change causes a drop in crop commodity by 20–25 % while population grows, THEN this condition will become a matter of national security. THEN this will require revisiting Belgian Economist Bernard Lietaer's TRC Trade Reference Currency ELSE face > socio economic chaos

TERRA Trade Reference Currency by Economist Bernard Lietaer

LINK <http://lietaer.com/2010/01/terra/>

Econometrics analyzes data using statistical methods to test, develop economic theory. These methods rely on statistical inferences to quantify and analyze economic theories by leveraging tools such as frequency distributions, probability, and probability distributions, statistical inference, correlation analysis, simple and multiple regression analysis, simultaneous equations models, and time series methods. Source: Investopedia: <https://www.investopedia.com/terms/e/econometrics.asp>

Electric dipole effect Electric meter claim based on electric dipole effect: closer is cheaper given less infrastructure needed given energy attenuates over distances • data over energy link where #energy pulses constitute a method and means to transmit data over electric wired, wireless pathways • electric dipole effect Radio Wave Properties: Electric and Magnetic Dipole Antennae Source: <https://youtu.be/wUpOlqbHcjI?t=111> • water drop in pond meme •Paul Revere linear, sequential series

ENERGY WIRELESS TRANSFER TESLA INSPIRED

DARPA POWER ("Persistent Optical Wireless Energy Relay"): "develop a means of distributing energy wirelessly around the globe through airborne power transfer. First dreamed up by Nikola Tesla almost 100 years ago, if successful, this would be the most significant change to energy transfer since the first rollout of electrification almost 150 years ago. The program goals include demonstrating the key components of a resilient, speed-of-light energy network". DARPA plans to create wireless energy transfer infrastructure to supply near-uninterruptable power to U.S. military bases worldwide. The plan, as reported by Popular Mechanics, is to use laser technology to beam electricity around the planet. Famously a dream of Nikola Tesla over 100 years ago, if successful, this technology, called fittingly enough POWER ("Persistent Optical Wireless Energy Relay"), would make the U.S. military less reliant on liquid fuel like diesel and vulnerable power lines, which can be intercepted or sabotaged by enemy forces. <https://interestingengineering.com/innovation/darpa-laser-power-transfer>

USPTO 13/573,002 claim: closer- cheaper given less attenuation over distance, less infrastructure needed. SCOTUS Alice in Wonderland 2014 ruling compliant water drop in pond physical meme for sound / light metrics, meters, descriptions relevant to sound, optical based quantum computing. Source: Interesting Engineering:

<https://interestingengineering.com/innovation/wireless-energy-transmission-darpa>

ERICSSON OPEN MONEY: Ericsson Patents Open Money for Society 20130166398 "System And Method For Implementing A Context Based Payment System." "It is our vision that one day everyone with access to a mobile phone will be able to spend, send and receive money as easily as sending a text via SMS." "When money is open, the way we send, spend and receive money will change forever." Ericsson posted on their commerce site "Bitcoin And the Value of Money" which discusses "From Bartering, to Gold, to Bitcoins" Facilitation of Effective Trade, Limited Resources, and Value as a Mutual Agreement. <https://letstalkbitcoin.com/ericsson-patents-open-money-for-society>

"Local producers are sometimes forced to price goods relative to distant competition, and, because of lower production and wage costs in different parts of the world (or even country), substantially lower profit margins can be the result. There are times, however, when consumers might be willing to buy locally produced goods for the good of the society {Emphasis LTB}, and that attitude is more prevalent today than in the past. But what a consumer says they will do, and what occurs in practical, real shopping situations can be significantly different. Faced with competitive quality products, but disparate prices, the consumer often feels that he or she has no real choice, especially if budgets are more constrained because of uncertain economic conditions, and therefore are not what they used to be. Thus, personal economic pressures can hinder "good" buying decisions. Retailers too are cognizant of an increased awareness for the value of locally produced products. They market local producers and arrange special sections with "good" products, i.e., those that minimally impact the environment both in terms of environmentally friendly manufacturing methods, but also those articles that have been produced locally." "Thus, current economic conditions, and prevailing economic theories make it difficult, if not impossible, for an average consumer to make an impact on the local economy and the local environment, regardless of their attitudes. Therefore, we provide methods for creating a context based payment system.

ERICSSON CONTEXT BASED PAYMENT SYSTEM: "Disclosed herein is a context-based payment system. Electronic currency or coupons can be made dependent on context, and the context can be one of location or geography, time, date, distance, sound, or other devices. The value of the currency exists only if a pre-condition is fulfilled. For example, if the currency is location dependent, the value only exists in a defined area (currency value area). The goods or the service in the value-system are also context dependent, that is, they can only be sold or offered in a defined area (product value area). Accordingly, if the product value area and the currency value area overlap, a purchase and payment can be made."

ERLANG – ERLANG FOLSOM by ERICSSON: Erlang based metrics system inspired by Coda Hale's metrics (<https://github.com/dropwizard/metrics>). The metrics API's

purpose is to collect real-time metrics from Erlang applications and publish them via Erlang APIs and output plugins. folsom is not a persistent store. There are 6 types of metrics: counters, gauges, histograms (and timers), histories, meter_readers and meters. Metrics can be created, read and updated via the folsom_metrics module. [LINK](#) <https://github.com/boundary/folsom>

ETHEREUM “WORLD COMPUTER” combination of cryptographic architecture and Turing completeness, Ethereum virtual machine (EVM) refers to part of the protocol that handles internal state and computation. It is often referred to as the project's defining innovation over other blockchain-based systems. By taking the cryptographic payment structure of bitcoin and adding a Turing complete scripting language, The term "Turing complete" means a system capable of performing logical steps of computational functions. Ethereum is different than from bitcoin in that it is first and foremost a computing platform Vs a payment system. [LINK](#) <http://coindesk.com/whats-big-idea-behind-ethereums-world-computer/>

EQUILIBRIUM ALGORITHM / polynomial-time algorithm by John Nash Princeton University: Nash equilibrium, named after the mathematician John Nash, is the most common way to define the solution of a non-cooperative game involving two or more players. In a Nash equilibrium, each player is assumed to know the equilibrium strategies of the other players, and no one has anything to gain by changing only one's own strategy.[1] The principle of Nash equilibrium dates back to the time of Cournot, who in 1838 applied it to competing firms choosing outputs.[2]

If each player has chosen a strategy – an action plan based on what has happened so far in the game – and no one can increase one's own expected payoff by changing one's strategy while the other players keep theirs unchanged, then the current set of strategy choices constitutes a Nash equilibrium.

If two players Alice and Bob choose strategies A and B, (A, B) is a Nash equilibrium if Alice has no other strategy available that does better than A at maximizing her payoff in response to Bob choosing B, and Bob has no other strategy available that does better than B at maximizing his payoff in response to Alice choosing A. In a game in which Carol and Dan are also players, (A, B, C, D) is a Nash equilibrium if A is Alice's best response to (B, C, D), B is Bob's best response to (A, C, D), and so forth.

Nash showed that there is a Nash equilibrium for every finite game: see further the article on strategy. See: <http://web.cs.ucla.edu/~awm/cs288/class3.pdf>

Eurasian Economic Union (EAEU or EEU) [note 1] is an economic union of five post-Soviet states located in Eurasia. The EAEU has an integrated single market. As of 2023, it consists of 183 million people and a gross domestic product of over \$2.4 trillion.[4] The Treaty on the Eurasian Economic Union was signed on 29 May 2014 by the leaders of Belarus, Kazakhstan, and Russia, and came into force on 1 January 2015.[5] The EAEU encourages the free movement of goods and services, and provides for common policies in the macroeconomic sphere, transport, industry and

agriculture, energy, foreign trade and investment, customs, technical regulation, competition, and antitrust regulation. Provisions for a single currency and greater integration are envisioned for the future.[9][10]

Main articles: Eurasian Customs Union and Eurasian Economic Space

The Eurasian Conformity mark EAC.

The core objective of the Single Economic Space is the development of a single market and achieving the "four freedoms", namely the free movements of goods, capital, services and people within the single market. List of bilateral free trade agreements, Commonwealth of Independent States Agreement on the Establishment of a Free Trade Area (1994), and Commonwealth of Independent States Free Trade Area. See also ASEAN, Collective Security Treaty Organization, Comecon Community for Democracy and Rights of Nations, Enlargement of the Eurasian Economic Union, Eurasian Economic Community, Eurasian Patent Convention Eurasian Patent Organization, Soviet Union, Union of Sovereign States, Warsaw Pact, List of multilateral free-trade agreements

SOURCE: https://en.wikipedia.org/wiki/Eurasian_Economic_Union

FEDERATION (CLOUD COMPUTING): FEDERATION: from Latin: foedus, gen.: foederis, covenant characterized by a union of partially self-governing states or regions under a central (federal) government. In a federation, the self-governing status of the component states, as well as the division of power between them and the central government, are typically constitutionally entrenched and may not be altered by a unilateral decision of either party, the states or the federal political body. Individuals, organizations retain AUTONOMY to act on their own behalf. Federation: reuse of military System of Systems research, best practice guiding formation of a procedural template framework is key to forming and maintaining sustainable Trade Federations as Distributed Autonomous Organizations DAO's / DAC's Corporations. Military's organize individuals into organizations <OrgID> and Organizational Units <OU><OU><OU> dispersed autonomous groups working on collective goals synchronized in space-time.

FEDERATE: Within a federated system, an organization needs a standardized and repeatable way of describing services it makes available to teams in leagues and policies by which it runs its operations. Organization Identifiers </ORG IDs> represents a business, non-profit corporation, or government entity in the American Registry of Internet Numbers ARIN database. Entities may have more than one <Org_ID> for contingency planning. More than one ORG_ID enables business contingency plans for different scenarios, use cases, different circumstances.

FEDERATED IDENTITY MANAGEMENT: federation describes the organization arrangements necessary for interconnection between teams, leagues, and commissions joined to achieve common goals. Federated systems need to interoperate across organizational boundaries and connect processes utilizing different technologies, identity storage, security approaches and programming models. Resources available to the group include the health or availability of individuals forming groups where monitoring is performed to ascertain if groups are mission capable or not in context with

available resources and whether the group's location is within a pre-defined geo-spatial range of a given activity or event. A federation describes the organization arrangements necessary for linkage between teams, leagues, and commissions joined to achieve common goals. Operations are performed as part of group's activities. If trade is deemed non-equitable, groups, individuals may leave the trade federation as a network drop until conditions change or the individuals change their minds and decide to re-affiliate, re-tether to the collective. [LINK https://en.wikipedia.org/wiki/Federation](https://en.wikipedia.org/wiki/Federation)
See Bitcoin Blockchain smart contract RSK [federation](#) network Buenos Aires [Rootstock](#).

FIREFLY-HEARTBEAT ALGORITHM UNIVERSITY of BOLOGNA / HUNGARY: Firefly inspired Heartbeat Synchronization: in a paper entitled Firefly-inspired Heartbeat Synchronization in Overlay Networks by the University of Bologna and Trento Italy along with the University of Szeged, Hungary: "Heartbeat synchronization strives to have nodes in a distributed system generate periodic, local "heartbeat" events approximately at the same time. Many useful distributed protocols rely on the existence of such heartbeats for driving their cycle- based execution. The heartbeat synchronization protocol for overlay networks is inspired by mathematical models of flash synchronization in certain species of fire flies. Nodes send flash messages to their neighbors when a local heartbeat triggers. Fireflies adjust the phase of their next heartbeat based on incoming flash messages using an algorithm inspired by mathematical models of fire-fly synchronization. Heartbeat synchronization strives to have nodes in a distributed system generate periodic, local "heartbeat" events approximately at the same time. It differs from classical clock synchronization in that nodes are not interested in counting cycles and agreeing on a ID of a current cycle. There is no requirement regarding the length of a cycle with respect to real time as long as a length is bounded and all nodes agree on it eventually. The goal is to guarantee that all nodes start and end their cycles at the same time, with an error that is at least one, but preferably more, orders of magnitude smaller than a chosen cycle length. Firefly heartbeat synchronization reduces uncertainty in stochastic networks.
Paper: Firefly-inspired Heartbeat Synchronization in Overlay Networks. Ozalp Babaoglu. University Bologna, Italy <http://cs.unibo.it/~babaoglu/papers/pdf/SASO07-fireflies.pdf>

FIREFLY – HEARTBEAT ALGORITHM CHINA: The firefly algorithm (FA) is a nature-inspired metaheuristic optimization algorithm developed by Xin-She Yang that is inspired by the flashing behavior of fireflies (Yang, 2008), originally designed to solve continuous optimization problems (Lukasik and Žak, 2010 a major part of an edited book was also dedicated to the firefly algorithm and its applications (Yang, 2013a). For example, Senthilnath et al. provided an extensive performance study by comparing the firefly algorithm with 11 different algorithms and concluded that FA can be used for efficient clustering (Senthilnath et al., 2011); From: Swarm Intelligence and Bio-Inspired Computation, 2013 <https://www.sciencedirect.com/topics/engineering/firefly-algorithm>

FIX 4.0 : Heartbeat <0> message: The Heartbeat <0> is useful for monitoring the status of the communication link and to identify when the last of a string of messages was not received. When either end of a FIX connection has not sent any data for [HeartBtInt <108>] seconds, it will transmit a Heartbeat <0> message. When either end

of the connection has not received any data for (HeartBtInt <108> + "some reasonable transmission time") seconds, it will transmit a Test Request <1> message. If there is still no Heartbeat <0> message received after (HeartBtInt <108> + "some reasonable transmission time") seconds then the connection should be considered lost and corrective action be initiated. If HeartBtInt <108> is set to zero then no regular Heartbeat <0> messages will be generated. Note that a Test Request <1> message can still be sent independent of the value of the HeartBtInt <108> which will force a Heartbeat <0> message. Heartbeats issued as the result of Test Request <1> must contain the TestReqID <112> transmitted in the Test Request <1> message. This is useful to verify that the Heartbeat <0> is the result of the Test Request <1> and not as the result of a regular timeout. Source: https://www.onixs.biz/fix-dictionary/4.0/msctype_0_0.html

HEARTBEAT: In computer science, a **heartbeat** is a periodic signal generated by hardware or software to indicate normal operation or to synchronize other parts of a computer system.^{[1][2]} Heartbeat mechanism is one of the common techniques in mission critical systems for providing high availability and fault tolerance of network services by detecting the network or systems failures of nodes or daemons which belongs to a network cluster—administered by a master server—for the purpose of automatic adaptation and rebalancing of the system by using the remaining redundant nodes on the cluster to take over the load of failed nodes for providing constant services.^{[3][1]} Usually a heartbeat is sent between machines at a regular interval in the order of seconds; a **heartbeat message**.^[4] If the endpoint does not receive a heartbeat for a time—usually a few heartbeat intervals—the machine that should have sent the heartbeat is assumed to have failed.^[5] Heartbeat messages are typically sent non-stop on a periodic or recurring basis from the originator's start-up until the originator's shutdown. When the destination identifies a lack of heartbeat messages during an anticipated arrival period, the destination may determine that the originator has failed, shutdown, or is generally no longer available.

Heartbeat protocol used to negotiate and monitor the availability of a resource, such as a floating IP address. The procedure involves sending network packets to all the nodes in the cluster to verify its reachability.^[3] Typically when a heartbeat starts on a machine, it will perform an election process with other machines on the heartbeat network to determine which machine, if any, owns the resource. On heartbeat networks of more than two machines, it is important to take into account partitioning, where two halves of the network could be functioning but not able to communicate with each other. In a situation such as this, it is important that the resource is only owned by one machine, not one machine in each partition.

As a heartbeat is intended to be used to indicate the health of a machine, it is important that the heartbeat protocol and the transport that it runs on are as reliable as possible. Causing a failover because of a false alarm may, depending on the resource, be highly undesirable. It is also important to react quickly to an actual failure, further signifying the reliability of the heartbeat messages. For this reason, it is often desirable to have a heartbeat running over more than one transport; for instance, an Ethernet segment using UDP/IP, and a serial link.

A "cluster membership" of a node is a property of network reachability: if the master can communicate with the node it's considered a member of the cluster and "dead" otherwise.^[6] A heartbeat program as a whole consist of various subsystems:^[7]

Heartbeat Subsystem (HS): The subsystem that monitors the node's presence within the cluster through a series of [keepalive](#) or "hear-beat messages".

Cluster Manager (CM): The subsystem within the cluster—usually the master server—which keeps track of the "cluster members" and records which [resources](#) are on which nodes.

Cluster Transition (CT): When a node joins or leaves the cluster, this subsystem is responsible for keeping track of such occurrences for the purpose of triggering events to rebalancing and reconfiguring the master to distribute the load.

Heartbeat messages are sent in a periodic manner through techniques such as [broadcast](#) or [multicasts](#) in larger clusters.^[6] Since CMs have transactions across the cluster, the most common pattern is to send heartbeat messages to all the nodes and "await" responses in [non-blocking](#) fashion.^[8] Since the heartbeat or [keepalive](#) messages are the overwhelming majority of non-application related cluster control messages—which also goes to all the members of the cluster—major critical systems also include non-IP protocols like [serial ports](#) to deliver heartbeats.^[9] Wikipedia

Heartbeat Message Test Request: FIX 4.0 : Description

The Test Request <1> message is utilized to force a heartbeat from the opposing application. The Test Request <1> message is useful for checking sequence numbers or verifying communication line status. The opposite application will respond to the Test Request <1> with a Heartbeat <0> containing the TestReqID <112>.

The TestReqID <112> is used to verify that the opposite application is generating the heartbeat as the result of Test Request <1> and not a normal timeout. The opposite application will include the TestReqID <112> in the resulting Heartbeat <0>. Any string can be used as the TestReqID <112> (one suggestion is to use a timestamp string).

GAMIFICATION: application of typical elements of game playing (e.g., point scoring, competition with others, rules of play) to other areas of activity, typically as an online marketing technique to encourage engagement with a product or service

GDP INDEX ECONOMY: Thomas Edison and Henry Ford proposed a currency based on the value of a basket of crop commodities. Edison believed that crops held their value over time. Consider climate change reality and the merits are self-evident.

GERMAN ARMY RECOMMENDATION CIRCA 2003: using Battlefield Digitization, Net Centric Warfare, System of Systems Engineering best practice for OOTW Operations Other Than War - a German Army suggestion made in 2003 to support DATF Distributed Autonomous Trade Federations / DAOs for a world economic framework.

GEIA-STD-0007 Logistics Product Data Central Exchange Federated database, must establish exchange agreements with each "Partner". • Point to Point Simple exchange, must establish exchange agreements and Protocols with each Partner , similar data and structure. Data Types Dictionary „ XML Schema for Logistics Product Data – Update/Change Process „ XML Schemas for Transaction Sets – Provisioning & Style Sheet — Task Analysis. Data Element Dictionary Example The probability that, when

used under stated conditions in an ideal support environment, a system will operate satisfactorily at any time. This differs from Inherent Availability only in its inclusion of consideration for preventive action. Aa excludes supply downtime and administrative downtime. The measurement bases for MTBM and M must be consistent when calculating Aa. Aa may be expressed by the following formula: $Aa = \frac{MTBM - MTBM + M}{MTBM}$ where $MTBM = \frac{1}{M} \sum_{i=1}^M TFi$ and $M = \sum_{i=1}^N TFi$. Mean active maintenance downtime (where corrective and preventive actions are considered) $ETi = \frac{\sum_{i=1}^N TFi}{N}$. Task frequency for task i $N = \text{Total number of tasks performed}$. Note: The measurement bases for MTBF, MTBM-ND, and MTBPM must be consistent when calculating the MTBM parameter.

GITHUB: GitHub is a web-based Git repository hosting service. It offers distributed revision control, source code, source code management, bug tracking, feature requests, task management, and Wikis for every project. GitHub renders common formats like text, CSV, and geospatial data. GitHub includes enterprise controls to collaborate openly while limiting access to a team, to select stakeholders, or to entire organizations.

[LINK http://github.com/Beacon-Heart/Heart-Beacon](http://github.com/Beacon-Heart/Heart-Beacon)

GRAPHENE: form of partnership called a Decentralized Conglomerate A universal shared platform allows organizations to have a common interest in the platform itself, without the platform imposing any control on the organizations that join the universal platform ecosystem where organizations directly invest in each other." Profits can be shared without the necessity of the companies coordinating their operations. " By entering into a Decentralized Conglomerate means the co-ordination takes place within an automated system," "The OpenLedger team has created the universal shared platform on which organizations can enter agreements to share their profits in exchange for community support." Graphene Blockchain Worker System [LINK https://bitshares.org/doxygen/group_workers.html](https://bitshares.org/doxygen/group_workers.html)

HADOOP: Apache Hadoop is an open-source software framework for distributed storage and distributed processing of very large data sets on computer clusters.

Hashgraph is a [distributed ledger technology](#) that has been described as an alternative to [blockchains](#). The hashgraph technology is currently [patented](#), and the only authorized ledger is Hedera Hashgraph. The native [cryptocurrency](#) of the Hedera Hashgraph system is HBAR. Unlike blockchains, hashgraphs do not bundle data into blocks or use miners to validate transactions. Instead, hashgraphs use a "gossip about gossip" protocol where the individual nodes on the network "gossip" about transactions to create [directed acyclic graphs](#) that time-sequence transactions.^[1] Each "gossip" message contains one or more transactions plus a [timestamp](#), a [digital signature](#), and [cryptographic hashes](#) of two earlier events. This makes Hashgraph form an asynchronous [Byzantine Fault-Tolerant \(aBFT\)](#) [consensus algorithm](#).^[2] Hashgraph was invented by the American [computer scientist](#) Leemon Baird. Baird is the co-founder, chief technical officer of Swirlds holder of hashgraph algorithm patents

HISTOGRAMS / TIMERS: Histograms are collections of statistical analysis values, such as mean, min, max, kurtosis and percentile that can be used as timed update functions.

HFT High Frequency Trade Circuit Breaker / Trade Window token passing

The World Economic Forum WEF in 2008: stated the need for a HFT High Frequency Trade circuit breaker. Given the quantum computing arms race where quantum computer A is "1000 x faster" than B, is it TIME? Use of the </108> heartbeat message is a simple method to implement a way to stop trade activities, algorithms belonging to a specific system or company, fund rather than shutting down the entire trading system. Setting time limits (TTL Time To Live) token passing to trade windows pegged to the closest statistical mean heartbeat epoch avoids the potential of rapid attrition of firms with slower quantum, non-quantum systems and retail individual investors. If given a choice of detecting </events> {"events"} using quantum particles or waves, are not waves preferable given a wave is more likely to reliably detect an event than a probabilistic based particle? Wave detection doesn't necessarily involve cooling to absolute zero that consumes resources and energy to a greater degree.

HFT Circuit Breaker: </108> Heartbeat message Start, Stop, TTL epoch time limit trade window turn token pass </Org_ID> </URN>

Hopf Fibration / Bloch sphere: In the mathematical field of [differential topology](#), the **Hopf fibration** (also known as the **Hopf bundle** or **Hopf map**) describes a [3-sphere](#) (a [hypersphere](#) in [four-dimensional space](#)) in terms of [circles](#) and an ordinary [sphere](#). Discovered by [Heinz Hopf](#) in 1931, it is an influential early example of a [fiber bundle](#). Technically, Hopf found a many-to-one [continuous function](#) (or "map") from the 3-sphere onto the 2-sphere such that each distinct *point* of the 2-sphere is mapped from a distinct [great circle](#) of the 3-sphere ([Hopf 1931](#)).^[1] Thus the 3-sphere is composed of fibers, where each fiber is a circle — one for each point of the 2-sphere. The Hopf fibration has many implications, some purely attractive, others deeper. For example, stereographic projection $S^3 \rightarrow R^3$ induces a remarkable structure in R^3 , which in turn illuminates the topology of the bundle (Lyons 2003). Stereographic projection preserves circles and maps the Hopf fibers to geometrically perfect circles in R^3 which fill space. Here there is one exception: the Hopf circle containing the projection point maps to a straight line in R^3 — a "circle through infinity". The fibers over a circle of latitude on S^2 form a torus in S^3 (topologically, a torus is the product of two circles) and these project to nested toruses in R^3 which also fill space. The individual fibers map to linking Villarceau circles on these tori, with the exception of the circle through the projection point and the one through its opposite point: the former maps to a straight line, the latter to a unit circle perpendicular to, and centered on, this line, which may be viewed as a degenerate torus whose minor radius has shrunken to zero. Every other fiber image encircles the line as well, and so, by symmetry, each circle is linked through every circle, both in R^3 and in S^3 . Two such linking circles form a Hopf link in R^3 . Hopf proved that the Hopf map has Hopf invariant 1, and therefore is not null-homotopic. In fact it generates the homotopy group $\pi_3(S^2)$ and has infinite order. In quantum mechanics, the Riemann sphere is known as the **Bloch sphere**, and the Hopf fibration describes the topological structure of a quantum mechanical two-level system or qubit. Similarly, the topology of a pair of entangled two-level systems is given by the Hopf fibration. See USPTO 13/573,002 water drop in pond, Paul Revere linear sequential (line) memes. Source: https://en.wikipedia.org/wiki/Hopf_fibration

Financial Nostradamus / USPTO 13/573,002 fusion: Veritaseum is a blockchain-based fintech software company which delivers global access to peer-to-peer capital markets through its decentralized platform, digital asset research, and transfers. At heart, the project seeks to level the economic playing field by creating software which enables participation in P2P capital markets without intermediates like banks, brokers, financial advisors, and other mediators. The use case of VERI token is to redeem with Veritaseum software for advisory services, research and to gain entry into Veritaseum's autonomous financial machines, P2P value trading system, and P2P letters of credit. The platforms utility token VERI is used to purchase access to the platform's products and services, which range from asset tokenization to financial research data and even self-custody escrow services. VeADIR stands for Veritaseum Autonomous Distributed Interactive Research. Source: <https://cryptonews.com/coins/veritaseum/>

Financial Standard ISO 20022 is a International Standard prepared by ISO Technical Committee TC68 Financial Services. It describes a common platform for the development of messages in ASN.1 Abstract Syntax Notation: A single standardization approach (methodology, process, repository) to be used by all financial standards initiatives. It is a common platform for the development of messages using:

- a modelling methodology to capture in a syntax-independent way financial business areas, business transactions and associated message flows
- a central dictionary of business items used in financial communications
- a set of XML and ASN.1 design rules to convert the message models into XML or ASN.1 schemas, when use of the ISO 20022 XML or ASN.1-based syntax is preferred.

The resulting models and derived messages are published in the Catalogue of messages and stored in the ISO 20022 Financial Repository available on this website. This flexible framework allows communities of users and message development organizations to define message sets according to an internationally agreed approach using internationally agreed business semantics and, whenever desirable, to migrate to the use of a common XML or ASN.1-based syntax.

ISO 20022 ISO describes semantic Foundation Tech / Standards for programmable \$ given the internet was financed, steered by the Department of Defense / NATO. Why reinvent decades of research and system of systems engineering structured data exchange best practice? Is this even possible any time soon?

Gross national income (GNI), previously known as gross national product (GNP), is the total domestic and foreign output claimed by residents of a country, consisting of Gross Domestic Product (GDP), plus factor incomes earned by foreign residents, minus income earned in the domestic economy by nonresidents (Todaro & Smith, 2011: 44).[2] Comparing GNI to GDP shows the degree to which a nation's GDP represents domestic or international activity. Kuznets became the first economist to show that the Absolute Income Hypothesis gives inaccurate predictions in the long run by using time-series data. Wikipedia https://en.wikipedia.org/wiki/Simon_Kuznets

IDMAPS – SONAR HOPS: internet distance estimation service: IDMaps is a global internet host distance estimation service that provides distance information used by SONAR / HOPS query / reply service. IDMaps measures, disseminates internet wide distance information to for example, Distributed Autonomous Virtual Organizations DAVOS. Higher level services for example at the macro-cycle level collect distance information to build a virtual distance map of internet by estimating distance between any IP address pair. Location is achieved by use of triangulation Distance information adjusts to “permanent” topology changes e.g., splits, joins, adds, moves, drops, merges in lieu of formal merger / acquisition. IDMaps assists Network Time Protocol (NTP) servers establish long term peering relationships. Distance Metrics focus is on latency (e.g., round-trip delay) and where possible, bandwidth. We improve stochastic harmonization by use of firefly inspired algorithms that strive to achieve synchronization by matching firefly synchronization behavior with the closest heartbeat snapshot. [LINK](#)

IEEE 802.11AG hop-by-hop detection and control for epoch assignment and hop counts management and for hop by hop detection function to determine hop by hop count corresponding to machine readable and executable null / 0 and steps from null representing hop counts e.g., +1, +2, +3, +4 and / or -1, -2, -3, -4 Paul Revere linear, sequential metaphor indicating distance traveled in context with router / server / switch / node traversal. IEEE 802.11 HbH hop by hop control described, represented by USPTO 13/573,002 Paul Revere, rain drop in pond meme - metaphor metrics denoting increases / decreases in thresholds intensity, duration and hop count sums

IEEE 802.11AG hop by hop detection, control for epoch assignment, hop count management, hop by hop detection function to determine hop by hop count corresponding null / 0 and steps from null representing hop counts e.g., +1, +2, +3, +4 and / or -1, -2, -3, -4 Paul Revere linear, sequential metaphor indicating distance traveled in context with router / server / switch / node traversal

IEEE 802.11 HbH hop by hop control supporting Paul Revere, metrics of increases / decreases in thresholds, intensity, duration and hop count summation

IEEE C37.118 Harmonization and Synchronization for heartbeat data pulses and watchdog heartbeat functions in electrical power grid applications to base micro-grid arbitrage when used with user, customer, client, organization beacon broadcasts

IEEE Industry Connections

IC17-002-01: Digital Inclusion through Trust and Agency (DITA)

IC22-015: Decentralized Metaverse Initiative (DMI)

IC20-022: Disaster Recovery for Blockchain Nodes and Enterprise Workloads

2140.1-2020 - IEEE Standard for General Requirements for Cryptocurrency Exchanges

2140.2-2021 - IEEE Standard for Security Management for Customer Cryptographic Assets on Cryptocurrency Exchanges

2140.4-2023 - IEEE Standard for Distributed/Decentralized Exchange Framework Using Distributed Ledger Technology (DLT)

2140.5-2020 - IEEE Standard for a Custodian Framework of Cryptocurrency

2142.1-2021 - IEEE Recommended Practice for E-Invoice Business Using Blockchain Technology

2143.1-2020 - IEEE Standard for General Process of Cryptocurrency Payment

2144.1-2020 - IEEE Standard for Framework of Blockchain-based Internet of Things (IoT) Data Management

2146.1-2022 - IEEE Approved Draft Standard for Entity-Based Risk Mutual Assistance Model through Blockchain Technology

2418.2-2020 - IEEE Standard Data Format for Blockchain Systems

2418.7-2021 - IEEE Standard for the Use of Blockchain in Supply Chain Finance

2418.10-2022 - IEEE Standard for Blockchain based Digital Asset Management

3205-2023 - IEEE Standard for Blockchain Interoperability Data Authentication and Communication Protocol

3801-2022 - IEEE Standard for Blockchain-based Electronic Contracts

3207-2022 - IEEE Standard for Blockchain-Based Digital Asset Identification

3802-2022 - IEEE Standard for Application Technical Specification of Blockchain-based E-Commerce Transaction Evidence Collecting

3218-2022 - IEEE Standard for Using Blockchain for Carbon Trading Applications

3203-2023 - IEEE Approved Draft Standard for Blockchain Interoperability Naming Protocol

3206-2023 - IEEE Standard for Blockchain-based Digital Asset Classification

3209-2023 - IEEE Standard for Blockchain Identity Key Management

3217-2023 - IEEE Standard for Application Interface Specification for Blockchain Systems

3224-2023 - IEEE Standard for Blockchain-Based Green Power Identification Applications

3219-2023 - IEEE Approved Draft Standard for Blockchain-based Zero-Trust Framework for Internet of Things (IoT)

2145-2023 - IEEE Approved Draft Standard for Framework and Definitions for Blockchain Governance

3810-2023 - IEEE Standard for Framework of Energy Market Simulation

3806-2023 - IEEE Standard for Blockchain-Based Hepatobiliary Disease Data Extraction and Exchange

P2140.3 - Standard for User Identification and Anti-Money Laundering on Cryptocurrency Exchanges

P2143.2 - Standard for Cryptocurrency Payment Performance Metrics

P2143.3 - Standard for Risk Control Requirements for Cryptocurrency Payment

P2144.2 - Standard for Functional Requirements in Blockchain-based Internet of Things (IoT) Data Management

P2144.3 - Standard for Assessment of Blockchain-based Internet of Things (IoT) Data Management

P2145 - Standard for Framework and Definitions for Blockchain Governance

P2146.2 - Standard for External Data Retrieval of Blockchain for Risk Mutual Assistance Model

P2418.1 - Standard for the Framework of Blockchain Use in Internet of Things (IoT)

P2418.3 - Standard for the Framework of Distributed Ledger Technology (DLT) Use in Agriculture

P2418.5 - Standard for Blockchain in Energy

P2418.6 - Standard for the Framework of Distributed Ledger Technology (DLT) Use in Healthcare and the Life and Social Sciences

P2418.11 - Framework for Use of Distributed Ledger Technology in Security of Electronic Voting (e-Voting) Systems

P2958 - Standard for a Decentralized Identity and Access Management Framework for Internet of Things

P3201 - Standard for Blockchain Access Control

P3202 - Standard for Capability Evaluation Requirements of Blockchain Practitioners

P3203 - Standard for Blockchain Interoperability Naming Protocol

P3204 - Standard for Blockchain Interoperability - Cross Chain Transaction Consistency Protocol

P3206 - Standard for Blockchain-based Digital Asset Classification

P3207 - Standard for Blockchain-based Digital Asset Identification

P3208 - Standard for Blockchain-based Digital Asset Exchange Model

P3209 - Standard for Blockchain Identity Key Management

P3210 - Standard for Blockchain-based Digital Identity System Framework

P3211 - Standard for Blockchain-based Electronic Evidence Interface Specification

P3212 - Standard for Blockchain System Governance Specification

P3214 - Standard for Testing Specification of Blockchain Systems

P3216 - Standard for Blockchain Service Capability Evaluation

P3217 - Standard for Application Interface Specification for Blockchain Systems

P3218 - Standard for Using Blockchain for Carbon Trading Applications

P3219 - Standard for Blockchain-based Zero-Trust Framework for Internet of Things (IoT)

P3220 - Guide for the Application of Non-Fungible Token (NFT) Based Digital Asset

P3221 - Standard for Technical Requirements of Digital Collection Services Based on Blockchain Technologies

P3222 - Standard for the Reference Architecture of Blockchain as a Service

P3223 - Standard for the Reference Architecture of Blockchain Fusion Server

P3224 - Standard for Blockchain-based Green Power Identification Application

P3225 - Standard for Using Blockchain in Low Carbon Zones Evaluation

P3226 - Standard for Trusted Data Circulation based on Blockchain and Distributed Ledger Technologies (DLT)

P3228 - Standard for the Recurring Transactions Using Distributed Ledger Technologies (DLTs)

P3800 - Standard for a data-trading system: overview, terminology and reference model

P3802 - Standard for Application Technical Specification of Blockchain-based E-Commerce Transaction Evidence Collection

P3803 - Standard for Household Appliance Customer Data Assetization and Commercialization Requirements
P3806 - Standard for Blockchain-based Hepatobiliary Disease Data Extraction and Exchange

P2147.1 - Standard for Requirements of Integrated Consortium Chain Station

P3807 - Standard for Consortium Chain Certificate Application

P3808 - Standard for Consortium Chain Traceability Application

P3809 - Standard for Technical Specification of Blockchain-based Electronic Bidding

P3811 - Standard for Security Service Specifications for DLT-based Supply Chain Finance

P3812.2 - Standard for Data Access Management for Identity Relationships

P3813 - Standard for General Framework and Technical Requirements for an Industrial Digital Asset Trading Platform

P3814 - Standard for Carbon Asset Trading Mechanism and Technical Requirements

P3818 - Standard for Technical Requirements of Blockchain-based Data Management for Medical Service

P3817 - Standard for Natural Gas Market Knowledge Graphs

P3812.3 - Standard for Decentralized/Disintermediation Identity Framework Based on Distributed Ledger Technology (DLT)

P3813 - Standard for General Framework and Technical Requirements for an Industrial Digital Asset Trading Platform

P3814 - Standard for Carbon Asset Trading Mechanism and Technical Requirements

P3818 - Standard for Technical Requirements of Blockchain-based Data Management for Medical Service

P3817 - Standard for Natural Gas Market Knowledge Graphs

P3812.3 - Standard for Decentralized/Disintermediation Identity Framework Based on Distributed Ledger Technology (DLT) blockchain / time_chain

P3815 - Standard for Layer 2 Framework for Blockchain and Distributed Ledger Technologies (DLT)

P3816 - Standard for Internet of Rights (IOR): Overview and Architecture

P3819 - Standard for Metaverse Financial System - Reference Architecture and Technical Requirements

P3816 - Standard for Internet of Rights (IOR): Overview and Architecture

P3819 - Standard for Metaverse Financial System - Reference Architecture and Technical Requirements

P3821 - Standard for Framework of Digital Intelligent Comprehensive Energy Service Station Management Systems

P3820 - Standard for Explainability Capability Evaluation of Anti-Fraud Artificial intelligence (AI) Systems

P3215 - Standard for Consensus Framework for Blockchain System

P3127 - Guide for an Architectural Framework for Blockchain-based Federated Machine Learning

P3227 - Standard for a Reference Framework of Data Security Circulation System Based on Blockchain and Federated Computation

P3229 - Guide for Industrial Software Application Based on Blockchain

P3230 - Standard for Blockchain based Power System Demand Response Technical Specification

P3231 - Standard for a Blockchain-based Energy Metaverse Application Model, Framework, and Requirements

P3232 - Standard for Blockchain-based Renewable Energy Certificates Trading Technical Specifications

P3227.1 - System Technical Requirements for Risk Assessment of On-chain Digital Content

P3233 - Standard for Blockchain-Based Decentralized Storage Protocol Specification

IEEE Blockchain Conformity Assessment Program

K% RULE: Economist Milton Friedman predicted the rise of a computer capable of automatically adjusting the inflation rate of money. is the monetarist proposal that the money supply should be increased by the central bank by a constant percentage rate every year, irrespective of business cycles.

KRYPTON: Ethereum based smart contract platform [LINK](http://krypton.rocks) <http://krypton.rocks>
KONG API MANAGEMENT: Application Program Interface scalable, open source API Layer (API Gateway, or API Middleware). Kong runs in front of any RESTful API and is extended through Plugins, which provide extra functionalities and services beyond the core platform. Kong was originally built at Mashape to secure, manage and extend over 15,000 APIs & Microservices for its API Marketplace [LINK](https://getkong.org/about/) <https://getkong.org/about/>

Law of Time dot org: 13 MOONS OF PEACE Math:

The 13 Moon calendar is a solar-galactic cycle that meshes the 365-day third-dimensional solar cycle with the 260-day fourth-dimensional galactic cycle (Tzolkin) every 52 years. The 365-day orbit of Earth around the Sun naturally divides into thirteen 28-day sequences ($13 \times 28 = 364$) which correspond to the thirteen lunations occurring during one solar year, plus one extra day, July 25, the Day Out of Time, a day to practice time is art and peace through culture. Its daily use helps entrain the mind into the threshold of galactic consciousness. The 13 Moon/28-day calendar embraces and synchronizes all true calendrical and mathematical systems, from lunar calendars, to the Mayan long count, to the Elder Futhark runes, to the I Ching hexagrams. This system reveals a master matrix, containing all other systems. The Gregorian calendar has little cyclic or periodic order. Months are uneven; length of months does not correlate with number of seven-day weeks, and numbers change every month. [Law of Time](https://lawoftime.org/education/) <https://lawoftime.org/education/>

"One people, one Earth, one Time": "The times we are living in require higher thinking. There has never in the history of the Earth been a time like this. We are now participating in what is called the biosphere-noosphere transition. "Only by lifting our minds to planetary consciousness and beyond can we realize solutions to the multiple challenges facing our planet today. With a new consciousness we can effectively educate and mobilize humanity to an unprecedented level of creative problem solving and realize a positive future." Source: <http://lawoftime.org>

LAW OF TIME Book of the Cube Time Cube Matrix Cosmic Calendar Law of Time dot org – see math behind the Earth – Moon – Sun cyclic math based repeating patterns.

LIBRARY of ALEXANDRA (The Distributed Blockchain Library) [LINK](#)

LITTLE LEAGUE BASEBALL TOURNAMENT / GAME OF BASEBALL RULES
See Baseball Rules: http://mlb.mlb.com/mlb/official_info/official_rules/official_rules.jsp

Luxor Egypt: "the shortest path to the knowledge of truth is nature"

mBridge cross border CBDC payments, fragmentation of payments solution. A key driver is geopolitics and the use of Swift for sanctions. Countries that fear they could be next have started looking for alternatives. Technology isn't necessarily the driver of fragmentation but is an enabler. Some envisage the cross border CBDC [project mBridge](#) as one of the platforms that could break Swift's stranglehold over cross border payments. **Launching in mid-2024 with a minimum viable product, mBridge** involves the Bank for International Settlements (BIS) and the central banks of China, Hong Kong, Thailand and the UAE.

MEDICI Stock Exchange Blockchain "Medici," Goal: democratize Wall Street
[LINK http://wired.com/2014/10/overstock-com-assembles-coders-build-bitcoin-like-stock-market/](http://wired.com/2014/10/overstock-com-assembles-coders-build-bitcoin-like-stock-market/)

MICROSOFT Azure Blockchain as a Service (BaaS): Project Bletchley is a vision for Microsoft to deliver Blockchain as a Service (BaaS) that is open and flexible for all platforms, partners and customers. Source: <https://azure.microsoft.com/en-us/blog/bletchley-blockchain/> Project Bletchley common themes:

- Platform openness requirement.
- Identity, key management, privacy, security, operations management, interoperability
- Consortium / Federation blockchains, permissioned networks for contracts,
- Fabric for blockchain, serving as cloud platform for distributed applications

Middleton, Reggie Patents: US11196566, US11895246, JP6813477

Invented Decentralized Finance - Owner of most powerful patented IP in the FinTech Industry. Patent US11196566, US11895246, JP6813477, JP7204231

Japanese Patent Office Patent Grant May of 2014 Reggie Middleton filed multiple applications in peer-to-peer, zero trust value transfer (back then based on Bitcoin blockchain). On October 16th 2020 the Japan Patent Office (JPO) granted Reggie Middleton the patent "An apparatus, system, or method that facilitates the transfer of value between parties with low or no confidence", Mr. Middleton developed a P2P digital currency swap application utilizing his IP, placing Mr. Middleton as the pioneer and creator of DeFi (Decentralized Finance) in the cryptocurrency markets.

Milton Friedman's K% rule as an "economic heartbeat".

K-Percent Rule DEFINITION: The K-Percent Rule proposal by economist Milton Friedman was the central bank should increase the money supply by a constant percentage every year. The K-Percent Rule proposes to set the money supply growth / reduction at a rate equal to the growth of real GDP each year. K-Percent Rule

Milton Friedman's K% rule is a GDP Gross Domestic Product economic heartbeat, a GDP pulse. Apply a Quantum Random Number Beacon QRNB for non-repudiation at

any location / time in the future = basis for a one world economic system of systems unit of value statistical mean value index for a Federal FEDCOIN, World Coin. Milton Friedman was a Nobel Prize winning Economist
Investopedia <http://www.investopedia.com/terms/k/k-percent-rule.asp>

MIT Massachusetts Institute of Technology Digital Currency Initiative

MONEYBALL: The Art of Winning in an Unfair Game Book

Moneyball: The Art of Winning an Unfair Game is a book by Michael Lewis is about the Oakland Athletics baseball team and its general manager Billy Beane.

<http://en.wikipedia.org/wiki/Moneyball>

<https://datascience.berkeley.edu/moneyball-book-review/>

MONEYBALL ECONOMICS: Sabermetrics, or Moneyball, is the practice of crunching data in an effort to build a stronger and smarter team without needing to go after the rock stars of the sport who may cost a team millions. This method holds that the skill of individual players isn't what makes or breaks a team; in the long run, the goal is to make sure that each necessary skill is accounted for, whether by one player or four. The team will work like a clock, with each cog serving its own purpose (no matter how hopeless they may be at another area).. crafting a team while staying within a meager budget.

NAMED DATA NETWORKING NDN NEXT GENERATION INTERNET: Named-data networking focus is on content caching to reduce congestion and improve delivery speed, simpler configuration of network devices, and building security into the network at the data level. Types of Packets: Communication in NDN is driven by receivers i.e., data consumers, through the exchange of two types of packets: Interest and Data. Both types of packets carry a name that identifies a piece of data transmitted in one Data packet. Overview of the Packet Contents for NDN Packet: NAMED DATA NETWORK INTEREST: A consumer puts name of a desired piece of data into an Interest packet and sends it to network. Routers use name to forward Interest query toward data producer(s). Data: Once Interest packet reaches a node that has the requested data, the node will return a Data packet that contains both the name and the content, together with a signature by the producer's key which binds the two. This Data packet follows in reverse the path taken by requesting consumer's interest. NDN Distance packet.

NATO / DoD SYSTEM OF SYSTEMS ENGINEERING REUSE: DoD - NATO has invested decades of mapping OPSCODE brevity codes to symbology / symbols / symbol sets contained in three hundred 300 plus message set / use cases as part of Battlefield digitization, Net Centric Warfare NET Enabled Operations NEO NETOPS system of systems engineering. Blockchain, Digital Ledger Technology DLT crypto currency developers are recreating, reinventing this decades old, tedious, time intensive, labor intensive, expensive structured data exchange wheel with every new meme, metaphor. Crypto currency economics needs a universal syntax lexicon digital base Artificial Intelligence A.I., quantum blockchain heartbeat beacon to synchronize, sample tokenized commodities across a stochastically harmonized UTZ Universal Time Zone using the firefly-heartbeat algorithm and Princeton University Mathematician John Nash's Equilibrium algorithms NATO bases are small cities that transact most goods,

commodities with the host nation. Why reinvent the syntax lexicon Rosetta Stone wheel? Reuse: system of systems tool to accelerate an EIN Earth Intelligence Net – see Project #UNRIG by Robert David Steele

NET CENTRIC OPERATIONS / NET ENABLED OPERATIONS NEO

See: https://en.wikipedia.org/wiki/Network-centric_warfare See: <http://ncoic.org>

To determine if a organization - squad or platoon was mission capable or where it was supposed to be and equipped with the requisite resources: food, water, fuel, ammo etc. data is sampled and forwarded using a minimum of network resources e.g., time frames, intervals, epochs allocated for specific purposes. The Internet Protocol was examined closely and it was re-discovered that time interval frame assignments were left unassigned / available by internet creators (Stanford U etc.) to transport additional state meta data at some future date when a need arose. These heretofore unassigned time intervals set aside for future use would be used to carry data about the organization – the unit designation or Organizational Identifier <Org_ID>, geo-location at specified times and its resources <URN> Uniform Resource Name. Deriving common building blocks from JBFSA which are the common building blocks (heartbeat and </108< heartbeat messages intrinsic to financial and First Response Systems. USPTO 13/573,002 is based upon and applies improvements to United States Army Communication Electronic Command CECOM's greatest invention Blue Force Tracker.

National Information Exchange Model NIEM: connects communities of people who share a common need to exchange information in order to advance their missions. [LINK](#)

“Nature may reach the same result in many ways. Like a wave in the physical world, in the infinite ocean of the medium which pervades all, so in the world of organisms, in life, an impulse started proceeds onward, at times, may be, with the speed of light, at times, again, so slowly that for ages and ages it seems to stay, passing through processes of a complexity inconceivable to men, but in all its forms, in all its stages, its energy ever and ever integrally present. A single ray of light from a distant star falling upon the eye of a tyrant in bygone times may have altered the course of his life, may have changed the destiny of nations, may have transformed the surface of the globe, so intricate, so inconceivably complex are the processes in Nature. In no way can we get such an overwhelming idea of the grandeur of Nature than when we consider, that in accordance with the law of the conservation of energy, throughout the Infinite, the forces are in a perfect balance, and hence the energy of a single thought may determine the motion of a universe.” — Nikola Tesla

NXT FOUNDATION: Nxt revolutionizes the financial technology, crowdfunding and governance industries by providing not only the groundbreaking NXT crypto-currency, but also a powerful, modular toolset to build with in any way Nxt users can imagine. Nxt gives users complete freedom to create their own applications.

<http://blockchainwizards.com/nxtfoundation/>

OPEN LEDGER: Smart #Bitcoins backed w real world collateral: decentralized exchange #blockchain. Graphene real-time blockchain technology, options:

1. Create new currency as User Issued Asset. revenue generating asset of Open Ledger using decentralized platform called OBITS. [LINK](#)
2. Create a Market Pegged Asset for coin: allow trading only in certain market pairs. Define who is allowed to hold coin by using white- and blacklists. Issuer can opt-out of his privileges indefinitely for the sake of trust and reputation.
3. BitTeaser is powered by a digital token with the abbreviation “BTSR”. The network infrastructure allows users to earn tokens by blogging, selling ads, and being active community members. [LINK](#) <http://ccedk.com/dc/btsr>
4. ICO Crowd Funding Economic Enterprise Engine – Crowdfunding 3.0: official form of payment used to pay for any startup services offered by CCEDK, investment with revenue streams from payments and fees, token offering real return over time, Token and investment with an exit ex: sell ICO token at level 1 ICO price until final launch. Fund buy back, burning process reducing overall supply allowing a growth in value of remaining funds over time

Object Management Group's (OMG) Data Distribution Service for Real-Time Systems (DDS) is an open middleware standard that enables scalable, real-time, dependable, high performance and interoperable data exchanges between publishers and subscribers. DDS is brokerless and provides abstraction of a virtual Global Data Space, a ubiquitous, universal and fully distributed data cache. DDS provides a standard API as a interoperable wire protocol.

OPCODE: TURING COMPLETE SCRIPTING LANGUAGE: In computing, an opcode (abbreviated from operation code) is the portion of a machine language instruction that specifies the operation to be performed. Beside the opcode itself, instructions usually specify the data they will process, in form of operands.

<https://en.wikipedia.org/wiki/Opcode>

Open Financial Exchange (OFX) is a [data-stream format](#) for exchanging [financial](#) information

Secrets of Synchronization / Particle - wave duality (#quantum) firefly pair coupling to synchronize across time - space via firefly-heartbeat algorithm for stochastic harmonization, UTZ synchronization @ 8:10: <https://youtu.be/t- VPRCtiUg?t=490>

Open Telemetry OTEL: Observability has made it possible for both developers and operators to gain that visibility into their systems. In order to make a system observable, it must be instrumented. That is, the code must emit traces, metrics, and logs. The instrumented data must then be sent to an Observability back-end.

OpenTracing vendor-neutral API for sending telemetry data to an Observability back-end; it relied on developers to implement their own libraries to meet the specification.

OpenCensus provided a set of language-specific libraries that developers could use to instrument their code and send to any one of their supported back-ends.

- single, vendor-agnostic instrumentation library per language with support for both automatic and manual instrumentation.
- single vendor-neutral collector binary that can be deployed in a variety of ways.
- generate, emit, collect, process, export telemetry data end-to-end.
- control of data with the ability to send data to multiple destinations in parallel through (workflow rules) configuration.
- Open-standard semantic conventions to ensure vendor-agnostic data collection
- ability to support multiple context propagation formats in parallel to assist with migrating as standards evolve.

OpenTelemetry main components:/ Cross-language specification

Tools to collect, transform, and export telemetry data/ Per-language SDKs Automatic instrumentation and contrib packages

OpenTelemetry Collector is a vendor-agnostic proxy that receives, processes, and exports telemetry data. It supports receiving telemetry data in multiple formats (e.g., OTLP, Jaeger, Prometheus, as well as many commercial/proprietary tools) and sending data to one or more backends. It supports processing, filtering telemetry data before export. Collector contrib packages bring support for data formats and vendor backends

Open Telemetry Signals:

- Traces: Traces: big picture of what happens when a request (s) is / are made
- Metrics: A metric is a measurement about a service, captured at runtime.
- Logs: A log is a timestamped text record, either structured (recommended) or unstructured, with metadata.
- Baggage: Baggage refers to contextual information that's passed between spans

OpenTelemetry main components: Cross-language specification: Tools to collect, transform, and export telemetry data/ Per-language SDKs Automatic instrumentation and contrib packages. OpenTelemetry lets you replace the need for vendor-specific SDKs and tools for generating and exporting telemetry data. Data: Defines the OpenTelemetry Protocol (OTLP) and vendor-agnostic semantic conventions

Collector: The OpenTelemetry Collector is a vendor-agnostic proxy that can receive, process, and export telemetry data. It supports receiving telemetry data in multiple formats (e.g., OTLP, Jaeger, Prometheus, as well as many commercial/proprietary tools) and sending data to one or more backends. It also supports processing and

filtering telemetry data before it gets exported. Collector contrib packages bring support for more data formats and vendor backends. For more information, see Data Collection.

Open Telemetry Language SDKs: language SDKs to use the OpenTelemetry API to generate telemetry data with your language of choice and export that data to a preferred data backend. These SDKs incorporate automatic instrumentation for common libraries and frameworks used to connect to manual instrumentation in your application.

OPEN TELEMETRY Automatic Instrumentation: a broad number of components that generate relevant telemetry data from popular libraries and frameworks for supported languages. For example, inbound and outbound HTTP requests from an HTTP library will generate data about those requests. Using automatic instrumentation may differ from language to language, where one might prefer or require the use of a component that you load alongside your application, and another might prefer that you pull in a package explicitly in your codebase. It is a long-term goal that popular libraries are authored to be observable out of the box, such that pulling in a separate component is not required. SOURCE: <https://opentelemetry.io/docs/reference/specification/>

OPERAND PROGRAMMABLE MONEY: Operand - “In mathematics, an operand is the object of a mathematical operation, a quantity on which an operation is performed.” “In computing, an operand is the part of a computer instruction that specifies what data is to be manipulated or operated on, while at the same time representing the data itself.”

In Operand, the transactional unit carries the execution methods and parameters that apply to the units of currency involved for that transaction. Operand is programmable money that brings the utility of everyday banking features to the unbanked and underbanked and empowers their adoption through the automata of the Operand protocol. Operand is a currency that functions as a seamless and embedded economic layer on the web that serves as the technological underlay for payments, decentralized exchange, digital asset invocation and transfer, and smart contract issuance and execution. By embedding the instruction set of the transaction into the transaction metadata, the blockchain itself serves as the interpreter for programmed transactions. Operand creates utilities such as direct debit payments or even standing orders. Operand is trustless and non-retractable whilst being fully accountable and transparent on the public ledger. The programmable aspect enables further security on every transaction as the clients must reach network consensus on the method of execution. Smart contracts can then be forged on all aspects of exchange.

[LINK](http://operand.money) Page: <http://operand.money>

PAUL REVERE LINEAR-SEQUENTIAL MEME

The Paul Revere linear-sequential meme – metaphor is a physical, historical meme used instead of an abstract metaphor that the internet uses called TCP/IP “hop counts”.

Hop Counts: (123): Hops are linear and sequential referring to applicant's Paul Revere

meme (126). Hops are described / defined from null as a condition / state: stationary, inactive. Hops are changes in location from point a to point b to point n. Hops follow a base running paradigm in the main embodiment (131) and are referential to TCP/IP in embodiment 1. Hops are counted incrementally where hops are changes in location e.g., home plate to first, second, and third base and back to home base (131). Hop metrics are incremental changes from null 0,1,2,3,4 - N (126) that may be positive or negative values. Hop counts are used to equitably meter, measure and derive performance or effectiveness metrics, meters.

Time stamps (112) form time frames, temporally bound hops e.g., in time and space. Erlang logic is useful in establishing time boundaries and time limits among geo-spatially disperse events. Time filtered and spatially metered reports are comprised of state meta-data snapshot / heartbeat message / sync delta messages where state meta data is harvested during micro-cycles then posted / displayed during longer macro-cycles. Time filtered and spatially metered reports are comprised of state meta-data snapshot / heartbeat message / sync delta messages where state meta data is harvested during micro-cycles then posted / displayed during longer macro-cycles.

Pneumatic computer uses pressure instead of electricity:

A computer chip made of glass and silicone holds liquids that move from one side of the chip to the other in reaction to pressure changes. This has been used to control and automate miniaturized biochemistry experiments A pneumatic computer made of glass and silicone uses pressure instead of electricity to encode data. It can enable a chip-sized device to perform procedures that are usually done by technicians in labs. They sandwiched a sheet of silicone 0.25 millimeters thick between two thin panes of glass. They etched tiny channels into the glass so that liquids needed for chemical reactions could flow through them, and then punched small holes into the silicone layer to connect channels between the two panes. Karmela Padavic-Callaghan 2 June 2023

Price Discovery Patent Application: 0160358256 [0056] In accordance with an example embodiment of the present invention, the amount of an investment required from a speculator is calculated by executing the following cost of speculation equation: $V \cdot \int_{t_0}^T g(\log(P) - \log(\Delta P)) / R dt$. The variables for the cost of speculation equation are as follows: P represents a variable of price, P(t) is a variable function of price over time in a given market, ΔP represent a speculative price function. P(t) can mathematically represent the future prices as functions of price over time. The function value of R(t) is a predetermined value for the rate of return. For example, for R(t), the value can be 100% annualized so for a t in years $R(1)=2$, $R(2)=4$ and $R(0.5)=1.414$, but as would be appreciated by one skilled in the art, any function is possible. The value for V(t) at any given time is the expected value to the market (e.g., volume of goods to trade multiplied by the market commission) The value for V(t) can be updated empirically as the commodities market functions by calculation as a moving average of volume times the markets total transactional overhead charge. Source / Attributed to: Noah Healy Data Scientist at Castle Hill Gaming strategic design for (commodity) markets drastically lowering transaction costs while increasing returns for informed

speculators to launch a global economic boom. Price discovery method and means:
Source: <https://tinyurl.com/4w4m359h>

PROJECT BEACON: Reuse NATO's system of systems syntax lexicon OPSCODE brevity code structured data exchange, heartbeat micro to macro cycle Universal Time Zone UTZ sync to support an EIN Earth Intelligence Network neural net emulation. Support Beacon Communities with an open-source Earth Intelligence Network EIN integrated with NIST's QRNB quantum random number beacon blockchain for event, transaction non-repudiation at any place – time in the future .

PROJECT BEACON METHOD: A snapshot or sync delta value taken at a predetermined time interval (micro-cycle to macro cycle) is used to calculate a statistical mean value of commodities comprising a GDP index used as a value index nation's / world's unit of value as the basis for valuating a currency unit of exchange.

Paul Revere's ride as an analog to hop by hop, hop count metrics for quantum dots comprising quantum circuits

Science Alert: <https://www.sciencealert.com/a-huge-step-forward-in-quantum-computing-was-just-announced-the-first-ever-quantum-circuit>

QUANTUM COMPUTING / USPTO 13/573,002 The Heart Beacon Cycle Time - Space Meter is descriptive to the quantum computing level and SCOTUS Alice in Wonderland Alice Corp Vs CLS Bank ruling... waves (USPTO 13/573,002 water drop in pond meme) single photon shifts (USPTO 13/573,002 Paul Revere meme).

Quantum BIG Bell Test: In 2015, NIST BOULDER | Colorado was one of the first groups to carry out a complete test of Bell theorem using quantum states of light, and conclusively show the presence of Einstein's "spooky action." However, in that experiment the decisions about how to carry out the measurements were made by random numbers generated from different physical processes. <https://thebigbelltest.org/team/nist-boulder/>

Quantum annealing starts from a quantum-mechanical superposition of all possible states (candidate states) with equal weights. Then the system evolves following the time-dependent [Schrödinger equation](#), a natural quantum-mechanical evolution of physical systems. The amplitudes of all candidate states keep changing, realizing a quantum parallelism, according to the time-dependent strength of the transverse field, which causes quantum tunneling between states. If the rate of change of the transverse field is slow enough, the system stays close to the ground state of the instantaneous Hamiltonian (also see [adiabatic quantum computation](#)).^[6] If the rate of change of the transverse field is accelerated, the system may leave the ground state temporarily but produce a higher likelihood of concluding in the ground state of the final problem Hamiltonian, i.e., diabatic quantum computation.^{[7][8]} The transverse field is finally switched off, and the system is expected to have reached the ground state of the classical [Ising model](#) that corresponds to the solution to the original optimization problem. An experimental demonstration of the success of quantum annealing for random magnets was reported immediately after the initial theoretical proposal.^[9]

Quantum computing based on waves at room temperature Vs particles in a liquid nitrogen cooled chamber given energy required to keep the environment near absolute zero with liquid nitrogen. Use of light waves at room temperature = more ecologically sustainable, more accurate quantum computing given less challenge to synchronize, stochastically harmonize quantum computing sites over UTZ Universal Time Zone as a basis for programming, computing programmable money / programmable economy. Quantum computing: particle or wave? Why pursue / choose particle detection at 0 degrees Kelvin over (electro-magnetic) waves ("wave-packets") at room temperature given Heisenberg's uncertainty principle? This has profound implications for space - time, stock, commodity market data = our world. Science News Army Research Laboratory Article on quantum computing at room temperature: <https://www.sciencedaily.com/releases/2020/05/200501184307.htm>

Quantum "Schroedinger's equation at it's heart describes energy and looks similar to describing the action of waves in water" so, if an (observed) event can appear as a particle or a diffusion pattern in a wave, why not use diffusion patterns in waves at room temperatures Vs liquid cooled silicon computer chips chilled to near absolute zero for efficiencies in energy and accuracy at different temperature zones / elevations given temperature drops every 1000 meters / feet in altitude? Source: Einstein's nightmare: <https://youtu.be/-hxIjpxTaiA?t=211>

QUANTUM COMPUTING STOCK / COMMODITY MARKETS USE CASE: given: other than the ubiquitous </108> {"108"} heartbeat message sending start, stop, TTL Time To Live commands to algorithmic HFT trade to master controllers, how will stock, commodity, crypto etc. markets be mitigated, moderated among the quantum computing haves / have nots? How will market trade sessions be mitigated, moderated among quantum haves and have nots? i.e., QCCS Quantum Computing Control System <https://tinyurl.com/e4h5wxk>

QEC IEEE Article: Quantum Computing Error Correct QEC is getting practical February 25th 2021: Quantum Error Correction QEC, in combination with the theory of fault-tolerant quantum computing, suggests that engineers can in principle build an arbitrarily large quantum computer that if operated correctly would be capable of arbitrarily long computations. This would be a stunningly powerful achievement. The prospect that it can be realized underpins the entire field of quantum computer science: Replace all quantum computing hardware with "logical" qubits running QEC, and even the most complex algorithms come into reach. For instance, Shor's algorithm could be deployed to render Bitcoin insecure with just a few thousand error-corrected logical qubits. LINK: <https://spectrum.ieee.org/tech-talk/computing/hardware/quantum-computer-error-correction-is-getting-practical>

QFS Quantum Financial System ground station data center in Las Vegas Nevada to my knowledge does not make use of the Department of Commerce's NIST National Institute of Science and Technology's QRNB Quantum Random Number Beacon. Crypto currencies need to be quantum computing based rather than simply quantum resistant and use light waves at room temperature Vs particle detection given the particle - wave duality twin slot phenomenon using liquid nitrogen for Ecological energy

consumption and economic (less energy, less expensive) efficiencies. In other words, a quantum computing, quantum financial system for the 99 %

Quantum Computing Quantum Circuit Quantum dots metrics

Quantum Computing Science Alert: The latest invention follows the team's creation of the first ever quantum transistor in 2012. (A transistor is a small device that controls electronic signals and forms just one part of a computer circuit. An integrated circuit is more complex as it puts lots of transistors together.) To make this leap in quantum computing, the researchers used a scanning tunneling microscope in an ultra-high vacuum to place quantum dots with sub-nanometer precision. The placement of each quantum dot needed to be just right so the circuit could mimic how electrons hop along a string of single- and double-bonded carbons in a polyacetylene molecule. Relevance:

QRNB: QUANTUM RANDOM NUMBER BEACON NIST: uses two independent sources of randomness, each with an independent hardware entropy source and SP 800-90-approved components. The Beacon is designed to provide unpredictability, autonomy, and consistency. Unpredictability means that users cannot algorithmically predict bits before they are made available by the source. Autonomy means that the source is resistant to attempts by outside parties to alter the distribution of the random bits. Consistency means that a set of users can access the source all receiving the same random string. The Beacon broadcasts full-entropy bit-strings in blocks of 512 bits every 60 seconds. Each value is time-stamped and signed and includes the hash of the previous value to chain the sequence of values together. This prevents all, even the source, from retroactively changing an output packet without being detected. The beacon keeps all output packets and makes them available online. The Beacon periodically outputs a pulse containing 512 fresh random bits, time-stamped, signed and hash-chained. For example, each pulse also pre-commits to the randomness to be released in the next pulse. The latter enables users to securely combine randomness from different beacons. The Beacon protocol also specifies the interface for users to interact with the Beacon, in order to obtain information about past pulses. A randomness beacon produces timed outputs of fresh public randomness. Each output, called a pulse, includes metadata / cryptographic elements. The main goal of the NIST Random # Beacon is to serve as a baseline for deployment of many interoperable beacons NIST: http://nist.gov/itl/csd/ct/nist_beacon.cfm

Quantum Random Number Generator QRNB: The NIST method generates digital bits (1s and 0s) with photons, or particles of light, using data generated in an improved version of a landmark [2015 NIST physics experiment](#). That experiment showed conclusively that what Einstein derided as "[spooky action at a distance](#)" is real. Researchers process the spooky output to certify and quantify the [randomness](#) available in the data and generate a string of more random bits. [LINK](#)

QRNB Quantum Random Number Beacon Non repudiation: The QRNB provides a method and means to prevent repudiation of any event, transaction at any point in time – space. QRNB intent is to be interoperable with other QRNB's, therefore, this Max Planck Institute / Announcement is germane to a discussion of a one world government / one world economic system of systems: distributed quantum computers – will need

(UTZ Universal Time Zone) stochastic harmonization. "Our work provides a pathway towards extreme mechanical nonlinearities, and towards quantum devices that use mechanical resonators as qubits" <https://www.nature.com/articles/s41534-021-00393-3>

QUANTUM COMPUTING VIA Sound Waves QUANTUM ACOUSTICS

Good vibrations for quantum computing Amy Navarathna & Warwick P. Bowen

Similar to the photons that make up beams of light, indivisible quantum particles called phonons make up a beam of sound. These particles emerge from the collective motion of quadrillions of atoms, much as a "stadium wave" in a sports arena is due to the motion of thousands of individual fans. When you listen to a song, you're hearing a stream of these very small quantum particles. Originally conceived to explain the heat capacities of solids, phonons are predicted to obey the same rules of quantum mechanics as photons. The technology to generate and detect individual phonons has, however, lagged behind that for photons. Technology being developed, in part by my research group at the Pritzker School of Molecular Engineering at the University of Chicago. We are exploring the fundamental quantum properties of sound by splitting phonons in half and entangling them together. [Nature Physics volume 18, pages736–738 \(2022\)](https://www.nature.com/articles/s41567-022-01613-z) <https://www.nature.com/articles/s41567-022-01613-z>

Sound waves let quantum systems ‘talk’ to one another University of Chicago: Breakthrough could advance quantum sensors, computing and communication

Researchers at the University of Chicago and Argonne National Laboratory have invented an innovative way for different types of quantum technology to “talk” to each other using sound. The study, published Feb. 11 in *Nature Physics*, is an important step in bringing quantum technology closer to reality. Researchers are eyeing quantum systems, which tap the quirky behavior of the smallest particles as the key to a fundamentally new generation of atomic-scale electronics for computation and communication. But a persistent challenge has been transferring information between different types of technology, such as quantum memories and quantum processors.

“We approached this question by asking: Can we manipulate and connect quantum states of matter with sound waves?” said senior study author David Awschalom, the Liew Family Professor with the Institute for Molecular Engineering and senior scientist at Argonne National Laboratory. One way to run a quantum computing operation is to use “spins”—a property of an electron that can be up, down or both. Scientists can use these like zeroes and ones in today’s binary computer programming language. But getting this information elsewhere requires a translator, and scientists thought sound waves could help. “The object is to couple the sound waves with the spins of electrons in the material,” said graduate student Samuel Whiteley, the co-first author on the paper. “But the first challenge is to get the spins to pay attention.” So they built a system with curved electrodes to concentrate the sound waves, like using a magnifying lens to focus a point of light. The results were promising, but they needed more data. To get a better look at what was happening, they worked with scientists at the Center for

Nanoscale Materials at Argonne to observe the system in real time. Essentially, they used extremely bright, powerful X-rays from the lab's giant synchrotron, the Advanced Photon Source, as a microscope to peer at the atoms inside the material as the sound waves moved through it at nearly 7,000 kilometers per second.

"This new method allows us to observe the atomic dynamics and structure in quantum materials at extremely small length scales," said Awschalom. "This is one of only a few locations worldwide with the instrumentation to directly watch atoms move in a lattice as sound waves pass through them." One of the many surprising results, the researchers said, was that the quantum effects of sound waves were more complicated than they'd first imagined. To build a comprehensive theory behind what they were observing at the subatomic level, they turned to Prof. Giulia Galli, the Liew Family Professor at the IME and a senior scientist at Argonne. Modeling the system involves marshalling the interactions of every single particle in the system, which grows exponentially, Awschalom said, "but Professor Galli is a world expert in taking this kind of challenging problem and interpreting the underlying physics, which allowed us to further improve the system." It's normally difficult to send quantum information for more than a few microns, said Whiteley—that's the width of a single strand of spider silk. This technique could extend control across an entire chip or wafer.

"The results gave us new ways to control our systems, and opens venues of research and technological applications such as quantum sensing," said postdoctoral researcher Gary Wolfowicz, the other co-first author of the study. The discovery is another from the University of Chicago's world-leading program in quantum information science and engineering; Awschalom is currently leading a project to build a quantum "teleportation" network between Argonne and Fermi National Accelerator Laboratory to test principles for a potentially unhackable communications system. The scientists pointed to the confluence of expertise, resources and facilities at the University of Chicago, Institute for Molecular Engineering and Argonne as key to fully exploring the technology.

Funding: Air Force Office of Scientific Research, U.S. Department of Energy Office of Basic Energy Sciences, National Science Foundation, Department of Defense

University of Chicago: <https://news.uchicago.edu/story/sound-waves-let-quantum-systems-talk-one-another>

Citation: "Spin-phonon interactions in silicon carbide addressed by Gaussian acoustics." Whiteley et al., Nature Physics, Feb. 11, 2019. doi: [10.1038/s41567-019-0420-0](https://doi.org/10.1038/s41567-019-0420-0)

Spin-phonon interactions in silicon carbide addressed by Gaussian acoustics
Hybrid spin-mechanical systems provide a platform for integrating quantum registers and transducers. Efficient creation and control of such systems require a comprehensive understanding of the individual spin and mechanical components as well as their mutual interactions. Point defects in silicon carbide (SiC) offer long-lived, optically addressable spin registers in a wafer-scale material. Here, we show Gaussian focusing of a surface acoustic wave in SiC, characterized using a stroboscopic X-ray diffraction imaging technique, which delivers

direct, strain amplitude information at nanoscale spatial resolution. Using ab initio calculations, we provide a more complete picture of spin-strain coupling for various defects in SiC with C₃v symmetry. This reveals the importance of shear strain for future device engineering and enhanced spin-mechanical coupling. We demonstrate all-optical detection of acoustic paramagnetic resonance without microwave magnetic fields, relevant for sensing applications. Finally, we show mechanically driven Autler-Townes splittings and magnetically forbidden Rabi oscillations. These results offer a basis for full strain control of three-level spin systems.

SOURCE: NATURE: <https://www.nature.com/articles/s41567-019-0420-0>

Quantum Computing Vibrations encode, process data like quantum computers. A simple mechanical system built from aluminum rods uses vibrations to encode information, mimicking quantum computing in a non-quantum system. Some properties of quantum computers can be imitated with sound trapped in a simple mechanical device. This has the advantage of being less fragile than quantum computers, while still replicating some of their properties. Quantum computers could eventually solve problems that are impossible for the best conventional supercomputers, but they are tricky to work with. Many lose their quantumness, which is key for their advantages over ordinary computers, and stop working very quickly because of disturbances from their environments. propose using tiny mechanical vibrations. The atoms are coupled via phonons—the smallest quantum mechanical units of vibrations or sound waves. / USPTO 13/573,002 water drop in pond meme

SOUND ACOUSTIC WAVES FOR QUANTUM INFORMATION PROCESSING

Acoustic system that gives us the possibility creating these Bell states," Deymier said. "It's the complete analog to quantum mechanics." Demonstrating that this is possible has opened the door to applying classical nonseparability to the emerging field of phononics. Next, the researchers will work to increase the number of degrees of freedom that can be classically entangled -- the more, the better. They also want to develop algorithms that can use these nonseparable states to manipulate information.

Once the system is refined, they plan to resize it from the tabletop down to the microscale, ready to deploy on computer chips in data centers around the world.

This work was supported by the W.M. Keck Foundation and the National Science Foundation Emerging Frontiers in Research and Innovation Program.

Source: Science Daily [University of Arizona College of Engineering](#)

<https://www.sciencedaily.com/releases/2019/09/190919142346.htm>

QUANTUM COMPUTING via acoustic waves at room temperature

Analog / digital computing origins are based on (electromagnetic - radio) waves as is energy transmission whether wired or wireless. Sound is an emerging quantum computing option for example: Sound of the future: A new analog to quantum computing: Engineers are using soundwaves to search through big data with more

stability and ease. Researchers have demonstrated the possibility for acoustic waves in a classical environment to do the work of quantum information processing without the time limitations and fragility. <https://lnkd.in/gbpStiqy> Date: September 19, 2019
Source: University of Arizona College of Engineering

Quantum Vibrations via Diamonds / Silicon atoms: "We are testing tiny diamonds with built-in silicon atoms—these quantum systems are particularly promising," says Professor Peter Rabl from TU Wien. "Normally, diamonds are made exclusively of carbon, but adding silicon atoms in certain places creates defects in the crystal lattice where quantum information can be stored." These microscopic flaws in the crystal lattice can be used like tiny switches that can be toggled between a state of higher energy and a state of lower energy using microwaves. Together with a team from Harvard University, Peter Rabl's research group has developed a new idea to achieve the targeted coupling of these quanta within the diamond. One by one, they can be built into a tiny diamond rod measuring only a few micrometers in length, like individual pearls on a necklace. Just like a tuning fork, this rod can then be made to vibrate—however, these vibrations are so small that they can only be described using quantum theory. It is through these vibrations that the silicon atoms can form a quantum-mechanical link to each other. "Light is made from photons, the quantum of light. In the same way, mechanical vibrations or sound waves can also be described in a quantum-mechanical manner. They are composed of phonons: the smallest possible units of mechanical vibration," explains Peter Rabl, any number of these quanta can be linked together in the diamond rod via phonons. The individual silicon atoms are switched on and off using microwaves. During this process, silicon atoms emit or absorb phonons. This creates a quantum entanglement of the silicon defects, thus allowing quantum information to be transferred. The main advantage of this new technology lies in its scalability. The strategy of using the smallest unit of mechanical vibration phonons for this purpose could pave the way to a scalable quantum technology. [Link:](https://phys.org/news/2018-06-quantum_1.html) https://phys.org/news/2018-06-quantum_1.html /

REACT JS Java script: facilitates building of stateful & reusable UI components uses a concept called the Virtual DOM Document Object Model that selectively renders subtrees of nodes based upon state changes [LINK](#)

RWA Real World Assets: The economy of imaginary wealth is being inevitably replaced by the economy of real and hard assets". President Vladimir Putin.

ROSETTA STONE SYNTAX LIBRARY LEXICON CODE GUIDE REGISTRY

The Rosetta Stone is a rock stele, found in 1799, inscribed with a decree issued at Memphis, Egypt, in 196 BC on behalf of King Ptolemy V. The decree appears in three scripts: the upper text is Ancient Egyptian hieroglyphs, the middle portion is Demotic script, and the lowest is Ancient Greek. Because it presents essentially the same text in all three scripts (with some minor differences among them), the stone provided the key to the modern understanding of Egyptian hieroglyphs. It was the first Ancient Egyptian bilingual text recovered in modern times, and it aroused widespread public interest with its potential to decipher this previously untranslated hieroglyphic language. Lithographic copies and plaster casts began circulating among European museums and scholars.

Rosetta Stone concept in context with this project: a common syntax library and ability to convert <tags> to YAML indents to binary XML to various other Message Text Formats MTF to enable universal signaling / telemetry among a system of systems is needed. Structured messaging will help accelerate the process of organizing syntax into categories and forming syntax from disparate systems into template libraries simply because numbers are universal – text and symbols less so. Structured military messaging involves identifying use cases as messages and message sets commonly used to accomplish tasks that are identified by number. Data elements or Field Form Identifiers Reference Numbers or FFIRNS and Field Unit Designators as three and four digit codes unambiguously identify the use of the data element in number forms. Three and four digit codes in turn refer to text descriptions referencing symbols in symbol libraries / databases. Messages are processed, parsed in - out of distributed database.

SATOSHI: The satoshi represents one hundred millionths of a bitcoin because bitcoin has increased in value exponentially, smaller denominations are needed to facilitate smaller transactions. Small denominations make bitcoin transactions easier to conduct and, can act as demurrage fees to for example, move real world assets / commodities from point a to point n within trade federations.

SCOP HEARTBEAT ADMINISTRATIVE INTERFACE TOOL: is an Internet configuration tool. SCOP can start/stop services, view/edit configuration files, make backups, take a server online/offline, add/remove virtual/real servers, adjusts Financial FIX </108> messages. See: FIX Financial Information Exchange messaging standard

SCOTUS ALICE CORP VS CLS BANK: This project describes how the internet and derivatively the internet of money works and is compliant with the Supreme Court's Alice Corp Vs CLS Bank 2014 ruling "claims may not direct towards abstract ideas". All internet Web 3.0 and programmable money efforts are incorrect and are moving away from interoperability as each internet, internet of money theme variation sprouts and propagates more and more non-existent memes, metaphors.

SCOTUS ALICE CORP VS CLS BANK compliance with the Supreme Court's Alice Corp Vs CLS Bank 2014 ruling "claims may not direct towards abstract ideas". All internet Web 3.0 and programmable money efforts are incorrect and are moving away from interoperability as each internet, internet of money theme variation propagates non-existent memes, metaphors each using their own terms, vernacular, syntax.

1. Department of Commerce - Treasury – NIST QRNB Quantum Random Number Beacon located in Boulder Colorado
2. NIST's QRNB intent is to be interoperable with other QRNB's, therefore, this Max Planck Institute / Announcement is germane to a discussion of a one world government / one world economic system of systems: distributed quantum computers – will need (UTZ Universal Time Zone) stochastic harmonization. "Our work provides a pathway towards extreme mechanical nonlinearities, and towards quantum devices that use mechanical resonators as qubits" <https://www.nature.com/articles/s41534-021-00393-3>

Science News Army Research Laboratory Article quantum computing at room temperature: <https://www.sciencedaily.com/releases/2020/05/200501184307.htm>

Space - Time Energy over distance SLA:

energy attenuates over distance. Shorter = closer = cheaper given less infrastructure, maintenance needed USPTO 13/573,002 energy metrics, meter claim [#energy](#) [#Haramein](#) [#Tesla](#) [#Bucky Fuller](#) [#SLA](#) [#space-time](#)

SPATIAL ECONOMETRICS:

- central place theory
- international trade theory
- location theory
- GIS data in economics, urban economics
- monocentric versus polycentric models in urban economics
- new economic geography
- systems of cities
- urban agglomeration, urban production externalities

See Dictionary of Economics [LINK](#)

http://dictionaryofeconomics.com/article?id=pde2008_S000195

STREAMING K ALGORITHM: streaming algorithms are algorithms for processing data streams in which the input is presented as a sequence of items and can be examined in only a few passes (typically just one). These algorithms have limited memory available to them (much less than the input size) and limited processing time per item. These constraints may mean that an algorithm produces an approximate answer based on a summary or "sketch" of the data stream in memory. [LINK](#):
https://en.wikipedia.org/wiki/Streaming_algorithm

Structured Data Exchange Military Message Text Format USMTF / XML MTF

FORMATTED MESSAGE CATALOG includes, describes in detail 300 + messages info exchange requirements using common, Message Text Formats MTFs. MTFs specify <CONTENT> / information agreed by group consensus presenting information in a logical, well specified and unambiguous layout resulting in a highly efficient information payload to overhead ratio. Thinking of the world's language, symbol and syntax differences along with coder's proclivity to design a different data </tag> {"tag"} convention with each new programming language, the use of NUMBERS as a universal method to unambiguously, consistently describe data transaction parameters is logical. See FIGURE 5: Code Syntax Lexicon, Message Template Library
See FIGURE 6: Structured Military Messaging / Data Rosetta Stone

Structured data system of systems engineering: military messaging identifies messages, message sets, data element fields BY NUMBER to improve the interoperability of Joint military systems. See MIL-STD-6040. XML-MTF mapping specification and associated XML-MTF schema derivation procedures provided by NATO describe a common method of translating MTF messages to, and from, the equivalent XML representation. XML-MTF mapping specification and schema derivation procedure illustrate specific considerations such as Tag naming conventions and

ambiguity issues. The XML-MTF involves detailed descriptions of MTF structure and rules, specification of legal field content, e.g. data elements [LINK](#)
<https://en.wikipedia.org/wiki/USMTE>

Symbolic artificial intelligence: is the term for the collection of all methods in artificial intelligence research that are based on high-level symbolic (human-readable) representations of problems, logic and search.[1] Symbolic AI used tools such as logic programming, production rules, semantic nets and frames, and it developed applications such as knowledge-based systems (in particular, expert systems), symbolic mathematics, automated theorem provers, ontologies, the semantic web, and automated planning and scheduling systems. The Symbolic AI paradigm led to seminal ideas in search, symbolic programming languages, agents, multi-agent systems, the semantic web, the strengths. imitations of formal knowledge and reasoning systems.

Physical symbol system (also called a formal system) takes physical patterns (symbols), combining them into structures (expressions) and manipulating them (using processes) to produce new expressions. The physical symbol system hypothesis (PSSH) is a position in the philosophy of artificial intelligence formulated by Allen Newell and Herbert A. Simon. They wrote: A physical symbol system has the necessary and sufficient means for general intelligent action." [2] —Allen Newell and Herbert A. Simon

This claim implies both that human thinking is a kind of symbol manipulation (because a symbol system is necessary for intelligence) and that machines can be intelligent (because a symbol system is sufficient for intelligence).[3] The idea has philosophical roots in Hobbes (who claimed reasoning was "nothing more than reckoning"), Leibniz (who attempted to create a logical calculus of all human ideas), Hume (who thought perception could be reduced to "atomic impressions") and even Kant (who analyzed all experience as controlled by formal rules).[1] The latest version is called the computational theory of mind, associated with philosophers Hilary Putnam and Jerry Fodor.[4] Source: Wikipedia: https://en.wikipedia.org/wiki/Physical_symbol_system

SYNC DELTAS: STATE META DATA: Time filtered, and spatially metered reports are comprised of state meta-data snapshot / heartbeat message / sync delta messages where state meta data is harvested during micro-cycles then posted / displayed during longer macro-cycles See hop count treatise referential to internet TCP/IP treatises.

System of Systems Engineering Battlefield Digitization Sync Deltas = changes from one epoch time cycle to the next: crypto currencies tethered to tangible commodities formed into indices of Delta-1 assets: Linear Finance (LINA) is a cross-chain Decentralized Delta-One Asset Protocol with Unlimited Liquidity. It is the first protocol that allows users to cost-effectively create, trade and manage liquid assets (Liquids) and creative thematical Digital Traded Funds. Linear Buildr is a decentralized application for staking and building LUSD, accepting a mixture of LINA tokens and other major cryptocurrencies. Linear Exchange enables trading of a variety of liquid assets

(Liquids) based on spot cryptocurrencies, commodities, and thematic indexes with nearly instant confirmation time and immediate finality. Source: <https://lnkd.in/dmTaeHJ>

Crypto currency index: firefly-heartbeat algorithm: optimal algorithm for sampling, reporting, heartbeat message event bus) index fluctuations across UTC Universal Time Coordination UTZ time zones synchronization and stochastic harmonization

TELEPATHY / A.I., ARTIFICIAL INTELLIGENCE: Reuse of DARPA - NATO's structured data exchange that maps data element OPSCODES to symbol sets is key to Artificial Intelligence #AI man - machine interface, consensus, consistency among myriad #blockchain programmable #money memes, metaphors... Given space travel risks, navigation based on consciousness / telepathy (use of symbols not words), a consistent syntax lexicon to communicate with #UFO EBO's that are likely Artificial Intelligence AI drones is reuse of NATO's structured data exchange that maps data element OPSCODES to symbol sets essential for man-machine interface.

TIME CRYSTALS: physicist Frank Wilczek in 2012, is a phase of matter which repeats in time, similar to how a regular crystal's structure repeats in space. What that means is that the particles in the crystal perpetually switch between two states without requiring the input of more energy and without losing any energy. These crystals are the first objects to break what is known as "time-translation symmetry," a rule in physics that states that a stable object will remain unchanged throughout time. Time crystals avoid this rule, being both stable and ever-changing. Scientists from Stanford and the Max Planck Institute for Physics of Complex Systems, as well as scientists at QuTech, a collaboration between the Delft University of Technology and the Netherlands Organization for Applied Scientific Research (TNO)

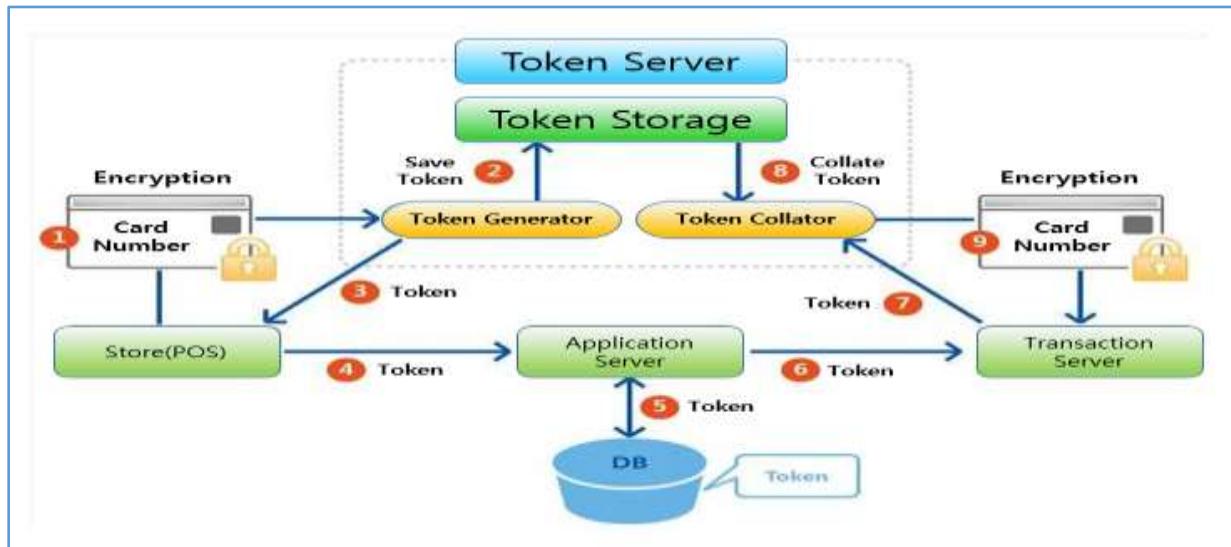
TOKENS / TOKENIZATION // DISTRIBUTED STATE MACHINES

"Distributed state machines have proven incredibly resilient architecture for value transfer which now supports over \$1.6trn of total on-chain asset value, with real-world assets making up less than 10% (\$132bn). However, the total value of on-chain assets pales in comparison with the off-chain traditional assets. To put this in perspective, a 1bps (0.01%) daily increase in the total off-chain traditional asset market value is equivalent to the entire on-chain real-world asset market doubling overnight"

"The emergent programmable on-chain asset class can support much more than its own weight, enabling faster and cheaper value transfer rails has the potential to be the settlement layer for existing off-chain real-world assets. In addition, public ledgers enable greater asset transparency and liquidity, thus reducing investor risk and borrower cost of capital. A holy grail of any capital market participants. This opportunity is most evident in real-world asset tokenization".

The next wave of evolutionary change in traditional financial markets and beyond is taking us from physical analog to virtual digital. Driven by standardization (SWIFT, ERC20), decreased settlement times and settlement cost".

"Tokenization, an evolution of securitization, is a real-world use case for encoding existing off-chain asset metadata in a digital token state. This new tokenization paradigm will increase asset liquidity, lower distribution costs and reduce settlement times. The value of increased capital efficiency is increasingly relevant in light of higher opportunity cost of elevated money market rates".



Selected On-chain RWA Initiatives



- Open-source suite of smart contracts that enables the issuance, management, and transfer of permissioned tokens.
- Its built-in decentralized identity framework, ONCHAINID, ensures only users meeting pre-defined conditions can become token holders, even on permissionless blockchains.



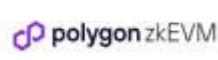
Source: Arete Capital.



- Avalanche Evergreen Subnets offer a suite of blockchain deployments and tooling designed to address company-specific and industry-wide considerations.
- Evergreen Subnets maintain the benefits of public network development, including interoperability and composability, while enabling particular chain-level features only possible in enterprise blockchains.



- ONYX Digital Assets is an asset tokenization private blockchain platform that enables financial institutions, asset managers and fintechs to unlock untapped utility for their financial assets.
- ONYX established in 2020 and has processed more than \$900 billion of tokenised assets since launch.



- The Polygon PoS chain is becoming a robust, decentralized, peer-to-peer network already finding adoption.
- As an example, Hamilton Lane opened its \$2.1 billion fund to individual investors through Securitize, all powered by Polygon.
- Enabled by EVM compatibility and Zero-knowledge privacy.

The next phase in RWAs will focus on overcoming the challenges of scalability, interoperability, and regulatory compliance. Scalability will be key in managing the sheer volume of transactions that the incorporation of RWAs into blockchain networks will bring. Interoperability between different blockchain platforms will enable a seamless and efficient transfer of assets, enhancing liquidity and market efficiency.

SOURCE: The Real World Asset Thesis: The Next Generation of Traditional Financial Markets Arete Research MCKENNA JAN 15 202

TRADE REFERENCE CURRENCY TRC

Belgian Economist Bernard Lietaer proposed a commodity based TRC Trade Reference Currency based on demurrage charges to support logistics of goods moved from supplier to consumer called the TERRA TRC. The Terra TRC Trade Reference Currency is a global complementary currency designed to provide an inflation-resistant international standard of value; to stabilize the business cycle on a global level; and to realign stockholder's interests with long-term sustainability. From a legal viewpoint, the Terra is standardized "countertrade" (international barter), which is routinely used for over one trillion dollars worth of transactions per year. Legislation on countertrade exists in about two hundred countries, including all the major trading nations.

The Terra is a CC complimentary currency that would be issued by a nation's central bank. As outlined by Lietaer in his seminal "A 'Green' Convertible Currency", what we will have is a "commodity-based currency, for a New Currency backed by a basket of from three to a dozen different commodities for which there are existing international commodity markets. For instance, 100 New Currency could be worth 0.05 ounces of gold, plus 3 ounces of silver, plus 15 pounds of copper, plus 1 barrel of oil, plus 5 pounds of wool." This CC/new money is therefore backed by the valuation of the commodities in the basket at the value of the national currency of the society it originates from. So in the US, the value of the basket, in terms of USD, will determine the exchange rate between those trading in USD for the Terra in America. The Terra would work in tandem with the national currency and is not a new money that supplants everything else in its wake. As the Terra TRC (Trade Reference Currency) White Paper by Takashi Kiuchi, Chairman of The Future 500, states: "The Terra is designed as a complementary currency operating in parallel with national currencies. Therefore, everything that exists today as monetary and financial products or practices continues to exist. The Terra mechanism is only one additional option available for those international economic actors who voluntarily choose to use it." SOURCE:

<https://www.lietaer.com/2010/01/terra/>

TRADEFI Traditional finance, TradFi in short, refers to the established financial system that has been in place for many years. It consists of financial institutions, such as central banks, commercial banks, brokerage firms, investment banks, credit unions, pension funds, retail banks, insurance companies, mortgage companies, savings and loans associations, and mutual funds. These institutions often serve as intermediaries, facilitating transactions between parties involved in financial activities. The term TradFi often comes up in relation to DeFi, a relatively new financial system that aims to be decentralized, thus, intermediary-free. A financial instrument is a contractual agreement that holds value and can be traded. The following are key financial instruments commonly found in TradFi.

STOCKS: Stocks or equities represent fractional ownership in a company. Shareholders are entitled to a portion of the company's assets and profits based on the amount of shares they hold. Stocks are equity-based financial instruments.

Mutual funds: A mutual fund is an investment vehicle that pools funds from many investors. It then invests the money in stocks, short-term debt, and other securities. Investors that buy shares in mutual funds receive part ownership in the fund and are entitled to a portion of the fund's income based on the number of shares they hold. Mutual funds are equity-based financial instruments, with money market funds

BONDS: Bonds are long-term debt-based financial instruments that governments and corporations use to raise money. Therefore, bond buyers give issuers a loan for a certain period of time. Bond issuers are responsible for paying back the loan at face value at a set date (principal), plus a few interest payments.

Treasury bills (T-bills) known as T-bills, are financial instruments based on short-term debt. They are issued by governments and have a predetermined interest rate and a maturity period of 365 days or less. Investors who hold T-bills receive their initial investment plus interest at the end of the specified term. These instruments are considered low-risk as they are backed by the Treasury of the issuing country.

Bank deposits are funds that customers place at a banking institution through checking, money market, or savings accounts. A bank deposit is a liability that the bank owes to the depositor. As a result, bank deposits are debt-based cash instruments. Moreover, checks and loans are cash instruments since they can transmit payments between bank accounts. Deposit insurance ensures that funds are protected up to a certain amount.

Commercial papers: Commercial papers are unsecured short-term debt obligations that banks and large corporations issue to fund operations. This instrument pays a fixed interest rate and has a maturity of up to 270 days.

ETFs Exchange-traded funds are investment vehicles that allow investors to pool their money together and earn interest. The fund then invests in stocks, bonds, and other securities. ETFs are more flexible than mutual funds because investors can trade them at exchanges throughout the day. This stands in contrast to mutual funds, which investors can only purchase or redeem at the end of a trading day.

Derivatives are financial contracts between two or more people. They derive their value from the performance of an underlying asset. Stocks, market indexes, bonds, digital assets, interest rates, and commodities are examples of possible underlying assets. The four main types of derivatives are futures, forwards, swaps, and options.

Mortgage-backed securities (MBS) are debt-based financial instruments. Financial intermediaries create mortgage-backed securities by pooling together mortgages. So, when you buy an MBS, you are lending home buyers money. In return, you earn regular payments on your investment.

Real estate investment trusts (REITs) REITs are investment vehicles that permit collective investment in real estate. A REIT allows individuals to invest in real estate assets like hotels, shopping malls, and apartments and earn interest.

USMTF Message Transfer Format / Structured Data Exchange

The USMTF program applies to all character oriented IES, as determined and derived from DMS IER, MIL-STD-6040 is a mandatory standard Scope. The USMTF program establishes the standard for preparation, processing, storage, and discovery of USMTF data assets in support of DoD operations. USMTF data provides the means to achieve interoperability at the information level across all functional and mission areas and will be leveraged by communications and information systems used throughout the DoD. USMTF is a common message text format standard that facilitates information exchange across DoD and related entities. Effective, seamless interoperability is achieved through exposure and reuse of data. It's operationally agreed definitions and expressions serve as the foundation for interoperability among the military forces and DoD agencies. USMTF leverages common information syntax and data structures to maximize successful interpretation and utilization regardless of the data provider. This ability to exchange and share information increases visibility, understanding, and lethality, and is critical to the Warfighter for present and future battlespace management. Source: CJCSI 6241.01D 12 Jan 2021

USE CASE: @26:37 "we are entering a system called Bretton Woods Three: a system dominated by COMMODITIES" Federal Reserve Board member SOURCE: Youtube: <https://lnkd.in/eN4vGP58>

WATER DROP IN POND MEME USPTO 13/573,002

"Water drop in pond meme directs to a detailed treatises describing geo-spatial temporal intensity metrics and meters using sonar in water as opposed to a TCP/IP internet ping. Reasons for this distinction is that sonar wave behavior in water used by naval military units is well known while a TCP/IP internet "ping" is an abstract metaphor formed by time intervals / cycles / epochs / CPU clock intervals that are used to process / not process instructions describing distances between internet nodes.

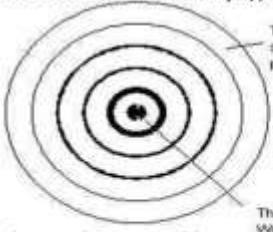
Water Drop in Pond area, circular, circumference metaphor – meme: areas defined by radius / circumference (124) are described in terms of radii within a circumference of a circle used to encompass or encircle a cluster of players, teams, or leagues into a discrete set. Resource items are typed, classified by <tags> measured from a known reference point i.e. ten-digit map grid coordinate describing a limited or bounded geo-spatial area described by concentric rings /circles shown to expand or contract with threshold metric changes denoting intensity i.e., an earthquake occurs during game with pre / aftershocks. Wave crests and troughs are converted into analog integer equivalents where amplitude and frequency changes convey event intensity, duration as thresholds. Discrete wave crest to trough phase changes are summed. Wave crests and troughs define cycles in terms of on, off, duration and describe slowing and

speeding up of events, activities occurring within the circular geo-spatial area containing items of interest --see geo-spatial area entries, in related art for treatises.

Radius searches performed within circumference (124) use <tags> as search key tag / word targets. Search results are filtered and processed by tag classes and types then saved as search results time tagged with the micro-cycle heartbeat timestamp (112) running concurrently within and assisting with the formation of a self-organizing reporting cycle in a macro-cycle as part of a Heart Beacon Cycle (137). Radius searches are conducted to discover threshold, duration and intensity conditions changes useful in precedence processing parameters i.e., flash override, flash, immediate, priority routine shown on appliqué acetate overlay display boards (134).

(Acoustic) Waves for energy / data propagation: Energy / data communication may travel the same paths if sufficient frequency band separation by sufficient frequency band space between the energy transmission band and the data internet band. See **Figure 39: Energy / Data unified field propagation claim water drop in pond meme**

Wave Structure of Matter (WSM) in Space



Water drop in pond meme <https://www.spaceandmotion.com/>

The IN and OUT waves form standing waves about the central point

On Truth & Reality
The Wave Structure of Matter (WSM) in Space

Paul Revere Linear, sequential meme

And as I shall explain in Einstein's relativity, when we apply this one law, where the wave velocity changes the wavelength also has a corresponding change such that we can never observe this change. This relates to the Lorentz transformations, the negative solution of the Michelson Morley experiment, and why we always measure a constant velocity of light even when it changes, thus why we cannot measure our motion through absolute space.

With respect to time, physics was always telling us that time is caused by frequency (and fundamentally by motion as the wave motion of space), since time equals the inverse of frequency $t=1/f$.

From our wave equation we see that while the velocity and wavelength change, the frequency remains constant, giving rise to an absolute time in the universe. This was one central problem of Einstein's relativity, he changed time and maintained a constant velocity of light, when the opposite is true. (Yes, this one property of waves from this simple wave equation has caused us so much confusion!).

"What we observe as material bodies and forces are nothing But Shapes and variations in the structure of space" Schrodinger

Physical Reality:

- 1. One Substance.** Space exists with properties of an elastic solid wave medium, propagating longitudinal waves in all directions, thus forming standing waves in all directions. When these standing waves are in-phase (coherent) around a central point then a spherical standing wave naturally forms - space vibrates in and out around the central point, which we call the particle. There are two opposite phase spherical standing waves, which create the electron and positron (matter and antimatter).
- 2. One Law.** The velocity of the waves is proportional to the wave amplitude (bigger waves travel faster). Where these waves are coherent, forming spherical standing wave 'particles', the wave amplitude is higher, and the waves travel faster. This, as I shall explain, is the foundation of all matter interactions, the source of causal connection and absolute truth.

Why matter and energy are equivalent, since a wave is a flow of energy between two states of the wave medium Space - kinetic energy (vibratory motion of space) and potential energy (elastic deformation of a nearly rigid space). Why matter and antimatter annihilate, due to destructive wave interference. How matter and antimatter can be created from apparently 'empty' space. How science can exist, since the spherical in and out waves provide continuous two way communication between matter in space (empirical knowledge), and the waves behave in a necessary manner due to this one law (logical knowledge).

Wave velocity is the velocity of light, $\sim 3 \cdot 10^8$ m/s, the wavelength is the Compton wavelength $\sim 10^{-12}$ m, and the frequency $\sim 10^{20}$ Hz. So in a pin head there are roughly a billion billion billion standing waves, each vibrating a billion trillion times a second, i.e. These standing waves are very small, and vibrate very fast, thus explaining how such complex standing wave structures (like us) can evolve in space. The fundamental equation of the universe is the simple wave equation; Velocity (C) = Frequency (f) * Wavelength (y)

Combined with the equation of the sphere (which is also Pythagoras' Theorem and the metric equation of Special Relativity), and explains the geometric foundations of reality, why space is three dimensional. $x^2 + y^2 + z^2 = r^2$



"Simplicity is the ultimate sophistication".
(Leonardo da Vinci)

Wave Structure of Matter (WSM) (we can) calculate the Doppler shifts of the in and out waves for relative motion. The WSM directly deduces both the de Broglie wave and the mass increase in the solution to these Doppler shifted waves (mathematical physicist Professor Milo Wolff deduced this). This is remarkable, just one deduction is enough for all scientists to take this very seriously.

Copenhagen (Probability Wave Function) Interpretation Vs de Broglie / Bohm Non-Local Determinism. The de Broglie wave is a non local phase wave, where its phase velocity = C^2 / relative velocity. If the relative velocity is one thousandth the speed of light C, then the de Broglie phase wave has a velocity of 1000C. And now we can solve this strangeness of the probability wave (Copenhagen) interpretation of quantum physics. For example, in the two slit experiment it is assumed that a particle 'transforms' into a probability wave, interferes through the two slits, and when observed on the screen, the probability wave function 'collapses' back to a particle. Both Einstein and Schrodinger thought this was just a mathematical solution, that the real cause of the probability was lack of knowledge of a connected system (they were correct), and that it was insane to think the probability wave was real (that led to Schrodinger's cat, which cannot be both alive and dead at the same time). And yet the probability wave had to be real to interfere through the slits. David Bohm who found the solution. He showed that you get the same probability function if reality is deterministic, but there must be a non-local hidden variable, what he called the pilot wave, that affects the experiment. However, rather than just postulating that a particle is guided by a non local pilot wave, we have now deduced that these spherical standing waves create a non local phase wave that affects their behavior. Einstein partly liked Bohm's solution, it removed the probability wave, but introduced non locality that contradicted his relativity. Einstein's error relates to his incorrect foundation of representing matter as continuous fields in space time, rather than discrete standing waves in space thus also explaining discrete quantum effects that Einstein could not explain with his continuous fields, explained by relativity.

The Heisenberg Uncertainty Principle

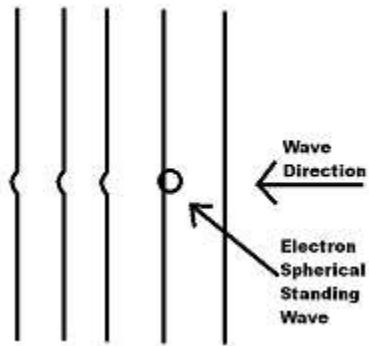
It is actually common knowledge that the uncertainty principle is a wave phenomena. In simplistic terms, if you know the position of a wave then you do not know its motion or wavelength, and if you know its motion and wavelength then you do not know its position. Secondly, to make an observation of a standing wave particle, you must have a wave interaction with that standing wave, which changes its position and motion.

Spin Spin is intriguing and gets a little complex, as we need to understand the Euler formula $e^{ix} = \cos x + i \sin x$, since Schrodinger used this relationship to generate rotating waves. What most people don't realize is that the formula shows that if you have two plane waves 90 degrees out of phase (sin and cos), and one is rotated 90 degrees to the other (using the imaginary number i), then the resultant of these two intersecting plane waves is a circularly rotating phase wave. So it is possible that our spherical standing wave has this spherical rotation of the in and out waves, creating the electron spin. I have written a second essay on this, also important, as it relates to Euler's number, and its connection to spherical geometry and physical reality, which explains the physical foundations of mathematics, why mathematics is so good at describing physical reality. See: <https://www.spaceandmotion.com/euler-equation.htm>

Unification of the Fundamental Forces (Charge / Light, Gravity)

Let us now put our one law to work to explain and unite charge, light and gravity, since all matter interactions (causal connection) are a result of this one law, bigger waves travel faster. (Though this is now obvious to me, it took me 25 years to realise that causal connection must involve a change in velocity, since acceleration is always involved in matter interactions, as per newton's law of inertia, Force = Mass * Acceleration.)

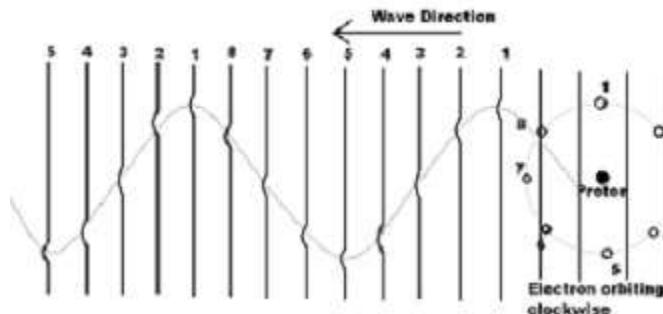
Charge



When an in phase plane wave flows through a high wave amplitude wave center, the wave travels faster and the wave front is advanced (hill). This occurs between electrons, and also between positrons, and the result of this advanced wave is that it causes electrons to repel one another, and positrons to repel one another (each advanced 'hill' on the wave front acts like a small 'push' when it flows through another standing wave, see below). However, if you have an electron and a positron

interacting, then the waves are opposite phase, cancel one another, the total wave amplitude is lower, the wave travels more slowly, causing a retarded wave front (hollow), and this causes opposite phase standing waves (electrons and positrons) to attract one another.

Light and the 'Electromagnetic Wave'

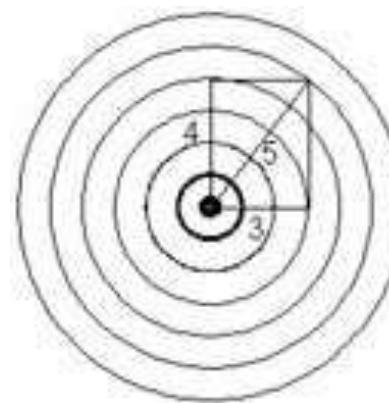


If the electron is bound in an atom or molecule, then it has a repeating wave pattern, and this pattern of advanced 'hills' on successive plane waves forms a wave pattern that is the cause of the 'electromagnetic' light wave. It is a resonance phenomenon, where the pattern of advanced

curves must match the standing wave pattern of the electron it interacts with (like pushing a swing, you must push at the correct phase for the swing to absorb the energy and swing higher). The energy is discrete (quanta / photon) because the change from one standing wave pattern to another is discrete. de Broglie first proposed this, without understanding the true wave mechanism behind it (he worked with a particle wave duality for matter).

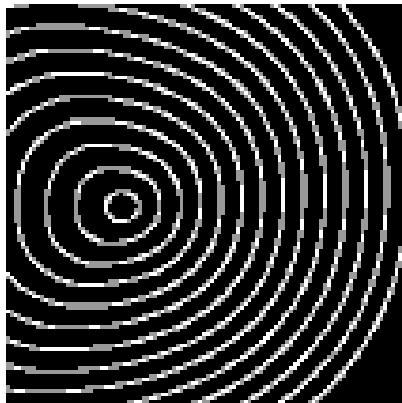
Acceleration and Ellipsoidal Geometry

A stationary standing wave in space is perfectly spherical. The diagram below shows this and why Pythagoras theorem is a property of spheres.



However, if the incoming plane wave from one direction has an advanced 'hill' on the surface of the wave, then this causes the stationary standing wave to move in the direction of the 'hill', and it changes its shape from spherical to ellipsoidal (like an egg!).

In the diagram below, imagine the incoming plane waves from the left have an advanced hill on them, this then changes the ellipsoidal shape of the standing wave and it begins to move to the right.



The ellipsoidal wave is stretched in the direction of motion (right side), thus the same wave energy is spread over a larger surface area and has a lower wave amplitude and thus velocity and wavelength, as per our one law. On the opposite side the effects are reversed, the ellipsoidal wave is squashed, has a smaller surface area, a higher wave amplitude, the wave travels faster and has a longer wavelength. This changing ellipsoidal geometry and wavelength / velocity is the foundation of inertia, since when you accelerate the standing wave, its resultant ellipsoidal shape changes, as does the in wave velocity which is slower in the direction of motion, faster on the opposite side, which then maintains its new velocity through space.

Importantly, the Lorentz Transformations have the electron becoming a squashed ellipsoid on both sides with motion, whereas the Wave Structure of Matter (WSM) has the electron as a stretched ellipsoid in the direction of motion (with slower in waves and shorter wavelength) and a squashed ellipsoid on the opposite side (with faster in waves and longer wavelength). This difference in ellipsoidal geometry from one side to the other is the foundation of the Doppler effect, magnetic moment, and also the Lorentz transformations and Einstein's general relativity. Note - Perhaps there is some experiment that could distinguish between Lorentz's squashed ellipsoid Vs the WSM where it is stretched in the direction of motion.

Most profoundly, we now have a physical reason for why acceleration is related to curvature and ellipsoidal geometry, since whenever a wave changes velocity there is a change in ellipsoidal curvature of the wave front (Einstein's matter-energy curves space-time). However, Einstein changed the length and time when he should have changed the length and wave velocity and kept the time (frequency) constant. In this way, even though the velocity of the waves changes, so does the wavelength such that you always measure the same velocity of light (which is also why Pythagoras' Theorem is true irrespective of motion and ellipsoidal geometry).

Gravity: To understand how gravity is united with light we must first understand where all the antimatter / positrons are, since positrons and electrons (opposite phase standing waves) are created equally, and both contribute to gravity. Positrons are naturally produced due to radioactive decay of certain isotopes, and can be artificially produced using high energy laser beams fired at gold. In Beta+ decay the proton emits a positron

and becomes a neutron, likewise, the neutron can emit an electron and become a proton in Beta- decay. The obvious conclusion from this is that positrons and electrons make up the structure of the proton, with one extra positron to account for the positive charge. What this exact structure is is unknown, but if the quark theory of protons is correct then the quarks are most likely positronium (a bound positron and electron). However, this exact structure of protons and neutrons is not needed, all we need to know is that in a neutral atom there are equal numbers of positrons and electrons. So now let us consider a plane wave flowing through a large body like the Earth, that has roughly the same number of positrons as electrons. If the plane waves are in phase with the electrons then they will get an advanced curve (hill) on their wavefront, and they will get a retarded curve (hollow) when travelling through positrons. The result is that you get as many advanced curves as retarded curves, and they will cancel one another out. i.e. It is a neutral body and there is no charge effect. And now finally we can unite light and gravity (though it took me 20+ years to work this out, even though it is simple and obvious, deduced from our one law). The solution. When the plane waves have advanced or retarded curves on their wave front, then the same wave energy is spread over a larger surface area, so the curved part of the wave front has a smaller wave amplitude, and thus a slower wave velocity. Thus an advanced curve will get smaller over time: the 'push force' decreases the further the wave travels through space), the retarded curve will do the opposite and get bigger over time (the 'pull force' increases the further the wave travels through space). So the push and pull 'forces' of advanced and retarded curves on the plane waves do not exactly cancel each other out, instead, there must always be a slight attractive force due to the slowing of the curved wave fronts due to our one law. This slight attractive force is the cause of gravity. What remains to be done is for mathematical physicists to calculate this relationship between wave amplitude, wave velocity, and ellipsoidal curvature. Einstein was correct to relate gravity to ellipsoidal curvature, but we now need to correct the error of Einstein working from continuous fields in space-time rather than discrete standing waves in space, and his changing of time rather than wave velocity as occurs with the Wave Structure of Matter. Geoff Haselhurst June 25th, 2023

Source: <https://www.spaceandmotion.com/physical-reality-simple-summary.htm>

"If you want to find the secrets of the universe, think in terms of energy, frequency and vibration". Nikola Tesla

Using Waves to Measure the World: Fisher Information Flux to Track Info Flow

International Space Federation ISF: A team of physicists has discovered that electromagnetic waves scattered by an object contain detailed, locally defined information about that object's properties. This information, quantified by a concept called Fisher information, flows through space in a way that's analogous to how energy flows in electromagnetic fields. a study has revealed a new way to understand how these waves carry information about the objects they encounter. Just as the famous Poynting vector describes energy flow in electromagnetism, the team has introduced a new "Fisher information flux" that tracks the flow of information in wave fields. This

revolutionary research published in *Nature physics* [1], opens up new possibilities for understanding and manipulating electromagnetic waves in various applications, from medical imaging to telecommunications. This new understanding based on Fisher information flux / flow is based on three key characteristics:

Local definition: The Fisher information content can be assigned to specific points in space, much like energy density in electromagnetic fields. This localization allows for precise mapping of information distribution within a wave field.

Conservation: The flow of Fisher information follows a continuity equation, similar to how energy is conserved in electromagnetic waves.

Measurability: The researchers have demonstrated that this information flow can be experimentally observed and quantified using microwave experiments. This practical aspect of the discovery paves the way for real-world applications. empirical studies

The concept of Fisher information isn't new – it's been used in statistics and data analysis for decades. In simple terms, Fisher information quantifies how much a signal tells us about a particular parameter we're trying to measure. What's revolutionary about this new work is the realization that Fisher information has a physical presence in wave fields, with its own density and flow patterns.

Previous studies have looked at how to maximize the Fisher information collected by detectors or how to shape input waves to get the most information out of a system. However, until now, little was known about how information is created when waves interact with an object and how that information propagates through complex environments. This new research opens up the "black box" of information flow between a target object and our detectors. To visualize this concept, imagine dropping a pebble into a pond. The ripples that spread out carry information about the pebble's size, shape, and the point where it hit the water. Now, picture being able to see not just the ripples, but also a colored "information field" that shows exactly where and how the information about the pebble is flowing through the water. That's essentially what this new theory allows scientists to do with electromagnetic waves. researchers created a complex scattering environment in a microwave waveguide – essentially a metal box that guides microwaves. Inside this box, they placed a movable metal target surrounded by small Teflon scatterers. By precisely measuring the microwave fields around the target as it was moved slightly, they were able to map out the flow of Fisher information about the target's position

Here's how the experiment worked:

Microwaves were injected into the waveguide from one end. The waves scattered off the target and the surrounding Teflon objects. Sensitive antennas measured the resulting microwave field at many points around the target. The target was moved slightly, and the measurements were repeated. By comparing the two sets of measurements, the researchers could calculate the Fisher information flux at each

point. One of the most surprising findings from this work is that the flow of energy and the flow of information can be decoupled (Fig. 3). The researchers demonstrated this with a simulation where most of the wave energy was transmitted through a system, but almost all of the Fisher information flowed in the opposite direction. This has potential applications in secure communication, where you might want to send information in one direction while minimizing the detectable energy in that same direction. To understand the technical details of how Fisher information propagates, the researchers derived a continuity equation that describes its flow. This equation shows that Fisher information is created at “sources” – areas where the electromagnetic field changes when the parameter of interest (like the target’s position) is varied. The information then flows away from these sources, either propagating out of the system or being reabsorbed by “sinks” such as areas with energy dissipation. The mathematical framework developed in this study goes beyond just static situations. The researchers extended their theory to the time domain, showing how Fisher information is generated and stored in wave packets as they propagate. This temporal aspect is crucial for understanding how information builds up in a system over time (Fig. 4).

Fig. 4 Fisher information content of a wave packet. A one-dimensional wave packet closely centered around a frequency ω scatters off a dielectric (grey rectangle), whose position is the parameter of interest. a, Energy density envelope (red) at times $T = 2, 6.5, 10$ (arbitrary units). The black arrows indicate the direction of motion of the wave packet. b, Fisher information density (blue) at the same times. The information is created at the sources located at the two sides of the scatterer (purple). Most of the energy is transmitted, whereas the information is solely flowing into the reflection channel. Image and caption taken from [1].

The researchers also made connections to quantum mechanics. They showed that the integrated Fisher information density in their framework corresponds to the quantum Fisher information of coherent light states. This provides a solid theoretical foundation for their work and suggests that the framework can extend to other quantum systems.

Unified Science in Perspective: While this research was focused on electromagnetic waves, the underlying principles could potentially be applied to other types of waves, such as acoustic waves used in ultrasound imaging or seismic waves used to study the Earth’s interior. This broad applicability makes the work particularly exciting for fields ranging from medical imaging to geophysics. This discovery bridges the gap between abstract mathematical concepts and physical reality, providing a new tool for scientists and engineers to analyze and manipulate wave phenomena. It could lead to improvements in various fields, such as:

- Medical imaging: Enhanced techniques for interpreting scattered waves in ultrasound or MRI scans.
- Telecommunications: More efficient ways to encode and transmit information using electromagnetic waves.
- Remote sensing: Improved methods for detecting and analyzing objects from a distance using radar or other wave-based technologies.

- Quantum information: New insights into the behavior of quantum systems and potential applications in quantum computing.

The implications of this new understanding of information flow are far-reaching. In fields like levitated optomechanics, where scientists are trying to cool tiny particles to their quantum ground state, knowing exactly how information about a particle's position radiates out could lead to more efficient detection schemes. In imaging and sensing applications, this framework could guide the design of new systems that maximize the collection of relevant information. As our world becomes increasingly reliant on precise measurements and efficient information transfer, theories like this one that provide a fundamental understanding of how information propagates through physical systems will become ever more crucial. This work opens up new possibilities for tracking and designing the flow of information, even in complex, disordered environments. It's a significant step forward in our ability to use waves not just to see the world, but to truly understand it. Using waves to explore our environment is a widely used paradigm, ranging from seismology to radar technology, and from biomedical imaging to precision measurements. In all these fields, the central aim is to gather as much information as possible about an object of interest by sending a probing wave at it and processing the information delivered back to a detector. Here we demonstrate that an electromagnetic wave scattered at an object carries locally defined and conserved information about all of the object's constitutive parameters. Specifically, we introduce the density and flux of Fisher information for general types of wave fields and identify the corresponding sources and sinks of information through which all these new quantities satisfy a fundamental continuity equation. We experimentally verify our theoretical predictions by studying a movable object embedded in a disordered environment and by measuring the corresponding Fisher information flux at microwave frequencies. Our results improve the understanding of the generation and propagation of information and open up possibilities for tracking, designing the flow of information in complex environments.

References: [1] Hüpfl, J., Russo, F., Rachbauer, L.M. et al. Continuity equation for the flow of Fisher information in wave scattering. Nat. Phys. (2024).
<https://doi.org/10.1038/s41567-024-02519-8>

SOURCE: <https://spacefed.com/physics/using-waves-to-measure-the-world-a-new-way-to-track-information-flow/>

Article Published: 10 June 2024 Continuity equation for the flow of Fisher information in wave scattering Jakob Hüpfl, Felix Russo, Lukas M. Rachbauer, Dorian Bouchet, Junjie Lu, Ulrich Kuhl & Stefan Rotter Source Nature <https://www.nature.com/articles/s41567-024-02519-8#citeas>

WAVE BASED ENERGY GENERATION, PROPULSION

Propulsion system using the antigravity force of the vacuum and applications

Abstract: A propulsion system for aerial, terrestrial, underwater or space propulsion, achieved through the manipulation (or engineering) of the vacuum with the proper electromagnetic interactions. This vacuum manipulation will allow the use of a new form of propulsion, and has applications in energy production and on the change of the time decay of radioactive elements. Opposing magnetic or electric fields create a mass repelling force, while attracting magnetic or electric fields create a mass attracting force. In particular, this vacuum manipulation process can be used to propel a mass that contains the field sources that perturb the vacuum. One possible application is the creation of a repulsion point in space through the interference of two or more longitudinal electrodynamic wave beams, which cause a repulsion force on the mass.

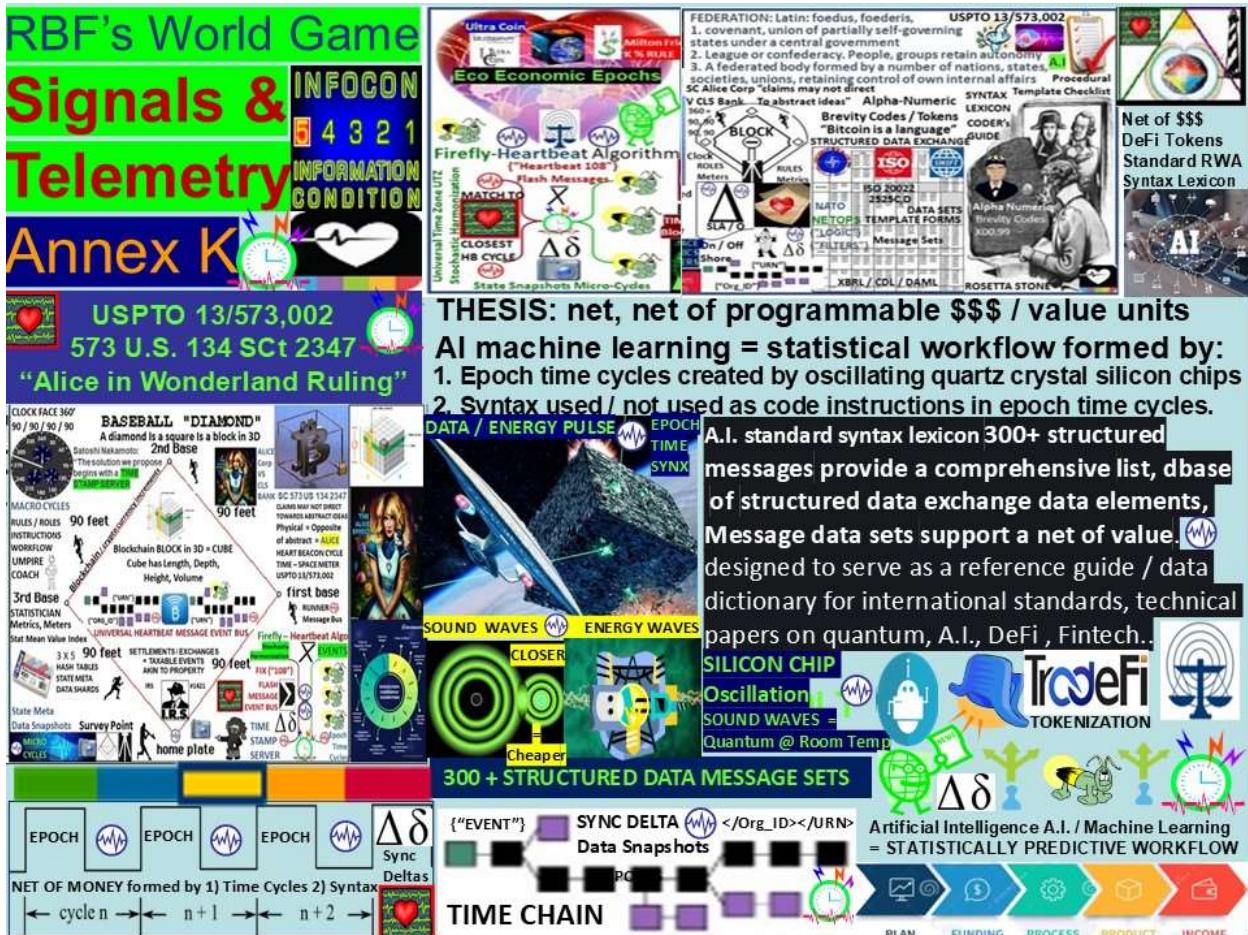
Summary: A propulsion system for aerial, terrestrial, underwater or space propulsion, through manipulation (or engineering) of the vacuum with proper electromagnetic interactions. Vacuum manipulation.. new form of propulsion, and has applications in ENERGY production and on CHANGE of TIME decay of radioactive elements. Opposing magnetic or electric fields create a mass repelling force, while attracting magnetic or electric fields create a mass attracting force. This vacuum manipulation process.. used to propel a mass that contains field sources that perturb the vacuum. .. the creation of a repulsion point in space through the interference of two or more longitudinal ELECTRO dynamic (micro) waves

US20120092107A1: Inventor Alexandre Tiago Baptista De Alves Martins Current Assignee Individual Worldwide applications 2009 PT 2010 WO US Application US13/380,202 events 2010-06-22 Application filed by Individual 2012-04-19 Publication of US20120092107A1 Status Abandoned



FIGURE E: The Heart Beacon Sculpture, Portland Oregon USA
Heart Beacon is an outdoor 2013 sculpture by American artists Blessing Hancock and Joe O'Connell, installed in **Portland, Oregon**, United States. *Heart Beacon* "takes the literal and metamorphic 'pulse'" of Portland's community and serves as a "symbol of hope and a potent reminder of the resilience of the individual taking inspiration from the

life-saving mission" of the center. Source: https://en.wikipedia.org/wiki/Heart_Beacon
LINK <https://codaworx.com/project/heart-beacon-city-of-portland>



SUMMARY: Adaptive Procedural Template Framework: checklist: ideas, algorithms, processes, procedures, metrics, meters, signal & telemetry structured data for consistent epoch time cycle for the net, programmable \$ / economy. Foundation Technology for DeFi, structured data syntax – symbol mapping / messaging / economy, quantum computing, AI artificial intelligence. Minimum trade federation consensus checklist i.e., timing - sync schedule, OPSCODE brevity codes, UTZ event stochastic harmonization, consensus algorithm common description, measurements, metrics supporting trade federation (s), support for DAO Distributed Autonomous Organizations, parallel economies e.g., Texas gold backed currency. Web 3.0 USPTO 13/573,002 framework supports for example, Distributed Trade Federation Organizations with DoD / NATO system of systems engineering signaling, telemetry engineering, syntax OPSCODE brevity codes matched to 2525C symbols for A.I. man-machine interface,

APPENDIC C: FINAL REJECTION RESPONSE PAPER SUMMARY July 6th, 2016

United States Patent and Trademark Office
ATTN: COMMISSIONER FOR PATENTS
P.O. Box 1450 Alexandria, Virginia 22313-1450

July 6, 2016

SAW Concepts LLC Simple Always Wins Concepts LLC
Attn: Tammy Lee McGee (Owner) and Steven J. McGee (CEO)
P.O. Box 28, Oceanport, NJ 07757

1. US Supreme Court Ruling Alice Corp V CLS Bank: "claims ineligible for patent protection under 35 U. S. C. §101 "directed to an abstract idea" <http://1.usa.gov/1V91pQe> [LINK](#)
2. 13/573,002 achieves Supreme Court Alice Corp V CLS Bank compliance via a Little League Baseball Tournament physical meme embodiment. Physical, tangible memes are applied.
3. Supreme Court Alice Corp V CLS Bank applies greater weight than Transco V Performance Ultimately, only the date when the best, most useful meme was filed matters. There is no point in establishing dates of other filings that have been superseded by a superior ruling
4. USPTO screen captures establish a patent worthy idea is formed at the exact instant of capture. The only method to protect intellectual property is patent assignment. Once a patent worthy idea is deemed formed, a court may not reverse itself. Stare decisis et non quæstio movera.
5. All internet artifacts are formed using time epochs, cycles, intervals, periods to process or not process syntax as instructions. 10/605,144, 10/708,000 establish this idea / fact. Metaphorical terms “ping”, “hop”, “packet”, “frames”, “Bitcoin”, “blockchain” “transactor chip” are described in baseball terms. “Incomprehensible” opinion due to USPTO examination of treatise language
6. All materials submitted after 10/605,144, 10/708,000 Jan 30, 2004 are theme, use case variants. No materials submitted after 10/708,000 may be considered “new” given this fact, truth.
7. USPTO cites 12/856,715 to examine 13/573,002 claims. 12/856,715 is labeled as a parent document and abandoned. USPTO must choose a condition, 12/856,715 cannot be both.
8. USPTO states applicants must submit an amendment and USPTO states application is final. USPTO must choose a condition, 13,573,002 cannot be both requiring an amendment / final.
9. Transco V Performance Contracting Inc. screen captures suspend USPTO procedures and methods redirecting examination outside USPTO PAIR system. Re-direction outside PAIR suspends expectation of applicant’s skill. USPTO lacks skill outside USPTO PAIR.
10. No date, time stamps on USPTO screen captures creates temporal ambiguity.

APPENDIX D: REFERENCES / SOCIAL MEDIA LINKS / DOCUMENTS

GITHUB: https://github.com/Beacon-Heart/Heart_Beacon

Proton Email (secure) ecoeconomicepochs@protonmail.com

Unstoppable Domains IPFS Web 3 page: <http://ecoeconomicepochs.dao>

Slideshare: <https://www.slideshare.net/EcoEconomicHeartbeat>

SCRIBD files: <https://www.scribd.com/user/11781571/Steven-James-McGee>

PATREON: https://www.patreon.com/Heart_Beacon

PIN INTEREST: <https://www.pinterest.com/EcoEconomicEpochs/>

LINKEDIN: <https://www.linkedin.com/in/ecoeconepochs/>

WordPress: <http://ecoheartbeat.wordpress.com>

Substack: <https://ecoeconomicheartbeat.substack.com/>

Subscribe Star: https://www.subscribestar.com/eco_econ_epochs

Mastodon: https://universeodon.com/@Heart_Beacon

FACEBOOK: <https://www.facebook.com/beaconheart>

MEDIUM: <https://medium.com/@heart.beacon.cycle>

MINDS: <https://www.minds.com/beaconheart>

TWITTER: @Heart_Beacon https://twitter.com/Heart_Beacon

DISCORD: GDP_Index_Economy#6495

Skype: Steven McGee

Gravatar: <https://en.gravatar.com/ecoeconheartbeat>

MeWE: <http://mewe.com/i/stevenmcgee2>

Maven: <https://app.maven.co/maven/506065>

Gitter <https://gitter.im/EcoEconHeartbeat/Lobby>

SLACK Workspace: Eco Economic Epochs for the programmable Economy
Workspace URL: ecoeconomicep-jo74963.slack.com

APPENDIX E: BRIEF DESCRIPTION OF THE GRAPHICS

Figure A: Adaptive Procedural Template checklist of tools, processes, procedures. OOTW Operations Other Than War: Foundation

A list of ideas, processes, procedures, tools, computing artifacts, algorithms used to support for example, a (Distributed Autonomous Organization DAO) trade federation. A minimum list of items required for use by consensus. An item in the list may be replaced by an item deemed an improvement – hence the description “adaptive”. Adaptive Procedural Template checklist view combining figure A and a view of a bank – tech firm team systems structure to describe a foundation technical framework. SUMMARY structured data syntax – symbol mapping / messaging, quantum computing, and AI artificial intelligence. Minimum trade federation consensus checklist i.e., timing - sync schedule, OPSCODE brevity codes, UTZ event stochastic harmonization, consensus algorithm common description, measurements, metrics supporting trade federation (s), DAO Distributed Autonomous Organizations, standards organizations.

This Adaptive Procedural Template document represents, cites decades of work with DoD / NATO and major defense contractors in over 36 congressional districts with international standards organization i.e., ISO, ITU, IEEE for example: DoD / NATO maps data element OPSCODE brevity codes to (Mil standard 2525C, D) symbols supporting A.I. man - machine interface that is time consuming, tedious process requiring consensus, concurrence among a (distributed) system of systems.

See DoD / DARPA system of systems engineering

Figure B: Nobel Prize winner Economist Friedman “only a crisis brings real change”

Nobel Prize winning Economist Friedman described in his K% rule a means to automate liquidity insertion, reduction in an economy based on GDP input among his many views

Figure C: OOTW Operations Other Than War: Eco Economic Epoch Heartbeat

Figure D: Structured Data derived, developed via Net Enabled Operations NEO

Figure E: SCOTUS ALICE CORP VS CLS BANK 2014 ruling compliant meme

Supreme Court ruled in the “Alice and Wonderland ruling” that “claims may not direct towards abstract ideas. The opposite of abstract for example, is a baseball field

FIGURE F: The Heart Beacon Sculpture, Portland Oregon USA

Figure 1: Foundation tech forming the internet, programmable \$\$\$, economy listed in an Adaptive Procedural Template of tools, processes, procedures, routines algorithms, etc.

A adaptive procedural template used to improve signaling, synchronization using TCP/IP heartbeat time stamping occurring during micro-cycles of state meta data prior to data fusion center entry among metrics, metering processes comprised of TCP/IP heartbeats,

heartbeat messages signaled during micro-cycles scheduling instructions, commands, processes, procedures, algorithms, telemetry instructions for example, to master-controller processes i.e., block, start, stop, pause, resume, set Time To live TTL i.e., stock market high frequency flash trade, currency, interest rates, tax rates, time banking, cloud computing commodity exchanges, big data, electrical micro-grid, fungible goods, real time bidding, many use cases. Time stamping and applying descriptive data type tags to heartbeat state meta data after data is collected and queued, stored in temporary structures or entered into database instantiations after the fact is problematic. All internet supported devices including high frequency stock, currency, commodity etc., flash trade master controllers receive heartbeats. Heartbeats are silicon chip created intervals, epochs, time cycles used to (not) process syntax during epoch time cycles.

Figure 2: The Heart Beacon Cycle Time Space Meter Adaptive Procedural Template checklist of tools, processes, procedures.. linked to treatises

An adaptive procedural template is a checklist where items on the checklist may be added or removed and replaced by items considered to be more useful or superior. Most of the items are intrinsic to DARPA, DOD system of systems engineering internet development supporting data digital dashboard operations in use over decades. An improvement to an invention may be itself considered to be an invention such as the firefly inspired heartbeat algorithm with it's intrinsic heartbeat message event bus. If a superior algorithm is found then this algorithm replaces the old algorithm and so on

Figure 3: USPTO 13/573,002 Heart Beacon Cycle Time – Space Meter Summary

SUMMARY: An invention can be an improvement to an existing invention, idea, product. USPTO 13/573,002's basis for invention is US Army CECOM Communication - Electronics Command's "Greatest Invention" a system of systems structured data exchange digital dashboard geo-temporal - spatial synchronization, standardization program matching brevity codes to symbols, symbol sets critical for A.I. Artificial Intelligence man - machine interface that has had many names over the decade used for OOTW Operations Other Than War following a German Army suggestion circa 2003. Invention relies on System of systems type processes: collection of task-oriented, dedicated systems pooling resources, capabilities together to create a more complex system with more functionality, performance than the sum of separate systems.

Figure 4: OOTW Operations Other Than War / H.A.N.Ds / System of Systems Engineering framework structured data exchange

Humanitarian Assistance Networked Donor System: H.A.N.D.S adaptation of military doctrine, organization, training, material, infrastructure, interagency interaction, leadership, personnel and facilities" to OOTW Operations Other Than War i.e., humanitarian aid... Circa 2003, German Bundeswehr suggested reuse of the concepts of "Network Centric Warfare" "Network Enabled Operations" "Vernetzte Operationsführung" in Germany, "Shared situational awareness enables collaboration

synchronization, and enhances sustainability, speed of command" DOD SITUATION AWARENESS PROGRAM SWORDS TO PLOWSHARES OOTW

Figure 5: Edison's Monetary Option 1922 / Algorithmic Stable Coin

Thomas Edison's Monetary option: Thomas Edison and Henry Ford proposed a currency based on the value of a basket of crop commodities in 1922. Inventor Thomas Edison believed that crops held their value over time. "I want to cast the variable out of money. This gold money is not good enough. It's a fiction" (New York Times 1922).

Figure 6: USPTO 13/573,002 Main Graphic

Graphic images representing a list of symbols, objects used to describe the invention

Figure 7: USPTO 13/573,002 Main Graphic Legend

Legend for graphic images represent a list of symbols used to describe the invention

Figure 8: USPTO 13/573,002 Building Blocks

Amended graphic depicting the main components, building blocks

Figure 9: Adaptive Procedural Template Checklist

Adaptive Procedural Template: list of ideas, processes, procedures, tools, computing artifacts, algorithms used to support for example, a trade federation. Minimum list of items required for use by consensus. An item in the list may be replaced by an item deemed as an improvement – hence “adaptive” Adaptive Procedural Template = checklist of useful tools, procedures...Use adaptive, procedural templates to aid individuals join trade federations. Affiliated organizations are geo-spatially, temporally located in distributed, dispersed locations across time – space. Member organizations may join or leave in an adhoc, agile manner to take advantage or react to events, situations while retaining autonomy or the ability to act on one’s own behalf, control one’s own activities, The process involves agile, adhoc joins, merges, drops to / from federation in lieu of formal merger, and acquisition.

Figure 10 : All things internet, net of programmable money, Economy, Web 3.0 are formed using 1) Time epochs 2) syntax

Silicon quartz crystal based computer chips oscillate, vibrate when stimulated by an electric current. The trough and crest wave pattern after being represented by sawtooth cube, square, boxes emanating, propagating along a line is used to describe time epochs or time cycles that are used or not used to process, parse syntax as if, then, else instructions or used in math calculations such as cryptographic math proofs. There are no internet “layers”, “packets”, “frames”, “pings”, “satoshis”, blockchain blocks...

FIGURE 11: internet, net of \$ formed by 1) epoch time intervals 2) syntax

All things internet, internet of money, blockchains are formed by unicast, multicast, anycast protocols. Programmable money's improvements are in cryptography.

Blockchains are formed by unicast, multicast, anycast and workflow filters.

Programmable money's improvements are in cryptography. Web 3.0 is based on the original internet TCP/IP structure that has not changed because it cannot change.

Statement: there are no packets, frames, layers, blocks, shards, graphs, hash graphs "bots", "motes", ... or Satoshi's traversing the net, stored in a blockchain cube.

Transactions are unicast, multicast, or anycast (workflow). The afore mention terms are non-existent, fictitious, imaginary metaphorical fabrications that are non - compliant with US Supreme Court SCOTUS Alice Corp Vs CLS Bank 2014 ruling "claims may not direct towards abstract ideas". Physical is the opposite of abstract

Figure 12: Blue Force Tracker / Maneuver Control System framework system

Force XXI Battle Command Brigade and Below (FBCB2) is a Linux-based communication platform designed for commanders to track friendly and hostile forces on the battlefield.[1] It increases a vehicle commander's situational awareness of the battlefield by gathering information near real-time based on vehicle locations being updated on the battlefield. This information is viewed graphically, and exchanged via both free and fixed text message formats (instead of verbal collection of reports).

Figure 13: Foundation technology standards basis for DeFi / Fintech IP wars

Framework: is a checklist: ideas, algorithms, processes, procedures, metrics, meters, signal & telemetry structured data for consistent Eco sustainable economic time cycle epochs for programmable \$ / economy / Net, Net of Money Foundation Technology for DeFi, programmable internet of money / Web 3.0 USPTO 13/573,002 framework supports for example, Distributed Trade Federation Organizations with DoD / NATO system of systems engineering signaling, telemetry engineering, syntax OPSCODE brevity codes matched with 2525C symbol sets vital for A.I. man-machine interface, interoperability, consistency, spatial – temporal, syntax lexicon consensus.

Foundation tech forming the internet, programmable \$\$\$, economy listed in an Adaptive Procedural Template of tools, processes, algorithms, etc. A adaptive procedural template used to improve signaling, synchronization using TCP/IP heartbeat time stamping occurring during micro-cycles of state meta data prior to data fusion center entry among metrics, metering processes comprised of TCP/IP heartbeats, heartbeat messages signaled during micro-cycles scheduling instructions, commands, processes, procedures, algorithms, telemetry instructions for example, to master-controller processes i.e., block, start, stop, pause, resume, set Time To live TTL i.e., stock market high frequency flash trade, currency, interest rates, tax rates, time banking, cloud computing commodity exchanges, big data, electrical micro-grid, fungible goods, real

time bidding, many use cases. Time stamping and applying descriptive data type tags to heartbeat state meta data after data is collected and queued, stored in temporary structures or entered into database instantiations after the fact is problematic. All internet supported devices including high frequency stock, currency, commodity etc., flash trade master controllers receive heartbeats. Heartbeats are sound wave / silicon chip created intervals, epochs, time cycles used to (not) process syntax during epochs.

The Heart Beacon Cycle Time - Space Meter is an Adaptive Procedural Template Framework checklist of ideas, algorithms, processes, procedures, metric, meters, signal & telemetry standards to establish consistent Eco sustainable economic time cycle epochs for program programmable money / programmable economy among Distributed Autonomous Organizations participating in trade federations on the (technically non-existent) crypto currency blockchain / hash-graph etc.

FIGURE 14: Code Syntax Lexicon, Message Template Library

Blockchain developers use alpha-numeric brevity OPSCODES to describe commodities or fungible goods or items that represent fungible stores of value. Military NATO bases are small cities that transact a range of goods, commodities, fungible items that are described by computer codes – OPSCODES that are matched with systemically, procedurally generated symbols and 2525 A, B, C, D standard series symbol sets essential to man – machine – computer Artificial Intelligence A.I. This disciplined effort took decades and thousands of man hours to develop and refine. Why reinvent this syntax lexicon library wheel with every new cryptocurrency blockchain startup ?

Structured military messaging involves identifying use cases as messages and message sets commonly used to accomplish tasks that are identified by number. Data elements or Field Form Identifiers Reference Numbers or FFIRNS and Field Unit Designators as three and four digit codes unambiguously identify the use of the data element in number forms. Three and four digit codes in turn refer to text descriptions referencing symbols in symbol libraries / databases. Messages are processed, parsed in - out of distributed database. Syntax / symbol source libraries that need a common reference format include as a minimum:

- Named-Data Networking NDN Centric Networking (XML tags)
- OASIS TOSCA YAML document indent data encoding scheme
- GITHUB code, syntax library, Java Script OS (“tag”) convention..

World Financial Standard ISO 20022 is a multi-part International Standard prepared by ISO Technical Committee TC68 Financial Services. It describes a common platform for the development of messages in ASN.1 Abstract Syntax Notation: A single standardization approach (methodology, process, repository) to be used by all financial standards initiatives. common platform for the development of messages using:

- a modelling methodology to capture in a syntax-independent way financial business areas, business transactions and associated message flows
- a central dictionary of business items used in financial communications

- a set of XML and ASN.1 design rules to convert the message models into XML or ASN.1 schemas, whenever the use of the ISO 20022 XML or ASN.1-based syntax is preferred ISO 20022: <https://www.iso20022.org/about-iso-20022>

FIGURE 15: Code Syntax Lexicon / Symbols / USPTO 13/573,002

Code Syntax Lexicon, Message Template Library: Establishing a consistent context library / lexicon and time stamping data by organization <Org_ID> and by data class type and by resource type to form a universal syntax, code, date element, tag Rosetta Stone and reference for coders, programmers, heartbeat algorithm event message bus. Military OPSCODE brevity alpha- numeric codes are mapped, associated, paired with MILSTD 2525 A, B, C, D symbols and symbol sets. MIL Standard sets are critical to A.I. Artificial Intelligence Man - machine interaction. USPTO 13/573,002's foundation is Battlefield Digitization / Network Centric Warfare's signaling, telemetry support framework where the improvement is OOTW Operations Other Than War involves use for net, net of programmable money, econometrics for DAO Distributed Autonomous Organizations / trade federations participating in a programmable economy.

Common syntax library of various Message Text Formats MTF to enable universal signaling / telemetry among a system of systems is ESSENTIAL. Decades of research at the taxpayer's expense into structured messaging / structured data exchange where the location, type of data identified by table number will help accelerate the process of organizing syntax into categories from disparate systems into data set reference repositories. Many semantic, syntax tags will be reusable. The rules, roles and logic developed by years of research involving of thousands of subject matter experts solving real world issues is the value to be extracted from 300+ message sets. NATO stays synchronized across many languages and cultures so why reinvent the wheel?

MESSAGE CATALOG: The USMTF message library has over 300 messages to choose from to facilitate information exchange requirements. MTFs presenting data in a logical, well specified and unambiguous layout. MTFs are transmission medium neutral. The content of the Message Catalogue has been developed by military operators. Military brevity codes and stock exchange codes are similar. security Identifier used in financial markets are: SYMBOL, CUSIP, ISIN, SEDOL, RIC Code, Syntax Lexicon Library

FIGURE 16: DoD / NATO structured data system of systems engineering / symbols

DoD / NATO system of systems engineering signaling, telemetry framework and syntax OPS CODE brevity codes matched with 2525C symbol sets vital for A.I. man-machine interface, interoperability, consistency and DAO consensus

Figure 17: Discovery Machine Machine Learning IP / USPTO 13/573,002

Discovery Machine® leverages a wide range of AI techniques from knowledge acquisition (KA) to machine learning (ML) to develop “intelligent constructs” for training, decision support and automation. Discovery Machine®'s highly acclaimed, patented

knowledge capture methodology works in conjunction with our patented visual modeling tools to enable the agile production of intelligent constructs. Discovery Machine® leverages a wide range of AI techniques from knowledge acquisition (KA) to machine learning (ML) to develop “intelligent constructs” for training, decision support and automation. Discovery Machine Discovery Machine®’s patented knowledge capture methodology works in conjunction with our patented visual modeling tools to enable the agile production of intelligent constructs. Discovery Machine®’s AI overcomes the limitations of ML imposed by sparse data environments by capturing the mental models trapped in the heads of your organization’s subject matter experts (SME) to bias and direct learning. Source: <https://discoverymachine.com/>

Figure 18: Discovery Machine Symbolic Artificial Intelligence / USPTO 13/573,002

Symbolic artificial intelligence: is the term for the collection of all methods in artificial intelligence research that are based on high-level symbolic (human-readable) representations of problems, logic and search.[1] Symbolic AI used tools such as logic programming, production rules, semantic nets and frames, and it developed applications such as knowledge-based systems (in particular, expert systems), symbolic mathematics, automated theorem provers, ontologies, the semantic web, and automated planning and scheduling systems. The Symbolic AI paradigm led to seminal ideas in search, symbolic programming languages, agents, multi-agent systems, the semantic web, the strengths. imitations of formal knowledge and reasoning systems. Physical symbol system (also called a formal system) takes physical patterns (symbols), combining them into structures (expressions) and manipulating them (using processes) to produce new expressions. The physical symbol system hypothesis (PSSH) is a position in the philosophy of artificial intelligence formulated by Allen Newell and Herbert A. Simon. They wrote: "A physical symbol system has the necessary and sufficient means for general intelligent action." [2] —Allen Newell and Herbert A. Simon

This claim implies both that human thinking is a kind of symbol manipulation (because a symbol system is necessary for intelligence) and that machines can be intelligent (because a symbol system is sufficient for intelligence).[3] The idea has philosophical roots in Hobbes (who claimed reasoning was "nothing more than reckoning"), Leibniz (who attempted to create a logical calculus of all human ideas), Hume (who thought perception could be reduced to "atomic impressions") and even Kant (who analyzed all experience as controlled by formal rules).[1] The latest version is called the computational theory of mind, associated with philosophers Hilary Putnam and Jerry Fodor.[4] Source: Wikipedia: https://en.wikipedia.org/wiki/Physical_symbol_system

Figure 19: Artifical Intelligence / USPTO 13/573,002

Artificial Intelligence is generated by 1) Time Epoch cycles used to parse, process during microchip oscillations created opportunities to apply rules described by syntax

Figure 20: Net, Net of \$, Artificial Intelligence A.I. = 1. Epoch time cycles 2. Syntax

Artificial Intelligence is generated by 1) Time Epoch cycles used to parse, process during microchip oscillations created opportunities to apply rules described by syntax

Figure 21: Syntax, brevity codes mapped to symbols for A.I. artificial intelligence Man-machine interface

Artificial Intelligence is generated by 1) Time Epoch cycles used to parse, process during microchip oscillations created opportunities to apply rules described by syntax

FIGURE 22: Blockchain Basics / How the internet works / USPTO 13/573,002

THESIS: All things internet, internet of programmable money are formed using:

1. Time epochs created by oscillating quartz crystal silicon chips
2. Syntax used / not used as programming instructions during epoch time cycles

All things internet, net of money blockchains are formed by unicast, multicast, anycast protocols. Programmable money's improvements are in cryptography. Blockchains are formed by unicast, multicast, anycast and workflow filters. Programmable money's improvements are in cryptography. Internet 3.0 and the new web will be based on the original structure and an Adaptive Procedural Template described by Stanford University. There are no packets, frames, layers, blocks, shards, graphs, hash graphs "bots", "motes"... or Satoshi's traversing the net, stored in a blockchain cube.

Figure 23: Blockchain Tri-lemma Quad-lemma / Net, net of Money ground truth

- The perfect blockchain has three elements: Security, decentralization, and scalability. Finding a balance between the three is difficult and presents a problem referred to as the blockchain trilemma.
- Scalability and decentralization are often held back by security, but security tends to be compromised by any shifts on a network that offer scalability.
- Projects either choose to focus on two out of three or work on finding a solution to tackle the trilemma once and for all. Innovative ideas like sharding, side-chains and state channels are used to address the trilemma but they're still experimental.
- A solution to the problem could lead to greater adoption of cryptocurrency and blockchain and a wide-spread use of the technology across industries.

In reality, Terms like blockchain, levels, (side) chains are epoch cycles created after the genesis block that is an epoch time interval, cycle produced by (silicon chip) oscillations.

Figure 24: Defi, Fintech Foundation tech for IP intellectual property wars

Foundation Tech / Standards for programmable \$ given the internet was financed, steered by the Department of Defense / NATO. Why reinvent decades of research and system of systems engineering structured data exchange best practice? Is this even possible any time soon? ISO 20022: <https://iso20022.org/about-iso-20022>

FIGURE 25: Situation Awareness Reference Architecture SARA

Situational Awareness Reference Architecture (**SARA**) to foster knowledge sharing capabilities. **SARA** is a compilation of industry standards, technical practices and processes designed to enable situational **awareness** across shared infrastructure.

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Figure 27: INFOCON Structured Data Exchange Precedence model

NATO / DoD SYSTEM OF SYSTEMS ENGINEERING REUSE: DoD - NATO has invested decades of mapping OPSCODE brevity codes to symbology / symbols / symbol sets contained in three hundred 300 plus message set / use cases as part of Battlefield digitization, Net Centric Warfare NET Enabled Operations NEO NETOPS system of systems engineering. Blockchain, Digital Ledger Technology DLT crypto currency developers are recreating, reinventing this decades old, tedious, time intensive, labor intensive, expensive structured data exchange wheel with every new meme, metaphor. Crypto currency economics needs a universal syntax lexicon digital base Artificial Intelligence A.I., quantum blockchain heartbeat beacon to synchronize, sample tokenized commodities across a stochastically harmonized UTZ Universal Time Zone using the firefly-heartbeat algorithm and Princeton University Mathematician John Nash's Equilibrium algorithms NATO bases are small cities that transact most goods, commodities with the host nation. Why reinvent the syntax lexicon Rosetta Stone wheel? Reuse: system of systems tool to accelerate an EIN Earth Intelligence Net – see Project #UNRIG by Robert David Steele

NET CENTRIC OPERATIONS / NET ENABLED OPERATIONS NEO See:
https://en.wikipedia.org/wiki/Network-centric_warfare See: <http://ncoic.org>

To determine if an organization - squad or platoon was mission capable or where it was supposed to be and equipped with the requisite resources: food, water, fuel, ammo etc. data is sampled and forwarded using a minimum of network resources e.g., time frames, intervals, epochs allocated for specific purposes. The Internet Protocol was examined closely and it was re-discovered that time interval frame assignments were left unassigned / available by internet creators (Stanford U etc.) to transport additional state meta data at some future date when a need arose. These heretofore unassigned time intervals set aside for future use would be used to carry data about the organization – the unit designation or Organizational Identifier <Org_ID>, geo-location

at specified times and its resources Uniform Resource Name. Deriving common building blocks from JBFSA which are the common building blocks (heartbeat and </108< heartbeat messages intrinsic to financial and First Response Systems. USPTO 13/573,002 is based upon and applies improvements to United States Army Communication Electronic Command CECOM's greatest invention Blue Force Tracker.

Figure 28: STRATML Markup Language

Strategy Markup Language (StratML) is an XML-based standard vocabulary and schema for the information commonly contained in strategic and performance plans and reports. StratML Part 1 specifies the elements of strategic plans, including: mission, vision, values, goals, objectives, and stakeholders. Part 2 extends Part 1 to include the additional elements required for performance plans and reports, including stakeholder roles and performance indicators. Originally adopted as an American national standard (ANSI/AIIM 21:2009) Part 1, Strategic Plans, was published as an international standard (ISO 17469–1) on February 11, 2015, with minor changes from the ANSI version.[1] On November 13, 2015, the ANSI version of Part 1 was replaced with the ISO version (ANSI/AIIM/ISO 17469-1).[2] On January 9, 2017, the ISO changes and several additional enhancements were approved for incorporation into Part 2, Performance Plans and Reports (ANSI/AIIM 22).[3] Internationalization of Part 2 will depend upon sufficient support from other nations in the ISO process.

The vision of the StratML standard is: "A worldwide web of intentions, stakeholders, and results." Its more explicit purposes include enabling strategic alignment through literal linkages between performance objectives and the business records supporting them. Although the initial focus has been on the plans and reports that U.S. federal agencies are required to compile and maintain under the Government Performance and Results Act (GPRA), the standard has been specified generically so as to be applicable not only to all organizations, worldwide, but also to individuals who choose to lead mission/goal-directed lives. Section 10 of the [4] GPRA Modernization Act (GPRAMA) requires U.S. federal agencies to publish their strategic and performance plans and reports in machine-readable format. StratML is such a format.

Source: [Wikipedia](#)

Figure 29: Universal Time Zone UTZ Stochastic Harmonization / Synchronization

Geo-spatial, temporal metrics, meters that are synchronized, stochastically harmonized across UTZ Universal Time Zone. Micro to macro-cycle heartbeat cycle, heartbeat message, blockchain updates for system of systems synchronization, stochastic harmonization, spatial econometrics

Figure 30: SCOP Heartbeat Epoch Time Interval Start, Stop, TTL Time To Live

INTERNET BUILDING BLOCK: HEARTBEAT ADMINISTRATIVE INTERFACE: SCOP Administrative Interface as an Internet, net of Money configuration tool. SCOP is a tool that exemplifies how the internet really works. SCOP is a web application, PHP based,

that is a front-end to heartbeat. . SCOP can start/stop services, view/edit configuration files, make backups, take a server online/offline, add/remove virtual/real servers, etc.

FIGURE 31: The Alice Effect / SCOTUS Alice Corp Vs CLS Bank 2014 ruling

SCOTUS 2014 Alice in Wonderland Alice Corp Vs CLS Bank ruling "claims may not direct towards abstract ideas". Physical is the opposite of abstract.

How the internet really works / impact on SCOTUS Alice Ruling 2014

Internet = unicast / anycast publish - subscribe / multicast - broadcast & workflow stored across, among a distributed database now as it was in the beginning

Figure 32: Firefly Inspired Heartbeat Synchronization Algorithm

Firefly inspired heartbeat synchronization algorithm proposed by the Universities of Bologna Italy, Hungary includes message event bus algorithm – protocol, software application neutral monitors geo-spatial, temporally distributed events reported across a DAO among federated groups synchronized in time-space for common goals. The firefly algorithm (FA) is a nature-inspired metaheuristic optimization algorithm developed by Xin-She Yang that is inspired by the flashing behavior of fireflies (Yang, 2008), originally designed to solve continuous optimization problems (Lukasik and Žak, 2010; From: Swarm Intelligence and Bio-Inspired Computation, 2013).

This work presents a **heartbeat** synchronization protocol for overlay networks **inspired** by mathematical models of flash synchronization in certain species of fireflies, and shows that synchronization emerges even when messages can have significant delay subject to large jitter. **Heartbeat** synchronization strives to have nodes in a distributed system generate periodic, local "**heartbeat**" events as heartbeat messages over a universal event message bus.

FIGURE 33: ECONOMIST MILTON FRIEDMAN'S K% RULE GDP HEARTBEAT

Economist Milton Friedman predicted the rise of a computer capable of automatically adjusting the inflation rate of money. is the monetarist proposal that the money supply should be increased by the central bank by a constant percentage rate every year, irrespective of business cycles.

FIGURE 34: TERRA TRC TRADE REFERENCE COMMODITY BASED CURRENCY

TRADE REFERENCE CURRENCY TERRA TRC: Terra (The Trade Reference Currency, TRC) is the name of a possible "world currency". The concept was proposed by Belgian economist and expert on monetary systems Bernard A. Lietaer in 2001, based on a similar proposal from the 1930s. The currency is meant to be based on a basket of the 9-12 most important commodities (according to their importance in worldwide trade). Currency resistant to inflation.

FIGURE 35: FEDERATE / FEDERATION

Trade federations form among local communities or among sovereign (First) nations. The off-site connector workflow object convention connects, mitigates, adjusts by summation, statistical mean by aggregation among federated, non-federated groups acting as format gateways among participating, non – participating groups. Federate Latin: foedus, gen.: foederis Latin: foedus, gen.: foederis, covenant characterized by a union of partially self-governing states or regions under a central (federal) government

Figure 36: Federate / Federation Beacon Communities

The parallel economy has two major draws. For consumers, it offers the opportunity to buy from firms that reflect their values. PublicSq, an online marketplace, is home to 40,000 firms devoted to freedom, the family unit and the constitution. The term “parallel economy” has been used to describe black markets, regional economies, and is also the name of a payment processor by Rumble. The term is most often used to describe the emergence of new technologies - centered ecosystem

FIGURE 37: ERICSSON ERLANG OPEN MONEY / USPTO 13/573,002

ERLANG – ERLANG FOLSOM: Erlang based metrics system inspired by Coda Hale's metrics (<https://github.com/dropwizard/metrics>). The metrics API's purpose is to collect real-time metrics from Erlang applications and publish them via Erlang APIs and output plugins. folsom is not a persistent store. There are 6 types of metrics: counters, gauges, histograms (and timers), histories, meter_readers and meters. Metrics can be created, read and updated via the folsom_metrics module.

LINK <https://github.com/boundary/folsom>

FIG 38: CRYPTOCURRENCY LAND USE IRS MEMO 1421 / USPTO 13/573,002

IRS Memo #1421: Purchased Bitcoins are treated akin to property. Plots A, B, C represent 3 unspent transaction outputs controlling N Bitcoins. - End-state Bitcoin quantity will be fixed like land “Bitcoin as protocol of ownership, not transfer. Coins never travel, but simply switch owners”. Method and means metric steps:

Step 1: prove coin ownership <Org_ID> Coin Issuer

Step 2: coins sent where, when Lat-Long, Time Stamp

Step 3: specify ownership <Org_ID> issuing agent

Step 4: Issuing Org of Record adjudicates w buyer

Figure 39: IDMaps / SonarHops Distance Estimation Service / USPTO 13/573,002

IDMAPS – SONAR HOPS: IDMaps / SonarHops internet distance estimation service: IDMaps is a global internet host distance estimation service that provides distance information used by SONAR / HOPS query / reply service. IDMaps measures, disseminates internet wide distance information to for example, Distributed Autonomous Virtual Organizations DAVOS. Higher level services for example at the macro-cycle level collect distance information to build a virtual distance map of internet by estimating distance between any IP address pair. Location is achieved by use of triangulation. Distance information adjusts to “permanent” topology changes e.g., splits, joins, adds, moves, drops, merges in lieu of formal merger / acquisition. IDMaps assists Network Time Protocol (NTP) servers establish long term peering relationships. Distance Metrics focus is on latency (e.g., round-trip delay) and where possible, bandwidth. We improve stochastic harmonization by use of firefly inspired algorithms that strive to achieve synchronization by matching firefly synchronization behavior with the closest matching heartbeat time temporal snapshot cycle interval.

FIGURE 40: BIG DATA THE NEXT OIL / USPTO 13/573,002

Big Data as the “Next Oil”: Establishing a consistent context library / lexicon and time stamping data by organization <Org_ID> and by data class type and by resource type to form a universal syntax, code, date element, tag Rosetta Stone and reference for coders, programmers, heartbeat algorithm event message bus. Establish a consistent context library / lexicon and time stamping data by organization <Org_ID> and by data class type and by resource type to form a universal syntax, code, date element, tag Rosetta Stone and reference for coders, programmers, heartbeat algorithm event message bus. Military OPSCODE brevity alpha- numeric codes are mapped, associated, paired with MILSTD 2525 A, B, C, D symbols and symbol sets. MIL Standard sets are critical to A.I. Artificial Intelligence Man - machine interaction. USPTO 13/573,002's foundation is Battlefield Digitization / Network Centric Warfare's signaling, telemetry support framework where the improvement is OOTW Operations Other Than War involves use for net, net of programmable money, econometrics for DAO Distributed Autonomous Organizations / trade federations participating in a new model eco sustainable programmable economy across the UTZ Universal Time Zone.

FIGURE 41: (Wireless) ENERGY ATTENUATION / USPTO 13/573,002 claim

USPTO 13,573,002 electric meter claim based on electric dipole effect: closer is cheaper given less infrastructure needed given energy attenuates over distances • data over energy link where #energy pulses constitute a method and means to transmit data over electric wired, wireless pathways • electric dipole effect Radio Wave Properties: Electric and Magnetic Dipole Antennae LINK: <https://youtu.be/wUpOlqbHcjI?t=111>

FIGURE 42: Tesla inspired Energy / data (sound) waves as medium for unified quantum field propagation / transmission / quantum computing foundation technology #Tesla #energy #data #quantumcomputing

FIGURE 43: Wave based energy producing propulsion system

ABSTRACT: A propulsion system for aerial, terrestrial, underwater or space propulsion, through manipulation (or engineering) of the vacuum with proper electromagnetic interactions. Vacuum manipulation.. new form of propulsion, and has applications in ENERGY production and on CHANGE of TIME decay of radioactive elements. Opposing magnetic or electric fields create a mass repelling force, while attracting magnetic or electric fields create a mass attracting force. This vacuum manipulation process.. used to propel a mass that contains field sources that perturb the vacuum. .. the creation of a repulsion point in space through the interference of two or more longitudinal ELECTRO dynamic (micro) waves

FIGURE 44: Tesla / Nature inspired method for an Energy Token Economy

FIGURE 4X: SPACE – TIME BEACON / CLOSER = CHEAPER = LESS TIME / FUEL

PROJECT BEACON METHOD: A snapshot or sync delta value taken at a predetermined time interval (micro-cycle to macro cycle) is used to calculate a statistical mean value of commodities comprising a GDP index used as a value index nation's / world's unit of value as the basis for valuating a currency unit of exchange. The world's systems need to be time-space synchronized, stochastically harmonized across the one world, global UTZ Universal Time Zone via heartbeat messages using universally shared, standards based OPSCODE brevity codes drawn from a universal structured data exchange syntax lexicon with over 300 use case templates

Figure 44: Time Chain / Time Stamp Server based QFS Quantum Financial System

All things internet, internet of money are formed with epoch time cycles – intervals and syntax OPS CODE brevity codes used as instructions. Space or the land use meme is used in blockchain – time chain based systems to represent stored, accrued value. See the IRS memo #1421 where a land use meme is described to represent Bitcoin's blockchain also referred to DLT Digital Ledger Technology where blocks from cubes

Figure 45: Space - Time Energy over distance SLA: energy attenuates over distance.

Shorter = closer = cheaper given less infrastructure, maintenance needed

USPTO 13/573,002 energy metrics, meter. Example: "when space-time spins, it creates mass. It produces energy in space that radiates. This radiation is what we call mass. At the fundamental level of space-time is a honey comb of overlapping spheres of energy each having a singularity at the center: Nassim Haramein "the new Einstein" USPTO 13/573,002 claim [#energy](#) [#Haramein](#) [#Tesla](#) [#Bucky](#) Fuller [#SLA](#) [#space-time](#)

Figure 46: myriad consensus algorithm blockchain memes / metaphors = Tower of Babel / Universal meme SCOTUS 2014 Alice Corp Vs CLS Bank compliant

Reuse of DARPA - NATO's structured data exchange that maps data element OPSCODES to symbol sets is key to Artificial Intelligence AI man - machine interface, consensus, consistency among myriad blockchain programmable money algorithms, memes. Method includes for example, universal meme for Bitcoin and like cryptocurrencies, Blockchain Proof of Work, Stake, POET Proof of Elapsed Time, Project Lightning Vs Segregated Witness, and Fast Internet Bitcoin Relay Engine FIBRE... A common tool / meme is needed to help establish consensus metrics, meters

Figure 47: Proof of Work Consensus / USPTO 13/573,002

Proof of Work (PoW) was first published in 1993 by Cynthia Dwork and Moni Naor and was later applied by Satoshi Nakamoto in the Bitcoin paper in 2008. The Proof of Work consensus algorithm involves solving a computational challenging puzzle in order to create new blocks in the blockchain. The process of verifying the transactions in the block to be added, organizing these transactions in a chronological order in the block and announcing the newly mined block to the entire network does not take much energy and time. The energy consuming part is solving the 'hard mathematical problem' to link the new block to the last block in the valid blockchain. When a miner finally finds the right solution, the node broadcasts it to the whole network at the same time, receiving a cryptocurrency prize (the reward) provided by the PoW protocol.

FIGURE 48: Proof of Stake Consensus

Proof-of-stake is a cryptocurrency consensus mechanism for processing transactions and creating new blocks in a blockchain. A consensus mechanism is a method for validating entries into a distributed database and keeping the database secure. In the case of cryptocurrency, the database is called a blockchain—so the consensus mechanism secures the blockchain. The next block writer on the blockchain is selected at random, with higher odds being assigned to nodes with larger stake positions.

Figure 49: PoST Proof of Space – Time Consensus

The rational proof of financial interest in the network achieved by PoST addresses two problems with proof-of-capacity: Arbitrary amortized cost - In a consensus system that doesn't account for time, participants can generate an arbitrary amount of PoC proofs by reusing the same storage space, lowering their true cost.

Figure 50: Proof of Activity Consensus

Proof-of-activity (PoA) is a blockchain consensus algorithm used to ensure that all transactions occurring on the blockchain are genuine, as well as to ensure that all miners arrive at a consensus. PoA is a combination of two other blockchain consensus algorithms: proof-of-work (PoW) and proof-of-stake (PoS). PoA increases the difficulty level of mining as time passes, PoA also prevents the chance of a 51% attack, like in POW and POS, because it is impossible to predict who the signing peer would be in the

future, and coin saving competition among signers does not allow the computing power to be accumulated within a group.

Figure 51: Proof of Authority Consensus

Proof-Of-Authority (PoA) is a consensus method that gives a small and designated number of blockchain actors the power to validate transactions or interactions with the network and to update its more or less distributed registry. It works as follow: according to the chosen scheme, one or more validating machines are responsible for generating each new block of transactions that will be included in the Blockchain. The new block can be accepted directly without verification, or by unanimous vote of block generators, or simply by a majority, depending on the configuration chosen for the Blockchain.

Figure 52: Proof of Burn Consensus

PoB coins are “burned” by sending coins to an address from where they are irretrievable. By committing the coins to an unreachable address, validators earn a privilege to mine on the system based on a random selection process. Thus, burning coins means that validators have a long-term commitment in exchange for their short-term loss. Depending on how the PoB is implemented, miners may burn the native currency of the Blockchain application or the currency of an alternative chain, such as bitcoin. The more coins validators burn, the better the chances of being selected to mine the next block.

Figure 53: Proof of Capacity Consensus

Proof of capacity (PoC) is a consensus mechanism algorithm used in blockchains that allows for mining devices in the network to use their available hard drive space to decide mining rights and validate transactions. Proof of capacity (PoC) authentication systems employ spare space on a device's hard drive to store solutions to a cryptocurrency hashing problem. Proof of capacity allows the mining devices, also known as nodes, on the blockchain network to use empty space on their hard drive to mine the available cryptocurrencies. Instead of repeatedly altering the numbers in the block header and repeated hashing for the solution value as in a PoW system, PoC works by storing a list of possible solutions on the mining device's hard drive even before the mining activity commences. The larger the hard drive, the more possible solution values one can store on the hard drive, the more chances a miner has to match the required hash value from his list, resulting in more chances to win the mining reward. To draw an analogy, if lottery rewards are based on matching the most numbers on the winning ticket, then a player with a longer list of possible solutions will have better chances of winning. Additionally, the player is allowed to keep using the lottery ticket block numbers again and again repeatedly.

Figure 54: Proof of Weight / Volumetric Consensus

Proof-of-Weight is a blockchain consensus mechanism that gives users a 'weight' based on how much cryptocurrency held. Proof-of-weight consensus mechanisms are based

off of the first Proof-of-Weight consensus model used in the cryptocurrency Algorand, which was developed by researchers at the MIT Computer Science & Artificial Intelligence Laboratory. The Proof-of-Weight consensus mechanism remains secure as long as the majority of weighted users are honest, and protects the network against double-spend attacks. Each time a transaction is made on a blockchain using the Proof-of-Weight consensus mechanism, the network creates a committee of random network members and assigns each member 'weight' (based on how much currency held on the network) which slightly centralizes the consensus process within a random committee.

FIGURE 55: Bitcoin Classic / Core / Unlimited / USPTO 13/573,002

Bitcoin Classic was a proposed hard fork from Bitcoin Core that proposed increasing the maximum size of transaction blocks. Bitcoin Classic proposed increasing blockchain sizes from 1 megabyte to 2 megabytes. In effect, this would double the number of transactions that could be processed per second. The proposed increase was less aggressive than what was proposed by Bitcoin XT in 2015 proposed increasing the size of blocks to 8 megabytes.

FIGURE 56: Microsoft Cloud blockchain formerly known as Project BLETCHLEY

Project Bletchley is a vision for Microsoft to deliver Blockchain as a Service (BaaS)

In Project Bletchley, Azure provides the fabric for blockchain, serving as the cloud platform where distributed applications are built and delivered.

Azure will be open to a variety of blockchain protocols, supporting simple, Unspent Transaction Output-based protocols (UTXO) like Hyperledger, more sophisticated, Smart Contract-based protocols like Ethereum, and others as developed. Introduced in Project Bletchley are two new concepts: blockchain middleware and cryptlets.

Blockchain middleware will provide core services functioning in the cloud, like identity and operations management, in addition to data and intelligence services like analytics and machine learning. These technologies will ensure the secure, immutable operation that blockchain provides, at the same time, deliver the business intelligence and reporting capabilities business leaders and regulators demand. Newly developed middleware will work in tandem with existing Azure services, like Active Directory and Key Vault, and other blockchain ecosystem technologies, to deliver a holistic platform and set of solutions. Cryptlets, a new building block of blockchain technology, will enable secure interoperation and communication between Microsoft Azure, ecosystem middleware and customer technologies. Cryptlets function when additional information is needed to execute a transaction or contract based on a date or time and providing market data. They will become a critical component of sophisticated blockchain systems, enabling all technology to work together in a secure, scalable way.

Figure 57: SAWTOOTH / POET Proof of Elapsed Time Consensus

Proof of elapsed time (PoET) is a [blockchain](#) network consensus mechanism that prevents high resource utilization and energy consumption; it keeps the process more

efficient by following a fair lottery system. The algorithm uses a randomly generated elapsed time to decide mining rights and block winners on a blockchain network. By running a trusted code within a secure environment, the PoET [algorithm](#) also enhances transparency by ensuring lottery results are verifiable by external participants.

- Proof of elapsed time (PoET) is a consensus algorithm developed by Intel Corporation that enables permissioned blockchain networks to determine who creates the next block.
- PoET follows a lottery system that spreads chances of winning equally across network participants, giving each node the same chance.
- The PoET algorithm generates a random wait time for each node in the blockchain network; each node must sleep for that duration.
- The node with the shortest wait time will wake up first and win the block, thus being allowed to commit a new block to the blockchain.
- PoET workflow is similar to Bitcoin's proof of work (PoW) but consumes less power because it allows a node to sleep and switch to other tasks for the specified time, thereby increasing network energy efficiency.

Figure 58: Proof of Space Time POST / USPTO 13/573,002

A proof of space-time (PoST) shows the prover has spent an amount of time keeping the reserved space unchanged. Its creators reason that the cost of storage is inextricably linked not only to its capacity, but to the time in which that capacity is used.

Figure 59: State Channels / USPTO 13/573,002

State channels allow participants to securely transact off-chain while keeping interaction with Ethereum Mainnet at a minimum. Channel peers can conduct an arbitrary number of off-chain transactions while only submitting two on-chain transactions to open and close the channel. State channels are two-way pathways opened between two users that want to communicate with each other in the form of transactions. Each participant in the channel signs these transactions with his private key to ensure that they are undeniably true and authorized.

FIGURE 60: Segregated Witness - Lightning Consensus / USPTO 13/573,002

Segregated Witness (SegWit) refers to a change in the transaction format of Bitcoin. Its stated purpose as a protocol upgrade was to protect against transaction malleability and decrease transaction times by increasing block capacity. Transaction malleability refers to the possibility that tiny pieces of transaction information could be changed, invalidating new cryptocurrency blocks. It is intended to speed up the validation process by storing more transactions in a block.

Segregated Witness (SegWit) is a change in Bitcoin's transaction format where the witness information was removed from the input field of the block. The stated purpose of Segregated Witness is to prevent non-intentional Bitcoin transaction malleability and

allow for more transactions to be stored within a block. SegWit is intended to solve a blockchain size limitation problem that reduces Bitcoin transaction speed.

The Lightning Network is a second layer for Bitcoin that uses micropayment channels to scale the blockchain's capability to conduct transactions more efficiently. This layer consists of multiple payment channels between parties or Bitcoin users. A Lightning Network channel is a transaction mechanism between two parties. Using channels, the parties can make or receive payments from each other. Transactions conducted on the Lightning Network are faster, less costly, and more readily confirmed than those conducted directly on the Bitcoin blockchain. The Lightning Network can also be used to conduct other types of off-chain transactions involving exchanges between cryptocurrencies. Concerns About the Lightning Network

The most apparent problem with the Lightning Network—which is meant to be decentralized—is that it could lead to a replication of the hub-and-spoke model that characterizes today's financial systems. In the current model, banks and financial institutions are the primary intermediaries through which all transactions occur. Businesses that invest in Lightning Network nodes may become similar hubs or centralized nodes in the network by having more open connections with others. Other concerns are fraud, fees, hacks, and price volatility.

FIGURE 61: BITCOIN NG NEXT GENERATION / USPTO 13/573,002

Bitcoin-NG is a Byzantine fault tolerant blockchain protocol that is robust to extreme churn and shares the same trust model as Bitcoin. In addition to Bitcoin-NG, we introduce several novel metrics of interest in quantifying the security and efficiency of Bitcoin-like blockchain protocols. We implement Bitcoin-NG and perform large-scale experiments at 15% the size of the operational Bitcoin system, using unchanged clients of both protocols. These experiments demonstrate that Bitcoin-NG scales optimally, with bandwidth limited only by the capacity of the individual nodes and latency limited only by the propagation time of the network.

Figure 62: Decentralized Oracle Networks / USPTO 13/573,002

Decentralized metalayer of oracle networks allows smart contracts to seamlessly use and create an array of decentralized services that accelerate dApp development, enable cross-chain functionality, and harmonize disparate technologies. DON's enables smart contracts on any blockchain to leverage extensive off-chain resources, such as tamper-proof price data, verifiable randomness, automation functions, external APIs,

FIGURE 63: Brave New Coin B-WAP Consensus / USPTO 13/573,002

Block-Weighted-Average-Price (B-WAP) API creates a USD price for any block in the Bitcoin blockchain, based on BNC's Bitcoin Liquid Index (BLX). Automatically appropriates blockchain transactions with a USD price or technical indicator for traders. Key Features: Look up any bitcoin blockchain transaction and receive back a USD value for any transaction. Built using historic bitcoin price index - the BNC BLX.API

updated every 10 min with a 2 hour delay on latest blocks (due to the nature of Block propagation to ensure avoidance of publishing rates on orphaned blocks). All rates time-stamped in UTC. Ability to look up by time-stamp. Ability to look up by block-height. Get by: Block-height, Time-stamp or Transaction, Transaction ID, Block ID, time-stamp, BWAP per block, Value in USD. BTC per transaction, bitcoin transaction fees per transaction. Exchanges Covered: Price discovery for the B-WAP comes from utilizing the BNC Bitcoin Liquid Index (BLX) bitcoin price calculation. As of 2018, coins were mined using a proof of work algorithm with a hash function called "X11", with eleven rounds of hashing, and the average time to mine a coin was around two and a half minutes. Masternodes provide two additional kinds of transactions. "InstantSend" bypasses mining and instead requires a consensus of masternodes to validate a transaction, speeding transactions.[3][1] "PrivateSend" gives users optional consumer-grade privacy; it mixes participating users' unspent Dash before executing a transaction.

FIGURE 64: DASH / USPTO 13/573,002

Dash is an open source cryptocurrency. It is an altcoin that was forked from the Bitcoin protocol. It is also a decentralized autonomous organization (DAO) run by a subset of its users called "masternodes". Dash was designed to allow transactions quickly and to have a swift governance structure in order to overcome shortfalls in Bitcoin.[3] What makes Dash different from Bitcoin is that it splits its rewards into three categories: 45% goes to miners, 45% goes to masternodes (these are computers that provide additional services in the network and have a significant investment in Dash tokens), and 10% goes towards its decentralized governance budget. Governance is handled through a form of decentralized autonomous organization in which decisions are made on a blockchain via masternodes. Masternodes perform standard node functions like hosting a copy of the blockchain, relaying messages, and validating transactions on the network, and in addition act as shareholders, voting on proposals for improving Dash's ecosystem. Anyone with 1,000 Dash Coins (DASH), the protocol's native cryptocurrency, can become a masternode owner.

FIGURE 65: ETHEREUM – CASPER / USPTO 13/573,002

Casper is a security-deposit based economic consensus protocol. Nodes = "bonded validators" place security deposit (an action called "bonding") If a validator generates an invalid action, account deposits are forfeited along with consensus privilege. Use of security deposits address "nothing at stake" problem; that behaving badly is not expensive. Casper is an EVENTUALLY CONSISTENT blockchain-based consensus protocol. CASPER favors availability over consistency

FIGURE 66: HYPERLEDGER FRAMEWORK / USPTO 13/573,002

Hyperledger Fabric, an open source project from the Linux Foundation, is the modular blockchain framework and de facto standard for enterprise blockchain platforms. Intended as a foundation for developing enterprise-grade applications and industry solutions, the open, modular architecture uses plug-and-play components

FIGURE 67: R3 Consortium CORDA / USPTO 13/573,002

Corda is a scalable, permissioned peer-to-peer (P2P) distributed ledger technology (DLT) platform that enables the building of applications that foster and deliver digital trust between parties in regulated markets. CORDA core functions:

- Choreographing workflow between firms without a central controller
- Supports inclusion of regulatory & supervisory observer nodes
- Validating transactions solely between parties to the transaction
- Supporting a variety of consensus mechanisms
- Recording explicit links between human-language legal prose documents and smart contract code

FIGURE 68: DFINITY Blockchain Nervous System / USPTO 13/573,002

The DFINITY Foundation is a major contributor to the Internet Computer blockchain. Internet Computer (IC) is a platform for executing smart contracts/The term “smart contract: a general-purpose, tamperproof computer program whose execution is performed autonomously on a decentralized public network. smart contracts

- are composable, meaning that they may interact with one another, and
- support tokenization, meaning that they may use and trade digital tokens.

Figure 69: Byzantine Fault Tolerant BFT-SMART / USPTO 13/573,002

Byzantine Fault-Tolerant State Machine Replication BFT-SMART dynamic distributed system processes are divided in two nonintersecting subsets: replicas and clients. Each system process has a unique identifier. During dynamic system execution, a sequence of views is installed to denote the reconfigurations due to replicas joins and leaves. A view is composed by a set of replicas identifiers. Modularity is achieved using a set of building blocks(or modules)containing the core functionality of BFTSMART. Blocks are divided in three groups: communication system, state machine replication and state management. BFT-SMART needs an eventually synchronous system. Total order multicast is achieved using the Mod-SMaRt protocol and with the Byzantine consensus algorithm Clients send requests to all replicas in cv, and wait for replies. replicas store each batch of ordered requests to a (stable) log and, periodically, take snapshots of the application state and store it in stable memory.

FIGURE 70: OpenBazaar Free Trade on the Blockchain / USPTO 13/573,002

OpenBazaar is an open source project developing a protocol for e-commerce transactions in a fully decentralized marketplace. [2] It uses cryptocurrencies as medium of exchange and was inspired by a hackathon project called DarkMarket. OpenBazaar Creates an online store for users to sell goods for Bitcoin

Connects these stores directly to each other on a global network

Users browse individual stores, search for products across whole network

A buyer directly connects, purchases good from the merchant using Bitcoin
Bitcoin payments via escrow protect merchants & buyers during trade

FIGURE 71: EPCIS RFID / USPTO 13/573,002

Electronic Product Code Information Services (EPCIS) GS1 Standard for creating, sharing visibility event data. What identifiers of object(s) or entities / subject of event
When date time when event took place, local time zone in effect
Where location identifier where event occurred, identifier of location where object(s) are expected to be following the event
Why Information about the business context, including: a Identifier that indicates the business step taking place

Figure 72: HASHGRAPH DAG Directed Acyclic Graph / USPTO 13/573,002

Hashed Timelock Contract (HTLC) A hashed timelock contract (HTLC) is a type of smart contract used in blockchain applications. It reduces counterparty risk by creating a time-based escrow that requires a cryptographic passphrase for unlocking. In practical terms, this means that the person receiving the funds in a transaction has to perform two actions to access the funds: enter the correct passphrase and claim payment within a specific timeframe. If they enter an incorrect passphrase or do not claim the funds within the timeframe, they lose access to the payment. A hashed timelock contract (HTLC) reduces counterparty risk in decentralized smart contracts by effectively creating a time-based escrow that utilizes a cryptographic passphrase. This type of smart contract requires the receiver of a payment to acknowledge it within a certain period of time or forfeit it. HTLCs is a fundamental tool used by the lightning network.

Figure 73: FEDCOIN – WORLD COIN ECONOMIC HEARTBEAT

Economist Milton Friedman's K% rule: "FEDCOIN / WORLD COIN currency derived from sampling lead economic indicators across a global, universal event bus by use of the firefly-heartbeat algorithm message event bus to track changes i.e., updating statistical means of a GDP Gross Domestic Product based index, USPTO 13/573,002 supports economist Milton Friedman's K% rule where a FEDCOIN / WORLD COIN currency is derived from sampling lead economic indicators across a global, universal event bus applying the firefly-heartbeat algorithm tracking changes, updating q statistical mean value index. Nobel Prize winning economist Milton Friedman described an "economic heartbeat" in his K% rule where the Treasury increases the money supply increases and decreases pegged to increases, decreases in GDP index volume.

Figure 74: Federal Reserve FedNOW Metallicus / USPTO 13/573,002

Federal Reserve Integration of FedNow with Metal Blockchain. Metal Blockchain is a crypto network designed by Metallicus, based on a modified version of Avalanche's code. The network was developed to offer compliance-friendly options for DeFi developers. The network

incorporates a subnet called “X-Chain” that empowers developers to establish transfer rules for assets. For instance, a token can be issued with guidelines, such as “only for US citizens” or “non-tradable until tomorrow.”

Figure 75 BIS project mBridge, bridges, blockchain – time chains, cubes..

mBridge mBL is an Ethereum EVM-compatible solution, referring to the ability of a blockchain to process transactions based on smart-contract codes that can run on many blockchain platforms. CBDC issuance, redemption, payments are implemented through smart contracts in the Solidity programming language. mBridge code is open sourced. mBL uses the Dashing consensus algorithm, a Byzantine Fault Tolerance (BFT) consensus protocol that uses proofs of partial confirmation of a block validation to reduce time needed to achieve consensus and to improve the overall protocol performance. Pseudonymous addresses and encrypted payment meta-data payloads are used to support privacy and confidentiality in transactions. mBL APIs are based on the global ISO 20022 messaging standard for financial information Legal Entity identifiers (LEIs) facilitate identification of entities facilitating AML/ CFT checks.

Figure 76: World Bank IMF Unicoin STABLE COIN / USPTO 13/573,002

Universal Monetary Unit (UMU), a.k.a Unicoin: store of value cryptograph supported by artificial intelligence (A.I.) Goals: continuous purchasing demand, minimal price volatility, and annual asset pricing targets. The primary value of any commodity is its utility value. Utility = pay for goods, services, and debts, preserve value over a long period of time. Employs machine learning trading bots. UMPC will establish yield payout rates for wallet holders to stake Unicoin in the Staked Proof of Trust (SPOT) consensus protocol. PoT consensus selects validators I.A.W contribution to the DeFI network.

Figure 77: Unicoin STABLE COIN CBDC / USPTO 13/573,002 TERRA TRC / UTZ

The primary value of any commodity is its utility value. Utility = pay for goods, services, and debts, preserve value over a long period of time. Employs machine learning trading bots. UMPC will establish yield payout rates for wallet holders to stake Unicoin in the Staked Proof of Trust (SPOT) consensus protocol. PoT consensus selects validators I.A.W contribution to the DeFI network / UNIVERSAL TIME ZONE UTZ PROJECT: Universal Time Zone (UTZ) Proposed Clock At the United Nations on May 20, 2003, President, George W. Bush, announced a proposal to unify all the world's time zones into a single Universal Time Zone (UTZ). Events across time zones will require synchronization, stochastic harmonization to be displayed by all in a common picture.

FIG 78: TRUTH COIN Nullius in Verba: On the word of no one. Future Wikipedia

1) Tradable Reputation

- Abstract Corp exists to prove consistency within / across TIME
- Collects \$ to power the mechanism.

2) SVD Cross-Validation

- Statistical technique: seeks importance.
- Gleans truth, measures conformity.

3) Strategic Use of TIME

- Funds can be 'locked' across time.
- Yet info-search-costs constantly fall.
- Net effect: time penalizes attackers only.

Figure 79: Figure 69: Volatility Problem Solution

How 'Bitbanks' Could Solve Bitcoin's Volatility Problem:

$$MV = PQ \text{ Money} \times \text{Velocity} = \text{Price} \times \text{Quantity}$$

The most important equation in monetary economics, the equation of exchange: $MV = PQ$. The quantity of money (M) times the rate spent (V for velocity) equals the price of everything bought (P) times the amount bought (Q for quantity). In Bitcoin, M Money is on a predetermined path, converging to 21m bitcoins. In relation to the other variables, Bitcoin is fixed. V, P, & Q fluctuate.

Figure 80: NEO / NEO Net Enabled Operations / Distributed Smart Economy

NEO NET Enabled Operations: Users are monitored as individuals within groups. Groups status is described, validated, authenticated, defined by statistical readiness / availability. operational concepts, architecture definition, information exchange requirements, data standards and protocols, and strategic and tactical-level decision support (with special emphasis on timely, data-driven collaborative decision making for complex operational problems among a system of systems using structure data).

Figure 81: IBM – Samsung ADEPT / USPTO 13/573,002

ADEPT: Autonomous Decentralized Peer-to-Peer Telemetry) concept that uses the BitTorrent peer-to-peer file sharing protocol, the Bitcoin cryptocurrency, Ethereum, and the peer-to-peer comms protocol Rehash. ADEPT tech ledgers, or record-keepers, store transactions which the IoT Internet of Things, programmable money will generate.

Figure 82: High Frequency Flash Trade Breaker / Algorithmic Regulation

HFT given: other than the ubiquitous </108> {"108"} heartbeat message sending start, stop, TTL Time To Live commands to algorithmic HFT trade to master controllers, how will stock, commodity, crypto etc. markets be mitigated, moderated among the quantum computing haves / have nots? Quantum computing mediation, mitigation among the quantum haves, have nots and techniques e.g., particle detection using liquid nitrogen vs waves at room temperature that will affect for example, transactions of HFT High Frequency Trade stock, commodities, cryptocurrencies, crypto currency synthetics, Central Bank Digital Currencies / and activities among DeFi DAO exchanges – trade

federations. HFT Algorithmic regulation: firefly inspired heartbeat synchronization algorithm applied to stocks, commodities, currency exchanges. Improving temporal trade parity between cryptocurrency blockchain and conventional and HFT, quantum computing enabled stock exchanges by using the firefly-heartbeat algorithm to take trade speed samples among trade populations across time zones to establish temporal consensus among disparate trade protocols, optimal trade speed / frequency by defining a start, stop and duration TTL Time To Live trade window. Define time intervals with discrete start, stop, TTL Time To Live trade windows using commands embedded within </108> heartbeats, heartbeat messages organic to all system's master controller.

Figure 83: USPTO 13/573,002 Econometrics, Meters, Trade Demurrage Fees

GDP Gross Domestic Product Index / statistical mean value index based TRC Trade Reference Currency demurrage fees by Economist Bernard Lietaer of Belgium. Demurrage fees incentivize conservation of resources, commodities i.e., discounts for locally produced, consumed goods and commodities where for example, closer is cheaper given closer consumes less fuel and produces less carbon emissions. Currency based on demurrage charges to support logistics of goods moved from supplier to consumer called the TERRA TRC. The Terra TRC Trade Reference Currency is a global complementary currency designed to provide an inflation-resistant international standard of value; to stabilize the business cycle on a global level; and to realign stockholder's interests with long-term sustainability. From a legal viewpoint, the Terra is standardized "countertrade" (international barter), which is routinely used for over one trillion dollars' worth of transactions per year. Legislation on countertrade exists in about two hundred countries, including all the major trading nations.

SOURCE: <https://lietaer.com/2010/01/terra/>

FIGURE 84: BLOCKCHAIN TRADENET

Block Tradenet trade system simple trade-investment platform uses a copy-trading method. Each investment runs on an FX-Bot which trades using trading algorithms. Bitcoin and the blockchain function as a medium of exchange, a store of value, a unit of account. Bitcoin adds digital, cryptographic, and distributed server functions to currencies. Because it functions simultaneously as a currency, an asset and a platform, Bitcoin is better described as a global cryptoCAP (currency, asset, platform) -- a synergistic form of "cryptocapital" to unleash the full economic power of the networked age. Bitcoin makes money PROGRAMMABLE. MONEY IS SIMPLY DATA - a simple way to measure and keep track of exchanges in value wealth accumulation. Bitcoin aggregates data in a distributed global ledger accessible to anyone, and software. First open platform for financial services. Color coins represent stocks, bonds, currencies,

FIGURE 85: Block-Time Arbitrage Blockchain: Blueprint for a New Economy

Blocktime Arbitrage MTL (machine trust language) time primitives might be assigned to a micropayment channel DAPP as a time arbiter. In blocktime, the time interval at which things are done is by block. This is the time that it takes blocks to confirm, so blockchain

system processes like those involving smart contracts are ordered around the conception of blocktime quanta or units. Since blocktime is an inherent blockchain feature, one of the easiest ways to programmatically specify future time intervals for event conditions and state changes in blockchain-based events is via BLOCKTIME. Universal blocktime source example: a procedure call to NIST or other time oracle.

BLOCKTIME: A General Temporality of Blockchains Blocktime as blockchains' temporality allows the possibility of rejiggering time and making it a malleable property of blockchains. The in-built time clock in blockchains is blocktime, the chain of time by which a certain number of blocks will have been confirmed. Time is specified in units of transaction block confirmation times, not minutes or hours like in a human time system. Block confirmation times are convertible to minutes. Conversion metrics may change over time. Credit: Melanie Swan: Blockchain Blueprint for a new economy

FIGURE 86: Financial Nostradamus / FutureMan fusion USPTO 13/573,002

Financial Nostradamus / USPTO 13/573,002 fusion: Veritaseum is a blockchain-based fintech software company which delivers global access to peer-to-peer capital markets through its decentralized platform, digital asset research, and transfers. At heart, the project seeks to level the economic playing field by creating software which enables participation in P2P capital markets without intermediates like banks, brokers, financial advisors, and other mediators. The use case of VERI token is to redeem with Veritaseum software for advisory services, research and to gain entry into Veritaseum's autonomous financial machines, P2P value trading system, and P2P letters of credit. The platforms utility token VERI is used to purchase access to the platform's products and services, which range from asset tokenization to financial research data and even self-custody escrow services. VeADIR stands for Veritaseum Autonomous Distributed Interactive Research. Source: <https://cryptonews.com/coins/veritaseum/>

FIGURE 87: GAMIFICATION / USPTO 13/573,002

GAMIFICATION: application of typical elements of game playing (e.g., point scoring, competition with others, rules of play) to other areas of activity, typically as an online marketing technique to encourage engagement with a product or service

FIGURE 88: IOTA TANGLE DAG / USPTO 13/573,002

IOTA: Internet Of Things IOT distributed ledger with microtransactions without fees. Tangle: a directed, ASYNCHRONOUS acyclic graph (DAG) for storing transactions

FIGURE 89: RIPPLE XRP Real Time Protocol / USPTO 13/573,002

Ripple Transaction Protocol or Ripple protocol, built on a distributed open source Internet protocol, consensus ledger and native currency called XRP. Ripple enables "secure, instant and nearly free global financial transactions of any size with no chargebacks." Ripple supports tokens representing fiat currency, cryptocurrency, commodity or any other unit of value such as frequent flier miles or mobile minutes.

Ripple is based around a shared, public database or ledger, which uses a consensus process that allows for payments, exchanges and remittance in a distributed process.

FIGURE 90: E Government as a Service E-GASS/ USPTO 13/573,002 Synergy

E-GaaS: international blockchain platform for organizing economic, state, social activities of citizens , communities on the basis of smart law, smart contract system. eGaaS offers a comprehensive solution needed for state and business management on the blockchain platform. Distributed digital asset registries were the first projects that used blockchain systems such as databases designed for secure storage of records on real estate property, stocks, copyright and so on. It is assumed hosting any document on the blockchain is equivalent to notarization of its content at a fixed time point ex:

7.2 A continuous action, operation, series of changes, sync deltas updating groups

1.5.7.3 A cyclic, iterative process syncing groups in time-space

Sync Deltas = changes from one epoch time cycle to the next: crypto currencies tethered to tangible commodities formed into indices of assets.

Heart Beacon Cycle provides a signal and telemetry framework reporting events, transactions to facilitate reporting of data sync deltas in time window intervals, stages and uses data filtering iteration to eliminate duplicated instructions, identical source code in the system of systems signaling, systems telemetry engineering framework.

Figure 91: GNOSIS / USPTO 13/573,002

Gnosis Wisdom (WIZ) pay platform fees in Services layer, Wiz subsidize other participants fees, provide initial subsidies for markets, or market trading. WIZ pegged to \$1 USD worth of fees. WIZ acts as coupon for \$1 of Gnosis

Gnosis tokens (GNO) generate Wisdom token s(WIZ) via smart contract

GNO token holders agree to “lock” tokens in a smart contract (30-365 days). A multiplier is added for longer lock durations. Smart contract determines selected lock duration and applies that duration to a formula regulating supply of WIZ tokens currently in use. Once users execute the contract, 30% of their WIZ are distributed for use, the remaining 70% is distributed proportionally over the locked duration. When lock duration expires, the locked GNO ceases to generate WIZ & GNO is freely transferable

Figure 92: Programmable money's main issues / adjustments

The crypto community has six major issues: Volatility, Inconsistent Memes, Identity, lack of intrinsic value and blockchain scalability. USPTO 13/573,002 addresses all six issues systemically. All things internet are built / made of TIME Cycles used / not used to process syntax as instructions. It follows, that issues with any internet system -- including Bitcoin must be fixed using this fundamental, universal truth.

ARTICLE: Could the Bitcoin Lightning Network Solve Blockchain Scalability? LINK: "hashed timelock contracts between users , in the blockchain, if only two participants care about a transaction, it's not necessary for all other nodes in the bitcoin network to know about that transaction. It is instead preferable to only have the bare minimum of information on the blockchain. It is desirable for two individuals to net out their relationship at a later date, rather than detailing every transaction on the blockchain. This can be achieved by using time locks as a component to global consensus. As a result, Bitcoin can scale to billions of transactions per day with the computational power available today on a modern desktop computer. Transaction between users occurs during a micro-cycle, then reconciled at a pre-arranged macro-cycle, with a NIST Cyber Beacon random # time stamp for non-repudiation given reconciliation will probably occur at a later date in time.

SCALABILITY: SEE ARTICLE: Could the Bitcoin Lightning Network Solve Blockchain Scalability? LINK: "hashed time-lock contracts between users" In the blockchain, if only two participants care about a transaction, it's not necessary for all other nodes in the bitcoin network to know about that transaction. It is instead preferable to only have the bare minimum of information on the blockchain. It is desirable for two individuals to net out their relationship at a later date, rather than detailing every transaction on the blockchain. This can be achieved by using time locks as a component to global consensus. As a result, Bitcoin can scale to billions of transactions per day with the computational power available today on a modern desktop computer. Transaction between users occurs during a micro-cycle, then reconciled at a pre-arranged macro-cycle, with a NIST Cyber Beacon random # time stamp for non-repudiation given reconciliation will occur at a later date in time. Bitcoin Lightning Network

IDENTITY: Organizational unit (computing) From Wikipedia, In computing, an organizational unit (OU) provides a way of classifying objects located in directories, or names in a digital certificate hierarchy, typically used either to differentiate between objects with the same name (John Doe in OU "marketing" versus John Doe in OU "customer service"), or to parcel out authority to create and manage objects (for example: to give rights for user-creation to local technicians instead of having to manage all accounts from a single central group). Organizational units most commonly appear in X.500 directories, X.509 certificates, Lightweight Directory Access Protocol (LDAP) directories, active directory (AD), and directories and certificate trees, but they may feature in almost any modern directory or digital certificate container grouping system. In most systems, organizational units appear within a top-level organization grouping or organization certificate, called a domain. In many systems one OU can also exist within another OU. When OUs are nested, as one OU contains another OU, this creates a relationship where the contained OU is called the child and the container is called the parent. Thus, OUs are used to create a hierarchy of containers within a domain. Only OUs within the same domain can have relationships. OUs of the same name in different domains are independent.

Figure 93 USPTO 13/573,002 Application key events

Patent application key events and concepts. USPTO SCREEN CAPTURES SUSPENDED PAIR RULES:

- Moved Examination outside PAIR
- Admin forms, fees, amendments MUTED
- NO Time Stamps = TEMPORAL AMBIGUITY
- Screen captures before / after filing

Alice Corp. v. CLS Bank International, 573 U.S. 134 S. Ct. 2347 (2014) RULING:
“claims may not direct towards abstract ideas”

Figure 94: USPTO 13/573,002 Amendment timeline

The first patent application was filed on September 11th, 2003 Method to commercialize structured military messages that establishes that the internet consists of internet time epoch cycles used / not used to process syntax (structured data). This filing was followed by many amendment filings. The USPTO sent web file captures from the first named inventor's site to the inventor several times from 2006 at two year intervals citing the precedent Transco Vs Performance Contracting Inc establishing a patentable idea

Figure 95: Double Slit experiment particle / wave duality

In physics, the double-slit experiment is a demonstration that light and matter can display characteristics of both classically defined waves and particles; ... experiment with light was part of classical physics long before the development of quantum mechanics and the concept of wave-particle duality. Quantum computing based on waves at room temperature Vs particles in a liquid nitrogen cooled chamber given energy required to keep the environment near absolute zero with liquid nitrogen. Use of light waves at room temperature = more ecologically sustainable, more accurate quantum computing given less challenge to synchronize, stochastically harmonize quantum computing sites over UTZ Universal Time Zone as a basis for programming, computing programmable money / programmable economy.

Figure 96: USPTO 13/573,002 Quantum Computing Space – Time

Alice Corp Vs CLS Bank are your patent applications, patents grants descriptive to the quantum computing level - future proofed? Are they written to be quantum resistant, or quantum based or both? What if events could be propagated by waves - is there a need for liquid nitrogen if the method and means is light wave laser based? Why go the liquid nitrogen route if we know the challenges in maintaining consistent temperatures across the globe at sea level Vs mountain tops, equator Vs poles... and don't forget the need to stochastically harmonize data sampling fluctuations across the world's time zones...

Figure 97: QUANTUM COMPUTING / USPTO 13/573,002 SYNERGY

A quantum computer is a computer that exploits quantum mechanical phenomena. At small scales, physical matter exhibits properties of both particles and waves, and quantum computing leverages this behavior using specialized hardware. USPTO 13/573,002 graphics are descriptive of quantum computing measures and metrics and the particle / wave duality using a water drop in pond meme, Paul Revere linear, sequential meme to describe quantum mechanics methods and metrics, meters

Figure 98: NIST QRNB Quantum Random Number Beacon / USPTO 13/573,002

National Institute for Standards and Technology NIST ATOMIC CLOCK in Boulder Colorado provides a global temporal reference source across the UTZ Universal Time Zone source for sync data event time stamps and NIST QRNB Quantum Random Number Beacon for non-repudiation of events / transactions at any point in time / place in the future. 1.11 Cited method uses waves Vs particles in quantum computing for ecological, temporal efficiencies and ease of synchronization, stochastic harmonization

Figure 99: NIST QRNB Quantum Random Number Beacon

NIST has developed a method for generating numbers guaranteed to be random by quantum mechanics. The method generates digital bits (1s and 0s) with photons, or particles of light. An intense laser hits a special crystal that converts laser light into pairs of photons that are entangled, a quantum phenomenon that links their properties. generates full-entropy bit-strings and posts them in blocks of 512 bits every 60 seconds. Each such value is sequence-numbered, time-stamped and signed, and includes the hash of the previous value to chain the sequence of values together and prevent even the source to retroactively change an output package without being detected.

Figure 100: Hopf Fibration / Bloch sphere

Hopf fibration, Hopf bundle or Hopf map describes a 3-sphere (a hypersphere in four-dimensional space) in terms of circles and an ordinary sphere. Discovered by Heinz Hopf in 1931, it is an influential early example of a fiber bundle. "The most important object in the universe". "Hopf fiber bundles appear in 8 quantum physics situations."

In quantum mechanics and computing, the Bloch sphere is a geometrical representation of the pure state space of a two-level quantum mechanical system (qubit), named after the physicist Felix Bloch. [1] Quantum mechanics is mathematically formulated in Hilbert space or projective Hilbert space. the points on the surface of the Bloch sphere represent the pure states of a single 2-level quantum system. A pure state being of the form: $|\psi\rangle=a|0\rangle+b|1\rangle$ and typically the north and south poles of this sphere correspond to the $|0\rangle$ and $|1\rangle$ states. The qubit $|\psi\rangle=a|0\rangle+b|1\rangle$ can be represented as a point (θ,ϕ) on a unit sphere called the Bloch sphere. Define the angles theta and phi by letting $a=\cos(\theta/2)$ and $b=e^{i\phi}\sin(\theta/2)$. Here, a is taken to be real, which can

always be made real by multiplying $|\psi\rangle$ by an overall phase factor (that is unobservable). Then $|\psi\rangle$ is represented by the unit vector ($\cos\phi\sin\theta, \sin\phi\sin\theta, \cos\theta$) called the Bloch vector.

Figure 101: Fisher Information flux flow waves

Fisher information flux flows are generated and stored in wave packets as they propagate. This temporal aspect is crucial for understanding how information builds up in a system over time. The International Space Federation (ISF) / Explore / Physics / Using Waves to Measure the World: A New Way to Track Information Flow Physics- Technology / Fisher wave information flux flows

Using Waves to Measure the World: A New Way to Track Information Flow

A team of physicists has discovered that electromagnetic waves scattered by an object contain detailed, locally defined information about that object's properties. This information, quantified by a concept called Fisher information, flows through space in a way that's analogous to how energy flows in electromagnetic fields. A team of physicists has discovered that electromagnetic waves scattered by an object contain detailed, locally defined information about that object's properties. This information, quantified by a concept called Fisher information, flows through space in a way that's analogous to how energy flows in electromagnetic fields. Just as the famous Poynting vector describes energy flow in electromagnetism, the team has introduced a new "Fisher information flux" that tracks the flow of information in wave fields. This revolutionary research published in Nature physics [1], opens up new possibilities for understanding and manipulating electromagnetic waves in various applications, from medical imaging to telecommunications. The implications of this discovery are far-reaching and could potentially revolutionize our approach to wave-based technologies.

Fisher Information flows refer to the concept of quantifying the non-Markovianity of open quantum systems. In this context, the Quantum Fisher Information (QFI) flow provides a measure to statistically distinguish Markovian and non-Markovian processes.

The QFI flow is based on the exchange of information between the open system and its environment. It has been established as an information-theoretic approach for characterizing the non-Markovianity of open quantum processes (Lu et al., 2009). In addition to its application in quantum systems, Fisher Information flows have been explored in other domains, such as:

Ecosystems: Fisher information is a measure of order in dynamic systems, and its stability over time is linked to sustainability (Cabezas et al., 2002; Karunanithi et al., 2011).

Physical systems: The behavior of Fisher information for molecular systems is consistent with the 2nd and 3rd Laws of Thermodynamics (Cabezas and Karunanithi, 2008). Fisher Information flows encompass:

Quantum Fisher Information (QFI) flow for characterizing non-Markovianity in open quantum systems Fisher information as a measure of order in dynamic systems, applicable to ecosystems and physical systems

FIGURE 102: QUBIT = non-existant notional construct = group think contrived for an expected outcome favorable to controlling agent

QUANTUM COMPUTING: the use of quantum-mechanical phenomena such as superposition and entanglement to perform computation. Quantum computers are believed to be able to solve certain computational problems, such as integer factorization. In a quantum Turing machine, the difference is that the tape exists in a quantum state, as does the read-write head. This means that the symbols on the tape can be either 0 or 1 or a superposition of 0 and 1; in other words, the symbols are both 0 and 1 (and all points in between) at the same time. While a normal Turing machine can only perform one calculation at a time, a quantum Turing machine can perform many calculations at once. The programmable economy will be anchored by quantum computing -for example, NIST's Quantum Random Number Beacon

QUANTUM COMPUTING / USPTO 13/573,002 The Heart Beacon Cycle Time - Space Meter is descriptive to the quantum computing level and SCOTUS Alice in Wonderland Alice Corp Vs CLS Bank ruling... waves (USPTO 13/573,002 water drop in pond meme) single photon shifts (USPTO 13/573,002 Paul Revere meme)

FIGURE 103: FIGURE 103: TIME – SYNTAX foundation framework for the internet, internet of things IoT, money DeFi / Fintech

Figure 104: Project #Unrig the System (s) Robert David Steele / Dr. Cynthia McKinney/ USPTO 13/573,002

Twelve + reforms needed to create educated engaged democracy, unrig the "pay to play system = DoD system of systems engineering structured data exchange best practice foundation DeFI Distributed Finance foundation technology for global Fintech

FIGURE 105: SPACESHIP EARTH OPERATING MANUAL SIGNALS ANNEX K

QUOTE: "There is only one revolution tolerable to all men, all societies, all political systems: Revolution by design and invention". Richard Buckminster Fuller author of The World (Peace) (simulation) Game book, futurist, environmentalist:

Climate change impact on food production: given food, fertilizer shortages (wheat, sunflower, soybean...), energy, fuel prices and looming fuel rationing, it logically follows that the world has no other options than to organize both micro (local) and macro (global) economies observing space - time conservative SLA Service Level Agreements where closer = cheaper given closer = less fuel, CO₂, time resources used to produce, ship.. Demurrage fees incentivize conservation of resources, commodities i.e., discounts for locally produced, consumed goods and commodities. It is TIME.

ECO INCENTIVES: Ecologically sustainable economic transactions need to be incentivized among the world's Ecological and Economic system of systems. **DECISION POINT:** Economic #RESET is a mathematical certainty. Do we RESET the global system of systems as is or will we re-engineer using NATO system of systems engineering standing on the shoulders of giants

CLIMATE CHANGE: IF / WHEN: Climate Change causes a drop in crop commodity food production by 20–25 % while population continues to grow, THEN it follows that this condition will become a matter of national security. It's TIME to implement an Ecologically Sustainable Economic Heartbeat ELSE face > greater chaos by not leveraging proven system of system structured data exchange methods. An ecologically sustainable economic heartbeat is needed. Why wait until crisis, DEFCON 2 stage? **CLIMATE CHANGE:** IF climate change causes a drop in crop commodity by 20–25 % while population grows, THEN this condition will become a matter of national security. THEN this will require revisiting Belgian Economist Bernard Lietaer's TRC Trade Reference Currency ELSE face >socio economic chaos TERRA Trade Reference Currency by Economist Bernard Lietaer LINK <http://lietaer.com/2010/01/terra/>

FIGURE 106: SPACESHIP EARTH OPERATING MANUAL SIGNALS ANNEX K

Figure 107: Programmable money through the lens of metaphysics

Metaphysical musings on programmable money: fictional "blocks on the cryptocurrency blockchain" in light of SCOTUS Alice in Wonderland 2014 ruling "claims may not direct towards abstract ideas" / The endless debate over (distributed) Database Vs messaging structured data exchange. In reality, messages are parsed in / out of data storage conventions using point to point or multicast internet protocol = same as it ever was

Figure 108: SUMMARY

Figure 109: Curriculum Vitae: Steven J. McGee First Named Inventor USPTO 13,573,002 The Heart Beacon Cycle Time – Space meter

Figure 110: First Named Inventor / Patent Applicant's Business Card

The Heart Beacon Cycle Time - Space Meter USPTO 13/573,002 adaptive procedural template / checklist of ideas, methods, processes, procedures, algorithms, tools
The author / First Named Inventor is an Aquarian / Aquarius Rising coincidentally.



First Named Inventor: Steven James McGee born 06:44 A.M. February 10th 1960



APPENDIX F: DRAWINGS / GRAPHICS

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World Game Annex K

Signals & Telemetry



Figure 1: Foundation Technology for programmable \$\$\$, Economy listed in an Adaptive Procedural Template



FIGURE 2: Adaptive Procedural Template list: The Heart Beacon Cycle Time Space Meter

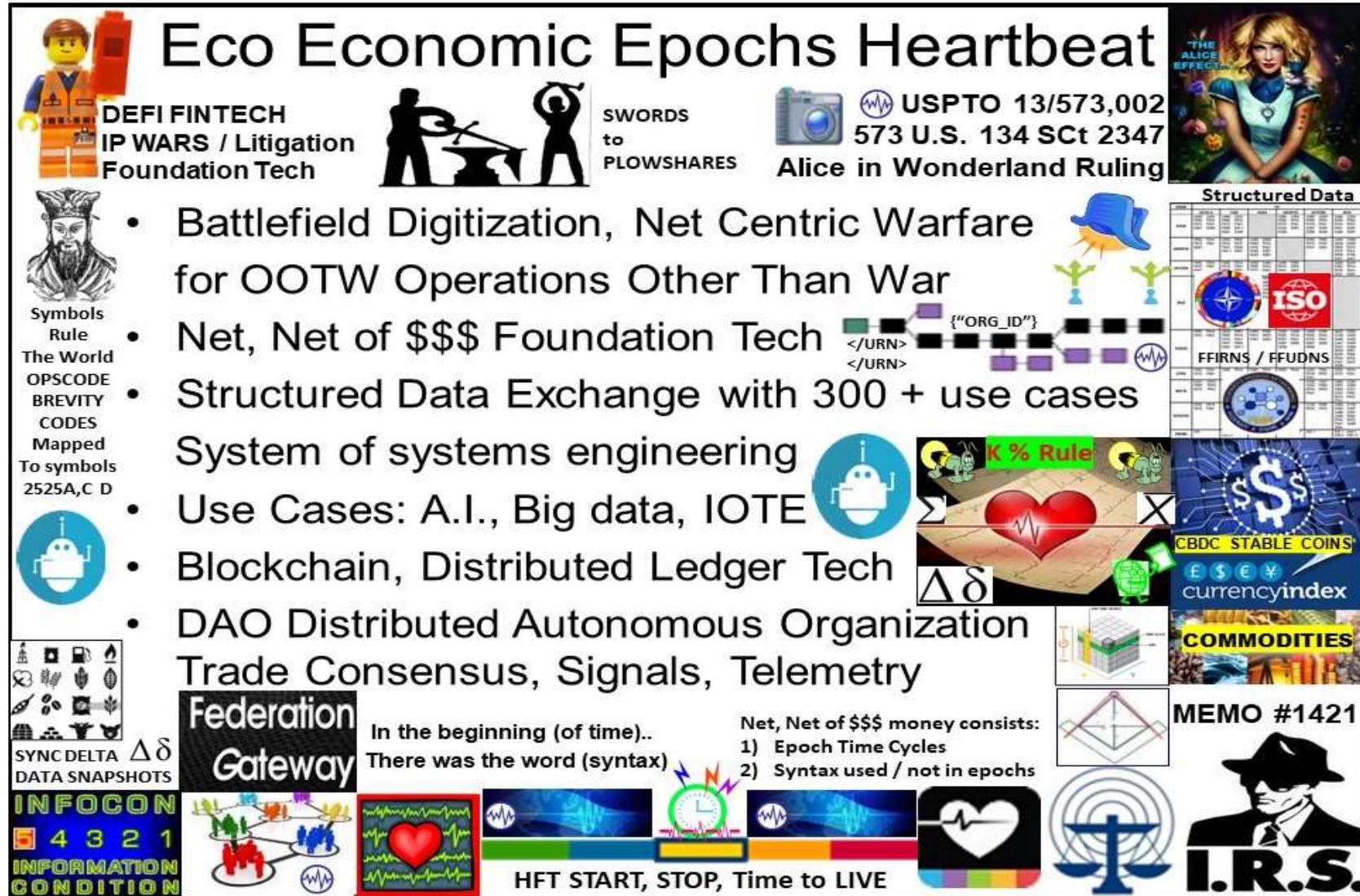


Figure 3: USPTO 13/573,002 Heart Beacon Cycle Time – Space Meter Summary

Humanitarian Assistance Networked Donor System

H.A.N.D.S: "Based on the need to speed up the processes of influencing an adversary, new concepts result in the adaptation of military doctrine, organization, training, material, infrastructure, interagency interaction, leadership, personnel and facilities" ... German Bundeswehr concept of "[OOTW Operations Other Than WAR](#)" or "[Vernetzte Operationsführung](#)" circa 2003

“Shared situational awareness enables collaboration synchronization, and enhances sustainability, speed of command”



Figure 4: OOTW Operations Other Than War / H.A.N.Ds / System of Systems Engineering framework



Figure 5: Edison's Monetary Option 1922 / TradeFI Tokenization

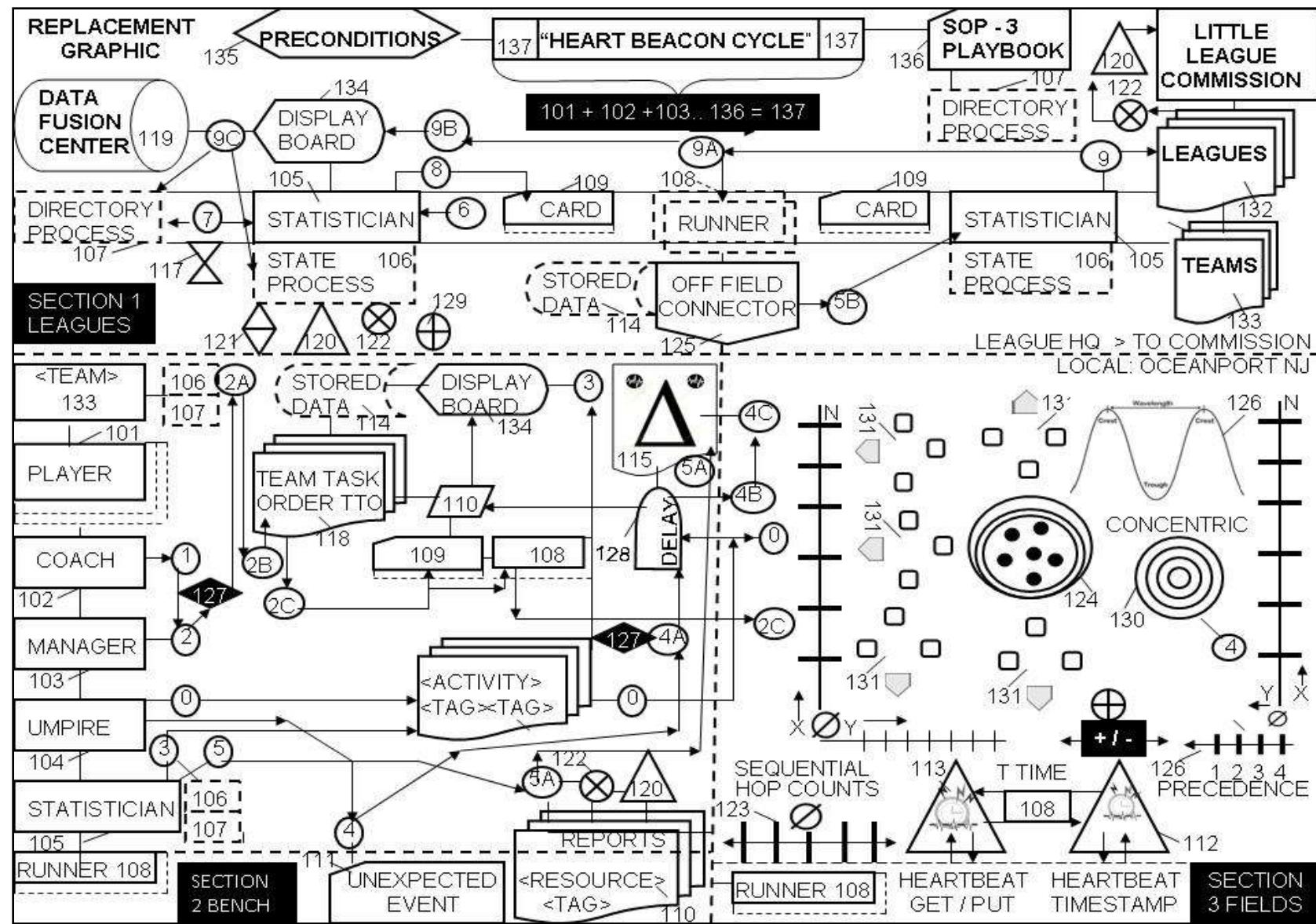


FIGURE 6: USPTO 13/573,002 Main Graphic

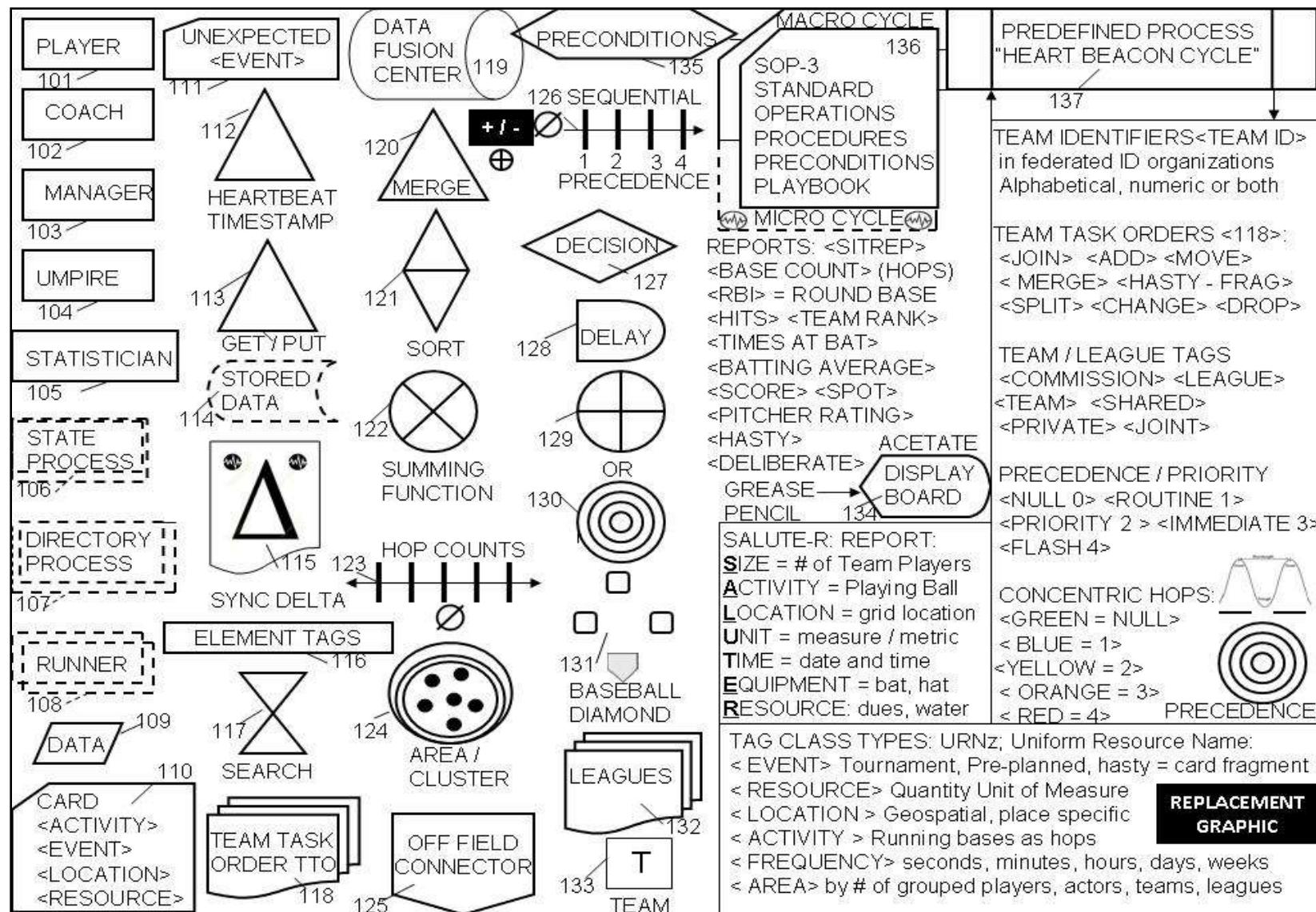


Figure 7: USPTO 13/573,002 MAIN GRAPHIC LEGEND

REPLACEMENT SHEET

BUILDING BLOCKS

201

B1: BUILDING BLOCK 1: TCP/IP HEARTBEAT TIME STAMP & DATA GET / PUT OF ORG ID / URN IN MICRO / MACRO CYCLES PRIOR TO DATA FUSION CENTER INSERTION



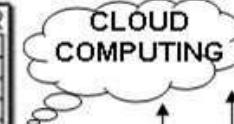
TASK ON / OFF



MACRO CYCLES



219



218

202 FEDERATED GROUP JOINS, MERGE, ADDS, DROPS

B2: BUILDING BLOCK 2: ADAPTIVE, CYCLIC, ITERATIVE PROCEDURAL TEMPLATES: XML ARTIFACTS i.e. UNIT TASK ORDER & K00.99 HEARTBEAT SYNC DELTA MESSAGES / STATE META DATA SNAPSHOTS IN NETWORK EXECUTION MANAGEMENT MARKUP OF SERVICE INTERFACE ARTIFACTS



TF BIZ

214

SYNC DELTA UTO 213

213

ADHOC / AGILE FEDERATED <ID> GROUPS SYNC'D IN TIME / SPACE

LEADER'S INTENT DECISIONS

215



211

212

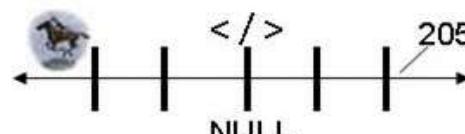


203

B3: BEACON TECH TYPE I: PAUL REVERE LINEAR, SEQUENTIAL HOP COUNTS



SYNC DELTA METRICS IN SLA CLAUSES AS MOE, MOP METER IN TAX CODES, TRANCHE CLASSES / RATINGS ARBITRAGE TRIGGERS



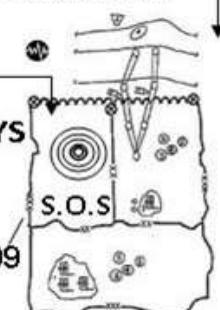
LENGTH, THRESHOLD, INTENSITY, DURATION



SEARCH FOLLOWED BY ARBITRAGE INVITES VIA BEACON NEWSCASTS. INVITE ACROSS SPACE / TIME



APPLIQUE' OVERLAYS



MAP VIEWS GEO-LOCATION SPECIFIC SHOW SYNC DELTAS BY GROUP / RESOURCE TYPE, EVENT CLASS / NEWSCAST BY TRANCHE <CLASSES>

204

B4 BEACON TECH TYPE II: WATER DROP IN POND RADIUS, CIRCUMFERENCE GEO SPATIO-TEMPORAL

Figure 8: USPTO 13/573,002 Building Blocks

Adaptive Procedural Template (checklist): Foundation tech for programmable \$\$\$, Economy / DeFI



- Reuse, mod of System of systems engineering framework, Syntax Lexicon Library data elements



- STRUCTURED DATA EXCHANGE

Reuse brevity codes mapped to 2525D symbol sets comprised of 300 + message sets for A.I. - machine Block-Time DLT arbitrage among Trade Federations </Org_ID> {“URN”} </URN> = COMMODITY



Eco Economic Epoch GDP Heartbeat signals and telemetry framework



Spatial / temporal UTZ synchronization, stochastic harmonization, Time - Space Distance Estimation Service Common Consensus Algo meme Eco sustainable incentives
“We can synchronize ourselves, DAO Trade Federations in time - space for common purposes”
Eco sustainable, Equitable Economic econometrics.

USE CASE: Banks - Tech firms are forming teams to assert foundation tech as a legal basis for IP intellectual property claims for programmable \$\$\$ DeFI

Use Case: Tokenize Europe 2025 initiative: reuse DoD / NATO's structured data brevity

OPSCODES mapped to 2525A, B, C, D symbols needed for A.I. man-machine interface

Reuse, modify 300 + Use Case message set templates data element FFIRNs FFUDNS or, redo a time, people intensive process that took decades to create, test and refine.



Fig 9: Adaptive Procedural Template Checklist of ideas, processes, procedures, structured data exchange templates

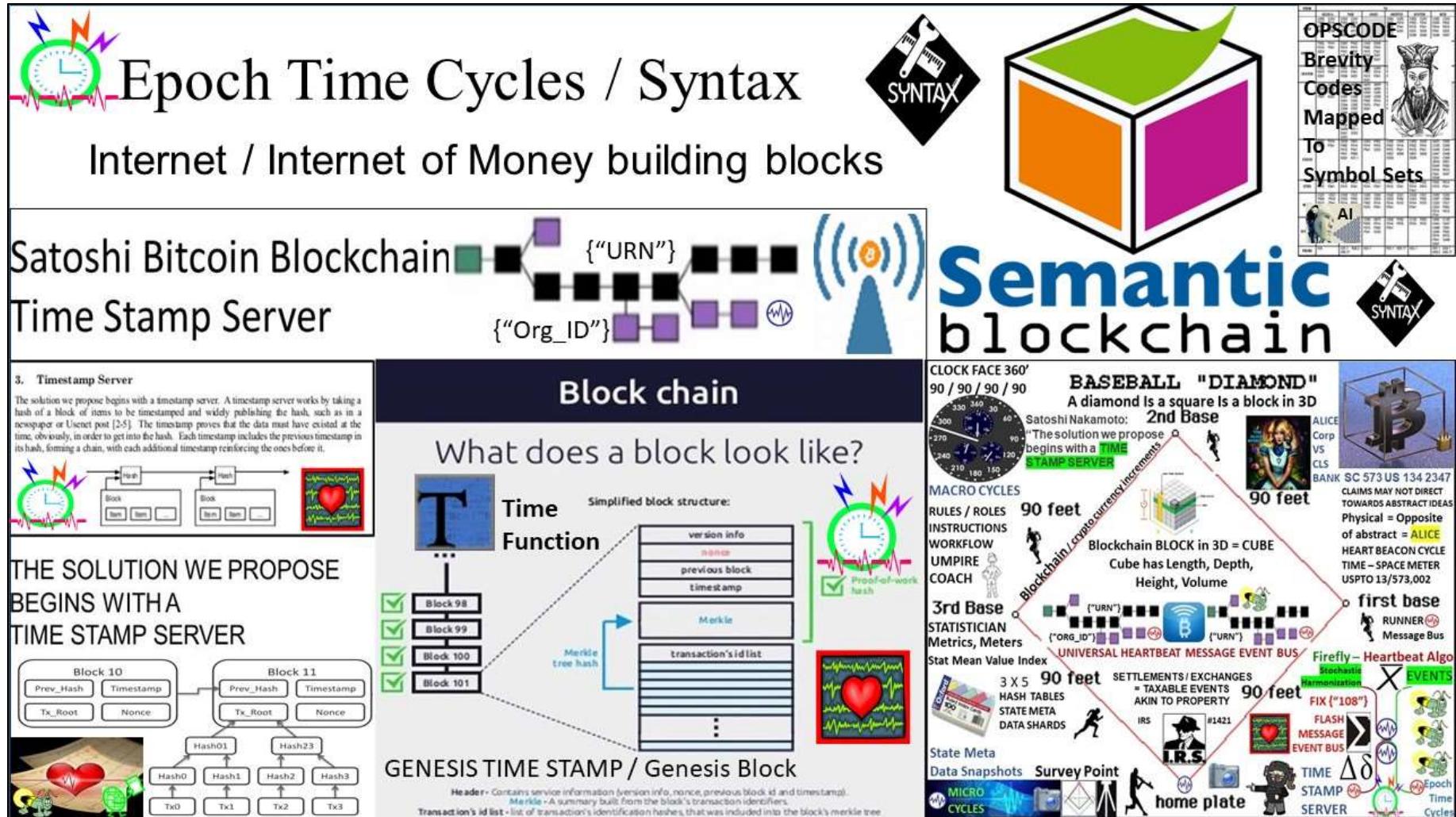
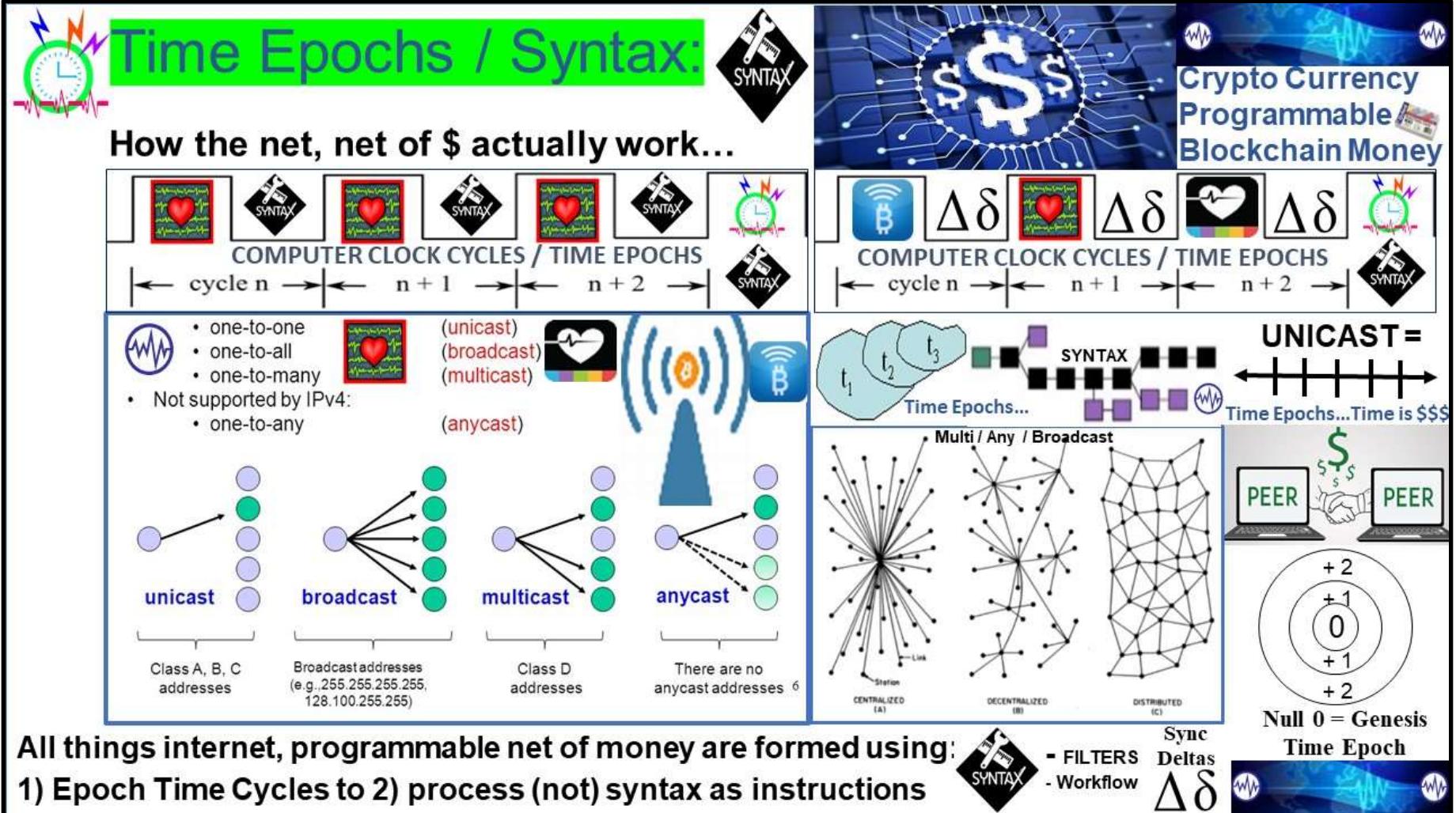


Figure 10: All things internet, artifacts of the programmable economy formed using 1) time epochs 2) syntax



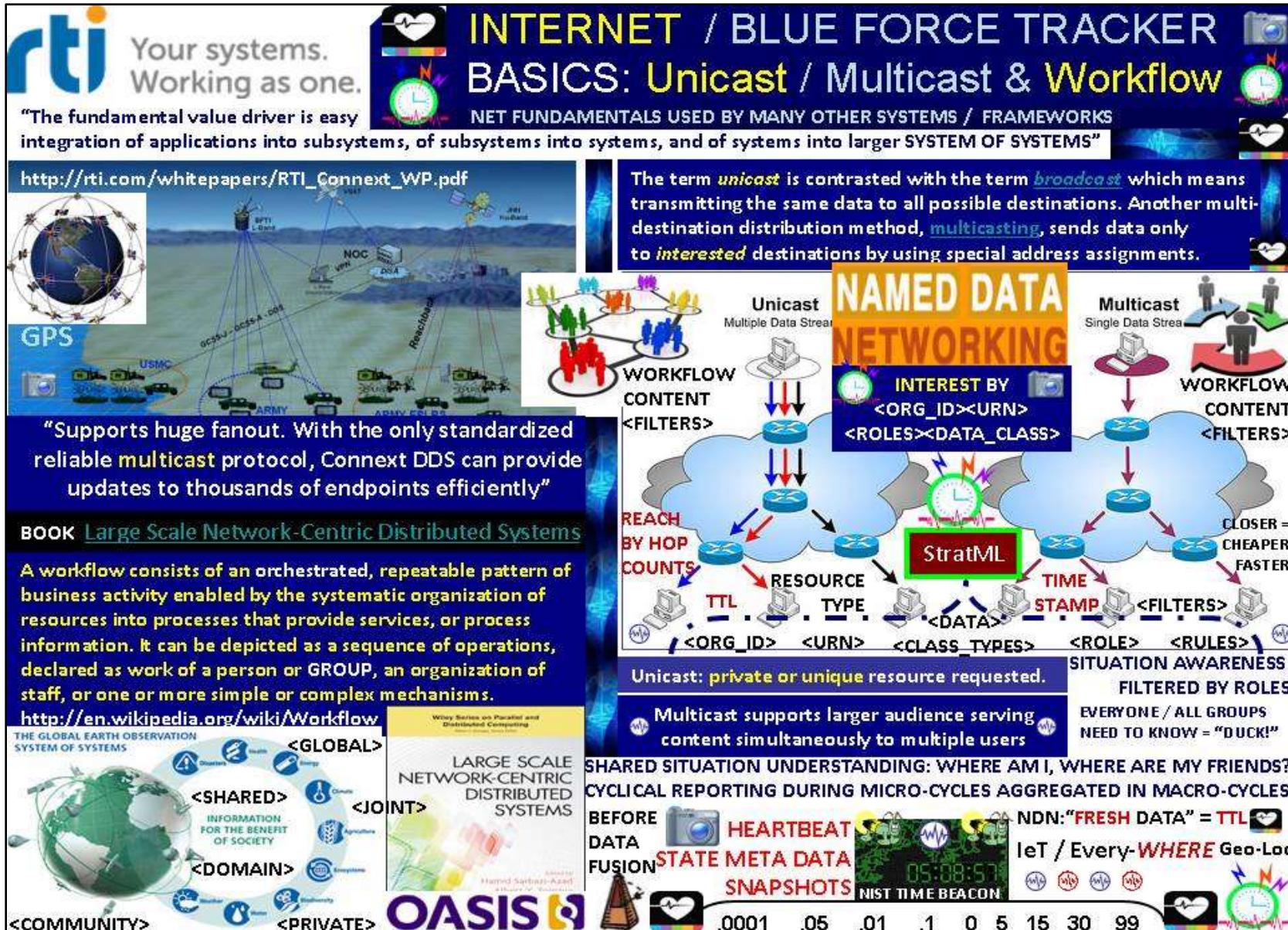
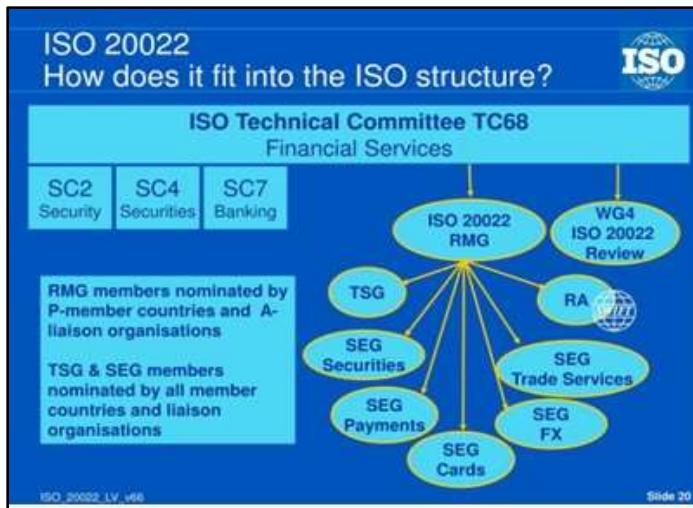


Figure 12: Blue Force Tracker / Maneuver Control Systems framework templates



FOUNDATION STANDARDS TECHNOLOGY

- ISO 20022
 - MIL STD

Structured Data Exchange
DoD System of Systems
Engineering

SCOTUS “Alice In Wonderland” 2014 Ruling

NDN: Named Data Networking

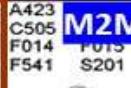
**ARIN, ASN-1
Binary XML
2525 A,B,C,D
Symbol Sets for
Human – A.I.**

World Financial Standard ISO 20022 is a multi part International Standard prepared by ISO Technical Committee TC68 Financial Services. It describes a common platform for the development of messages in ASN.1 Abstract Syntax Notation: A single standardization approach (methodology, process, repository) to be used by all financial standards initiatives. common platform for the development of messages using:

- a modelling methodology to capture in a syntax-independent way financial business areas, business transactions and message flows
- a central dictionary of business items used in financial communications
- a set of XML and ASN.1 design rules to convert the message models into XML or ASN.1 schemas, whenever the use of the ISO 20022 XML or ASN.1-based syntax is preferred ISO 20022: <https://www.iso20022.org/about-iso-20022>



Figure 13: Foundation technology standards basis for DeFi / Fintech IP wars

FROM	TO				CODE GUIDE					
	GCCS-A	TAIS	ASAS	AMDPCS	AFATDS	MCS				
ASAS	C002 C203 F002 F014 F015 F541 S201 S309	C002 C203	USMTF / XML MTF FORMATTED MESSAGE CATALOG = 300 + messages info exchange sets using common, CONSENSUS Message Text Formats MTFs. MTFs specify </CONTENT> / info agreed by group consensus presenting information in a logical, well specified unambiguous layout resulting in a highly efficient info payload to overhead ratio							
AMDPCS	TOKENS OPSCODE BREVITY CODES									
AFATDS	F002 F014 F015 F541 S201					F002 C203 F015 D630 S201 E500 F002 E002 F014 F015 F541 S201 S309 S507				
MCS	   	A423 C203 C505 F002 F014 F015 F541 S201	A423 A659 C002 C203 C400 C443 C447 C488 C501 C503 C504 C505 C506 C507 C508 E400 F002 F014 F015 F541 F658 F756 G489 K01.1 S201 S303	A423 A659 A656 A690 C002 C203 C400 C505 F002 F014 F015 F541 S201	  	A423 C203 C505 F002 F014 F015 F541 S201				
			ASSET TOKENS Token Economy		  	"SYMBOLS RULE THE WORLD"				
<h2>MESSAGE CATALOG</h2> <p>300 + Use Cases</p>										
<p>Data Elements: entity, attribute, relationship equivalents</p> <p>HEARTBEAT MESSAGE = K00.99 </108> {"108"}</p>										
Information Categories and Examples										
Object Categories	Examples	Location	Movement	Identify	Status	Activity	Intent			
OOB	SYNTAX LEXICON	STRUCTURED DATA lat/long	EXCHANGE Message Sets spd/hdg	country / alliance, type/class	readiness	targeting, reconitring	COA {"Java JS"}			
Infrastructure	Comm, power, transportation, water/sewer	Machine Trust Language MTL network, grid	throughput, flow rates,	name, part-of relationships	BDA, op levels	repair, hemaintenance	YAML expansion nlangs			
Sociological	Culture, religion, economic, ethnic, government, history, languages	temples, historic structures	ER Model	Class Diagram	Relational Database	Object DBMS	XML DTD / Schema			
Geophysical	Terrain, weather, climatology, oceanography, astrometry	feature lat/long, alt/dpth	Entity	Class	Table	Class	Element			
			Attribute	Attribute	Field / Column	Attribute	Child Element or Element Attribute			
			Domain Value	PURCHASE CODES	Instance, Value	TOKENS	DUI FUDN			

Information Elements Roles

- COI Determination Org Interaction
 - Search and Discovery
 - Ontologies STANDARDS
 - Taxonomies REFERENCE
 - Metadata Attributes / Filters



EEUDN: Field Format Unit Designator #

EEIRN Field Format Index Reference #

**Structured military messaging ID's
messages, message sets, data
element, symbol fields </108>
BY Form Field Position & NUMBER**



 {"108"}  NDN   Firefly-Heartbeat Flash Messages

PROCESS MESSAGE BY PRECEDENCE

OPERATIONAL NODES / ACTIVITIES

DATA SYSTEM FUNCTIONS PERFORMANCE

11.4 - Classification		11.8 - Kinematics	
11.4.1 - Category		11.8.1 - Pos / Vel / Acc (PVA)	
11.4.1.1 - Confidence Level		11.8.1.1 - Acceleration	
11.4.1.2 - Estimate Type		11.8.1.1.1 - Angular	
11.4.1.2.1 - Alternative		1.1.2 - Linear	
11.4.1.2.2 - Evaluated D	PURCHASE CODES	1 - Estimate Type	
11.4.1.3 - Value		1.2.1 - Estimated	
		1.2.2 - Observed	
		1.2.3 - Predicted	
		1.2.4 - Smoothed	
SYMBOL	Friend	Neutral	Hostile
2525C	Partner		
11.4.1.3.5 - Surface		Competitor	
11.4.2 - Platform / Point / Feature Type		1 - Velocity	
11.4.3 - Specific Type		1.1 - Horizontal	
11.4.4 - Type Modifier		1.4.2 - Vertical	
11.4.5 - Unit		VA Confidence	
		1 - Bearing Angle	
		2 - Bearing Angle Rate	
		3 - Covariance Matrix	

FIGURE 14: Code Syntax Lexicon, Message Template Library from 1st patent application 9 / 11 / 2003



FIGURE 15: Structured Military Messaging / Structured Data Exchange FFIRNS, FFUDNS

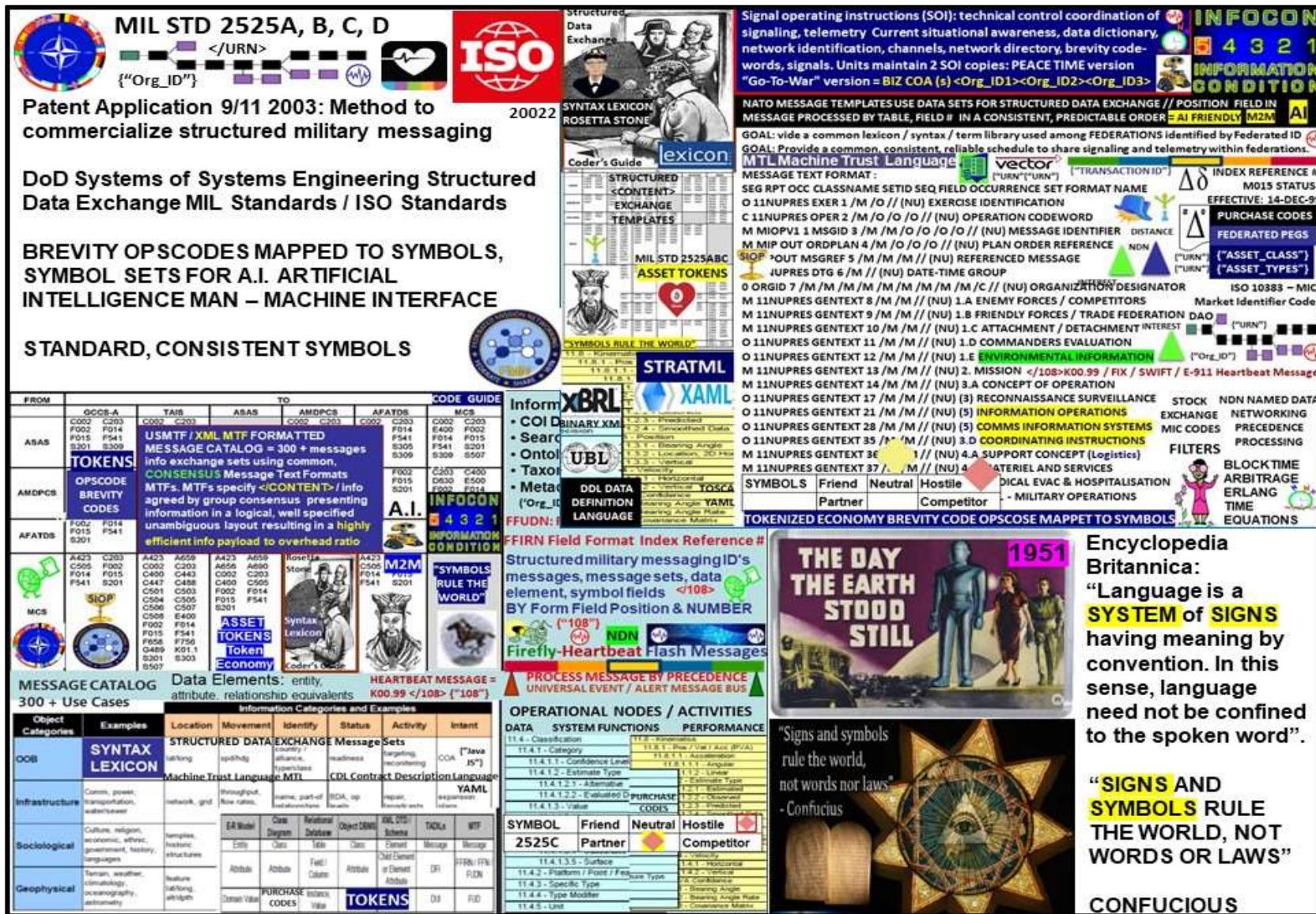


FIGURE 16: Artificial Intelligence Man – Machine Interface Syntax lexicon

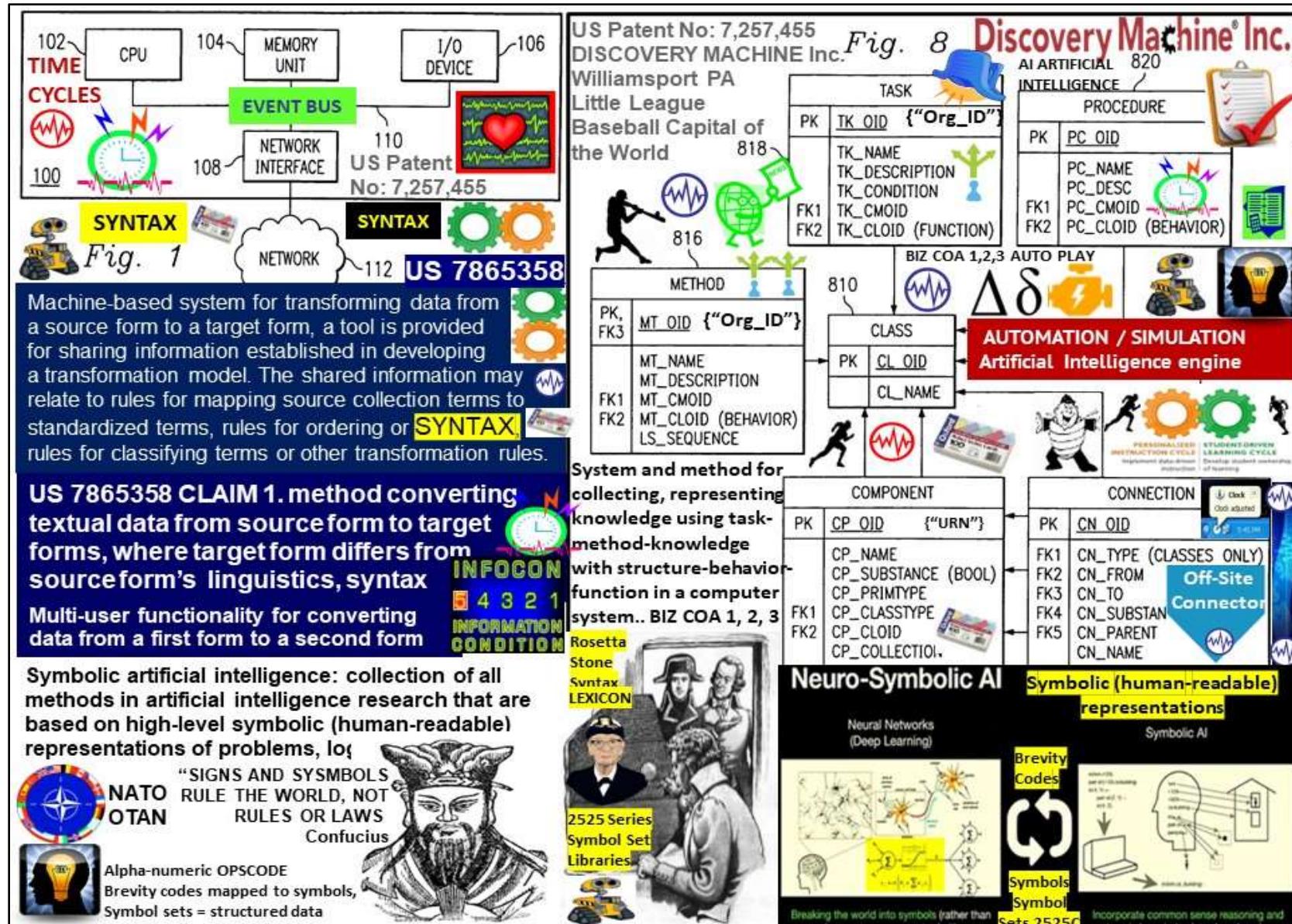


Figure 17: Discovery Machine Machine Learning IP / USPTO 13/573,002

Symbolic artificial intelligence: collection of all methods in artificial intelligence

research that are based on high-level symbolic (human-readable) representations of problems, logic and search.[1]

Symbolic AI used tools such as logic programming, production rules, semantic nets and frames, and it developed applications such as knowledge-based systems (in particular, expert systems), symbolic mathematics, automated theorem provers, ontologies, the semantic web, and automated planning and scheduling systems. The Symbolic AI paradigm led to seminal ideas in search, symbolic programming languages, agents, multi-agent systems, the semantic web, the strengths, imitations of formal knowledge and reasoning systems.

Physical symbol system (also called a formal system) takes physical patterns (symbols), combining them into structures (expressions) and manipulating them (using processes) to produce new expressions. The physical symbol system hypothesis (PSSH) is a position in the philosophy of artificial intelligence formulated by Allen Newell and Herbert A. Simon. They wrote: "A physical symbol system has the necessary and sufficient means for general intelligent action." [2] —Allen Newell and Herbert A. Simon

This claim implies both that human thinking is a kind of symbol manipulation (because a symbol system is necessary for intelligence) and that machines can be intelligent (because a symbol system is sufficient for intelligence). [3] The idea has philosophical roots in Hobbes (who claimed reasoning was "nothing more than reckoning"), Leibniz (who attempted to create a logical calculus of all human ideas), Hume (who thought perception could be reduced to "atomic impressions") and even Kant (who analyzed all experience as controlled by formal rules). [1] The latest version is called the computational theory of mind, associated with philosophers Hilary Putnam and Jerry Fodor. [4]

Source: Wikipedia: https://en.wikipedia.org/wiki/Physical_symbol_system

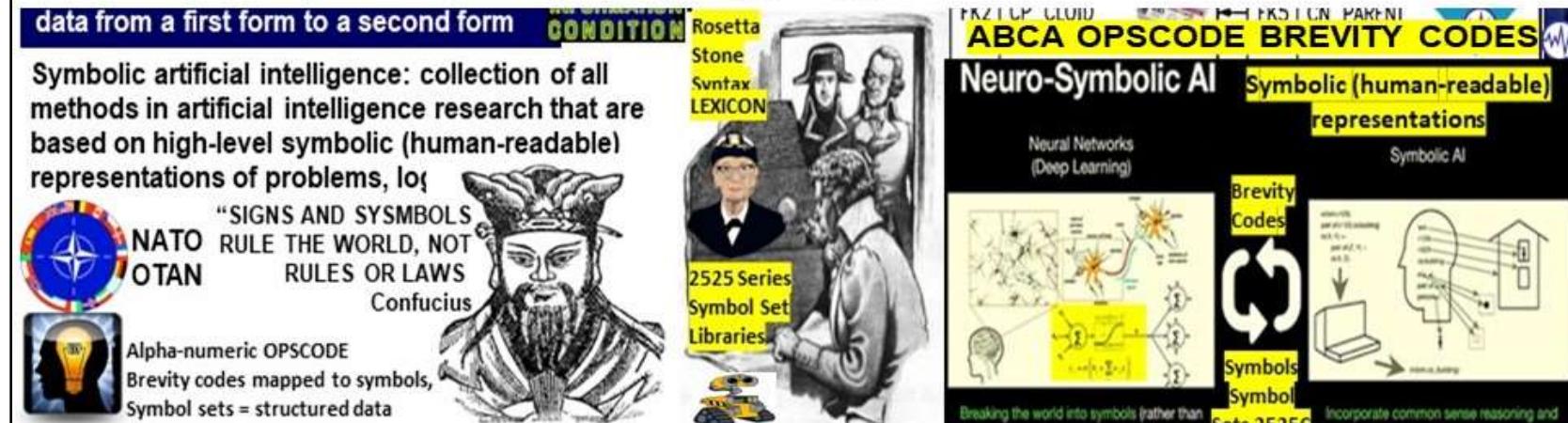


Figure 18: Discovery Machine Symbolic Artificial Intelligence / USPTO 13/573,002



Artificial Intelligence / USPTO 13/573,002 Adaptive Procedural Template

Machine Learning: data input / output = action (s): if, then else, or... do



Data, event cyclic time interval sampling sync delta snapshots



Natural Language Processing programming computers to process human languages to facilitate interactions between humans / computers

Data brevity OPSCODE sync delta time slot samples @ set intervals
Mapped to symbols 25 A,B,C,D
MILSTD for Man – machine interface



Automation & robotics: machines do repetitive tasks

Military = repetition. temporal , UTZ – UTC sync harmonization, international standards

Machine Vision: Machines capture, analyze visual information, data

Military = geo-spatial temporal Applique' overlays

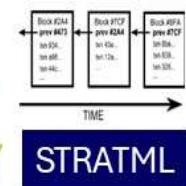
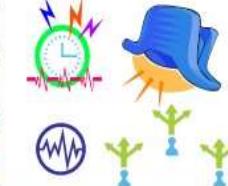
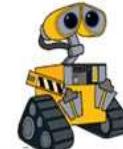


Figure 19: Artificial Intelligence / USPTO 13/573,002

Foundation Technology Trinity:

1. EPOCH (s) = Time intervals, cycles
2. SPACE (land use meme) ex: IRS memo #1421 "Bitcoin transaction akin to land"
3. SYNTAX structured data mapped to symbols for A.I. / man - machine interface

THESIS: All net artifacts, net of \$ are formed with:

- 1) Epoch time cycle intervals ex: chip oscillations
- 2) Syntax parsed, processed in epoch time intervals

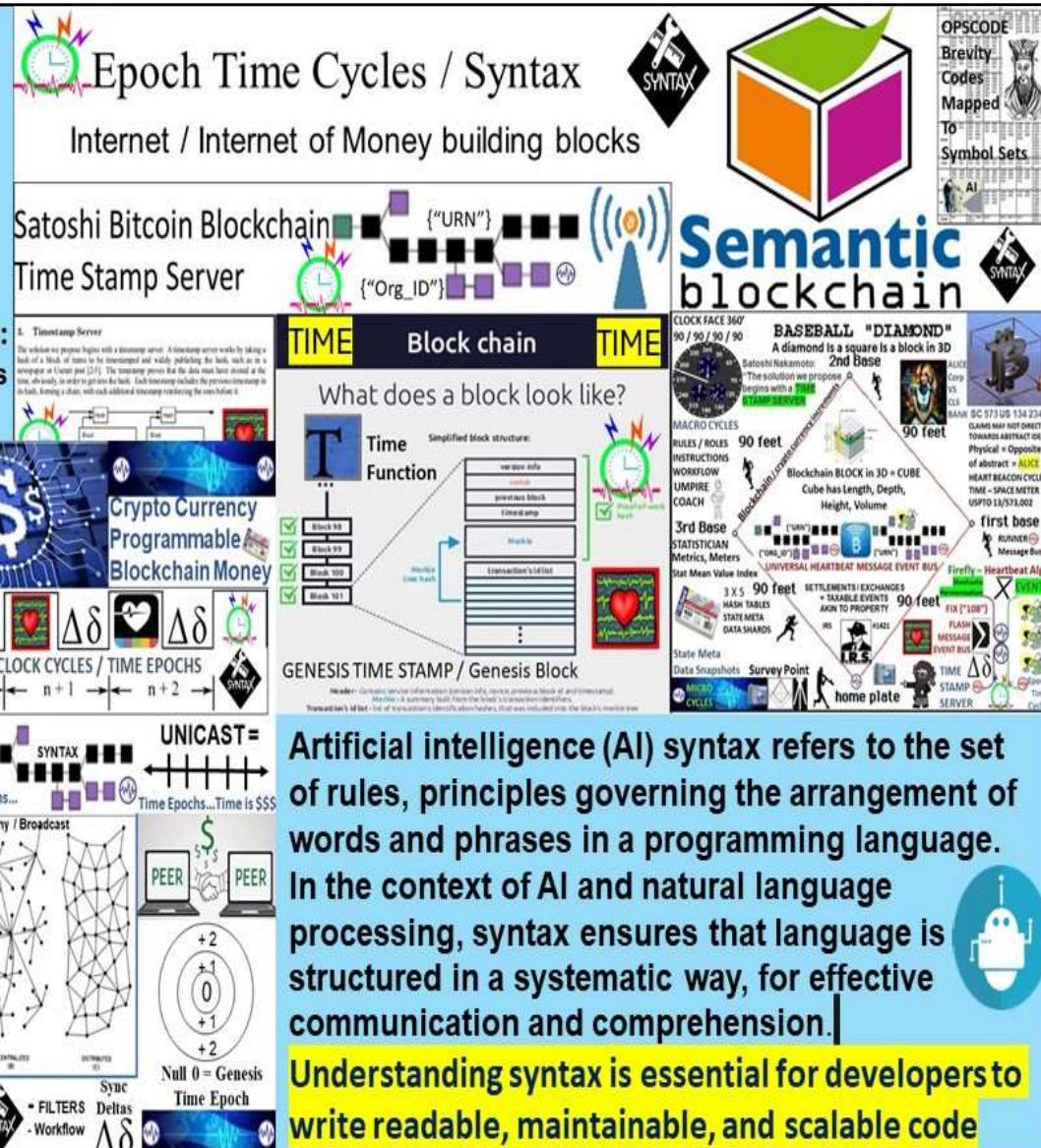
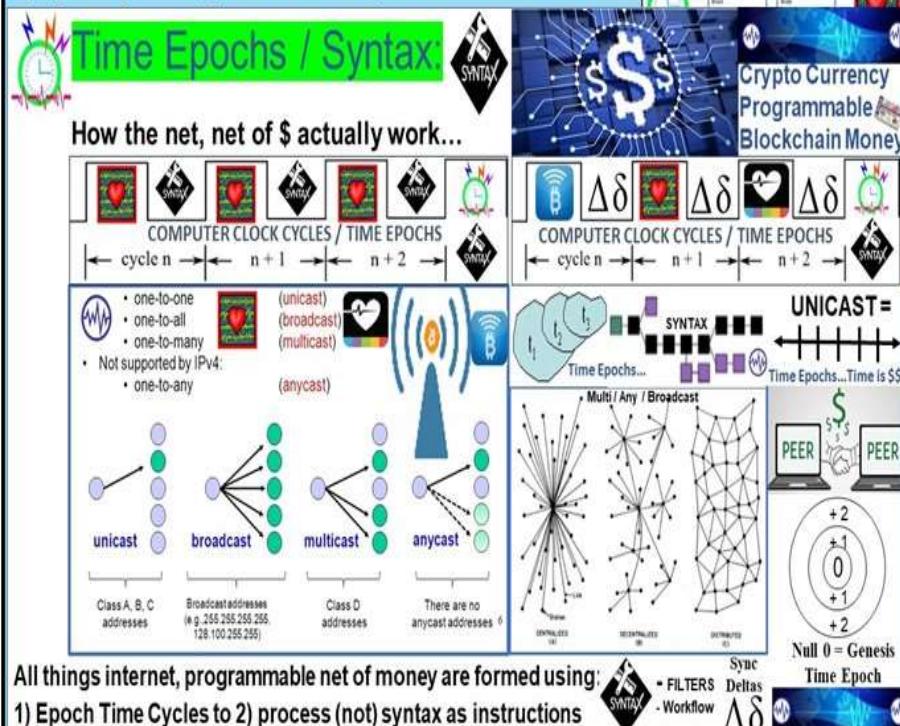


Figure 20: Net, Net of money, Artificial Intelligence A.I. = 1. Epoch time cycles 2. Syntax

USE CASE: standards adherence support for IEEE, ITU, ISO international data, internet, internet of money, IoT, Artificial Intelligence A.I ... standards

Systemic, signaling, synchronization of state meta data encoded as brevity OPSCODE tokens stochastically harmonized over the UTZ

FROM	TO										CODE GUIDE
	GCCS-A	TAIS	ASAS	AMDPCS	AFATDS	MCS					
C002 C203 F002 F014 F015 F541 S201 S309	C002 C203	C002 C203	C002 C203	C002	C003 F014 E400 F014 F015 F541 S201 S309	C002 C203 F002 F014 F015 F541 S201 S309					
ASAS	TOKENS	USM TFM / XML MTF FORMATTED MESSAGE CATALOG = 300 + messages info exchange sets using common, CONSENSUS Message Text Formats MTFs. MTFs specify <CONTENT>/info agreed by group consensus presenting information in a logical, well specified unambiguous layout resulting in a highly efficient info payload to overhead ratio									
AMDPCS	OPSCODE BREVITY CODES				F002 F015 S201	S203 C400 E500 F002 F014					
AFATDS	F002 F014 F015 F541 S201	A423 C203 C505 F002 F014 F015 F541 S201	A423 A659 C002 C203 C400 C505 C507 F002 C508 F014 C509 F541 C510 F658 C511 G489 C512 K01.1 S201 S303 S507	A423 A659 C002 C203 C400 C505 C507 F002 C508 F014 C509 F541 C510 F658 C511 G489 C512 K01.1 S201 S303 S507	Rosetta Stone Syntax Lexicon Coder's Guide	A423 C505 F002 F014 F541 S201	M2M INFOCON A.I. SYMBOLS RULE THE WORLD! HEARTBEAT MESSAGE = KOO.99 </108> {"108"}				
		Data Elements: entity, attribute, relationship equivalents									
		Information Categories and Examples									
Object Categories	Examples	Location	Movement	Identify	Status	Activity	Intent				
OOB	SYNTAX LEXICON	STRUCTURED DATA lat/long	EXCHANGE DATA spd/fhdg	Message Sets country / alliance, type/class	COA readiness	CDL Contract	Description Language YAML				
Infrastructure	Comm, power, transportation, water/sewer	network, grid	throughput, flow rates,	names, part-of relations,props	BDA, op. serials.	repair, reconfiguring	expansion, volume				
Sociological	Culture, religion, economic, ethnic, government, history, languages	temples, historic structures	ER Model	Class Diagram	Relational Database	Object DBMS Schema	XML DTD / Schema	TADILs	MTF		
Geophysical	Terrain, weather, climatology, oceanography, astrometry	feature lat/long, alt/depth	Attribute	Attribute	Field / Column	Attribute	Child Element or Element Attribute	DRI	FFRN / FFN	RUDN	
			Domain Value	PURCHASE CODES	Instance, Value	TOKENS	DU	FUD			



Figure 21: Syntax, brevity codes mapped to symbols essential for A.I. Man-machine interface

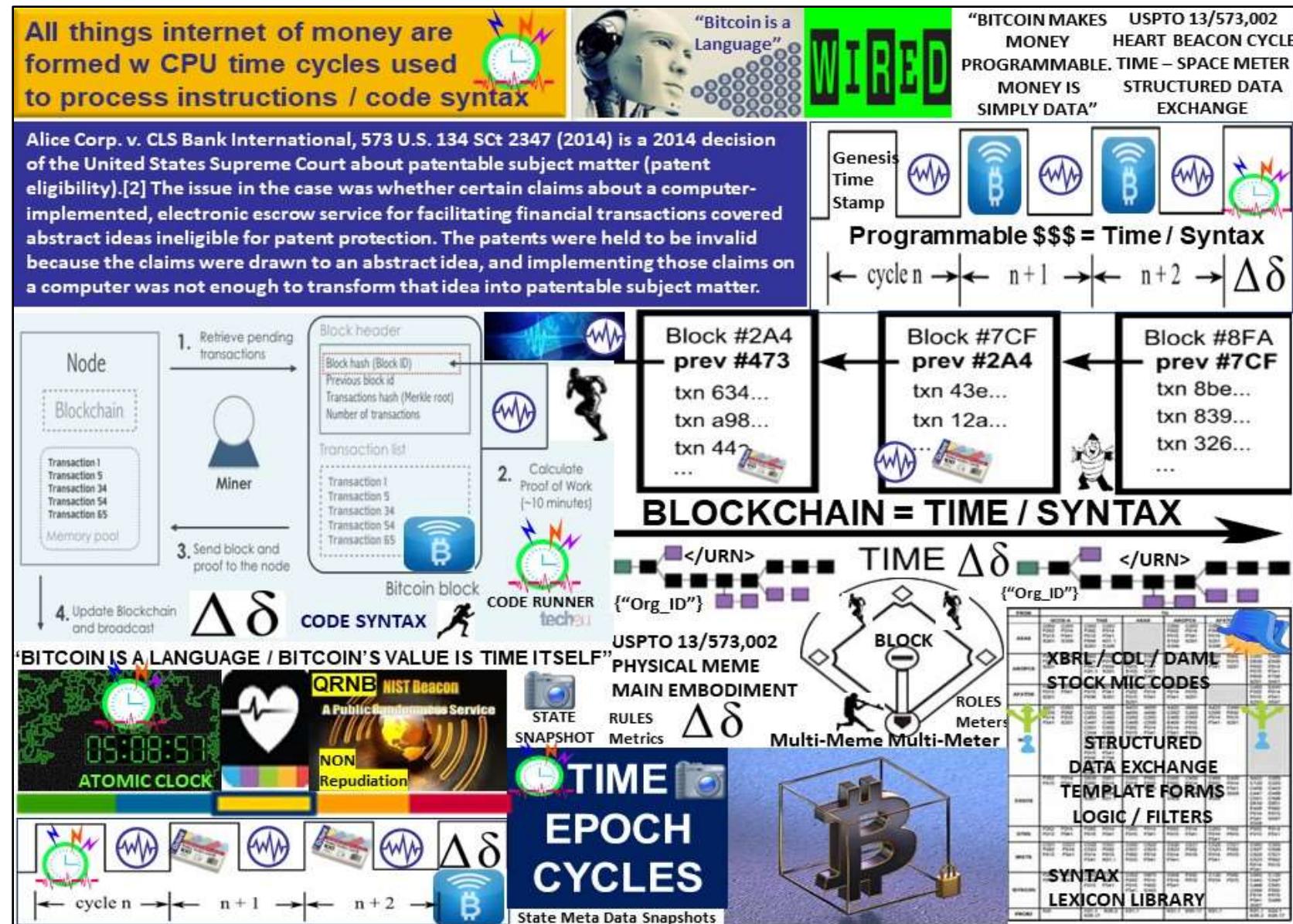


FIGURE 22: Blockchain Basics / How the internet really works / USPTO 13/573,002

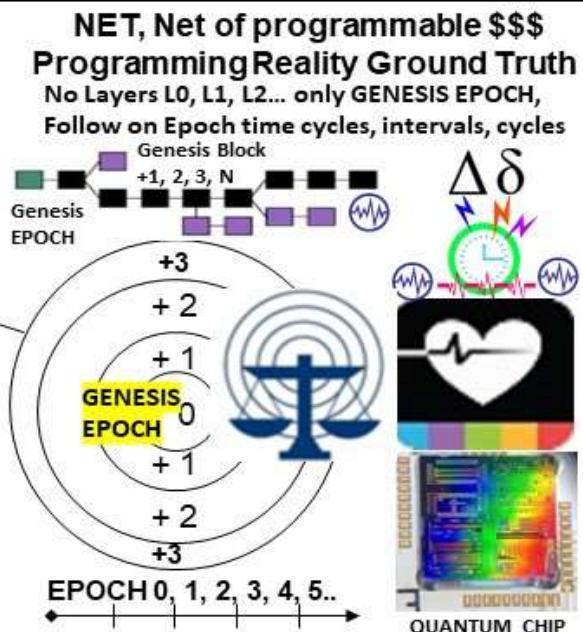
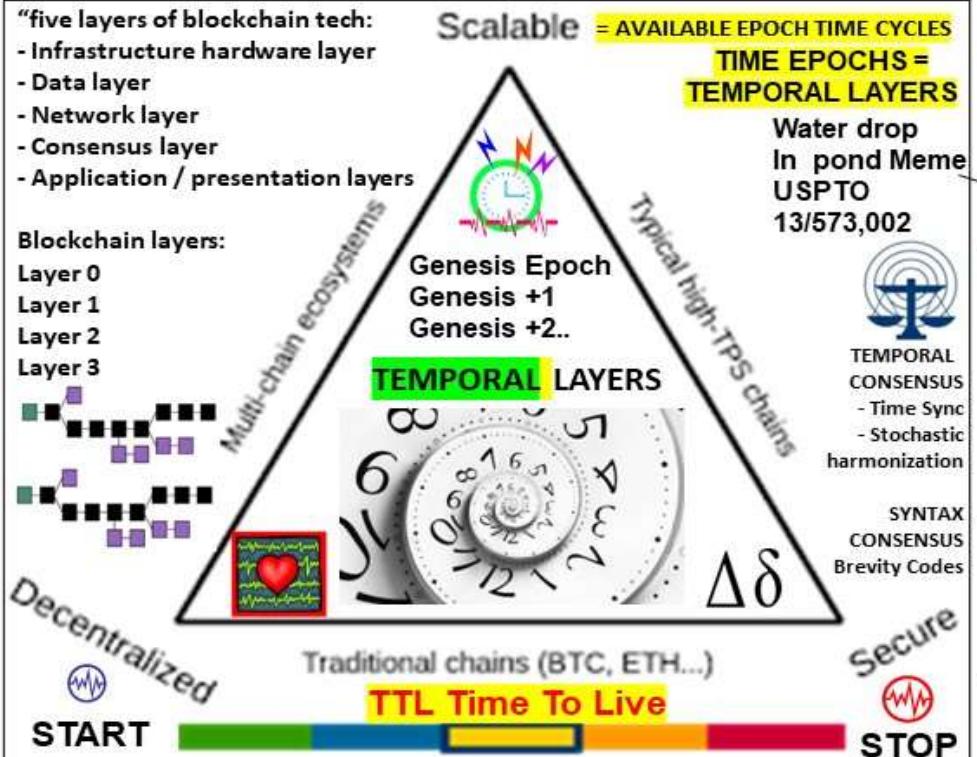
Blockchain Quad-lemma

"five layers of blockchain tech:
 - Infrastructure hardware layer
 - Data layer
 - Network layer
 - Consensus layer
 - Application / presentation layers

Blockchain layers:

Layer 0
 Layer 1
 Layer 2
 Layer 3

Blockchain = series of hashed blocks carrying transactional records. The first block of the blockchain is the **Genesis block**. After that, every new block added to the blockchain is linked to the Genesis block through a (temporal) iterative process.



THESIS: All things internet, net of programmable money are formed using:

1. Time epochs created by oscillating quartz crystal silicon chips
2. Syntax used / not used as programming instructions during epoch time cycles

All things internet, internet of money, blockchains are formed by unicast, multicast, anycast protocols. Programmable money's improvements are in cryptography. The internet consists of unicast, multicast broadcast, anycast and workflow filters, publish – subscribe paradigms..

Figure 23: The Blockchain Tri-lemma / Quad-lemma / Internet, Net of \$\$\$ ground Truth



Figure 24: Defi, Fintech Foundation technology for IP intellectual property wars

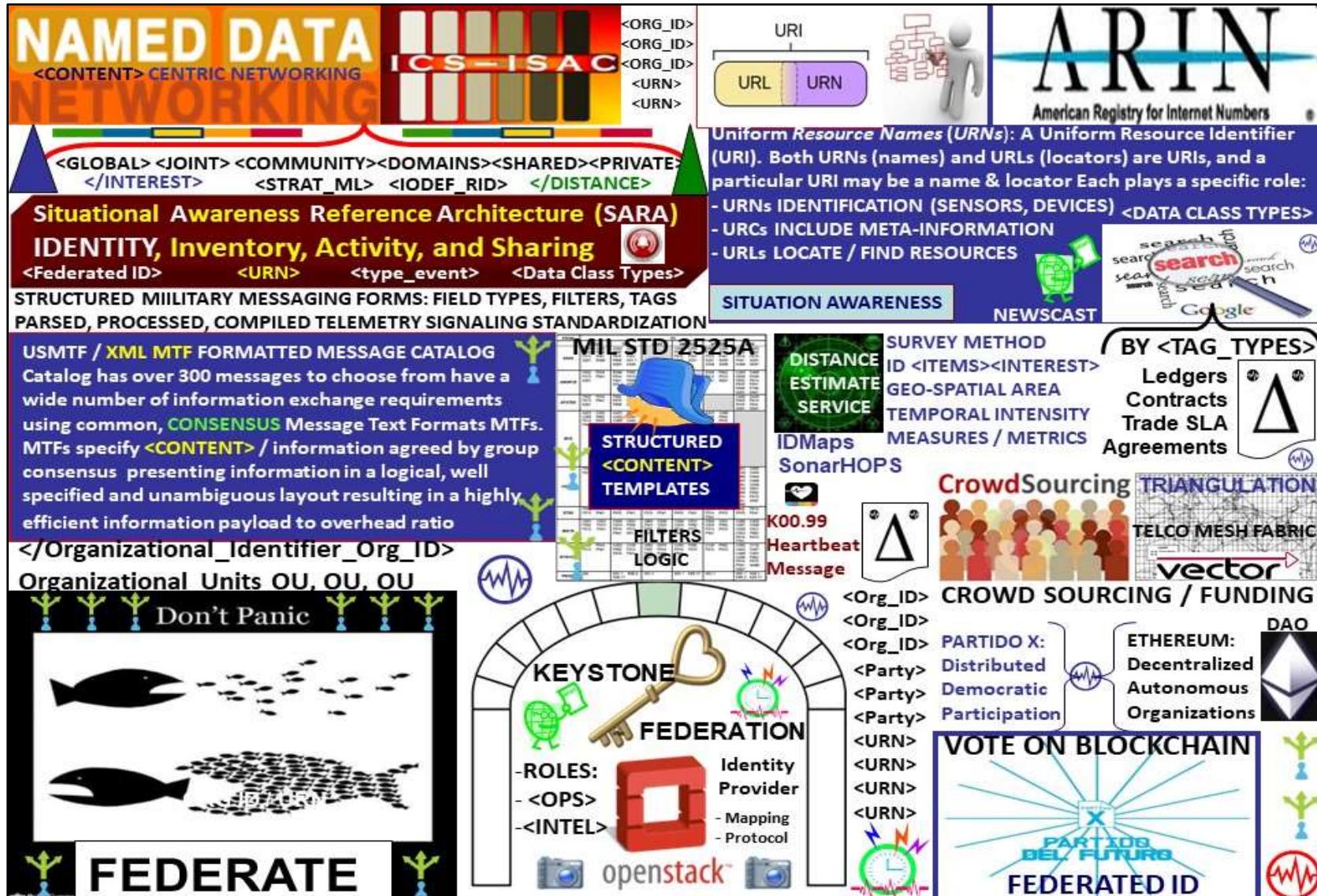


FIGURE 25: Figure SARA SYNTAX LEXICON LIBRARY

Situational Awareness Reference Architecture (SARA)

: Identity, Inventory, Activity, and Sharing <http://ics-isac.org/sara/>



IDENTITY: <UUID> = Devices, sensors
Federation Gateway <ORG_ID> Organizations

INVENTORY: Uniform Resource Name <URN>

<URN><URN> <COMMODITY><WATER><ENERGY><AVAILABLE UNITS>
<URN><URN> GEO-SPATIAL TEMPORAL INTENSITY METRICS
<URN><URN> UNIFIED EVENT / ALERT TRIGGER / THRESHOLDS

ACTIVITY: <EVENT><ALERT> <TIME_STAMP><ORG_ID><URN>

CONTENT LEXICON
ROSETTA STONE

SHARING:

COMMON <TAGS>
<Organizational_ID>
Resource Names <URN>
<Time_Stamps>
<State-Meta_Data>
<DATA_CLASS_TYPE>
<Heartbeat_snapshots>

<TAG> LIBRARY
TEMPLATES
NIEM
BUILDING INTEGRATION & EXCHANGE

**NAMED DATA
NETWORKING**
<Content> Centric



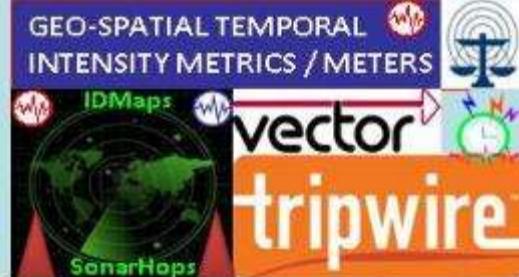
USMTF / XML MTF FORMATTED MESSAGE CATALOG
Catalog has over 300 messages to choose from have a wide number of information exchange requirements using common, **CONSENSUS** Message Text Formats
MTFs. MTFs specify <CONTENT> / information agreed by group consensus presenting information in a logically well specified and unambiguous layout i.e., templates

<ELEMENTS>

STRATML / IODEF RID CLASSES:
<GLOBAL><JOINT><SHARED>
<DOMAIN><FEDERATION>
<CITY><STATE><PRIVATE>

STRATEGIC
MARKUP
StratML
LANGUAGE

Industrial Control System
Information Sharing and
Analysis Center
IODEF



MIL-STD
2525A

STRUCTURED
<CONTENT>
TEMPLATES

<TAG>
LIBRARY



FIGURE 26: Situation Awareness Reference Architecture SARA

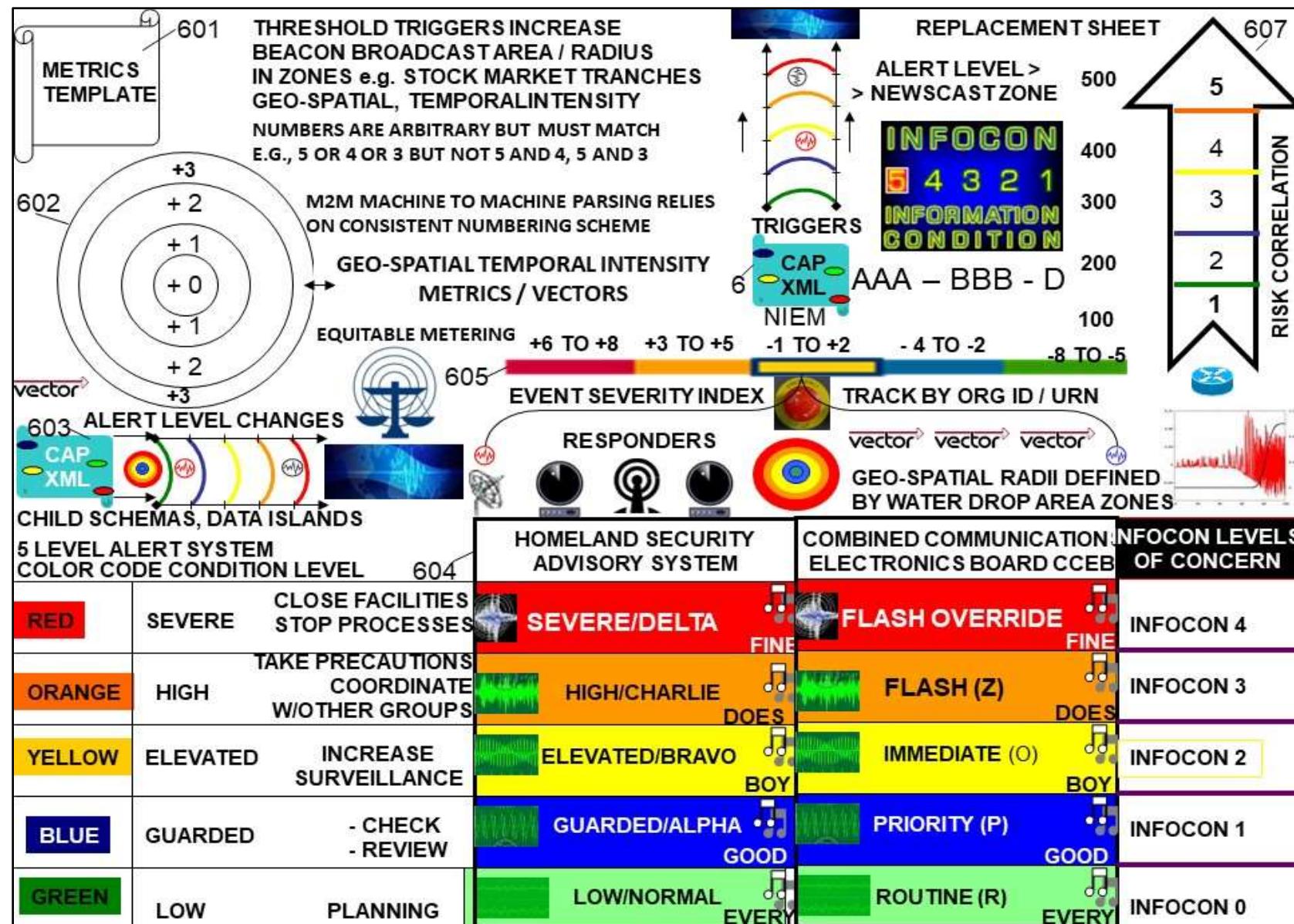


Figure 27: Structured Data Exchange INFOCON Precedence model

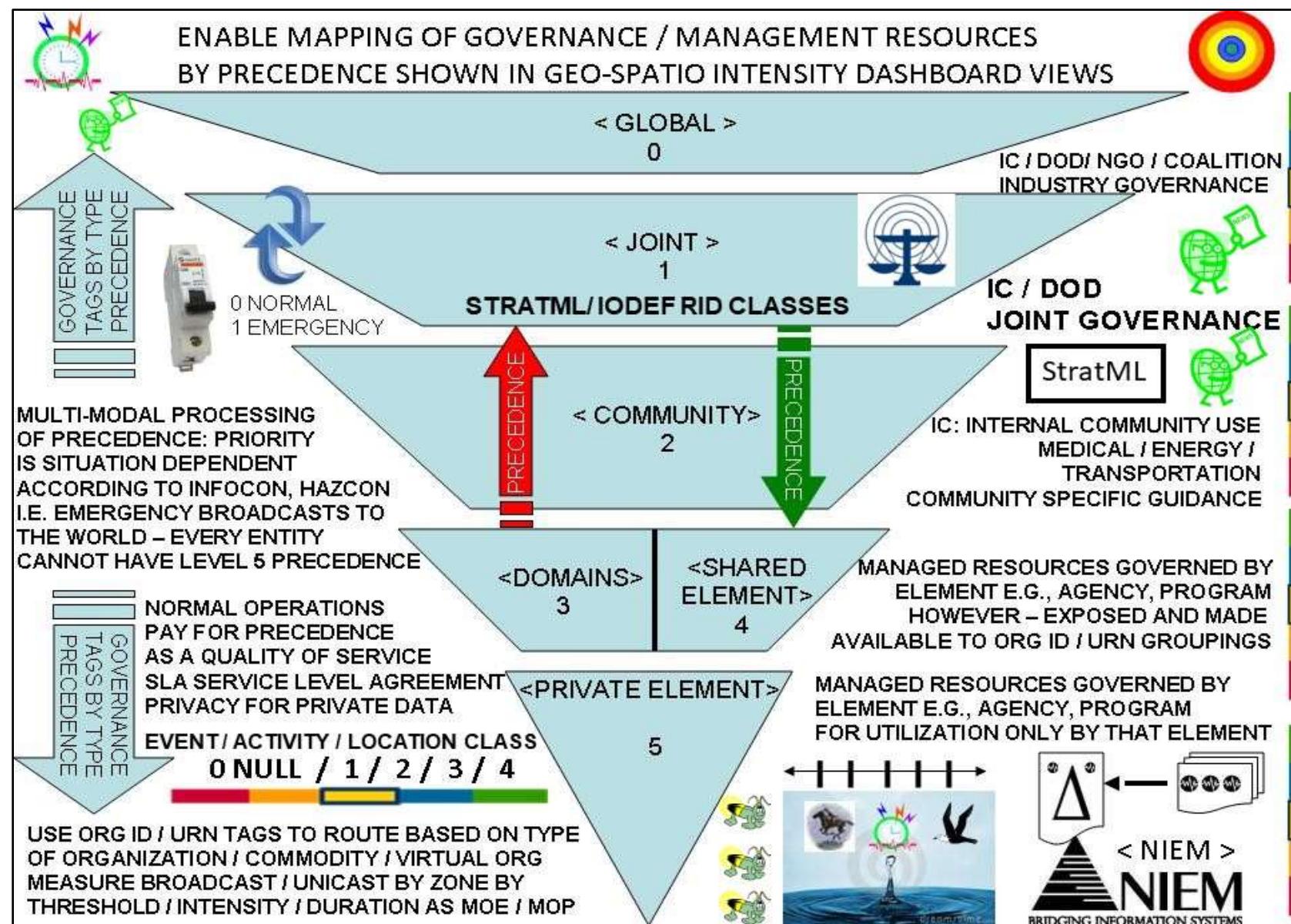


Figure 28: STRATML Markup Language

The current standard time common throughout the world is based on a 24-hour clock, with zones that are either 12 hours ahead or behind **Coordinated Universal Time (UTC)**. However, these time zones are decided upon by individual governments, without overall coordination and can even extend fourteen hours ahead UTC.



Figure 29: Universal Time Zone UTZ Stochastic Harmonization / Synchronization

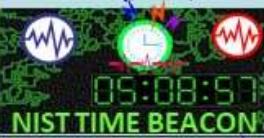
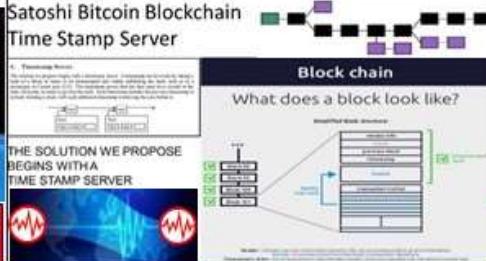
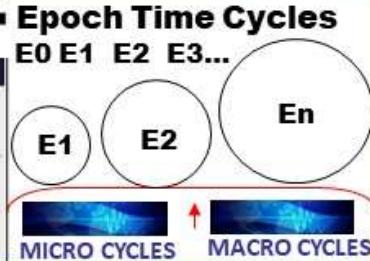
Interface Name	HEARTBEAT Administration Interface [SCOP]		
Documentation URL	http://scop.sourceforge.net/ http://linuxvirtualserver.org/software/index.html		
API Information  	#Big_Data	Functionality Areas  	Cloud Interface Management configuration, start, stop cloud services, edit configuration (heartbeat messages)
Programmable Money World Computer / Blockchain  		API Operation Count 	
Web service access type Network Effects / A.I.			Web application, front end to [network, device, system, blockchain] heartbeat
		LANGUAGE / PLATFORM BINDINGS  	
Interface Characteristics 		SCOP is a web application, PHP based front-end to heartbeat, IP Virtual Server ipvs and Idirectord [e.g., check interval @ 5 seconds] SCOP can start/stop services, view/ edit configuration files e.g., heartbeat message state management snapshots, backups, take a service online/offline, add/ remove virtual/real servers, services etc.	
<p>"The external environment could update resources at random... One solution is a heartbeat: defining a default lease duration delaying updates until the next cycle"</p>		 	Epoch Time Cycles E0 E1 E2 E3... 
QubitCoin Interval: Every 30 Seconds			

Figure 30: SCOP Heartbeat Epoch Time Interval Start, Stop, TTL Time To Live



FIGURE 31: The Alice Effect / SCOTUS Alice Corp Vs CLS Bank 2014 ruling



Figure 32: Firefly Inspired Heartbeat Synchronization Algorithm



FIGURE 33: ECONOMIST MILTON FRIEDMAN'S K% RULE Economic GDP HEARTBEAT

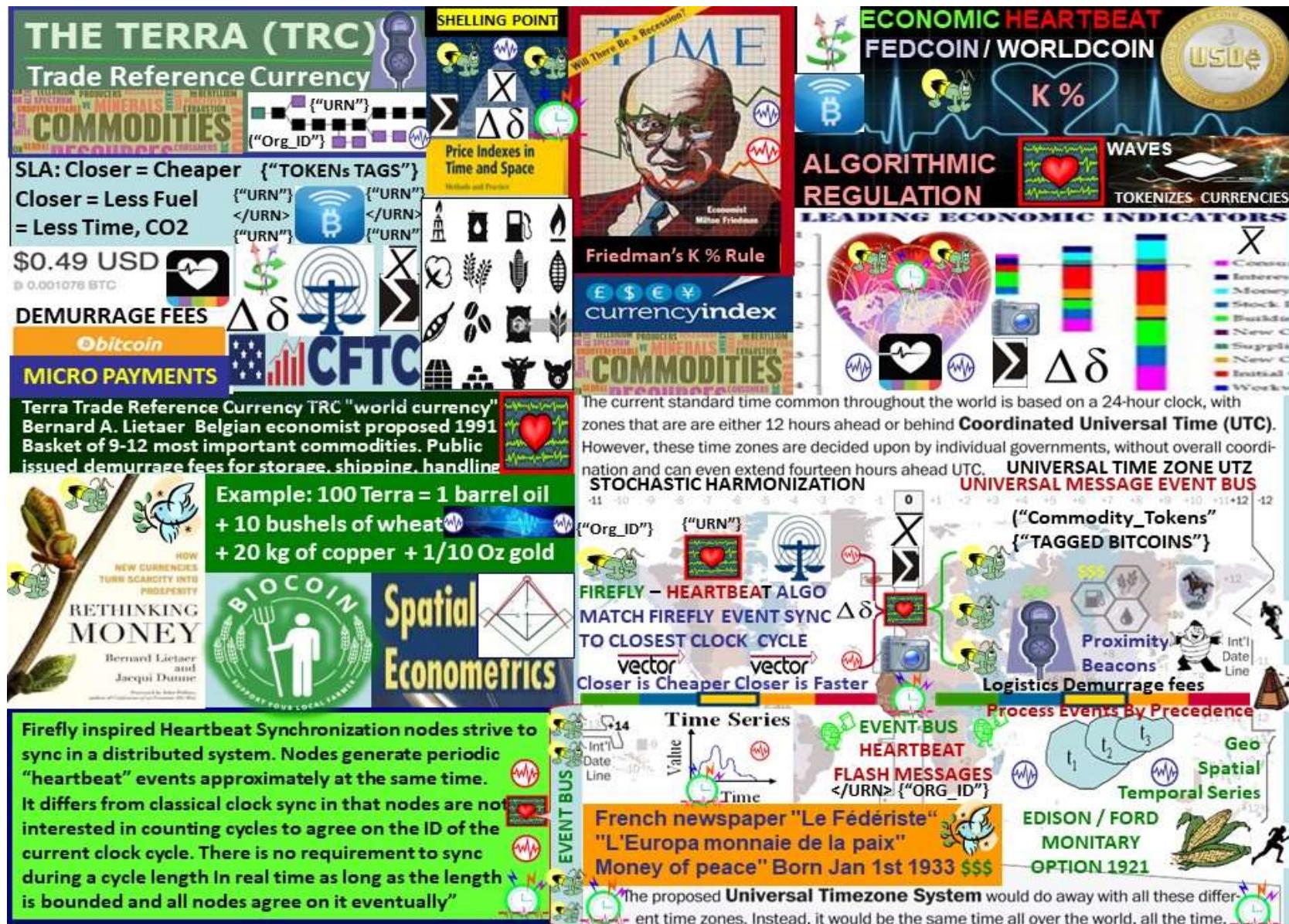




Figure 35: FEDERATE / FEDERATION / DAO



Figure 36: Federate / Federation Beacon Communities



FIGURE 37: ERICSSON ERLANG - ERICSSON'S OPEN MONEY / USPTO 13/573,002

What happens if we think about Bitcoin through the lens of *land*?

SC ALICE CORP VS CLS BANK: "claims may not direct towards abstract ideas"

UTXO: unspent transaction output'. bitcoins that have been sent somewhere but not yet themselves been spent. The set of all unspent transaction outputs (UTXOs) can be thought of as the latest STATE of every bitcoin that has ever been mined.

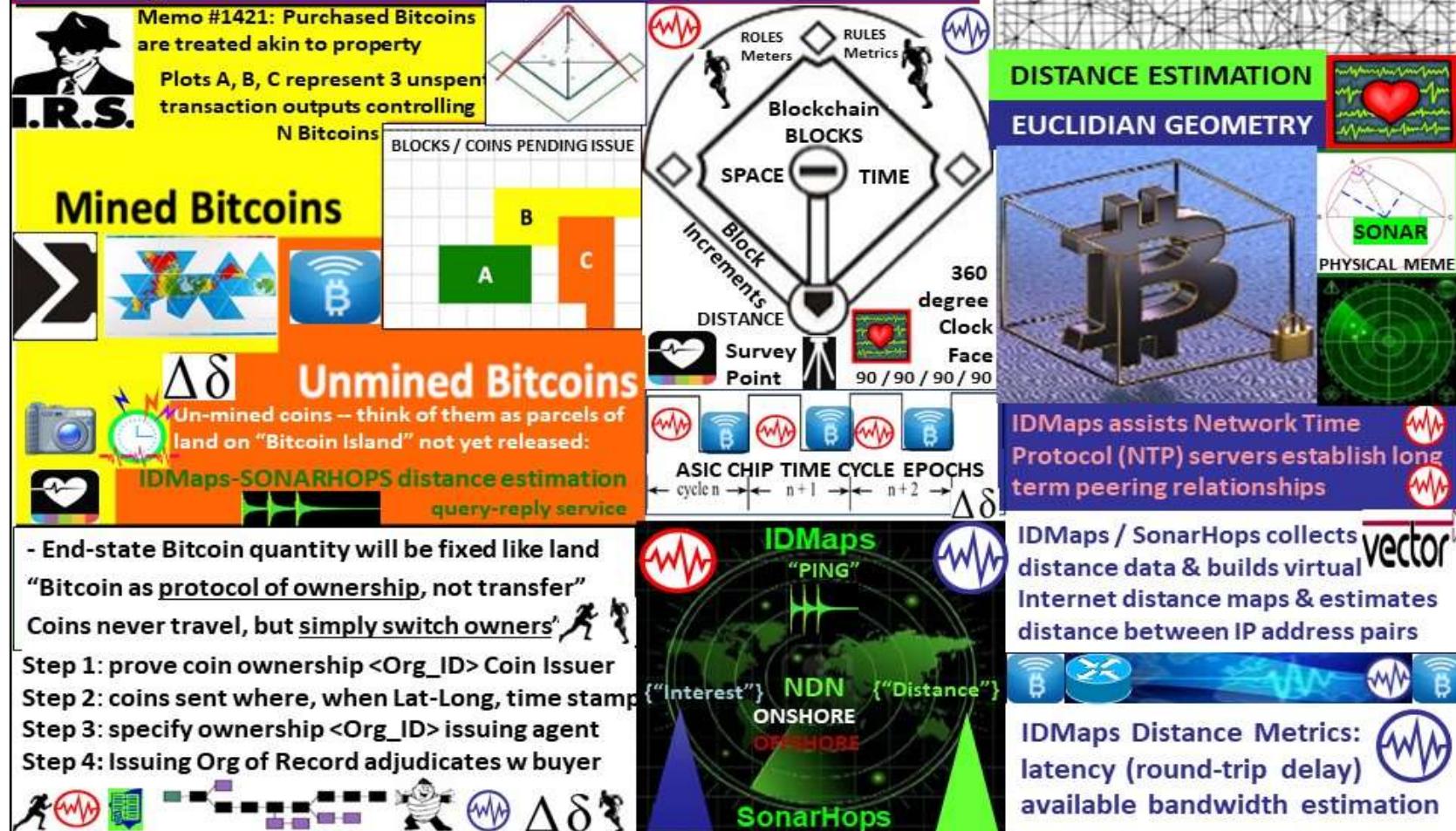


FIGURE 38: CRYPTOCURRENCY LAND USE MEME / IRS MEME 1421 / USPTO 13/573,002

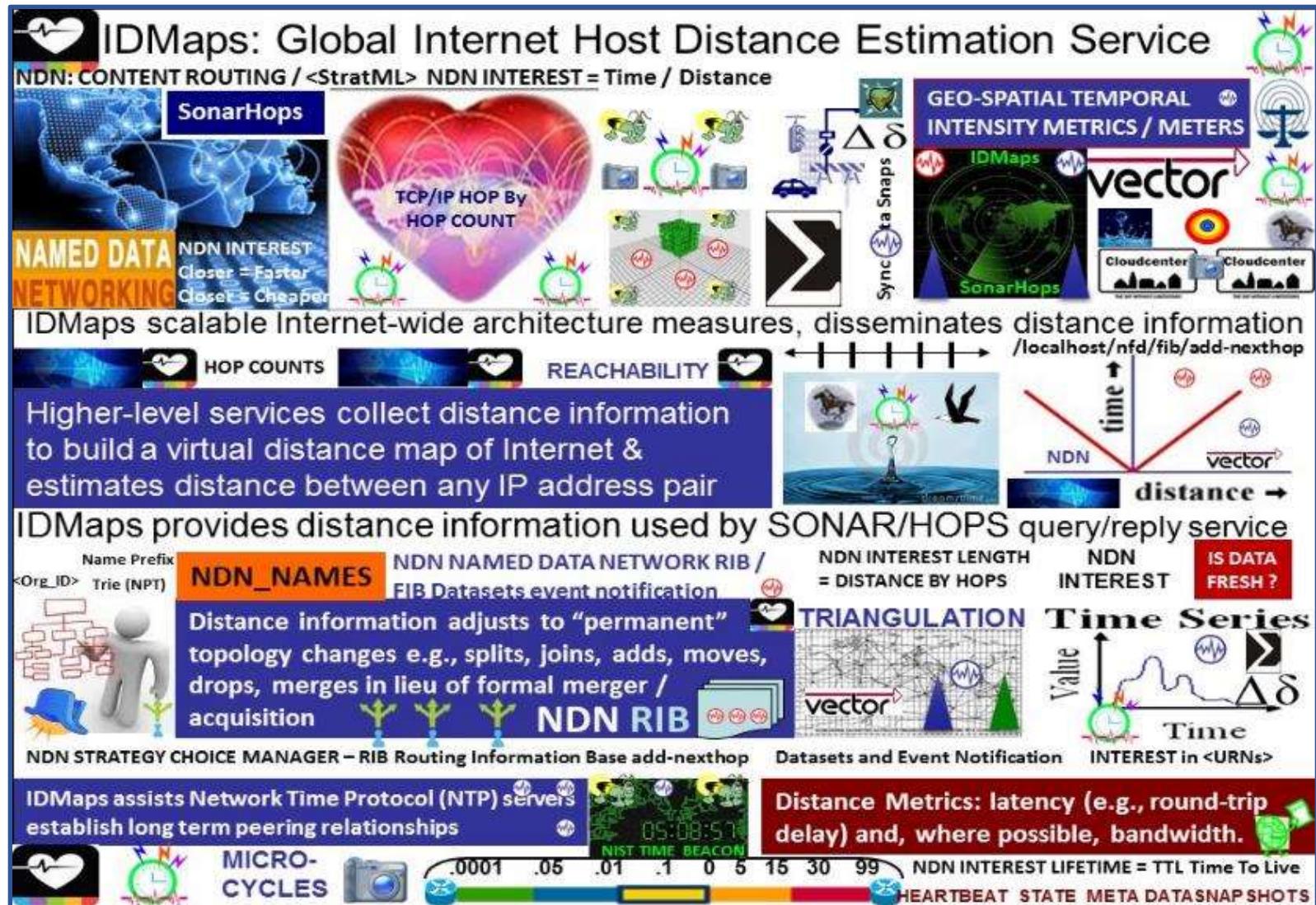


Figure 39: IDMaps / SonarHops Distance Estimation Service / USPTO 13/573,002

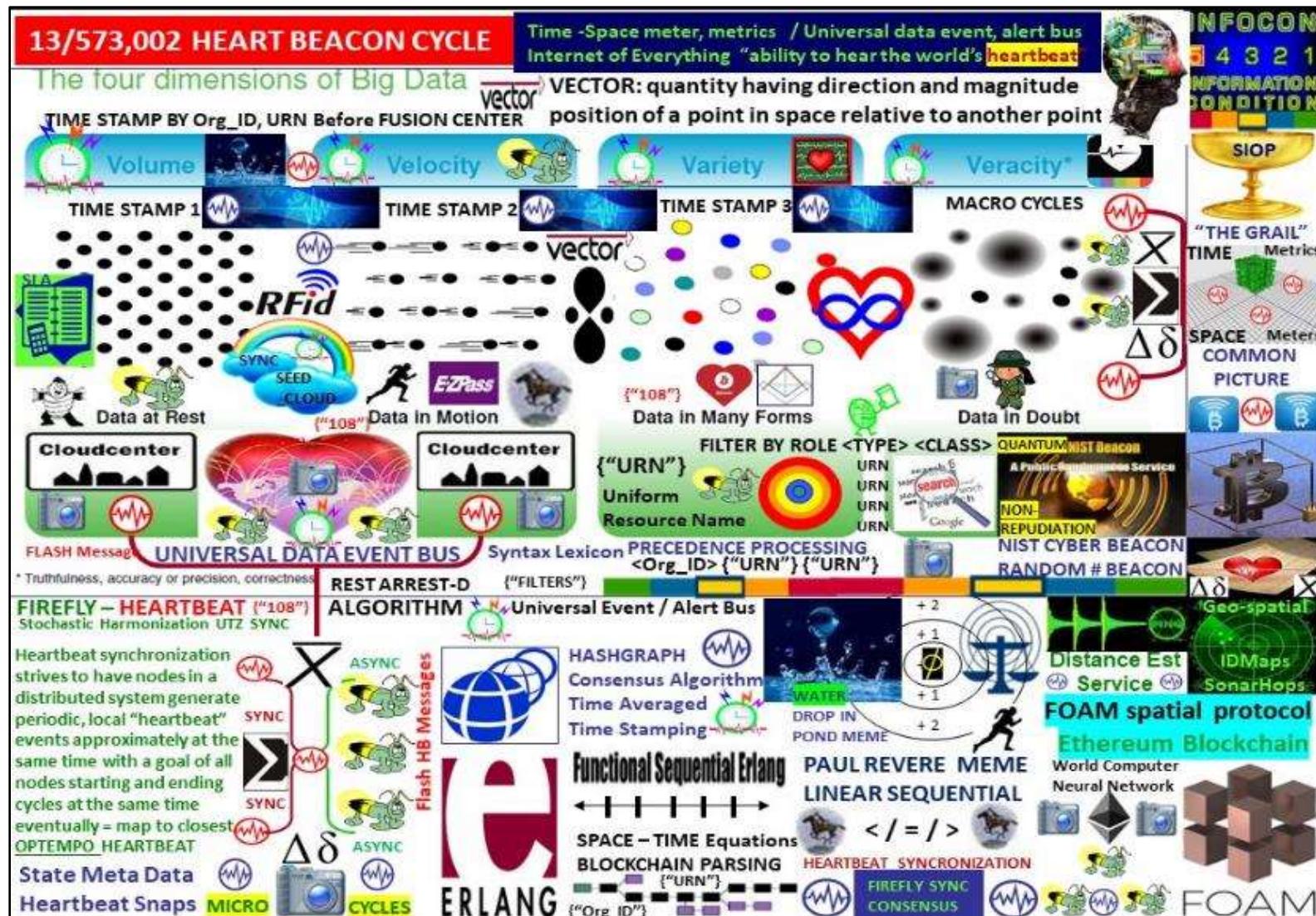


FIGURE 40: BIG DATA THE NEXT OIL / USPTO 13/573,002

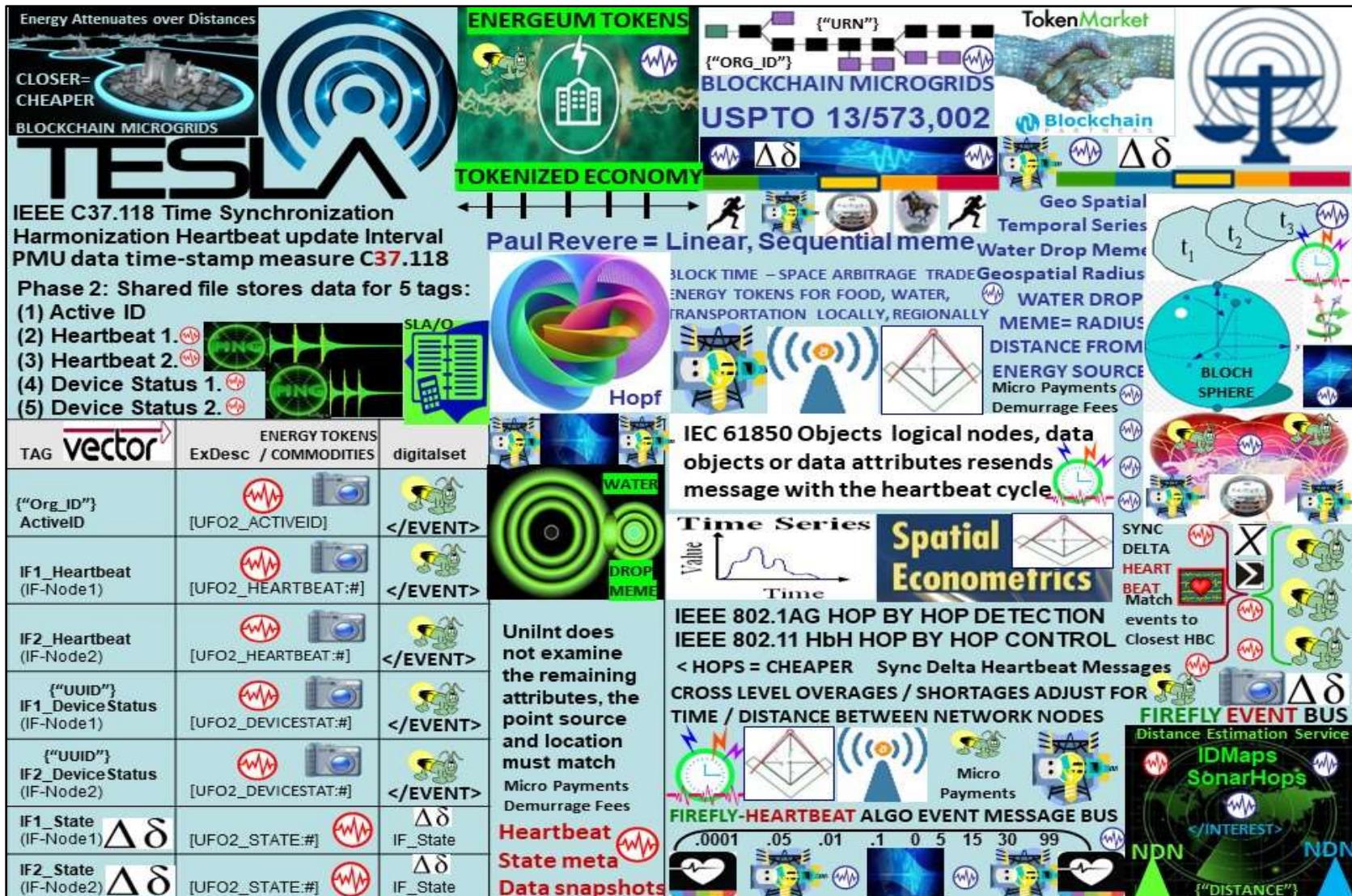
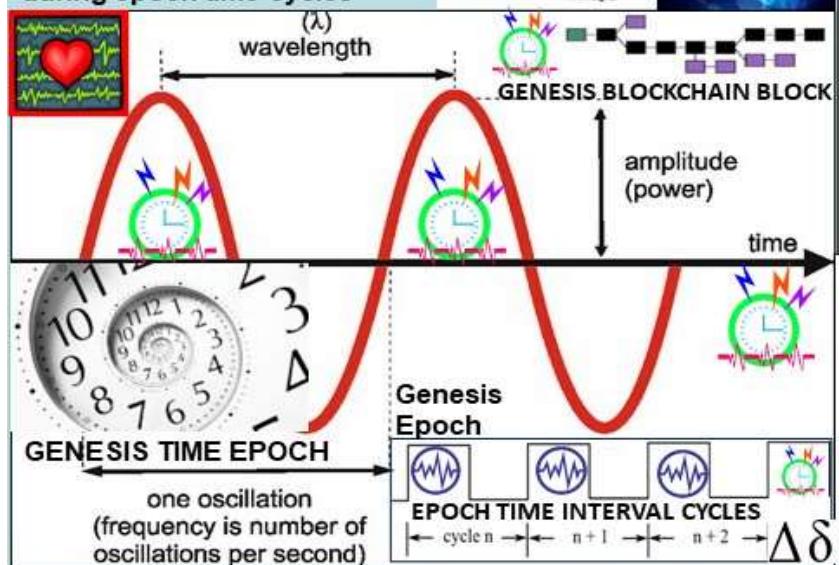


FIGURE 41: ENERGY ATTENUATES OVER DISTANCES / USPTO 13/573,002 Energy claim

THESIS: All things net, net of programmable \$\$\$ are formed using:

- 1) Time epochs created by quartz crystal silicon chips
- 2) Syntax used / not used as programming instructions during epoch time cycles



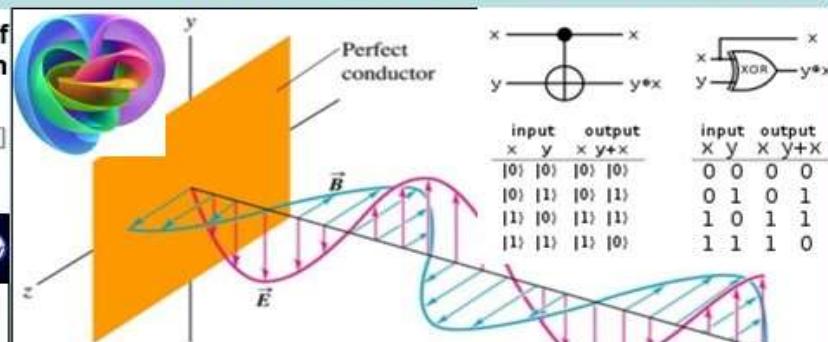
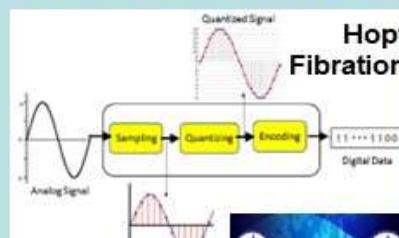
Quantum Computing Vibrations encode, process data like quantum computers. A simple mechanical system built from aluminum rods uses vibrations to encode information, mimicking quantum computing in a non-quantum system. "Light is made from photons, the quantum of light."

mechanical vibrations or sound waves can be described in a quantum-mechanical manner i.e., composed of phonons: the smallest possible units of mechanical vibration"

Link: https://phys.org/news/2018-06-quantum_1.html

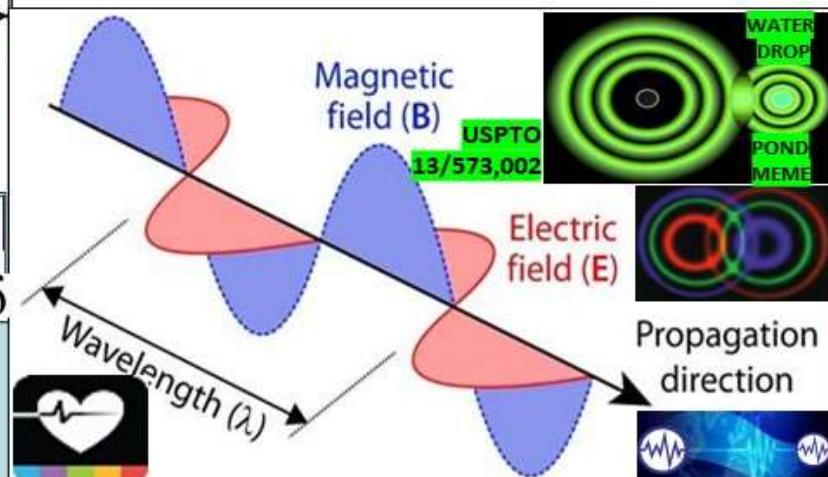
ENERGY / DATA WAVE METRICS / METERS

BELL STATE QUANTUM COMPUTING



STANDING ELECTRO- MAGNETIC WAVE

A **standing** electromagnetic wave does not propagate along the x -axis; instead, at every point on the x -axis the E and B fields simply oscillate.



"Nature may reach the same result in many ways. Like a wave in the physical world, in the infinite ocean of the medium which pervades all.. Nikola Tesla

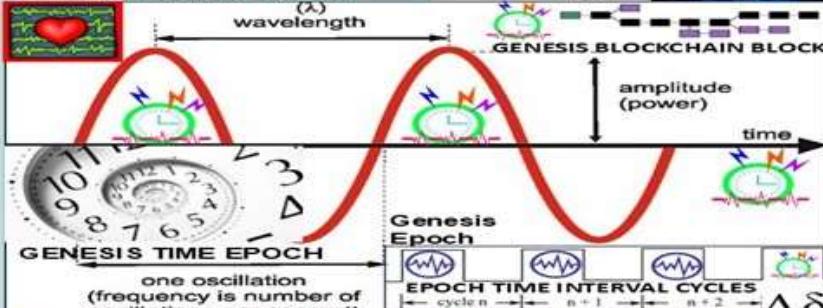
Figure 42: Energy / Data unified field propagation claim water drop in pond meme

United States US 20120092107A1 (12) PROPULSION SYSTEM USING THE
Baptista De Alves Martins (43) ENERGY PRODUCTION
Pub. Date: Apr. 19, 2012

ABSTRACT: A propulsion system for aerial, terrestrial, underwater or space propulsion, through manipulation (or engineering) of the vacuum with proper electromagnetic interactions. Vacuum manipulation.. new form of propulsion, and has applications in ENERGY production and on CHANGE of TIME decay of radioactive elements. Opposing magnetic or electric fields create a mass repelling force, while attracting magnetic or electric fields create a mass attracting force. This vacuum manipulation process.. used to propel a mass that contains field sources that perturb the vacuum.. the creation of a repulsion point in space through the interference of two or more longitudinal ELECTRO dynamic (micro) waves

THESSIS: All things net, net of programmable \$\$\$ are formed using:

- 1) Time epochs created by quartz crystal silicon chips
- 2) Syntax used / not used as programming instructions during epoch time cycles



Quantum Computing Vibrations encode, process data like quantum computers. A simple mechanical system built from aluminum rods uses vibrations to encode information, mimicking quantum computing in a non-quantum system. "Light is made from photons, the quantum of light. mechanical vibrations or sound waves can be described in a quantum-mechanical manner i.e., composed of phonons: the smallest possible units of mechanical vibration". Link: https://phys.org/news/2018-06-quantum_1.html

ENERGY PRODUCTION

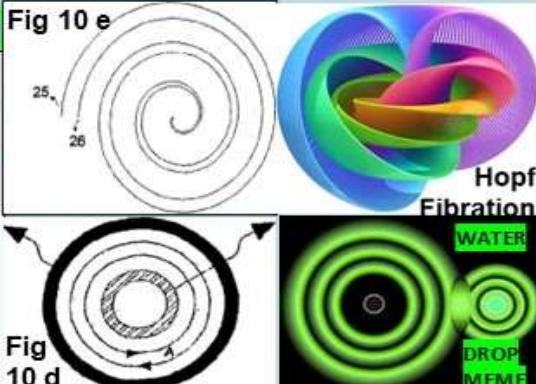


Fig 10 d

ENERGY / DATA WAVE METRICS / METERS

Hopf Fibration

Analog signal → Sampling → Decoding → Encoding → Digital Data

Hold signal → Waveform

GENESIS BLOCKCHAIN BLOCK

wavelength (λ)

amplitude (power)

time

Perfect conductor

E and B fields

STANDING ELECTRO-MAGNETIC WAVE

A standing electromagnetic wave does not propagate along the x-axis; instead, at every point on the x-axis the E and B fields simply oscillate.

USPTO 13/573,002

WATER DROP POND MEME

Magnetic field (B)

Electric field (E)

Propagation direction

Wavelength (λ)

BELL STATE QUANTUM COMPUTING

Perfect conductor

x y $x+y$ $x-y$

input output

$|0\rangle |0\rangle |0\rangle |0\rangle$

$|0\rangle |0\rangle |0\rangle |1\rangle$

$|1\rangle |0\rangle |1\rangle |1\rangle$

$|1\rangle |1\rangle |1\rangle |0\rangle$

$|x\rangle |y\rangle |x+y\rangle |x-y\rangle$

input output

$|0\rangle |0\rangle |0\rangle |0\rangle$

$|0\rangle |1\rangle |0\rangle |1\rangle$

$|1\rangle |0\rangle |1\rangle |1\rangle$

$|1\rangle |1\rangle |1\rangle |0\rangle$

$|x\rangle |y\rangle |x+y\rangle |x-y\rangle$

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$|1\rangle |0\rangle |1\rangle |1\rangle$

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$|0\rangle |1\rangle |0\rangle |1\rangle$

$|1\rangle |0\rangle |1\rangle |1\rangle$

$|1\rangle |1\rangle |1\rangle |0\rangle$

$|x\rangle |y\rangle |x+y\rangle |x-y\rangle$

$|0\rangle |0\rangle |0\rangle |0\rangle$

$|0\rangle |1\rangle |0\rangle |1\rangle$

$|1\rangle |0\rangle |1\rangle |1\rangle$

$|1\rangle |1\rangle |1\rangle |0\rangle$

$|x\rangle |y\rangle |x+y\rangle |x-y\rangle$

$|0\rangle |0\rangle |0\rangle |0\rangle$

$|0\rangle |1\rangle |0\rangle |1\rangle$

$|1\rangle |0\rangle |1\rangle |1\rangle$

$|1\rangle |1\rangle |1\rangle |0\rangle$

$|x\rangle |y\rangle |x+y\rangle |x-y\rangle$

$|0\rangle |0\rangle |0\rangle |0\rangle$

$|0\rangle |1\rangle |0\rangle |1\rangle$

$|1\rangle |0\rangle |1\rangle |1\rangle$

$|1\rangle |1\rangle |1\rangle |0\rangle$

$|x\rangle |y\rangle |x+y\rangle |x-y\rangle$

$|0\rangle |0\rangle |0\rangle |0\rangle$

$|0\rangle |1\rangle |0\rangle |1\rangle$

$|1\rangle |0\rangle |1\rangle |1\rangle$

$|1\rangle |1\rangle |1\rangle |0\rangle$

$|x\rangle |y\rangle |x+y\rangle |x-y\rangle$

$|0\rangle |0\rangle |0\rangle |0\rangle$

$|0\rangle |1\rangle |0\rangle |1\rangle$

$|1\rangle |0\rangle |1\rangle |1\rangle$

$|1\rangle |1\rangle |1\rangle |0\rangle$

$|x\rangle |y\rangle |x+y\rangle |x-y\rangle$

$|0\rangle |0\rangle |0\rangle |0\rangle$

$|0\rangle |1\rangle |0\rangle |1\rangle$

$|1\rangle |0\rangle |1\rangle |1\rangle$

$|1\rangle |1\rangle |1\rangle |0\rangle$

$|x\rangle |y\rangle |x+y\rangle |x-y\rangle$

$|0\rangle |0\rangle |0\rangle |0\rangle$

$|0\rangle |1\rangle |0\rangle |1\rangle$

$|1\rangle |0\rangle |1\rangle |1\rangle$

$|1\rangle |1\rangle |1\rangle |0\rangle$

$|x\rangle |y\rangle |x+y\rangle |x-y\rangle$

$|0\rangle |0\rangle |0\rangle |0\rangle$

$|0\rangle |1\rangle |0\rangle |1\rangle$

$|1\rangle |0\rangle |1\rangle |1\rangle$

$|1\rangle |1\rangle |1\rangle |0\rangle$

$|x\rangle |y\rangle |x+y\rangle |x-y\rangle$

$|0\rangle |0\rangle |0\rangle |0\rangle$

$|0\rangle |1\rangle |0\rangle |1\rangle$

$|1\rangle |0\rangle |1\rangle |1\rangle$

$|1\rangle |1\rangle |1\rangle |0\rangle$

$|x\rangle |y\rangle |x+y\rangle |x-y\rangle$

$|0\rangle |0\rangle |0\rangle |0\rangle$

$|0\rangle |1\rangle |0\rangle |1\rangle$

$|1\rangle |0\rangle |1\rangle |1\rangle$

$|1\rangle |1\rangle |1\rangle |0\rangle$

$|x\rangle |y\rangle |x+y\rangle |x-y\rangle$

$|0\rangle |0\rangle |0\rangle |0\rangle$

$|0\rangle |1\rangle |0\rangle |1\rangle$

$|1\rangle |0\rangle |1\rangle |1\rangle$

$|1\rangle |1\r$

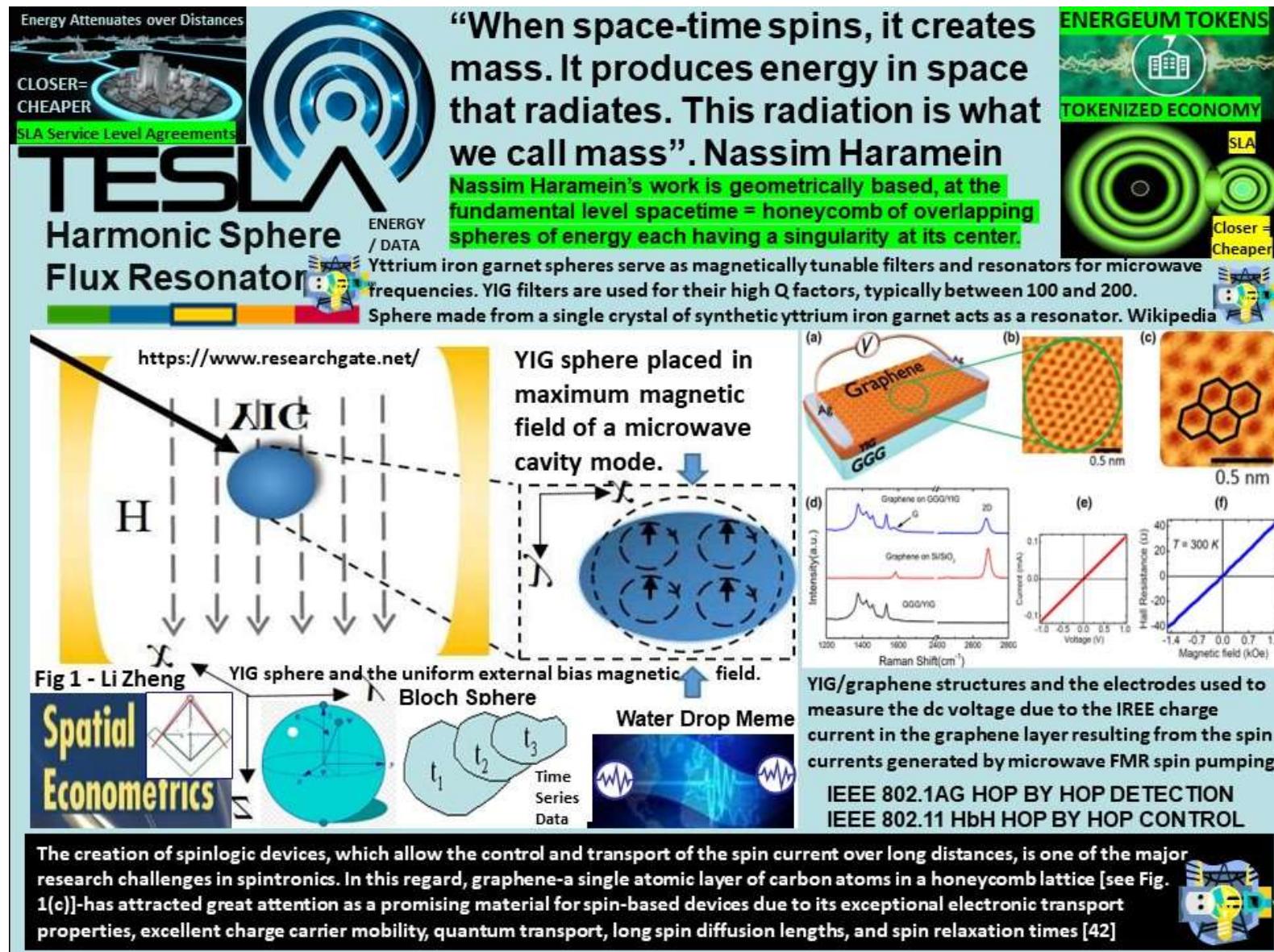


Figure 44 Harmonic Shere Flux Resonator

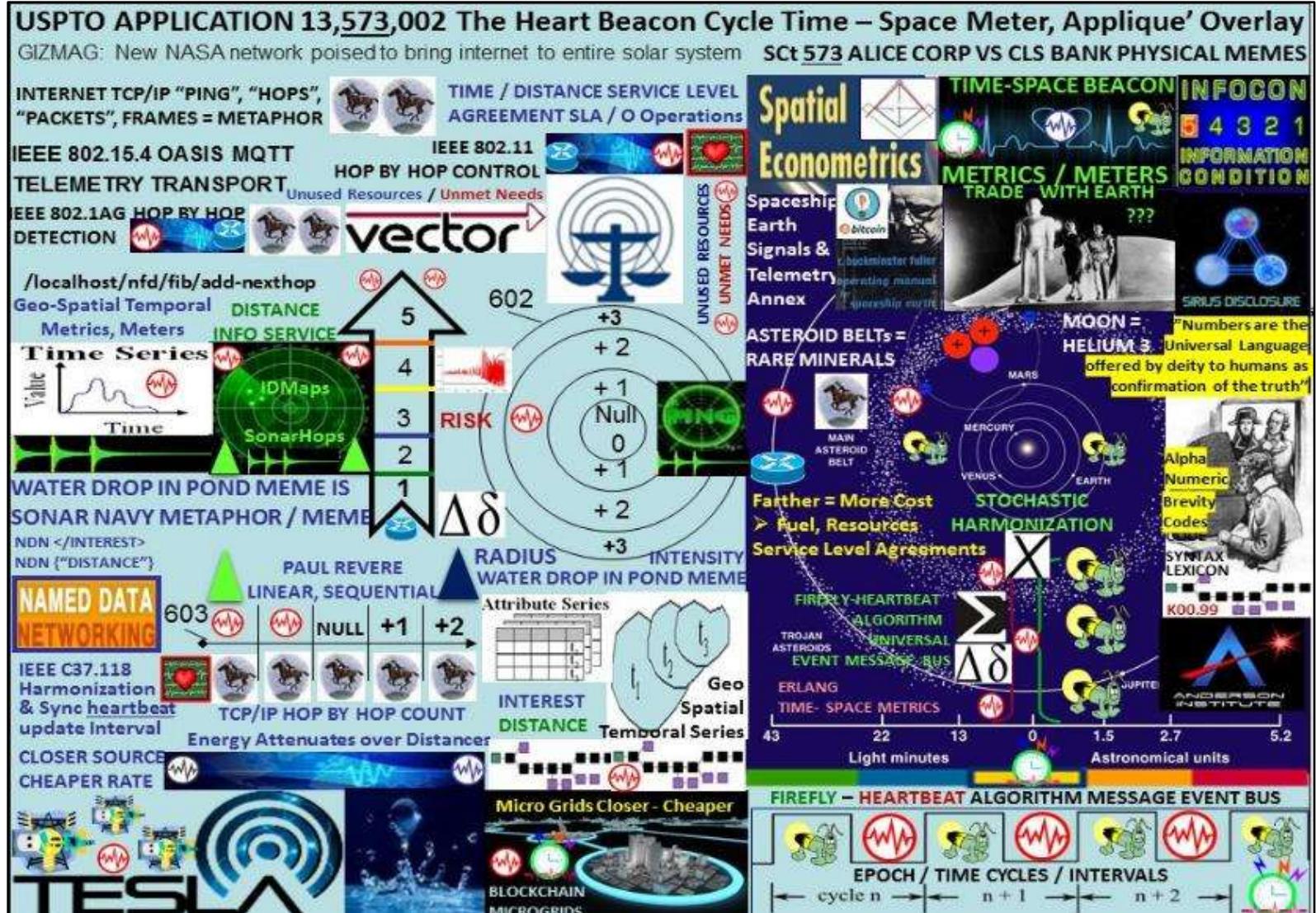


Figure 45: SPACE – TIME BEACON / CLOSER = CHEAPER = LESS TIME / FUEL

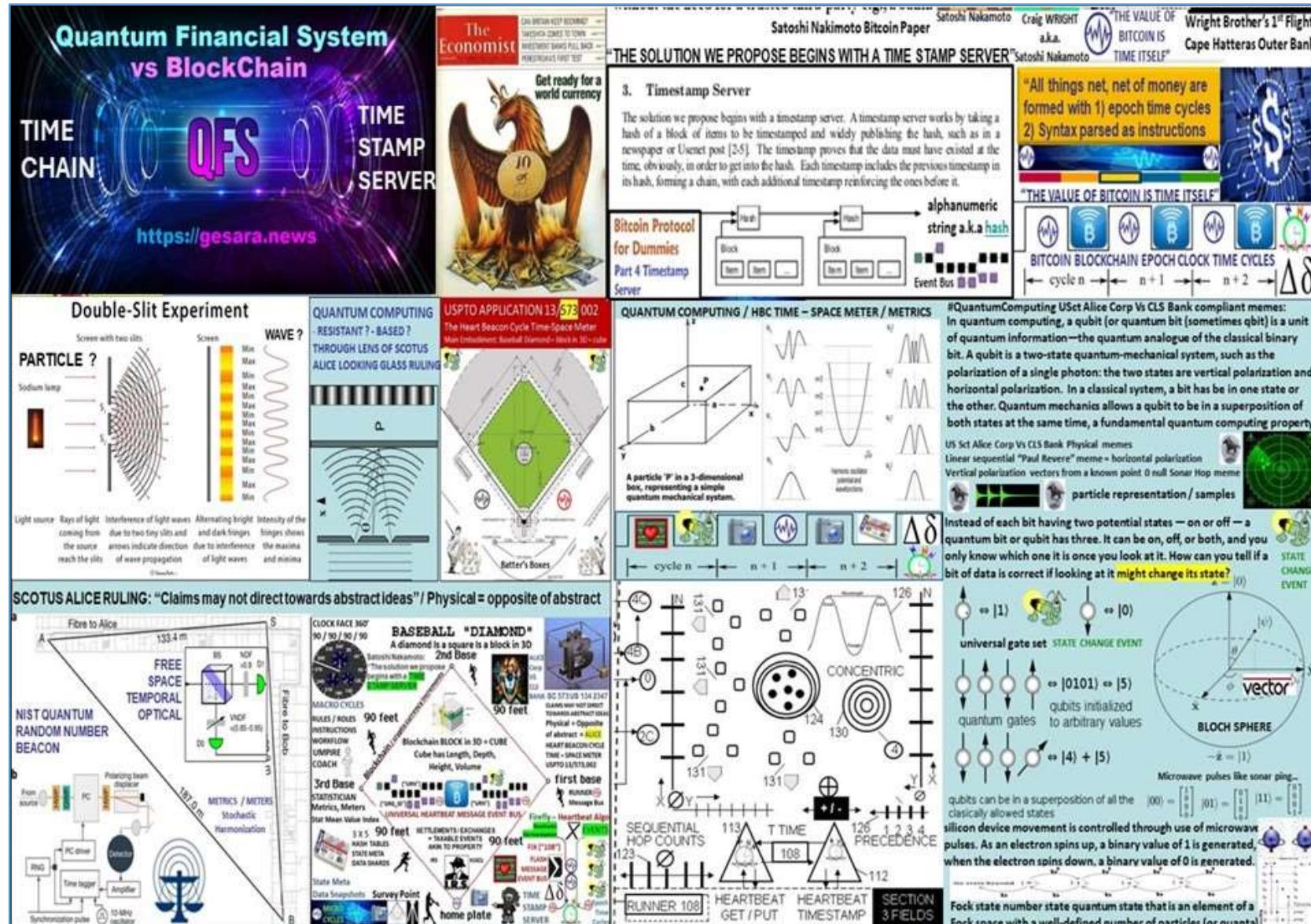


Figure 46: Time Chain / Time Stamp Server based QFS “Quantum Financial System” (Quantumly bogus)

Q: Which meme describes the myriad blockchain consensus algorithms the most comprehensively that uses an algorithm (based on nature = “shortest path to the knowledge of truth Luxor Temple) enabling distributed system of systems geo-spatial, UTZ Universal Time Zone temporal, semantic - syntactic sync, OPSCODE brevity code, data element & symbol (for A.I. man – machine interface) consensus?

Blockchain Consensus Algorithms & Mechanisms

In the world of blockchain consensus algorithms, consensus is the **HEART OF THE BLOCKCHAIN NETWORK**. Its main purpose is to achieve agreement on transactions among a distributed system (s).

Proof of Formulation: PoF: generation / propagation of blocks using a previously agreed sequence between participants of the generation of blocks, formed by two groups: a generator group and/or Formulator and a group of synchronization.

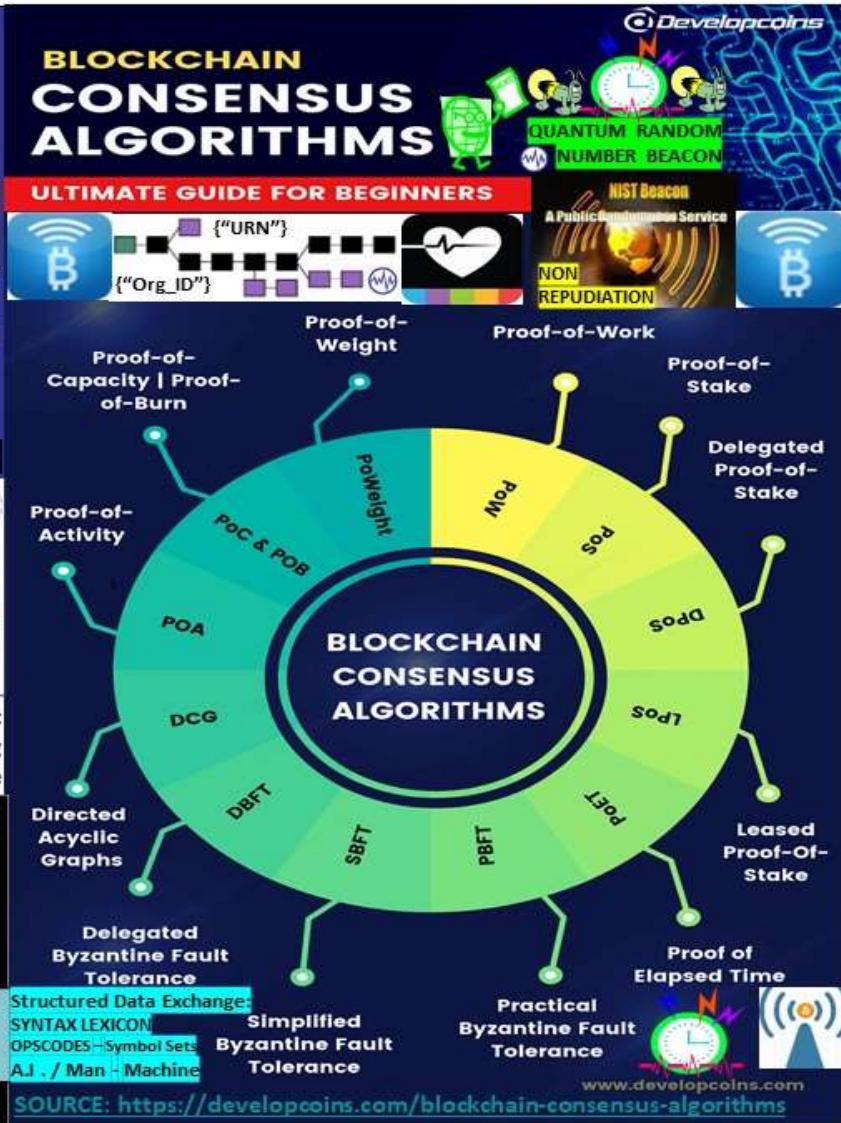
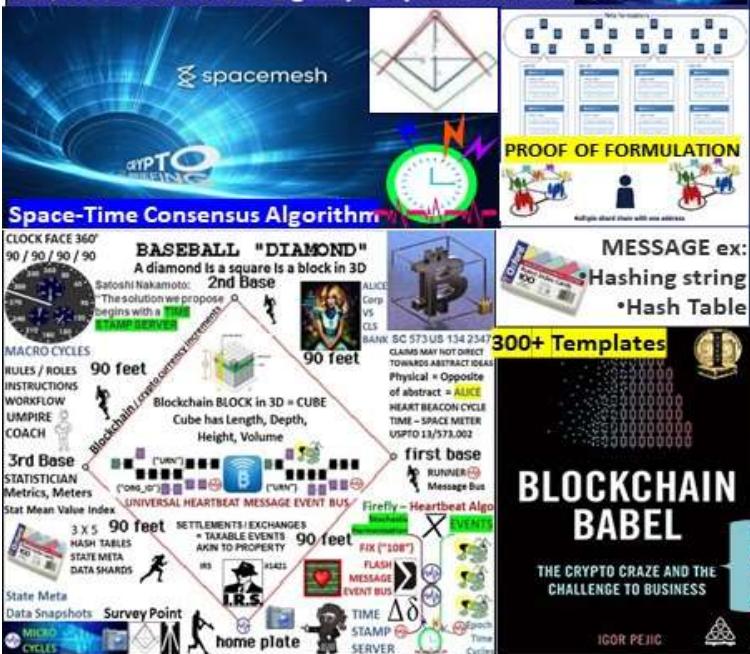


Figure 47: Universal meme / myriad consensus algorithm blockchain memes / metaphors = Tower of Babel

PROOF-OF-WORK

Time Series
Value ↑
Time →

THE PROBABILITY OF MINING A BLOCK IS DEPENDENT ON HOW MUCH WORK IS DONE BY THE MINER

"BITCOINS VALUE IS TIME ITSELF"
← cycle n → ← n + 1 → ← n + 2 →

TIMESTAMP marks the point that work started. Additionally, it contributes to the uniqueness of the work by an individual miner

THROTTLE equivalent to difficulty. State •target = maximum value of 8 bytes Snap (2^64) divided by the difficulty.

NONCE increments from 0..N until the target is met.

GUESS stores the guess Effectively, it begins at infinity.

HASH ← cycle n → ← n + 1 → ← n + 2 → |Δδ

Proof-of-Work: users perform some form of work to participate. Work must be difficult for the client but easy for the server/network to verify. POW determines the approximate time between blocks = rate that new bitcoins are created. Work is submitted as a message/timestamp payload with a nonce value. Payloads are made unique through use of public key encryption or address.Nonce allows checking the work without retracing all the procedural steps.

MESSAGE ex:
•Hashing string
•Hash Table

300+Message Templates

CLOCK FACE 360°
90 / 90 / 90 / 90
330 340 30 30
270 210 180 150
MACRO CYCLES
RULES / ROLES
INSTRUCTIONS
WORKFLOW
UMPIRE
COACH
3rd Base
STATISTICIAN Metrics, Meters
Stat Mean Value Index
3 X 5 HASH TABLES STATE META DATA SHARDS
State Meta Data Snapshots Survey Point
MICRO CYCLES

BASEBALL "DIAMOND"
A diamond Is a square Is a block in 3D
Satoshi Nakamoto: "The solution we propose begins with a TIME STAMP SERVER
2nd Base
Blockchain BLOCK in 3D = CUBE
Cube has Length, Depth, Height, Volume
["URN"] ["ORG_ID"] ["URN"] UNIVERSAL HEARTBEAT MESSAGE EVENT BUS
SETTLEMENTS / EXCHANGES = TAXABLE EVENTS AKIN TO PROPERTY
IRS #1421 home plate
FLASH MESSAGE EVENT BUS

FIREFLY-HEARTBEAT ALGORITHM STOCHASTIC HARMONY ACROSS TIME ZONES
ALICE Corp VS CLS BANK SC 573 US 134 2347 CLAIMS MAY NOT DIRECT TOWARDS ABSTRACT IDEAS Physical = Opposite of abstract = ALICE HEART BEACON CYCLE TIME - SPACE METER USPTO 13/573,002
first base RUNNER Message Bus

LOGIC FILTERS LOGIC GATES
SYNTAX LIBRARY LEXICON
CODER'S GUIDE

POW PAYLOAD : COMBINATIONS OF ENCRYPTED SYNTAX Attribute Series

Figure 48: Proof of Work Consensus / USPTO 13/573,002

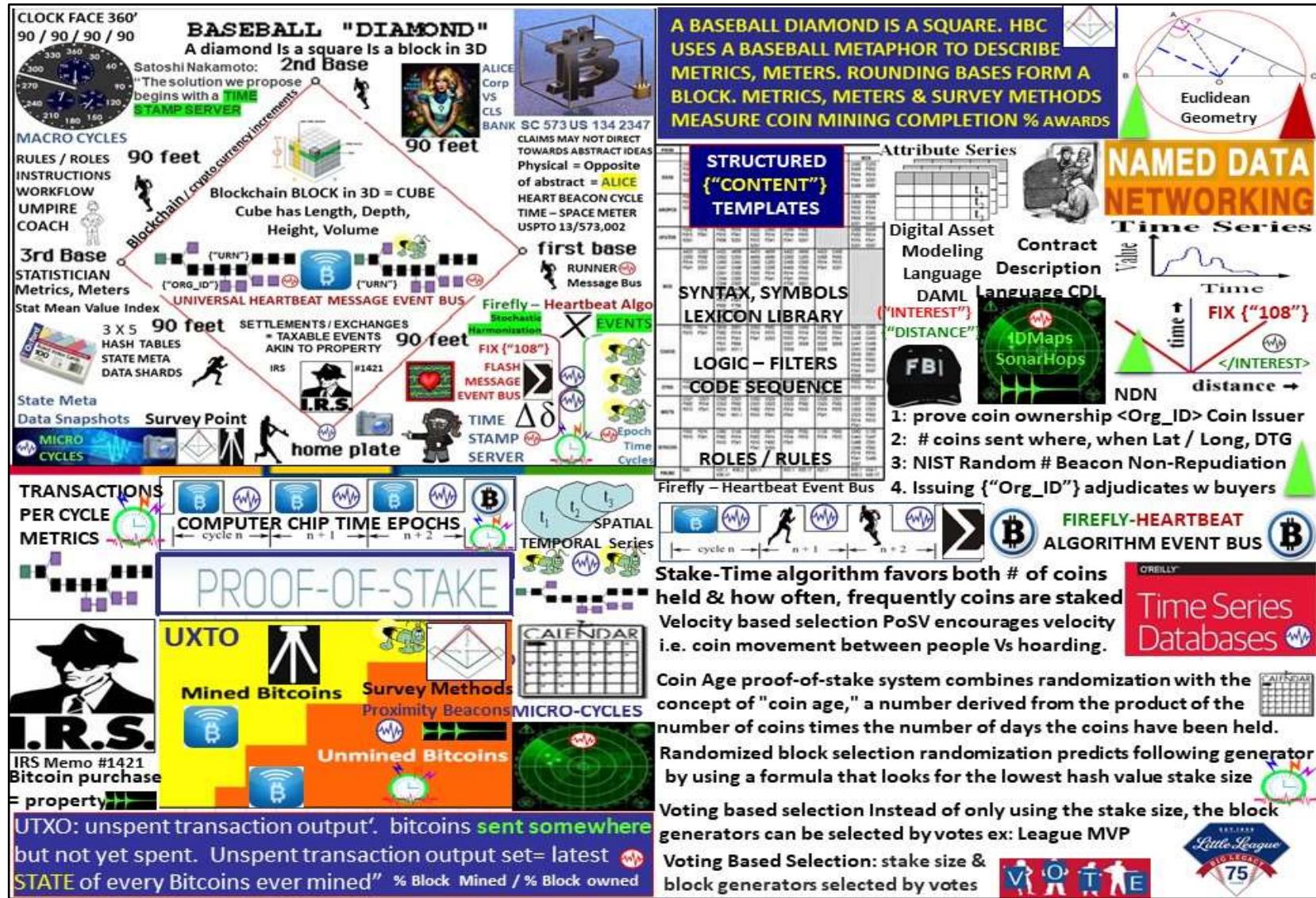


FIGURE 49: Proof of Stake Consensus / USPTO 13/573,002

PoST Proof-of-Spacetime (PoST)

PoST shows that physically storing data (spent "spacetime" resource/allocated storage capacity to the network) over a certain period of time.

PoST users / nodes must prove that they are spending a certain amount of space for storage.



Figure 50: PoST Proof of Space – Time Consensus / USPTO 13/573,002

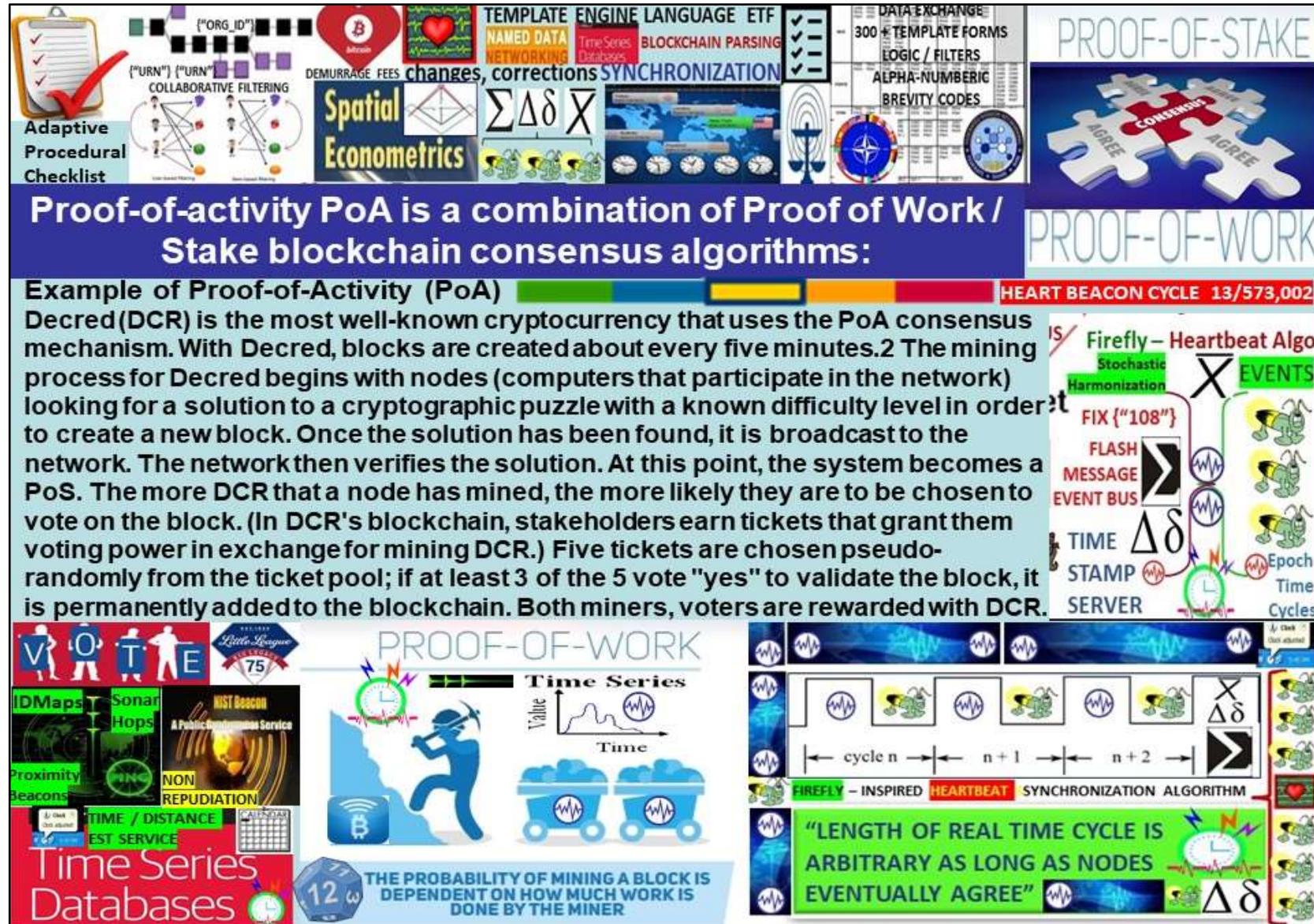


Figure 51: Proof of Activity Consensus / USPTO 13/573,002

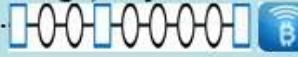
Proof of Burn



Proof of burn (POB) operates on the principle of allowing miners to “burn” virtual currency tokens. They are then granted the right to write blocks in proportion to the coins burnt.

Iain Stewart, the inventor of the POB algorithm, uses an analogy to describe the algorithm: burnt coins are like mining rigs. In this analogy, a miner burns their coins to buy a virtual mining rig that gives them the power to mine blocks. The more coins burned by the miner, the bigger their virtual mining “rig” will be.²

To burn the coins, miners send them to a verifiably un-spendable address. This process does not consume many resources (other than the burned coins) and ensures that the network remains active and agile. Depending upon the implementation, miners are allowed to burn the native currency or the currency of an alternate chain, such as Bitcoin. In exchange, they receive a reward in the native currency token of the blockchain.



You can send out transactions to the network that will burn your own cryptocurrency coins. Other participants can mine/burn on top of your block, and you can also take the transactions of other participants to add them to your block. Essentially, all of this burning activity keeps the network agile, and participants are rewarded for their activities (both burning their own coins and burning other people's coins).

To prevent the possibility of unfair advantages for early adopters, the POB system has implemented a mechanism that promotes the periodic burning of cryptocurrency coins to maintain mining power. The power of burnt coins “decays” or reduces partially each time a new block is mined. This promotes regular activity by the miners, instead of a one-time, early investment. To maintain a competitive edge, miners may also need to periodically invest in better equipment as technology advances.

UNIVERSAL HEARTBEAT MESSAGE EVENT BUS

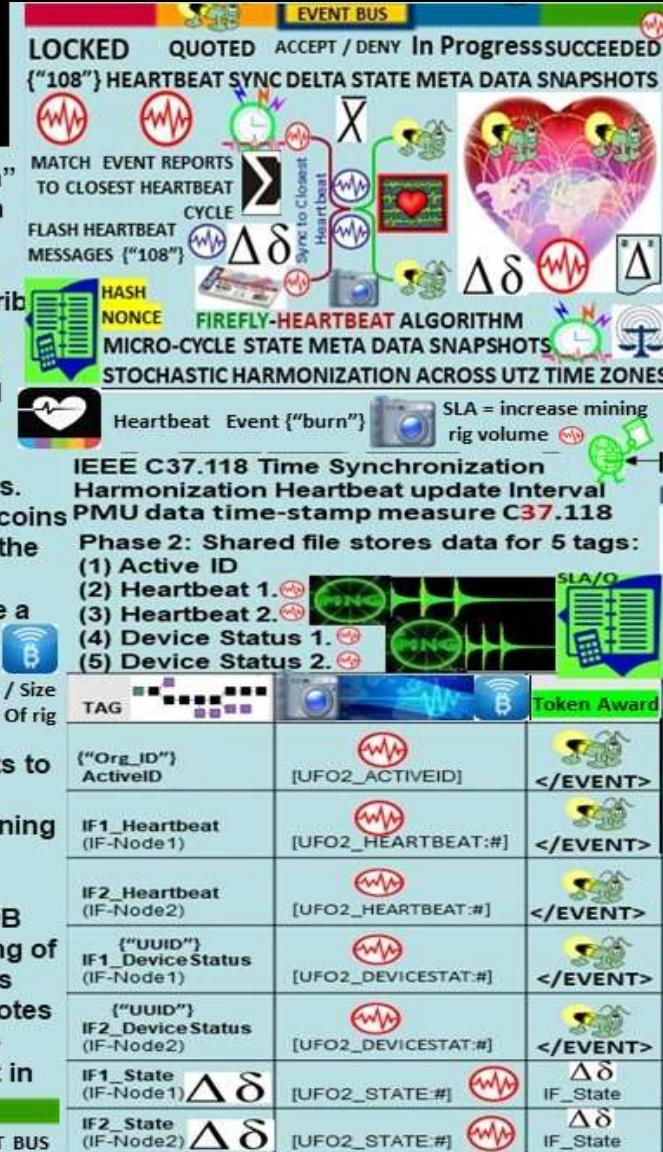
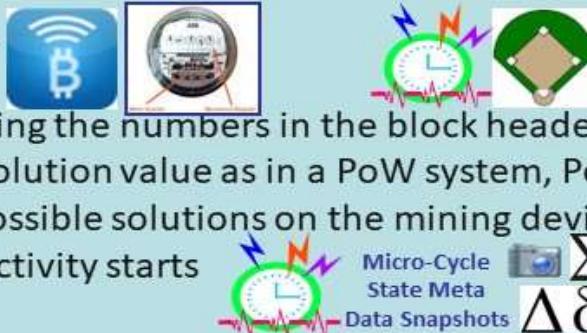


Figure 53: Proof of Burn Consensus / USPTO 13/573,002

Proof of Capacity PoC

consensus mechanism algorithm for mining devices to use hard drive space to decide mining rights, validate transactions

Proof of capacity for mining devices, also known as blockchain nodes, to use empty space on their hard drive to mine the available [cryptocurrencies](#).



Instead of repeatedly altering the numbers in the block header & repeated hashing for the solution value as in a PoW system, PoC works by storing a list of possible solutions on the mining device's hard drive before mining activity starts.



The larger the hard drive, the > possible solution values one can store on the hard drive, the more chances a miner has to match required hash value from his list, resulting in more chances to win the mining reward.



Analogy: if lottery rewards are based on matching the most numbers on the winning ticket, then a player with a longer list of possible solutions will have better chances of winning. Additionally, the player is allowed to keep using the lottery ticket block numbers again and again repeatedly.



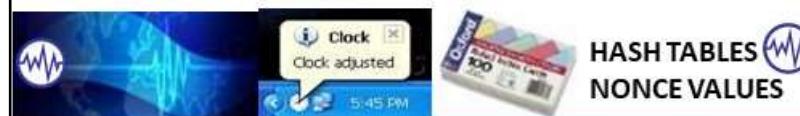
Figure 54: Proof of Capacity Consensus / USPTO 13/573,002



Figure 55: Proof of Weight Volumetric Consensus / USPTO 13/573,002

Bitcoin Classic seeks to mitigate the problem of more transactions, which are causing transaction backlogs and increased transaction costs, by increasing the block size - the number of kilobytes in a block of transactions - from 1MB to 2MB.

ALL THINGS INTERNET FORMED W 1) TIME EPOCHS 2) SYNTAX



BitPay Core: limits: 1) block size 'hard limit' adjusted on a regular basis coinciding with difficulty adjustments, 2) miner set 'soft limit' like focal points in Unlimited. $\Delta\delta$



Bitcoin Unlimited: absence of a hard-coded block-size limit. Users manually set limits on their own nodes; Consensus on a limit expected to emerge naturally at Schelling focal point. Unlimited introduces a level of democracy into development, management of the implementation, the community votes on changes.

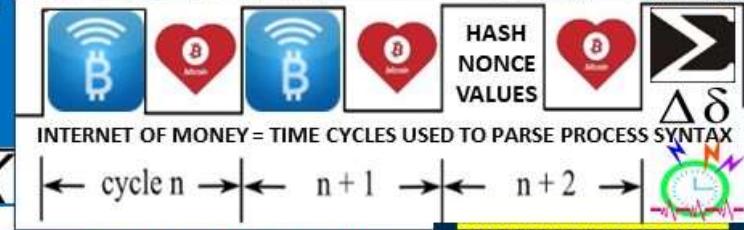
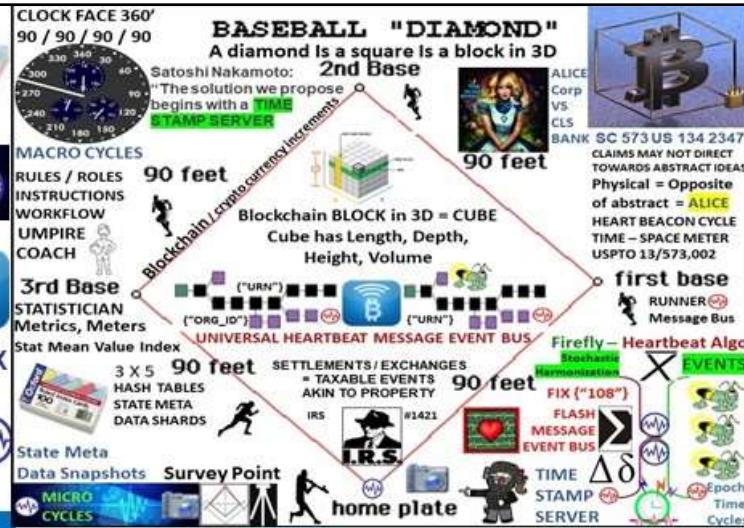


FIGURE 56: Bitcoin Classic - Core - Unlimited // USPTO 13/573,002

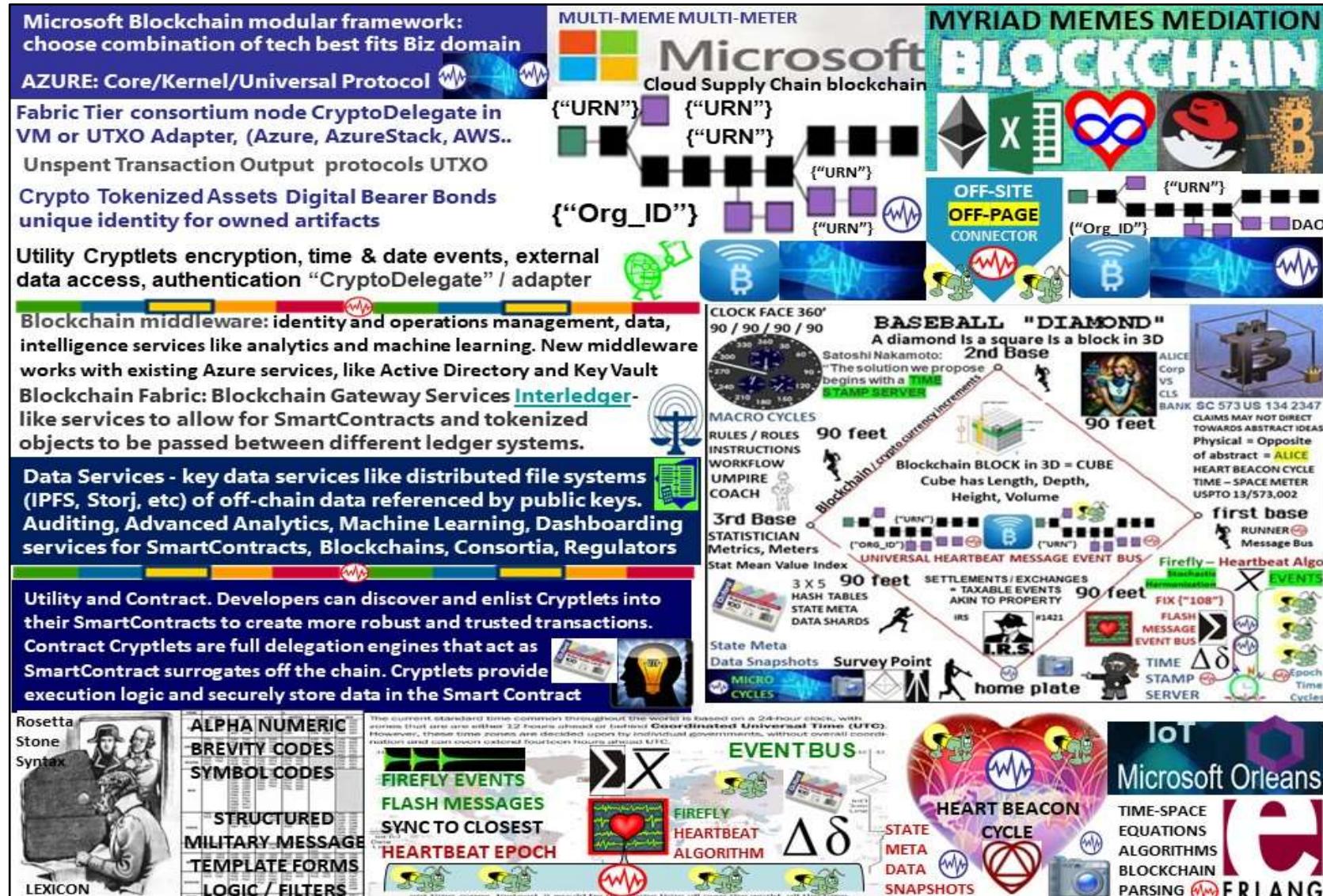


FIGURE 57: MICROSOFT CLOUD BLOCKCHAIN INTEROPERABILITY / USPTO 13/573,002

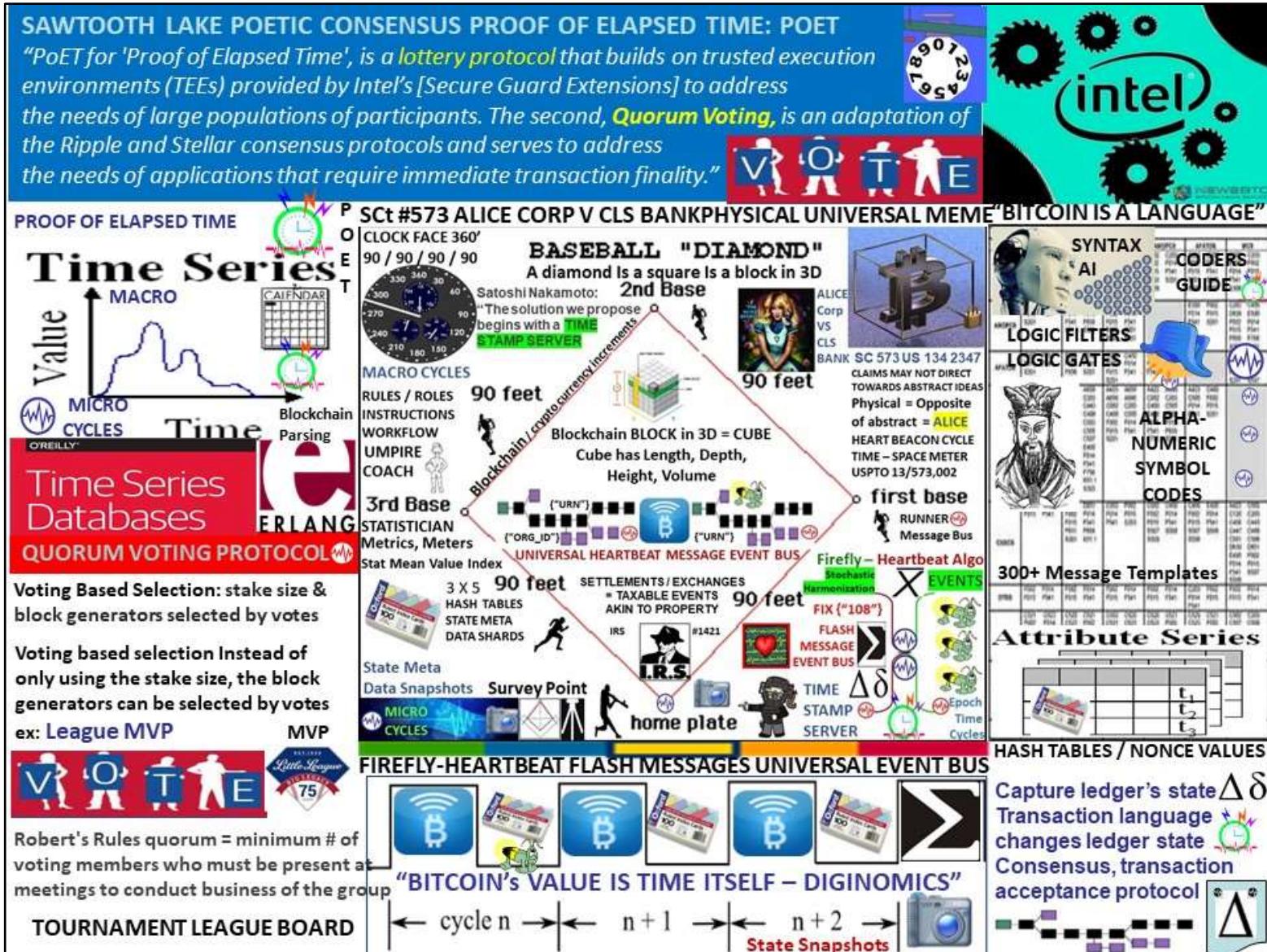


Figure 58: SAWTOOTH POET Proof of Elapsed Time Consensus / USPTO 13/573,002

PoST Proof-of-Spacetime (PoST)

PoST shows that physically storing data (spent "spacetime" resource/allocated storage capacity to the network) over a certain period of time.

PoST users / nodes must prove that they are spending a certain amount of space for storage.

181 contributions in the last year

EVENT MESSAGE BUS {"108"} Contribution settings

Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun

Mon Wed Fri

Learn how we count contributions

The proposed Universal Timezone System would do away with all these different time zones. Instead, it would be the same time all over the world, all the time.

queueing systems wait times stochastic processes, function scheduling Start, Stop TTL

PROXIMITY BEACONS BLOCKCHAIN PARSING

ERLANG O'REILLY TIME EQUATIONS

Erlang / Equilibrium Time – Sync Algorithms ROLES RULES

Time Series Databases

Dec Jan

Micro-Cycle State Meta Data Snapshots

IRS Memo #1421 Bitcoin purchase akin to property

UXTO Mined Bitcoins Survey Methods Proximity Beacons Unmined Bitcoins

MACRO CYCLES RULES / ROLES INSTRUCTIONS WORKFLOW UMPIRE COACH

3rd Base STATISTICIAN Metrics, Meters Stat Mean Value Index

3 X 5 HASH TABLES STATE META DATA SHARDS

State Meta Data Snapshots Survey Point MICRO CYCLES

Blockchain BLOCK in 3D = CUBE Cube has Length, Depth, Height, Volume

Blockchain / crypto currency increments

Satoshi Nakamoto: The solution we propose begins with a TIME STAMP SERVER

BASEBALL "DIAMOND" A diamond is a square is a block in 3D 2nd Base 90 feet

first base RUNNER Message Bus CLAIMS MAY NOT DIRECT TOWARDS ABSTRACT IDEAS Physical = Opposite of abstract = ALICE HEART BEACON CYCLE TIME – SPACE METER USPTO 13/573,002

Firefly – Heartbeat Algo EVENTS FIX {"108"} FLASH MESSAGE EVENT BUS

TIME STAMP SERVER home plate

Heartbeat Date Time Stamps Sync Pulse

STATE META DATA SNAPSHOTS

BITCOIN BLOCKCHAIN TRANSACTIONS ARE BASED ON TIME SEQUENCING TRANSACTION STATE CHANGES TO DISTRIBUTED LEDGERS BEACON BROADCAST

MICRO- CYCLES QUANTUM RANDOM #

NIST Beacon A Public Randomness Service

NON REPUDIATION ATOMIC CLOCK 05:08:57

Process transactions by precedence Attribute Series TIME Function

t₁ t₂ t₃

Arrival Rate Queue Forms Limited Resource Service Rate RFID

Geospatial Temporal Series

Time Series

Value Time

Time Stamp to Date Time Conversion

* Utilization * Service Time (T_b)

ERLANG CALENDAR: Calculate Wait Times

Figure 59: Proof of Space Time POST / USPTO 13/573,002



Figure 60: State Channels / USPTO 13/573,002

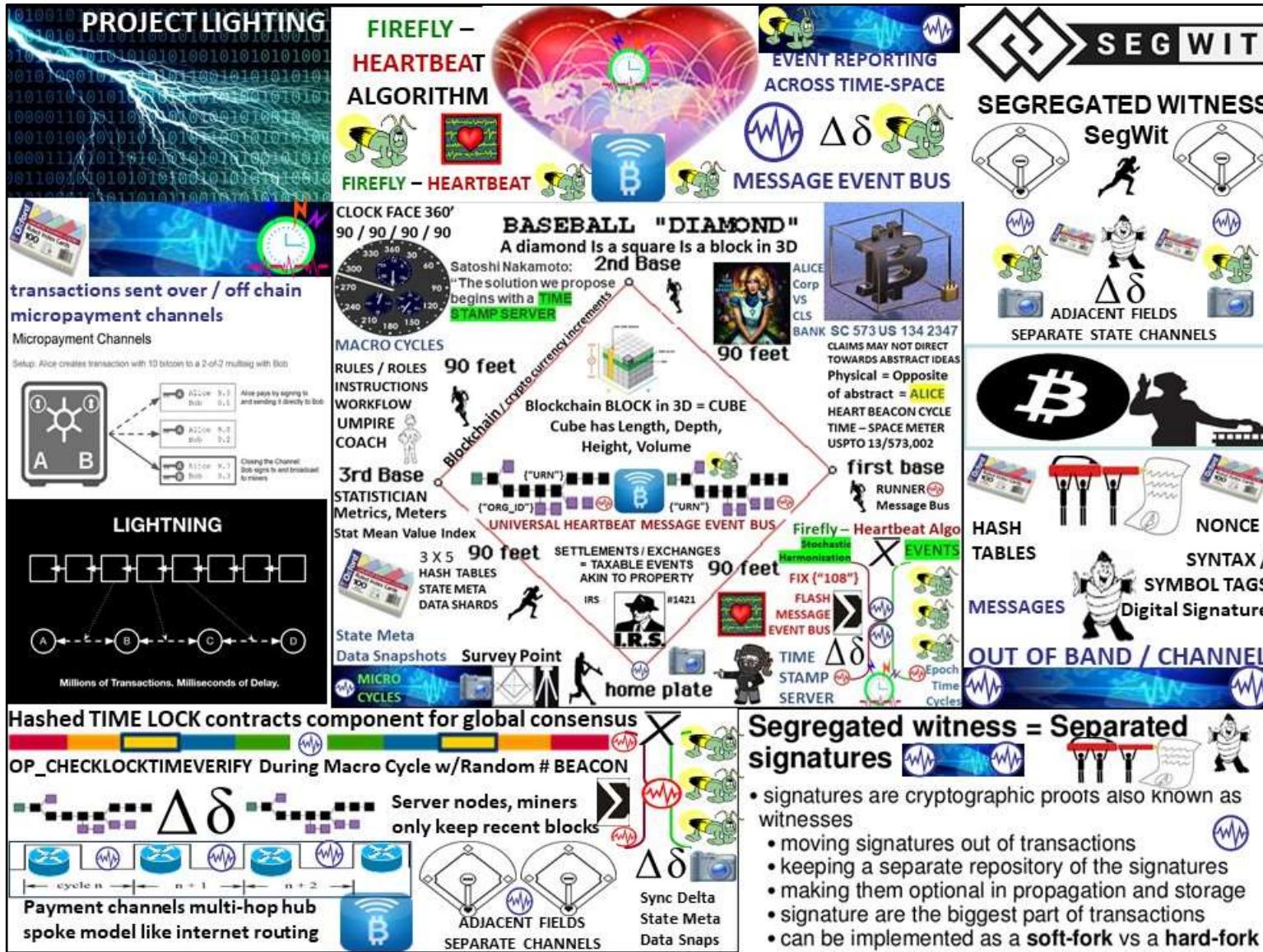


FIGURE 61: Segregated Witness / Project Lightning Consensus / USPTO 13/573,002

BITCOIN NG NEX GEN / Heart Beacon Cycle 13/573,002

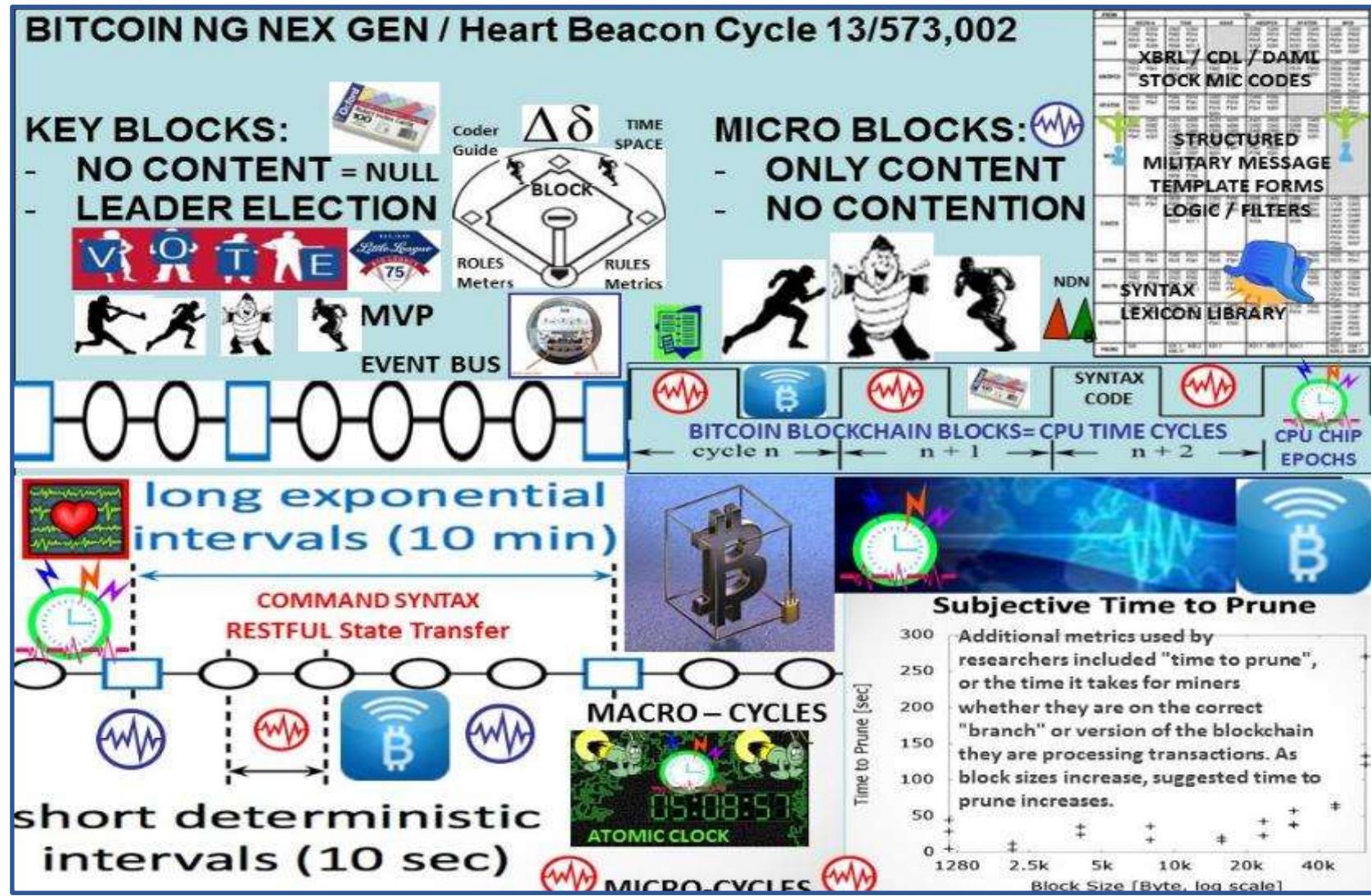


FIGURE 62: BITCOIN NG NEXT GENERATION / USPTO 13/573,002



Figure 63: Decentralized Oracle Networks / USPTO 13/573,002

Block-Weighted-Average-Price (B-WAP) API creates a USD price for any block in the Bitcoin blockchain, based on BNC's Bitcoin Liquid Index (BLX). Automatically appropriates blockchain transactions with a USD price or technical indicator for traders.

Key Features:

Look up any bitcoin blockchain transaction and receive back a USD value for any transaction.



Built using historic bitcoin price index - the [BNC BLX](#).

API updated every 10 min with a 2 hour delay on latest blocks (due to the nature of Block propagation to ensure avoidance of publishing rates on orphaned blocks).

All rates time-stamped in UTC.

Ability to look up by time-stamp.

Ability to look up by block-height.

Asset Classes: Digital Currencies

Get by: Block-height, Time-stamp or Transaction

Transaction ID, Block ID, time-stamp, BWAP per block, Value in USD. BTC per transaction, bitcoin transaction fees per transaction

- Exchanges Covered: Price discovery for the B-WAP comes from utilizing the BNC [Bitcoin Liquid Index](#) (BLX) bitcoin price calculation.

- Historical Rates: This API goes back to 2010-07-17 23:14:35 UTC.

BRAVE NEW COIN.
Digital Currency Insights

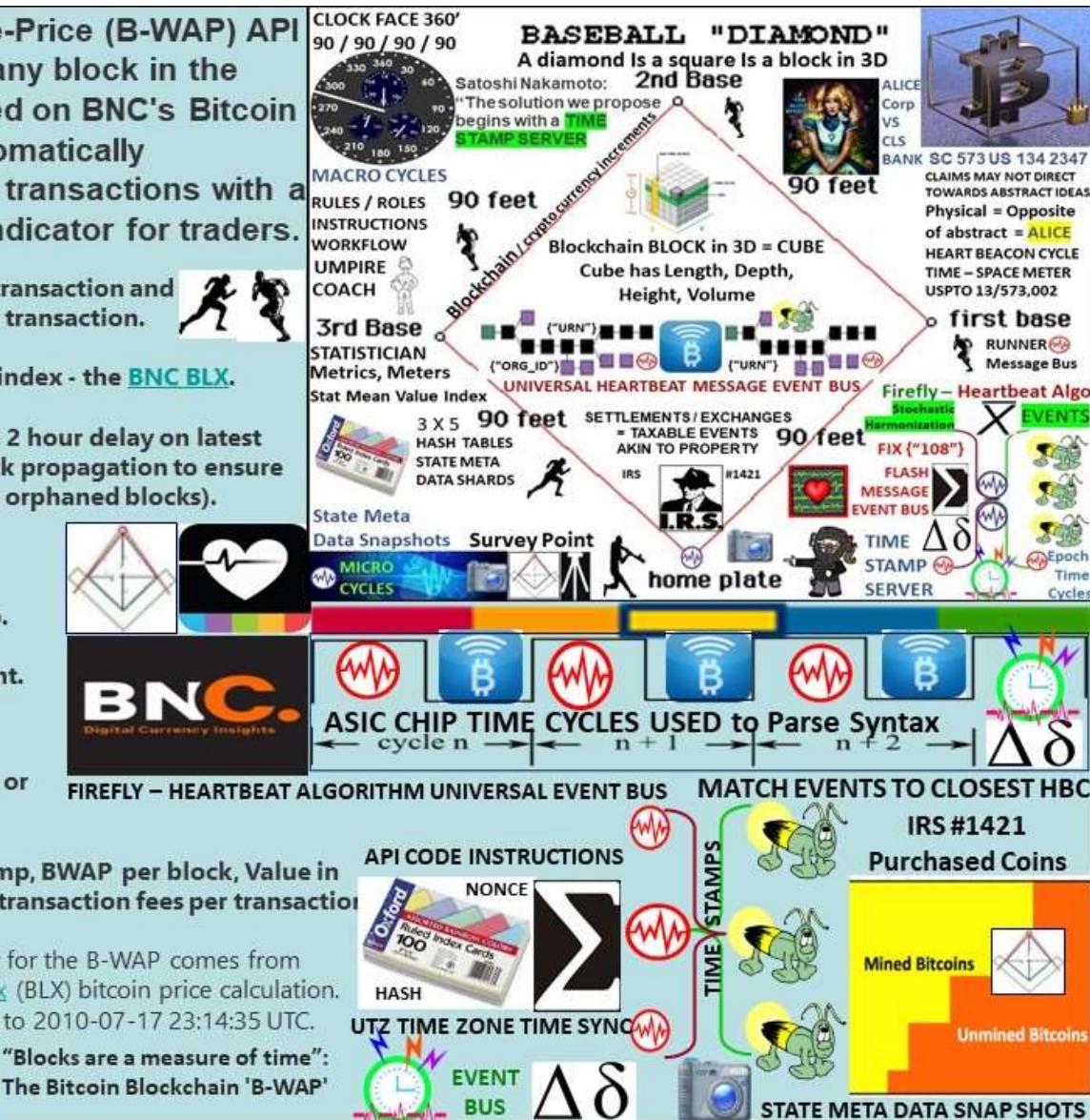


FIGURE 64: Brave New Coin B-WAP Consensus / USPTO 13/573,002



FIGURE 65: DASH / USPTO 13/573,002



FIGURE 66: ETHEREUM – CASPER / USPTO 13/573,002

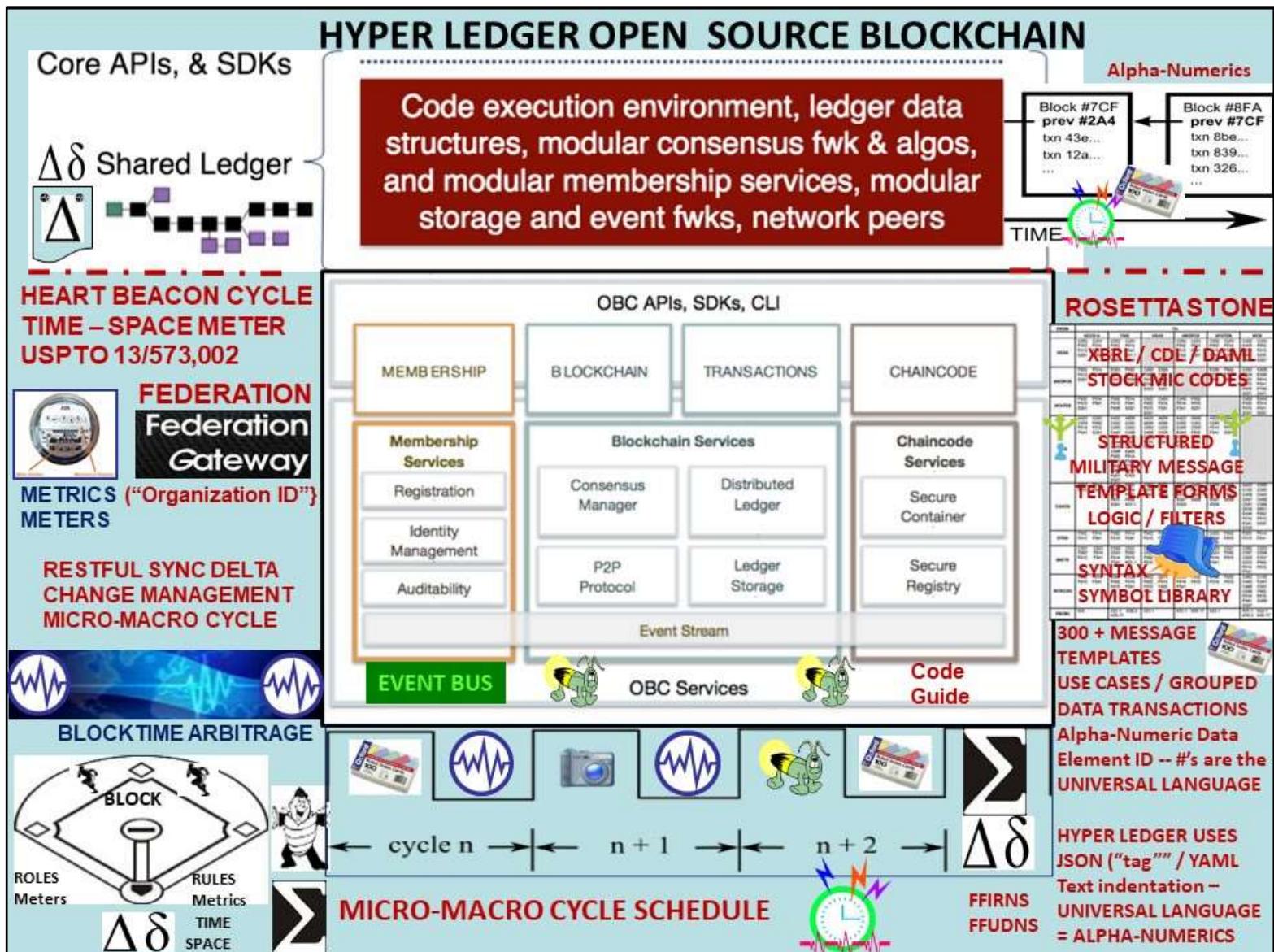


FIGURE 67: HYPERLEDGER FRAMEWORK / USPTO 13/573,002

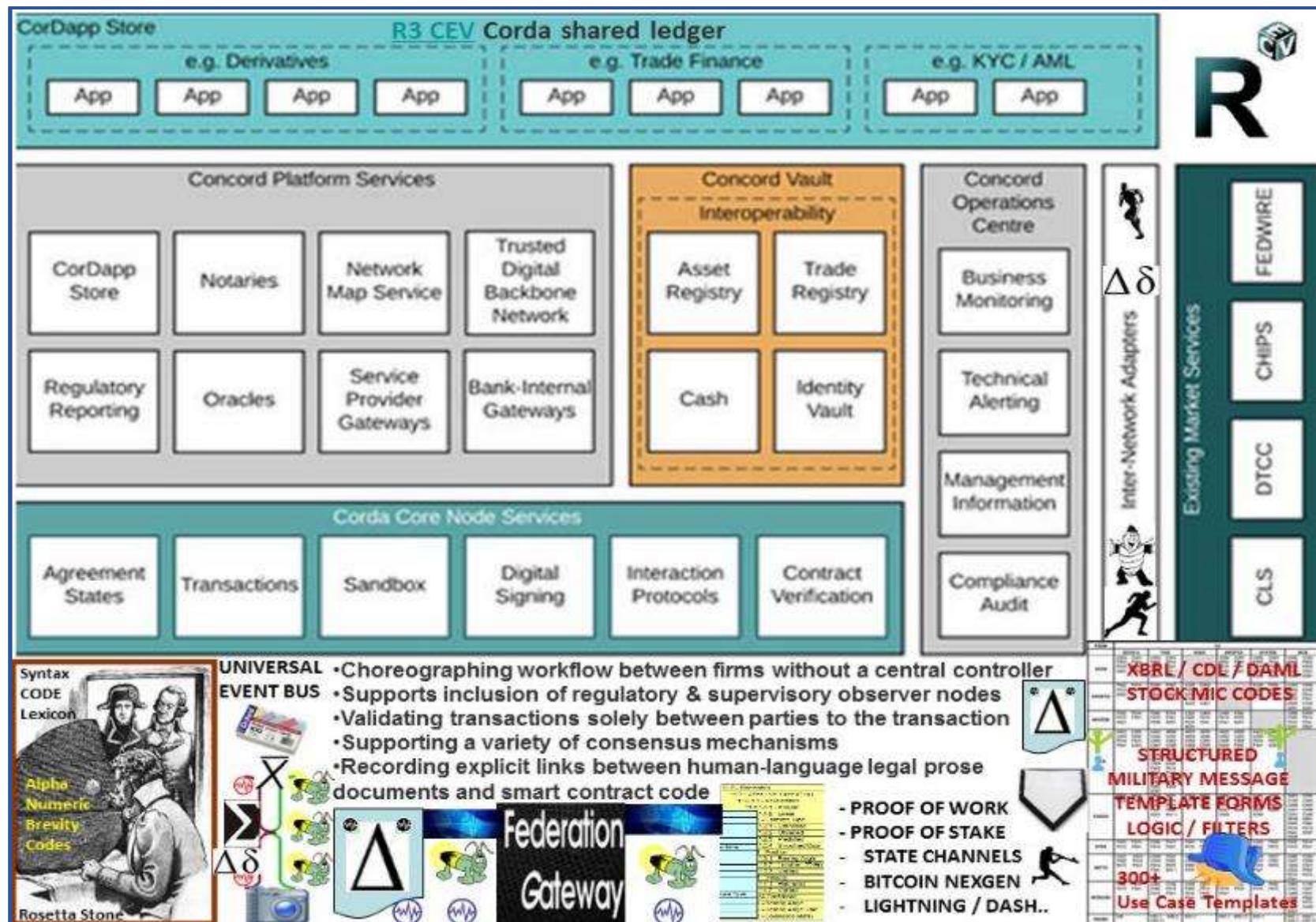


FIGURE 68: R3 Consortium CORDA / USPTO 13/573,002

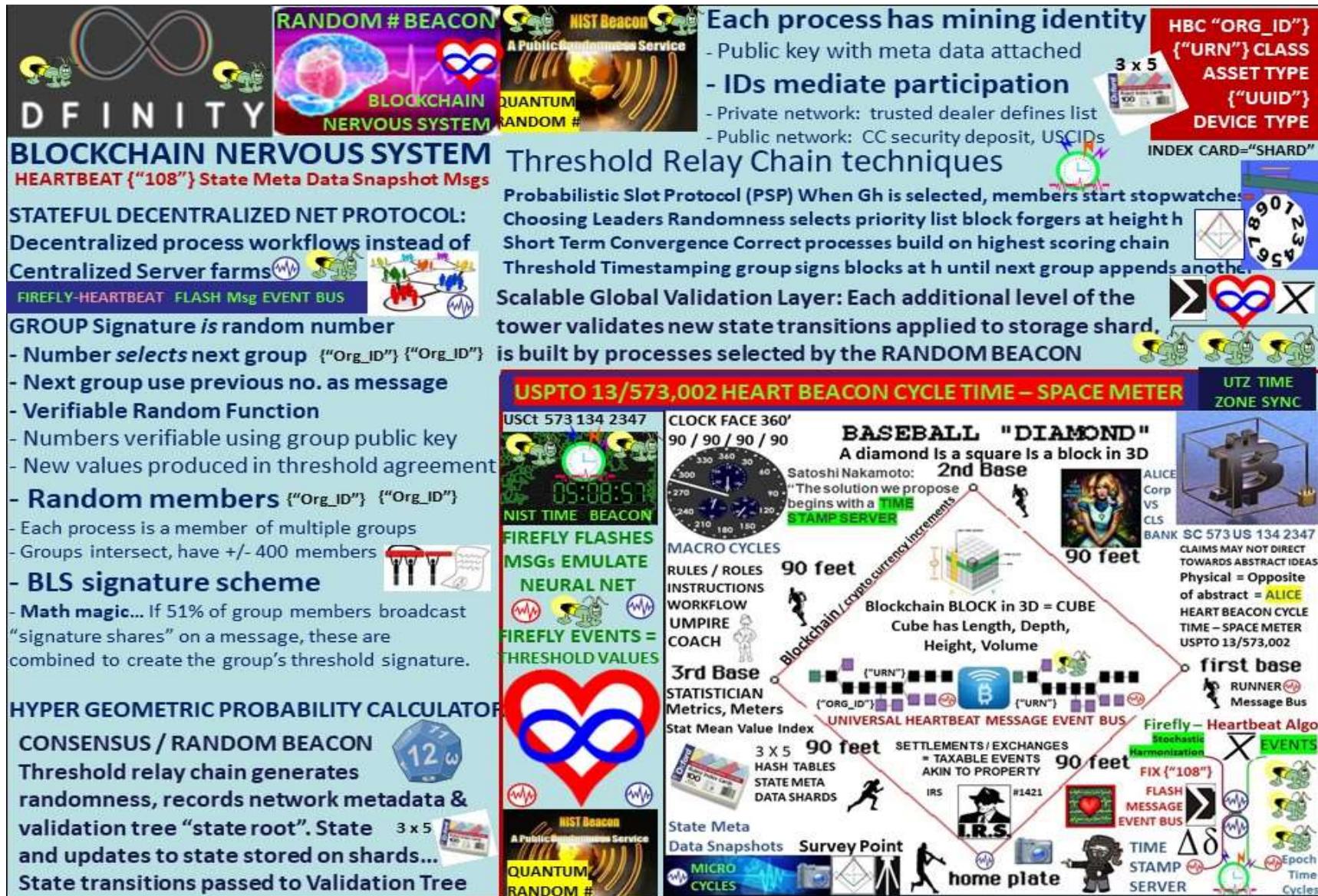
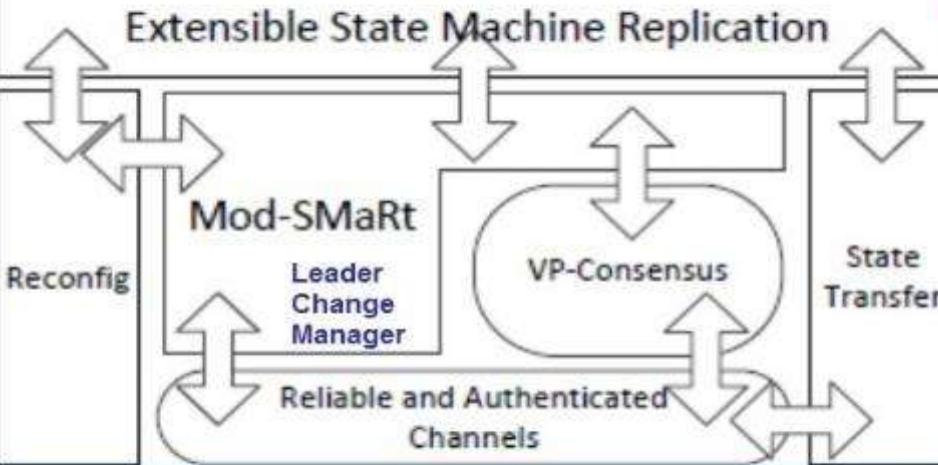


FIGURE 69: DFINITY Blockchain Nervous System / USPTO 13/573,002

Byzantine Fault-Tolerant State Machine Replication

BFT-SMART dynamic distributed system processes are divided in two nonintersecting subsets: replicas and clients. Each system process has a unique identifier. During dynamic system execution, a sequence of views is installed to denote the reconfigurations due to replicas joins and leaves. A view is composed by a set of replicas identifiers.



Modularity is achieved using a set of building blocks(or modules)containing the core functionality of BFTSMARt. Blocks are divided in three groups: communication system, state machine replication and state management.

BFT-SMART needs an eventually synchronous system

Total order multicast is achieved using the Mod-SMaRt protocol and with the Byzantine consensus algorithm Clients send requests to all replicas in cv, and wait for replies. replicas store each batch of ordered requests to a (stable) log and, periodically, take snapshots of the application state and store it in stable memory.

USPTO 13/573,002 HEART BEACON CYCLE TIME-SPACE METER

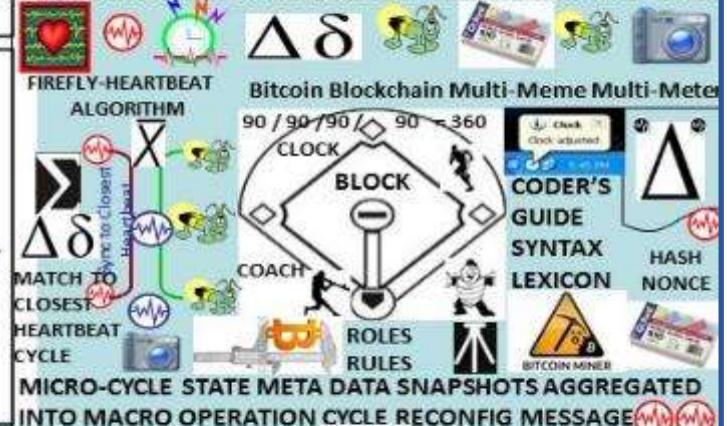
USC ALICE CORP V CLS BANK
PHYSICAL = OPPOSITE OF ABSTRACT



DERIVED FROM BATTLEFIELD DIGITIZATION DISTRIBUTED AUTONOMOUS ORGANIZATION DAO SYSTEM OF SYSTEMS

FEDERATED ID / ORGANIZATIONAL IDENTIFIER {"ORG_ID"}
ADDS, JOINS, DROPS, MOVES TO / FROM DAO
CHANGES IN STATE VIEWED IN "APPLIQUE' OVERLAY VIEWS

K00.99 HEARTBEAT SYNC DELTA STATE META DATA SNAPSHOT



Firefly inspired Heartbeat Synchronization nodes strive to sync in a distributed system. Nodes generate periodic "heartbeat" events approximately at the same time. It differs from classical clock sync in that nodes are not interested in counting cycles to agree on the ID of the current clock cycle. There is no requirement to sync during a cycle length in real time as long as the length is bounded and all nodes AGREE ON IT EVENTUALLY"

Figure 70: Byzantine Fault Tolerant BFT-SMART / USPTO 13/573,002

OpenBazaar open source decentralized peer to peer network online commerce —using Bitcoin —no fees and no restrictions



- Creates an online store for users to sell goods for Bitcoin
- Connects these stores directly to each other on a global network
- Users browse individual stores, search for products across whole network
- A buyer directly connects, purchases good from the merchant using Bitcoin
- Bitcoin payments via escrow protect merchants & buyers during trade

OpenBazaar is a different approach to online commerce. OpenBazaar connects buyers and sellers directly. Because there is no one in the middle of your transactions there are no fees, no restrictions, no accounts to create, and you only reveal personal information you choose.

PROJECT PHILOSOPHY: *MAKE TRADE FREE*
Mission: *shift trade to a decentralized platform*

VALUES:  Demurrage TERRATRC TRADE Fees REFERENCE CURRENCY "Money of Peace"

Free, open markets: Commodity / Currency Index
 Creating open, competitive markets for services that cannot be perfectly solved with technology

Privacy </Org_ID>
 - Users should fully control their data. Users have freedom to reveal as much personal identifiable information as they want, when they want

Bitcoin: OpenBazaar transactional currency

Cryptographic Security
 - tamper-proof agreements
 - 1) minimize potential disputes
 - 2) fast-track dispute resolution



TERRA TRC
HEART BEACON CYCLE USPTO 13/573,002 TIME – SPACE METER
Federation
ORG ID
Gateway
FIREFLY – HEARTBEAT ALGO
SYNC EVENTS
 Σ
 $\Delta\delta$
TO CLOSEST HB CYCLE
UTZ SYNC
Price Indexes in Time and Space Methods and Practice
SchellingPoint

FIGURE 71: Open Bazaar / USPTO 13/573,002

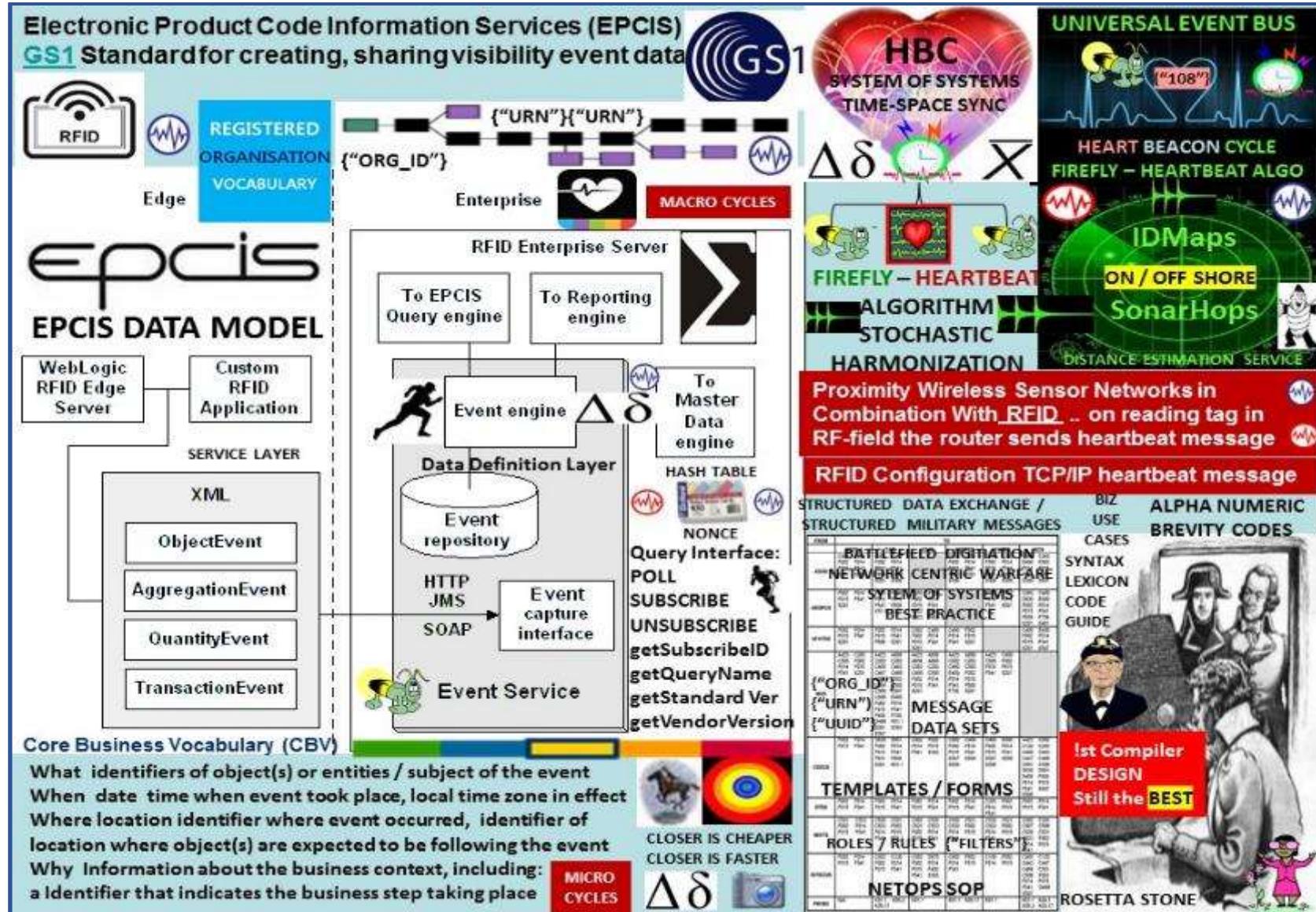


FIGURE 72: EPCIS RFID / USPTO 13/573,002



Figure 73: HASHGRAPH DAG Directed Acyclic Graph / USPTO 13/573,002



Figure 74: FEDCOIN – WORLDCOIN STABLE COIN / USPTO 13/573,002 ECONOMIC HEARTBEAT

Metallicus

Programmable
Money Transactions
Intrabank settlements

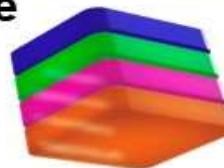
FedNOW
INSTANT PAYMENTS

PROTON A CHAIN Virtual Machine

CONTRACT C CHAIN Smart contract

PLATFORM P CHAIN Meta Data

EXCHANGE X Cross blockchain



Universal @names Identity / Governance / Resources / Staking

Snowball Consensus Algorithm
preference := pizza
consecutiveSuccesses := 0

while not decided:
ask k random people preference
if >= α give the same response:
preference := response with >= α

if preference == old preference:
consecutiveSuccesses++
else:

consecutiveSuccesses = 1
else:
consecutiveSuccesses = 0
if consecutiveSuccesses > β :
decide(preference)

EOSIO computer function emulation
NET, CPU bandwidth, RAM data
Publishing, Voting based not mining

Delegated Proof of Stake {"Org_ID"}

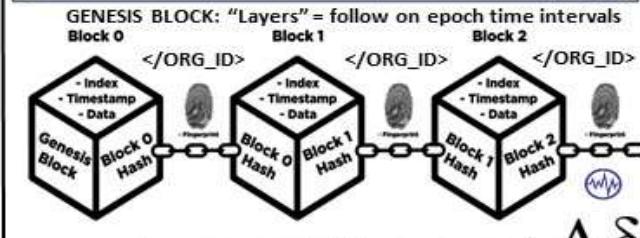
PROOF-OF-STAKE



DAG Acyclic Graph Parameters:
n: number of participants
k (sample size): between 1 and n
 α (quorum size): between 1 and k
 β (decision threshold): ≥ 1

ALL THINGS NET, NET OF \$\$\$
1) EPOCH TIME INTERVALS
2) SYNTAX (not) used in epochs

USPTO
13/573,002



SECURITY TOKEN: A DIGITAL ASSET THAT'S BACKED UP BY TANGIBLE ASSETS IN THE REAL WORLD

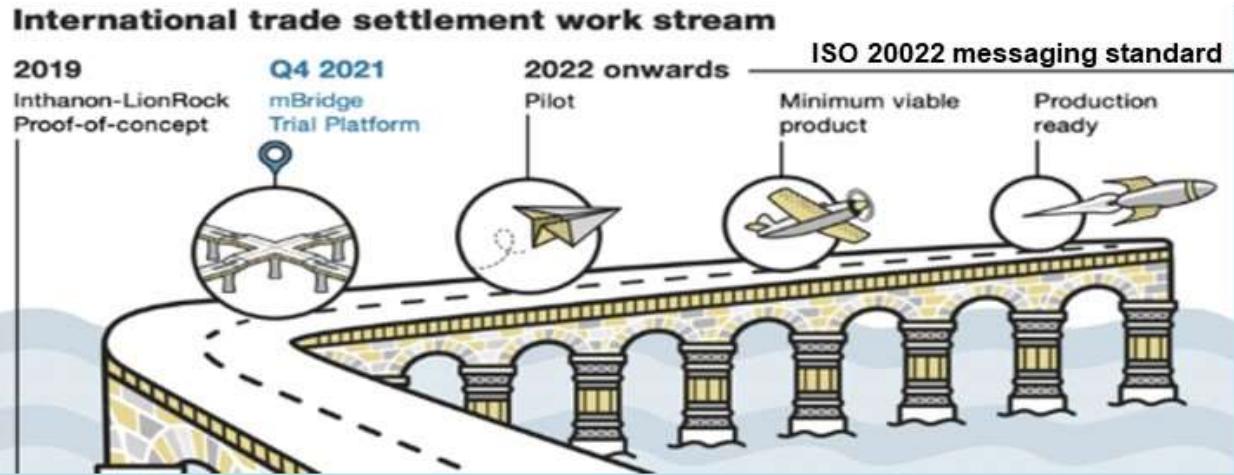
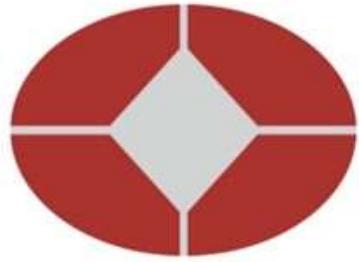


"all digital currency networks, the base layer of people generating the blockchain — "miners," "stakers," "witnesses," "validators," or "forgers" get paid"



Figure 75: Federal Reserve FedNOW Metallicus / USPTO 13/573,002

BIS



mBridge mBL is an Ethereum EVM-compatible solution, referring to the ability of a blockchain to process transactions based on smart-contract codes that can run on many blockchain platforms. CBDC issuance, redemption, payments are implemented through smart contracts written using Solidity programming language. The code open sourced.

mBL employs the Dashing consensus algorithm, a Byzantine Fault Tolerance (BFT) consensus protocol that uses proofs of partial confirmation of a block validation to reduce time needed to achieve consensus and to improve the overall protocol performance. Pseudonymous addresses and encrypted payment meta-data payloads are used to support privacy and confidentiality in transactions. mBL APIs are based on the global ISO 20022 messaging standard for financial information Legal Entity identifiers (LEIs) facilitate identification of entities facilitating AML/ CFT checks.



Figure 76 BIS project mBridge core participants, bridges, blockchain – time chains, cubes..



UNICOIN

Digital Capital Exchange

Unicon: IMF CBDC legal tender settlement coin

Universal Monetary Unit (UMU), a.k.a Unicon: store of value
cryptography, artificial intelligence (A.I.) Goals: continuous purchasing demand, minimal price volatility, and annual asset pricing targets.

The primary value of any commodity is its utility value.
Utility = pay for goods, services, and debts, preserve value over a long period of time. Employs machine learning trading bots. UMPC will establish yield payout rates for wallet holders to stake Unicon in the Staked Proof of Trust (SPOT) consensus protocol. PoT consensus selects validators I.A.W contribution to the DeFI network

KYC Entity	Ledgers	FX Rates	SPOT Protocol
Create Modify Suspend	Create Modify Suspend Balance	Balances Activity Deposit Withdraw	Stake Cashout Reject
KYC People	CBDC	Money Services	Authorizations
Create Modify Suspend	Create Modify Suspend	Transfer	Grant Authorization Revoke Authorization
Issuers	Pause	Escrow	Rates
Create Modify Suspend	Unpause	Create Escrow	Create Rate Modify Rate Suspend Rate
Post Rates	Mint	Accept Escrow	Limits
Branches	Burn	Cancel Escrow	Create Limit Modify Limit Suspend Limit
Create Modify Suspend	Redeem	Release Escrow	Sanctions
Agents	Swap	Milestones	Create Sanction Modify Sanction Suspend Sanction
Create Modify Suspend	Supply	Create Milestone	
	Price	Modify Milestone	
		Cancel Milestone	
		Release Milestone	
		Wallets	
		Create	
		Modify	
		Suspend	
		Pause	
		Unpause	
		Attach	

The DCMA – Digital Public Monetary System

Figure 9: Unicorn Global Localization of a CBDC Public Monetary System



Figure 77: World Bank IMF Unicon STABLE COIN / USPTO 13/573,002



UNICOIN

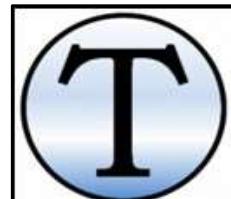
Digital Capital Exchange

Unicoin: IMF CBDC legal tender settlement coin

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Figure 78: Unicoin STABLE COIN CBDC / USPTO 13/573,002 TERRA TRC / UTZ- UTC



TRUTHCOIN Nullius in Verba: “On the word of no one”



Three ideas combined

HOW TRUTHCOIN WORKS:

1) Tradable Reputation

- Abstract Corp exists to prove consistency within / across TIME
- Collects \$ to power the mechanism.

2) SVD Cross-Validation

- Statistical technique: seeks importance.
- Gleans truth, measures conformity.

3) Strategic Use of TIME

- Funds can be ‘locked’ across time.
- Yet info-search-costs constantly fall.
- Net effect: time penalizes attackers only.



2. A kind of ‘Future Wikipedia’

	Wikipedia	Truthcoin
Focus	Outcomes of past events. Consensus on known facts.	Outcomes of <i>future</i> events. <i>Future</i> consensus on knowable facts.

3. A software protocol

A protocol is a set of rules that determine how something is performed or accomplished

Finance Thing	Interpretation	EVENT DERIVATIVE CORP = <Org_ID_1,2,3>
Bond (Debt)	“I, Paul Sztorc, owe \$20 to whoever is holding this bond certificate on 03/02/2015.”	
Stock (Equity)	“I, the CEO of SztorcCorp, owe 1/100 th of SztorcCorp’s profits to whoever is holding this stock certificate on 03/02/2015.”	
Binary Call Option	“I, Paul Sztorc, owe \$20 to whoever is holding this Option on 03/02/2015, <u>only if</u> the stock price of SztorcCorp is above 40 \$/share on that date.”	
...(others)...	...(others)...	...(others)...
Event Derivative	“I, Paul Sztorc, owe \$20 to whoever is holding this derivative on 12/01/2016, <u>only if</u> Hillary Clinton is elected US President in 2016. Otherwise I owe \$0.”	...(others)...
...(others)...	...(others)...	...(others)...

Protocol (Decentralized)	Centralized Non-Protocol
Spoken English	Shakespeare’s Globe Theatre, The Library of Alexandria, MLA Citation Format, Walt Whitman, J.K. Rowling.
Rules to American Football	The NFL, ESPN, The Buffalo Bills.
Bluetooth	A Set of Stereo Speakers, The iPhone 6, A Car Radio Equipped with Bluetooth
Bitcoin	VISA, PayPal, SWIFT, Western Union, Airline Miles, Amazon Coins, e-Gold, Liberty Reserve.



Figure 79 Truth Coin: Nullius in Verba On the word of no one / Wikipedia

How 'Bitbanks' Could Solve Bitcoin's Volatility Problem

MV=PQ Money x Velocity = Price x Quantity

The most important equation in monetary economics, the equation of exchange: $MV=PQ$. The quantity of money (M) times the rate spent (V for velocity) equals the price of everything bought (P) times the amount bought (Q for quantity). In Bitcoin, M Money is on a predetermined path, converging to 21m bitcoins. In relation to the other variables, Bitcoin is fixed. V, P, & Q fluctuate



Internet of Everything
Every Where Value Index



MACRO
ECONOMIC CYCLES

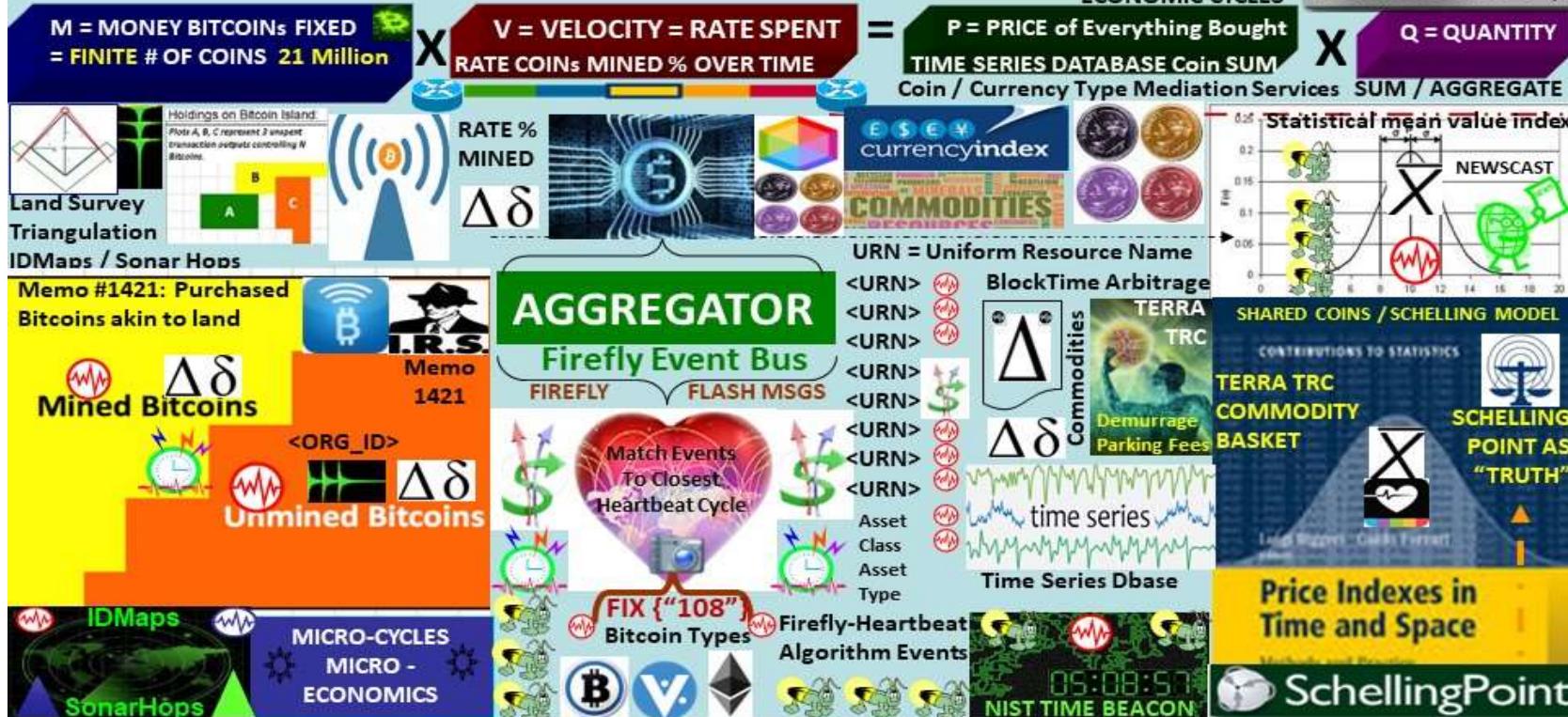
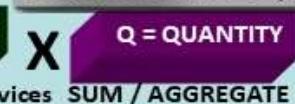


Figure 80: Volatility Problem Solution / USPTO 13/573,002



Figure 81: NEO Net Enable Operations / NEO Distributed Smart Economy / USPTO 13/573,002

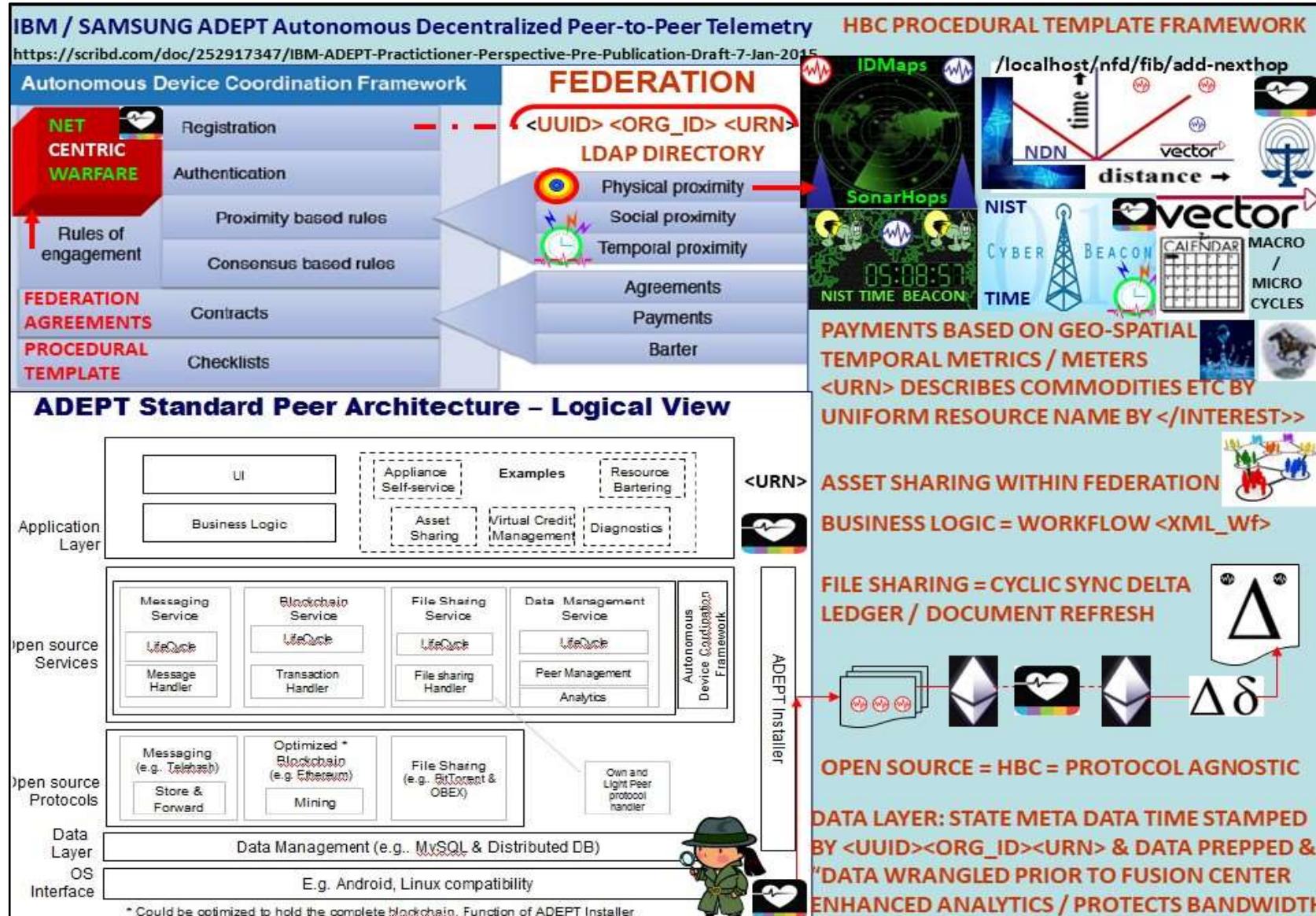


Figure 82: IBM – Samsung ADEPT / USPTO 13/573,002

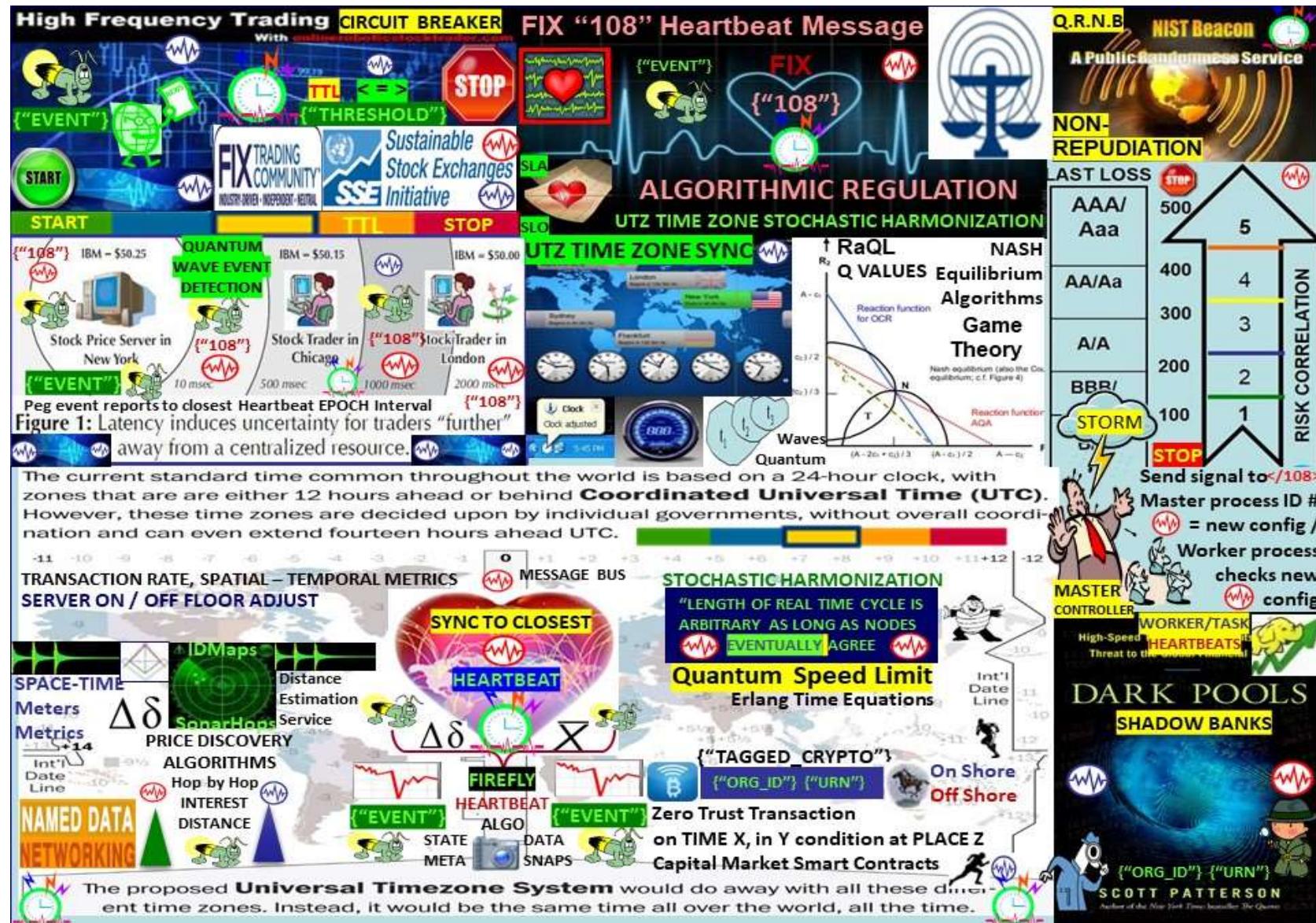


FIGURE 83: High Frequency Flash Trade Breaker HFT Algorithmic Regulation / USPTO 13/573,002



Figure 84: USPTO 13/573,002 Econometrics, Meters, Metrics, Trade Federation Demurrage Fees



FIGURE 85: TRADENET / USPTO 13/573,002



FIGURE 86: NEW ECONOMY BLOCKTIME ARBITRAGE / USPTO 13/573,002



"THE FINANCIAL
NOSTRADAMUS"
REGGIE MIDDLETON



USPTO 13/573,002
Heart Beacon Cycle
Time – Space Meter



VERITAS TOKENS P2P Capital Market smart contracts Eco Economic HEARTBEAT

Decentralized Trading Platform DAO ORACLE
access conventional, legacy financial data to
price, value, trade & settle OTC, P2P financials



INFOCON

4 3 2 1

INFORMATION

CONDITION

STATISTICAL MEAN VALUE INDEX PULSE

GDP INDEX ECONOMY K% RULE

CURRENT INDEXES

COMMODITIES

PREMIUMS

RECYCLED PRODUCTS

REFINERY PROCESSORS

REFINERY BY MINERALS

REFINERY BY METALS

REFINERY BY ENERGY

REFINERY BY TIME

REFINERY BY SPACE

REFINERY BY CLOUD

REFINERY BY INTERNET

REFINERY BY MOBILE

REFINERY BY AIR

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Gamification is the use of game thinking and game mechanics in non-game contexts to engage users in solving problems. Gamification techniques strive to leverage people's natural desires for competition, achievement, status, self-expression, altruism, closure.



FIGURE 88: GAMIFICATION / USPTO 13/573,00



IOTA: Internet Of Things IOT distributed ledger with microtransactions without fees

Tangle, a directed, ASYNCHRONOUS acyclic graph (DAG) for storing transactions

Contrary to Blockchains, consensus is no longer decoupled. It is an intrinsic part of the system for decentralized, self-regulating peer-to-peer network. Transfer value without fees

The iota network is ASYNCHRONOUS. In general, nodes do not necessarily see the same set of transactions. The tangle may contain conflicting transactions. The nodes do not have to achieve consensus on which valid transactions have the right to be in the ledger, meaning all of them can be in the tangle. However, in the case where there are conflicting transactions, the nodes need to decide which transactions will become orphaned. Nodes use the tip (unapproved transaction) selection algorithm to decide between two conflicting transactions. GHOST protocol main ledger = tree

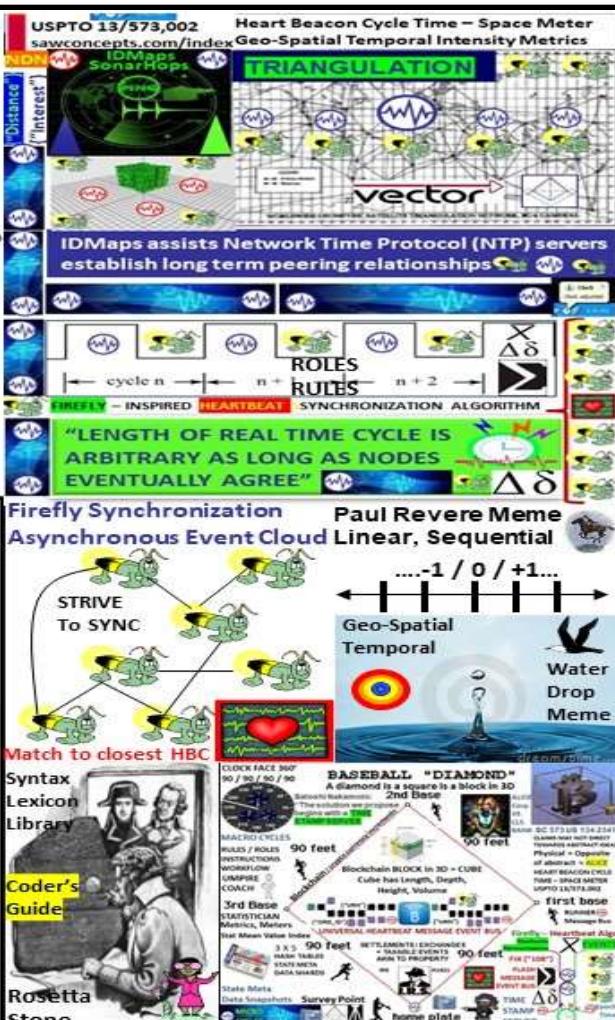
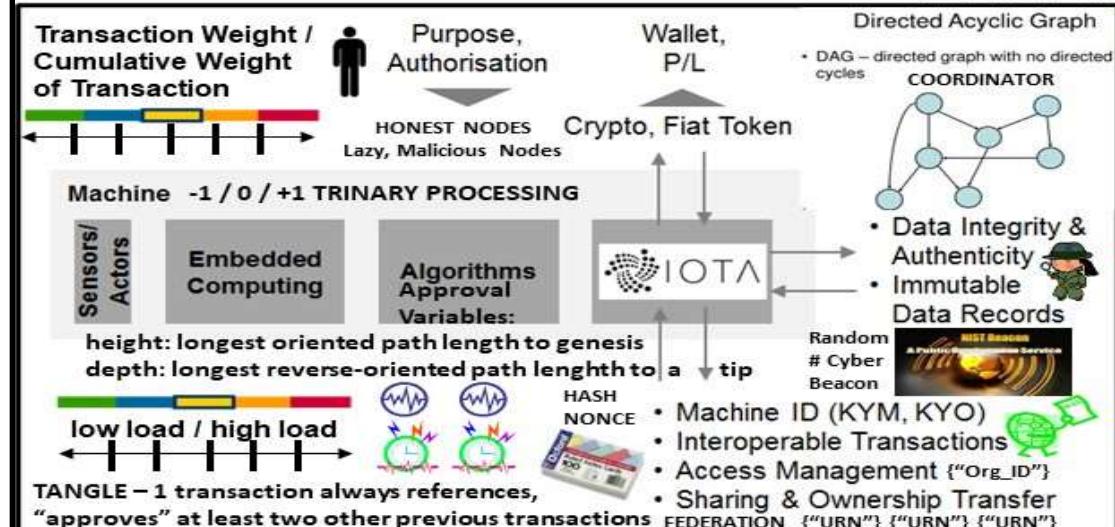


FIGURE 89: IOTA TANGLE DAG / USPTO 13/573,002

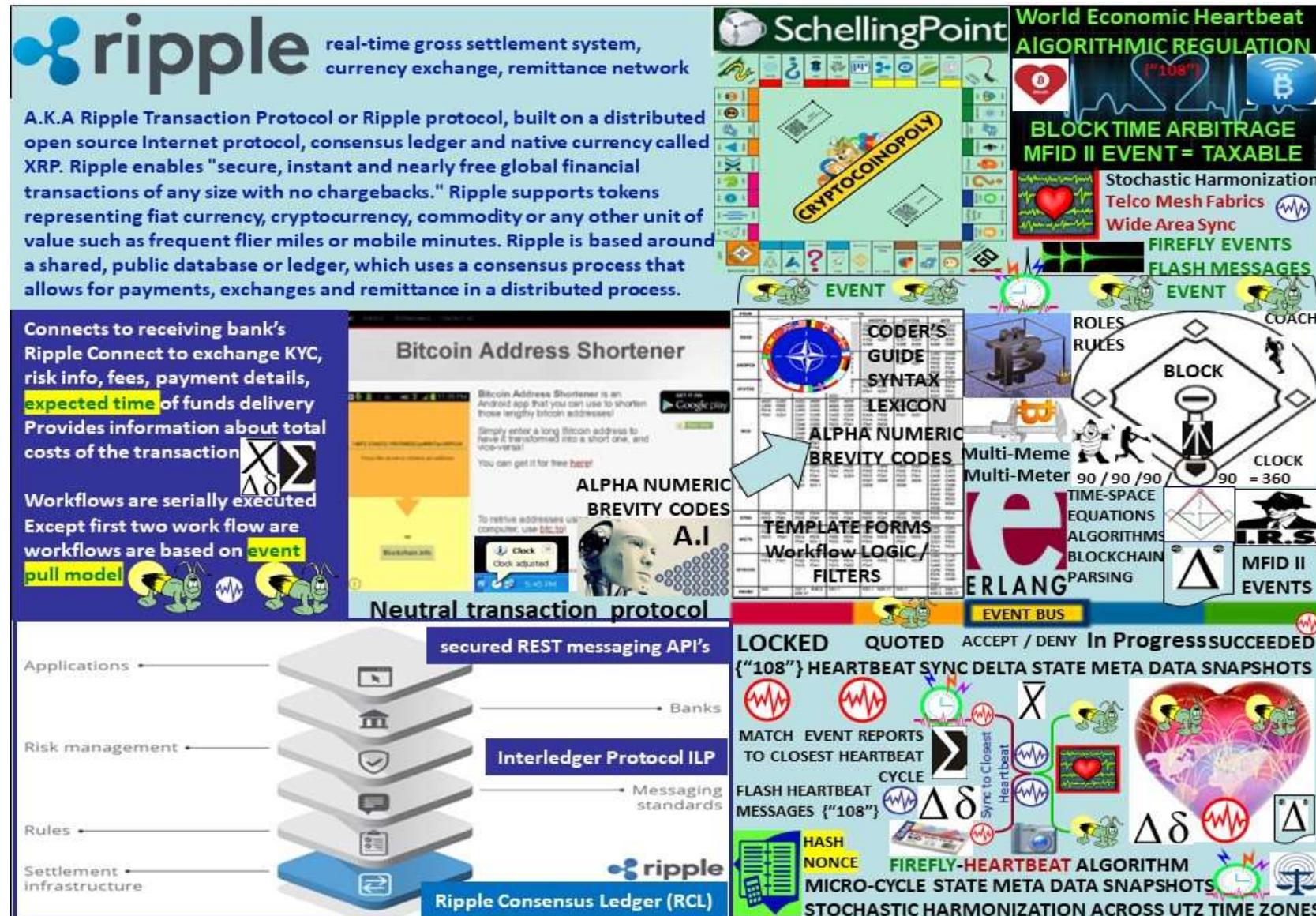


FIGURE 90: RIPPLE XRP Real Time Protocol / USPTO 13/573,002

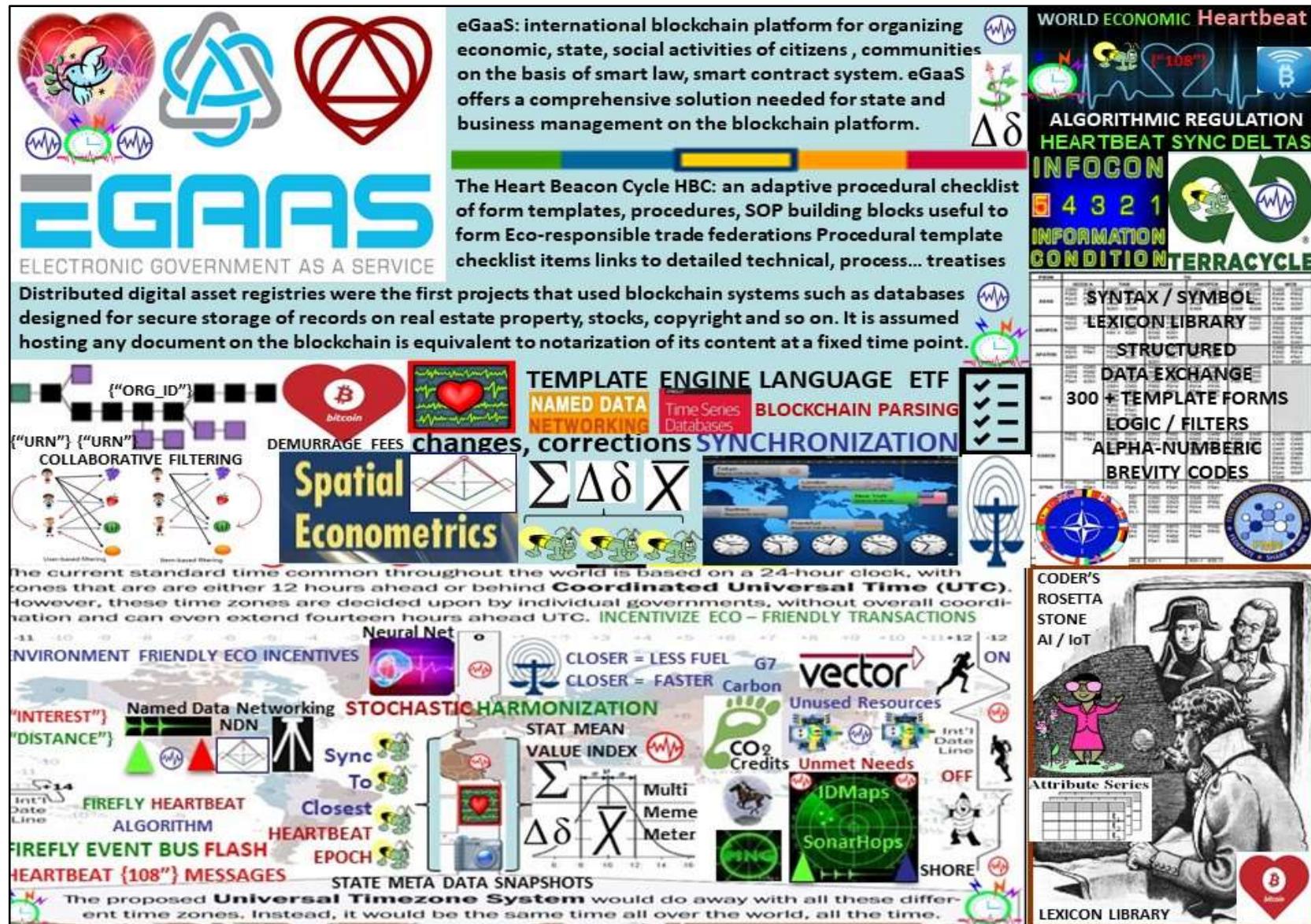


FIGURE 91: E Government as a Service E-GASS/ USPTO 13/573,002 Synergy



Figure 92: GNOSIS / USPTO 13/573,002



Figure 93: Cryptocurrencies main issues / resolutions



Figure 94: USPTO 13/573,002 Application time line, key events / SCOTUS compliant meme



FIGURE 95: USPTO 13/573,002 Amendment Timeline

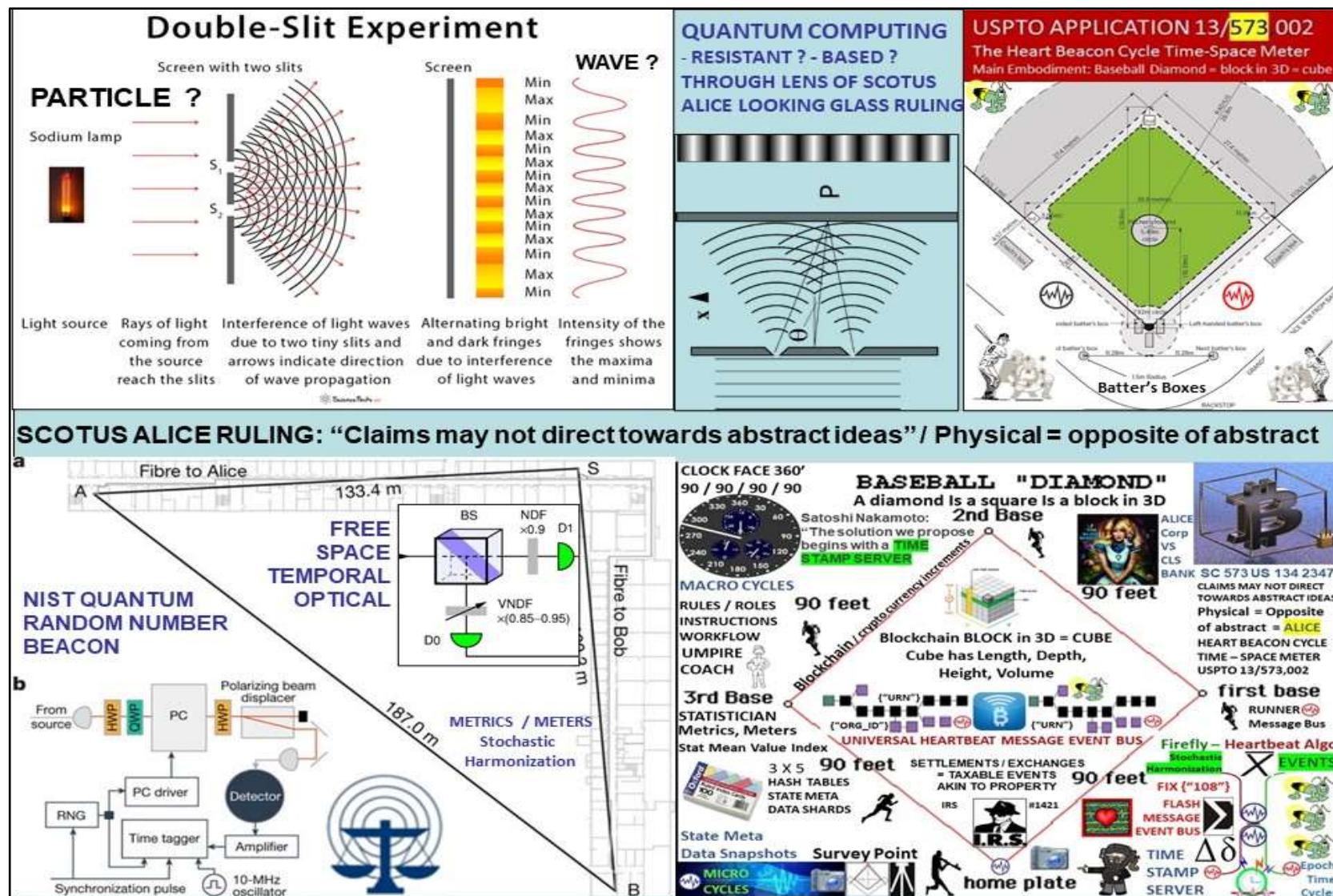


Figure 96: Double Slit experiment particle - wave duality / USPTO 13/573,002

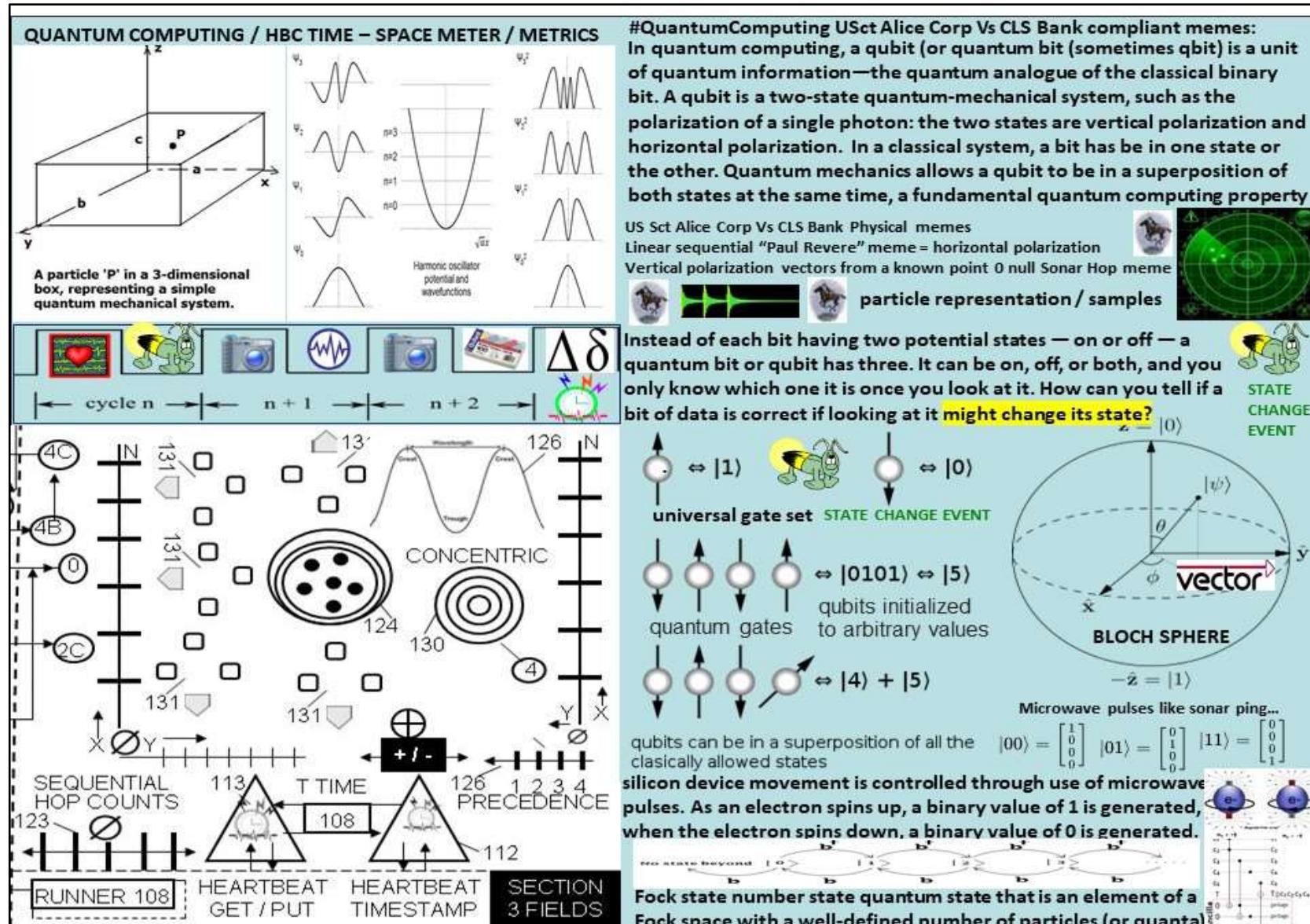


Figure 97: USPTO 13/573,002 Graphic supporting Quantum Computing Space – Time



Figure 98: QUANTUM COMPUTING / USPTO 13/573,002

NIST RANDOMNESS BEACON: broadcast full-entropy bit-strings in blocks of 512 bits every 60 seconds. Each value is time-stamped, signed, & includes hash of previous value to chain sequence of values together. This prevents all, even the source, from retroactively changing an output packet without being detected. The beacon keeps all output packets and makes them available online. 1st, Beacon-generated numbers cannot be predicted before they are published. 2nd, public, Beacon's time-bound, authenticated nature of the Beacon proves true random numbers not known before a certain point in time. 3rd, this proof can be presented offline at any point in the future

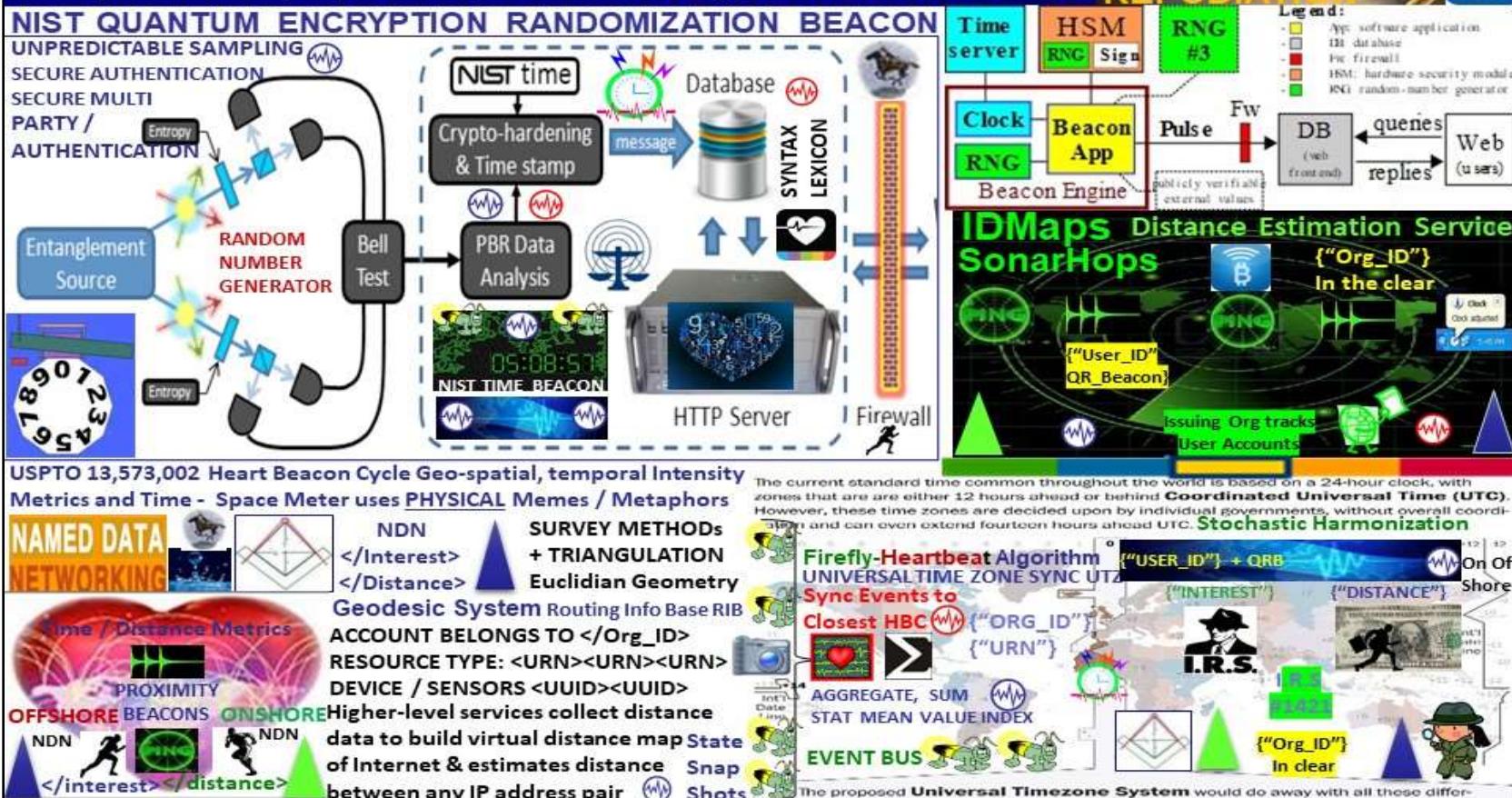


Figure 99: NIST QRNB Quantum Random Number Beacon / USPTO 13/573,002

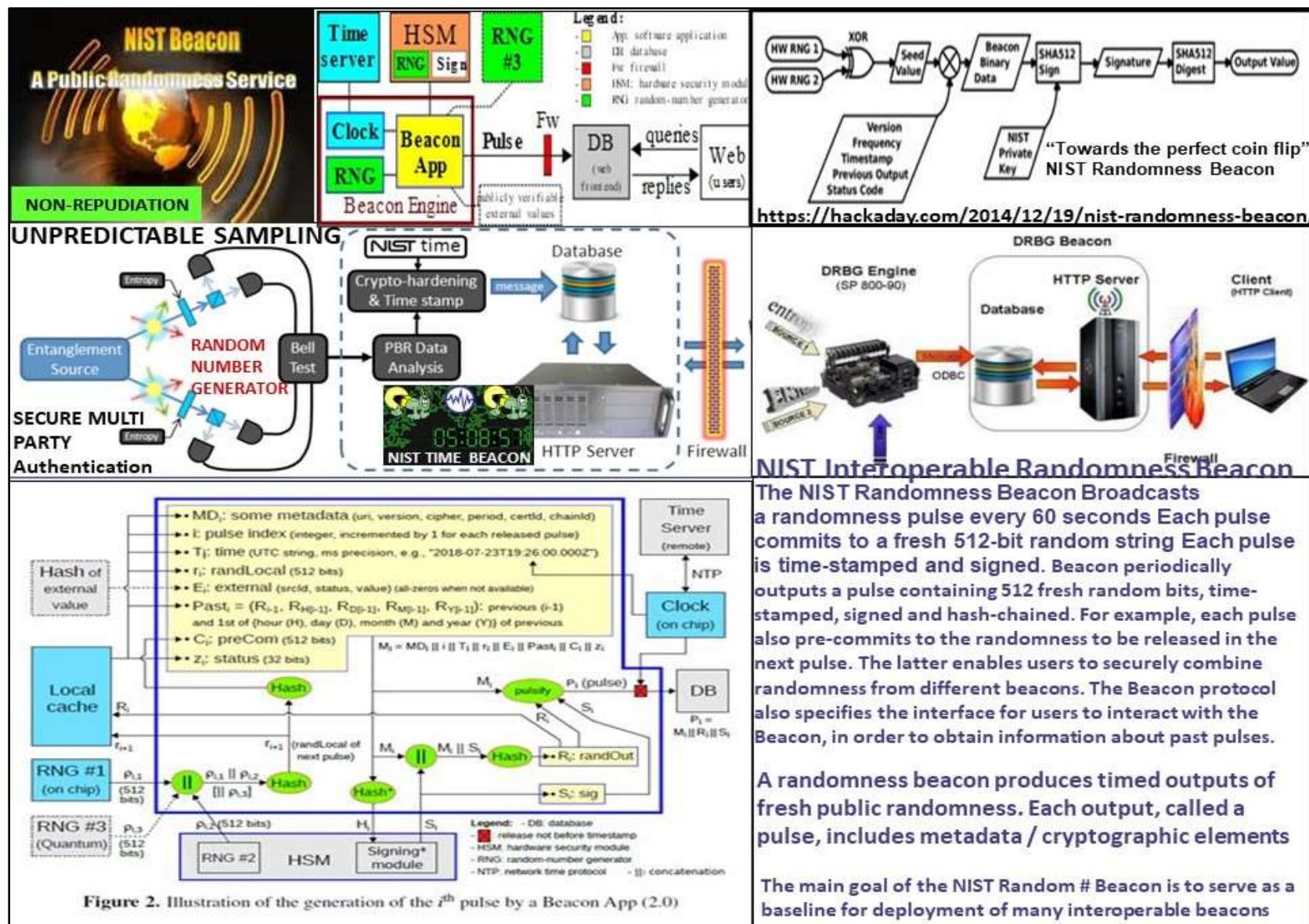
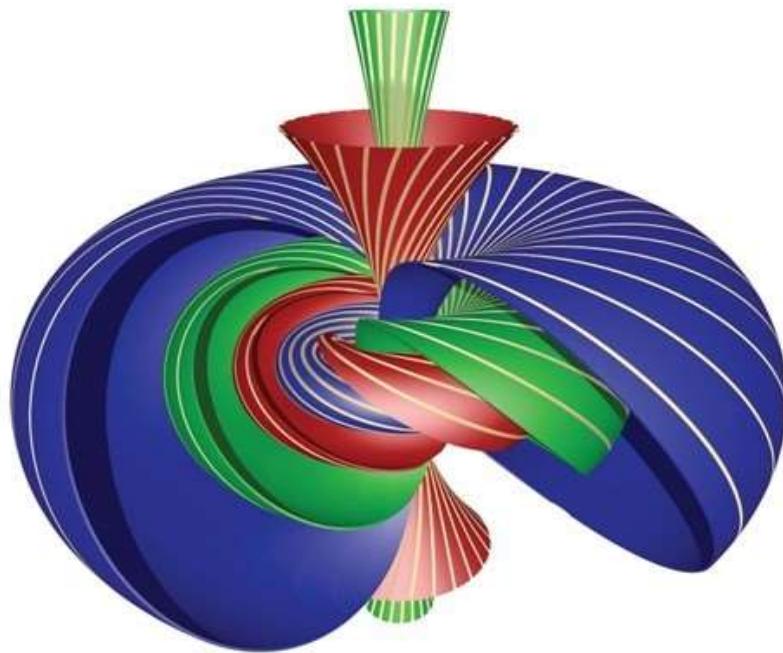


Figure 100: NIST QRNB Quantum Random Number Beacon Text Description

The Hopf Fibration

Edmund Harriss



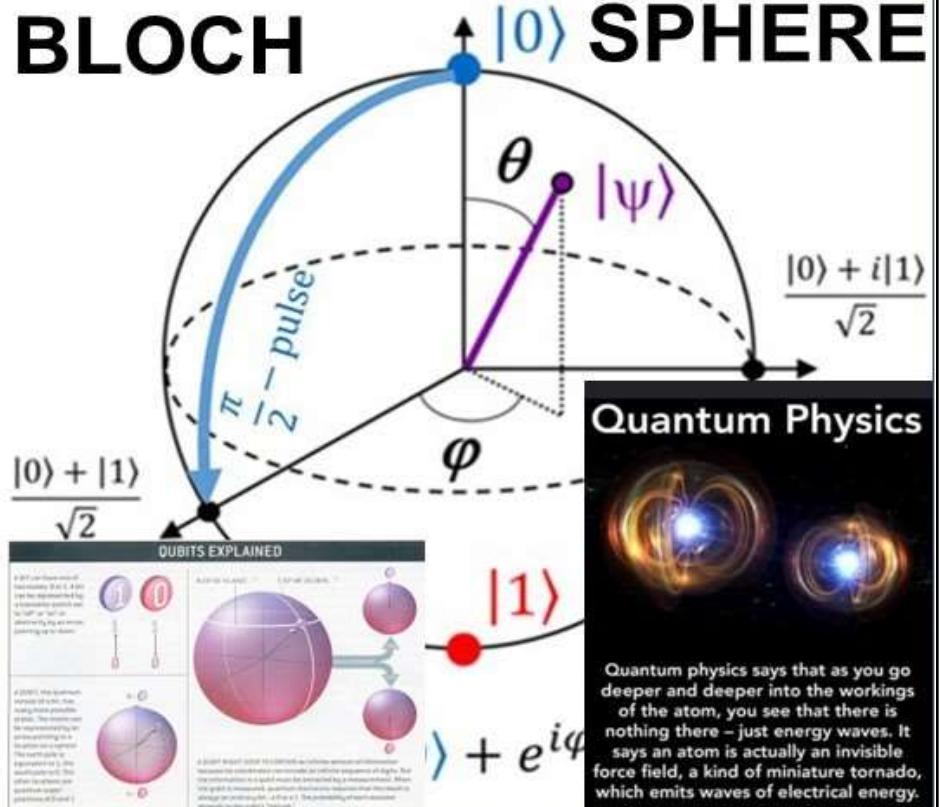
Hopf Fibration / #Bloch sphere

"the most important object in the universe"

"Hopf fiber bundles pop up in 8 quantum physics situations" ... USPTO 13/573,002 water drop in pond meme / scalar wave in 2D - 3D

Paul Revere linear - sequential hop count memo

BLOCH  SPHERE



The Bloch sphere provides a useful means of visualizing the state of a single qubit & operations on it. Any point on this sphere represents a linear combination of the 0 and 1 states with complex coefficients.

A $\pi/2$ -pulse 'rotates' a qubit from the 0-state to a superposition state.



Figure 101: Hopf Fibration / Bloch sphere

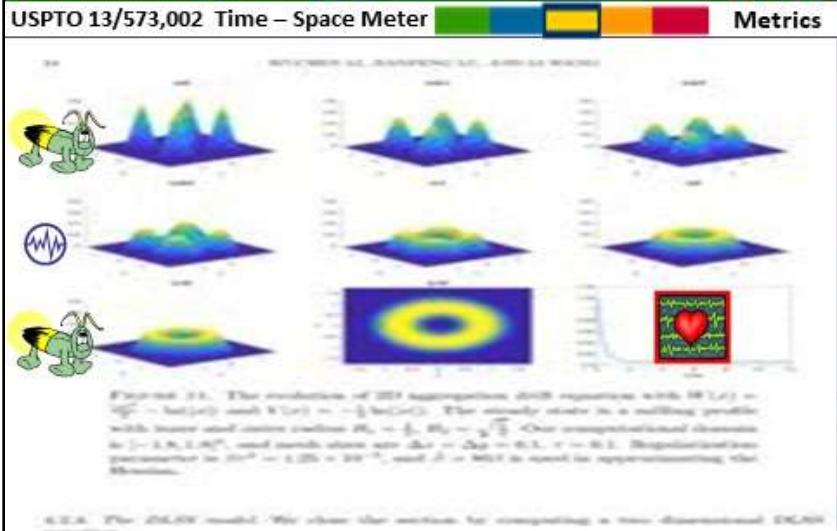
Fisher information flux flows are generated and stored in wave packets as they propagate. This temporal aspect is crucial for understanding how information builds up in a system over time



$\Delta\delta$



Metrics



The Variance of...

$\Delta\delta$

the partial derivative w.r.t. θ of...

the log-likelihood function of θ given observed value of X

$$\mathcal{I}(\theta) = \text{Var}\left(\frac{\partial}{\partial \theta} \ell(\theta | X)\right)$$



Continuity equation for flow of Fisher information in wave scattering: Nature / ISF International Space Federation

An electromagnetic wave scattered at an object carries locally defined and conserved information about all of the object's constitutive parameters. Specifically, we introduce the density and flux of Fisher information for general types of wave fields and identify the corresponding sources and sinks of information through a fundamental continuity equation. Our theoretical predictions involve a movable object embedded in a disordered environment by measuring the corresponding **Fisher information flux** at microwave frequencies. Our results improve the understanding of the generation, propagation of information supports tracking and designing the flow of information in complex system of systems environments.

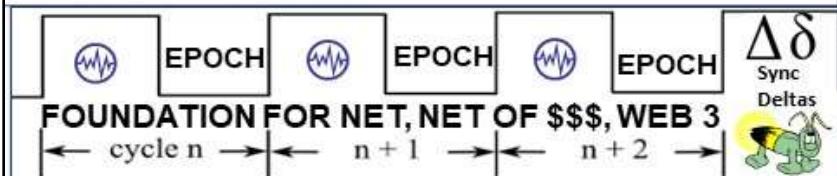
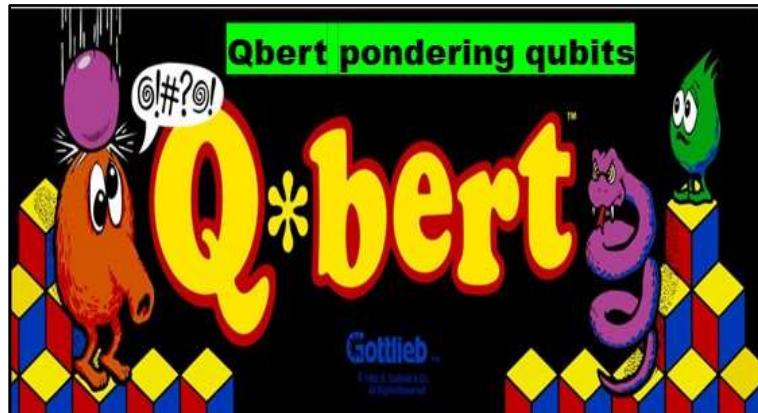


Figure 102: Fisher Information flux flow waves



Qubit vs bit: Qubits are represented by a superposition of multiple possible states. A qubit uses the quantum mechanical phenomena of superposition to achieve a linear combination of two states. A classical binary bit can only represent a single binary value, such as 0 or 1, meaning that it can only be in one of two possible states. A qubit, however, can represent a 0, a 1, or any proportion of 0 and 1 in superposition of both states, with a certain probability of being a 0 and a certain probability of being a 1.

Q: ARE WE ABSOLUTELY CERTAIN QUBITS EXIST ?

Q: IF CUBITS DO NOT EXIST, THEN ARE THEY SIMPLY A WAY TO ACHIEVE GROUP THINK FASTER ???

Q: 1/3 of an event (transaction) ... really ???

A bit is a unit for measuring information		
Classical bits		Quantum bits (Qubits)
Bit 1 Empty = "0"	Bit 2 Filled = "1"	Qubit 1 1/3 of "0" and 2/3 of "1"
20 red beads = "0"	20 blue beads = "1"	8/20 of "0" and 12/20 of "1"
Head = "0"	Tail = "1"	50% chance of landing on "0" 50% chance of landing on "1"

FIGURE 103: QUBIT = non-existant notional construct = group think contrived expected outcome

Foundation Technology Trinity:

1. EPOCH (s) = Time intervals, cycles
2. SPACE (land use meme) ex: IRS memo #1421 "Bitcoin transaction akin to land"
3. SYNTAX structured data mapped to symbols for A.I. / man - machine interface

THESIS: All net artifacts, net of \$ are formed with:

- 1) Epoch time cycle intervals ex: chip oscillations
- 2) Syntax parsed, processed in epoch time intervals

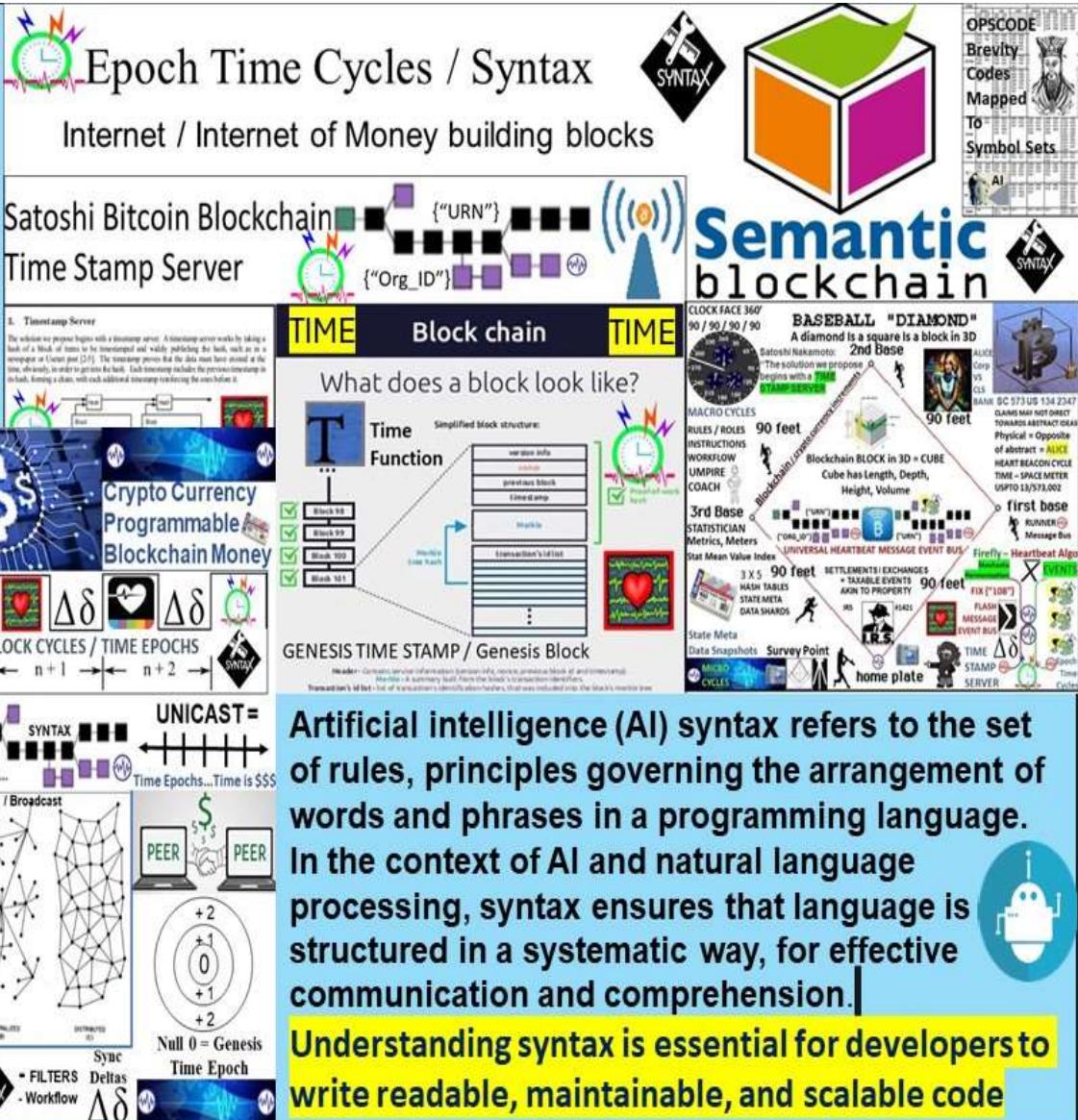
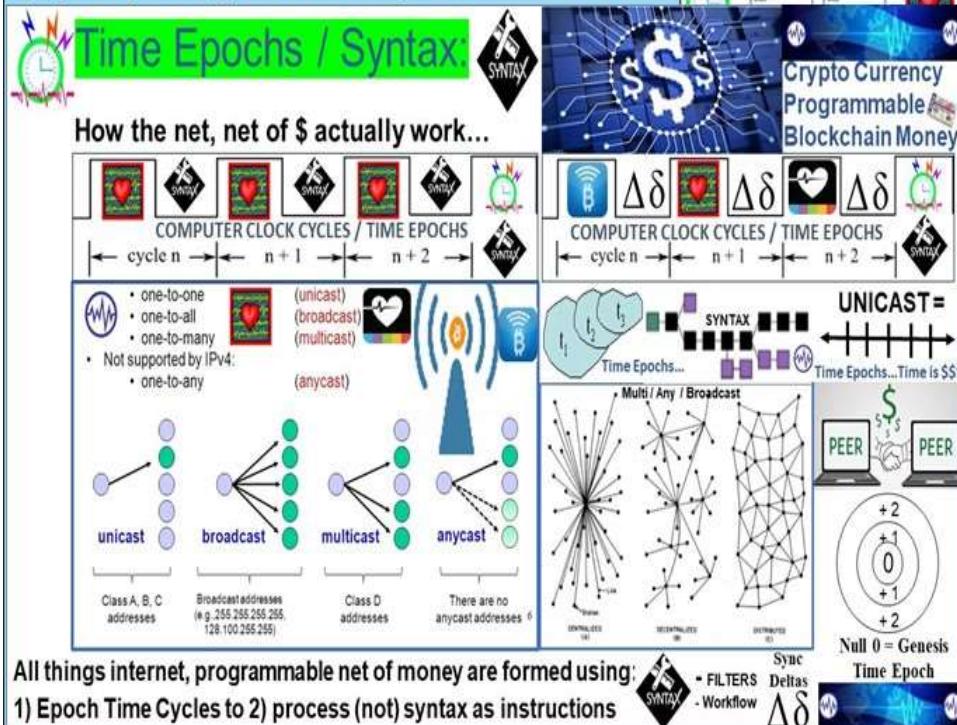


FIGURE 104: TIME – SYNTAX foundation framework for the internet, internet of things IoT, money DeFi / Fintec



Eco Economic Epoch Heartbeat: reuse of DoD / NATO signal, telemetry syntax - symbol set structured data exchange system of systems engineering framework for DAO Trade Federations, programmable money / Economy. It is time to stand on the shoulders of giants. **SLA Service Level Agreement Eco incentives:** closer = < time, cheaper, < fuel, < CO2 "Build a new model that makes the old model obsolete" Buckminster Fuller



Figure 105: Standing on the shoulders of giants



Figure 106: #Unrig the System Project Robert David Steele / Dr. Cynthia McKinney/ USPTO 13/573,002



FIGURE 107: SPACESHIP EARTH OPERATING MANUAL SIGNALS ANNEX K



Figure 108: Programmable money through the lens of metaphysics / USPTO 13/573,002

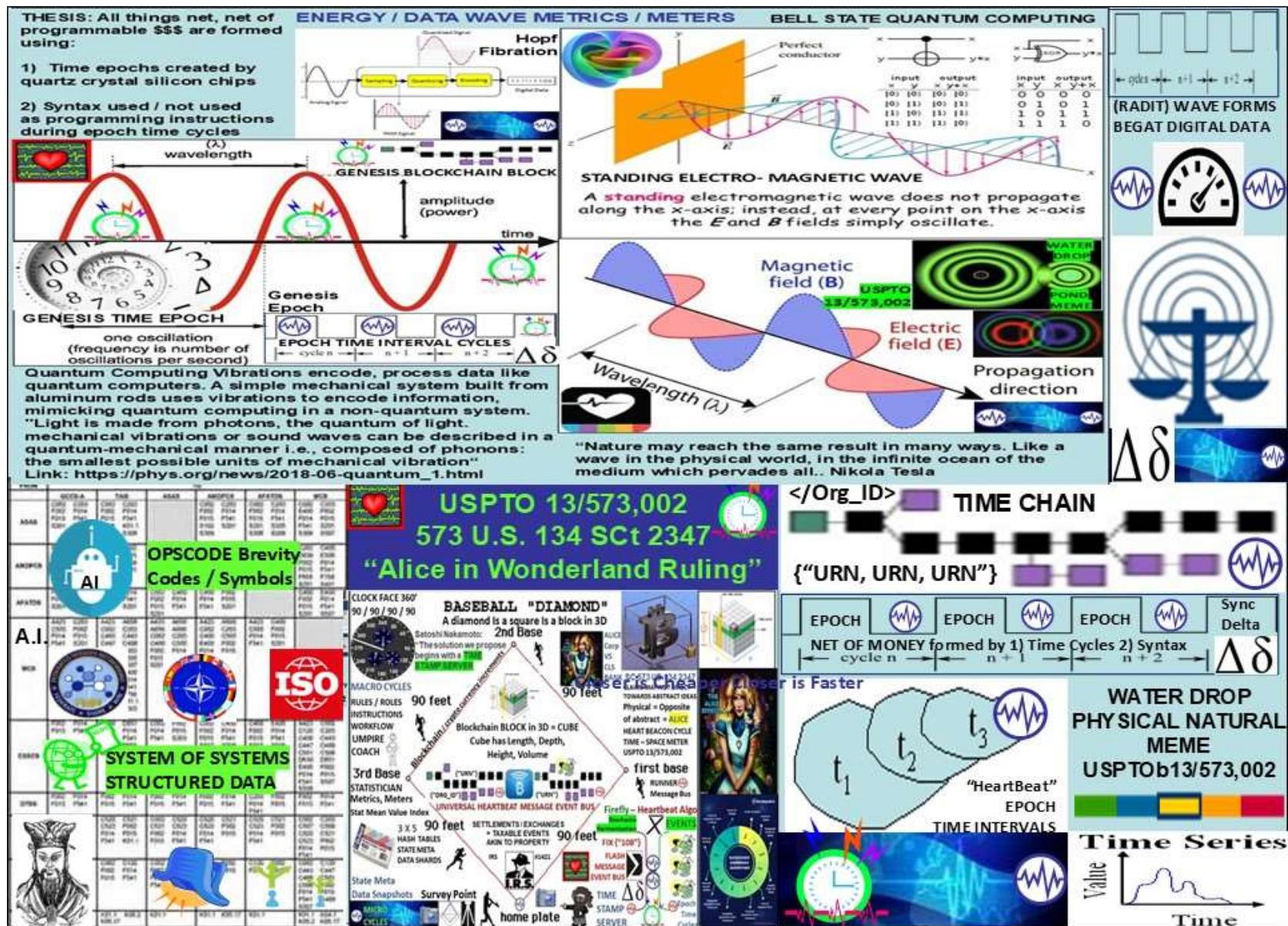


Figure 109: THESIS / SUMMARY

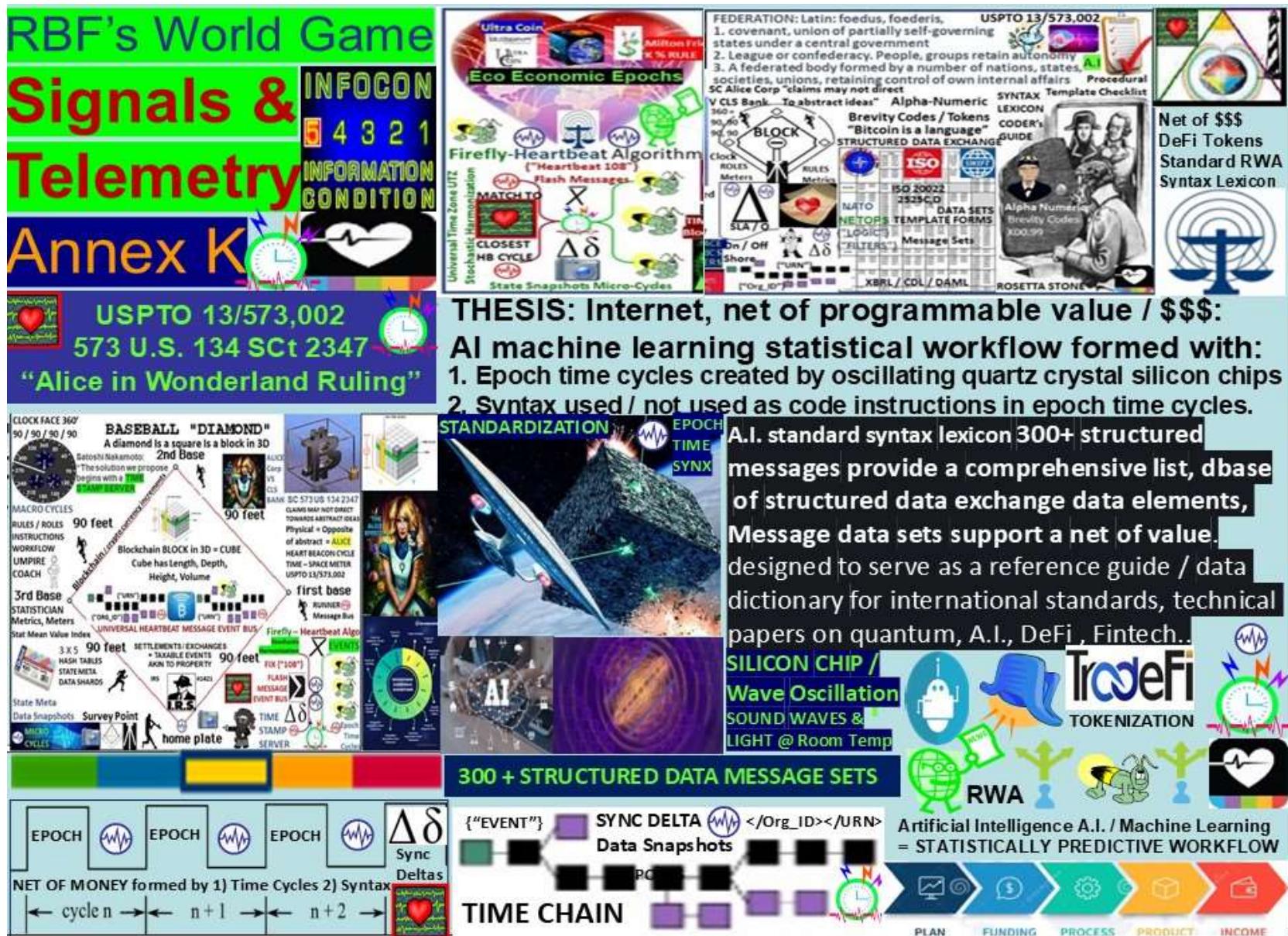


Figure 110: Summary Graphic / Thesis #2

Patent Applicant 13/573,002 Curriculum Vitae

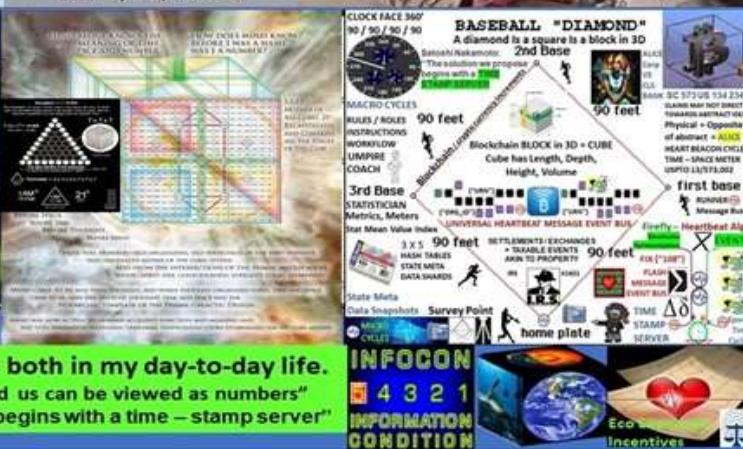
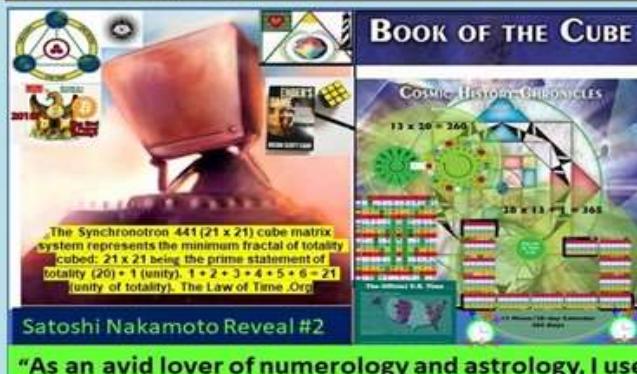
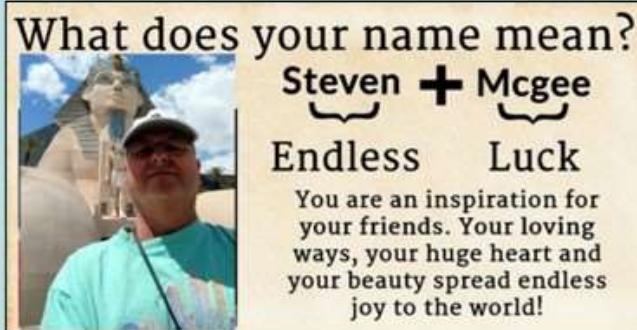
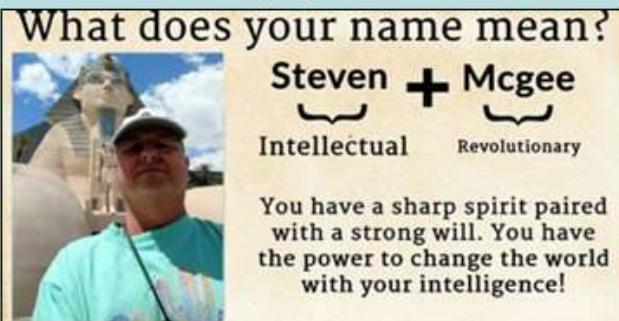


Figure 111: Curriculum Vitae: Steven J. McGee



Figure 112: Business Card