

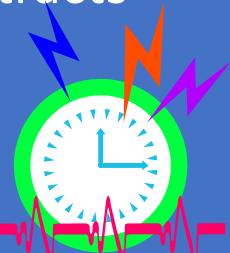
- Economic Framework systemic incentives:



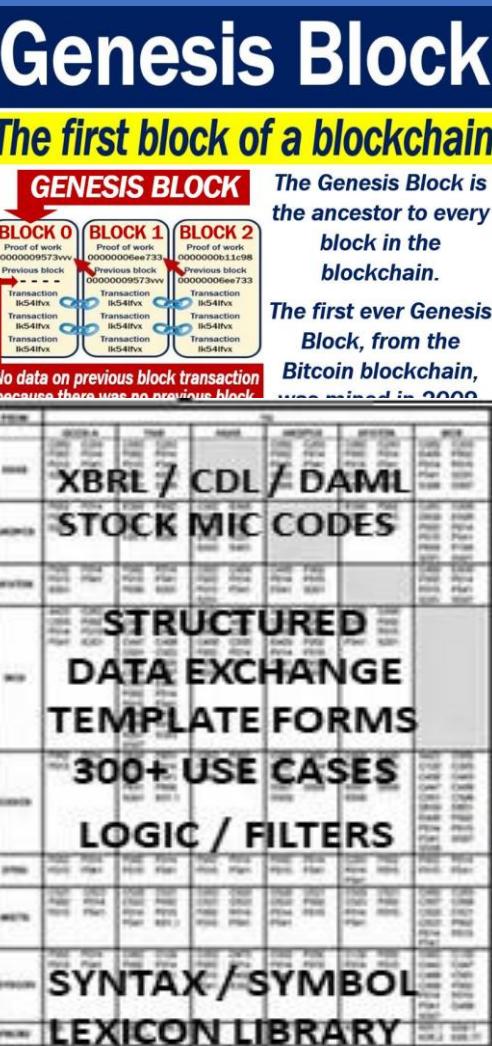
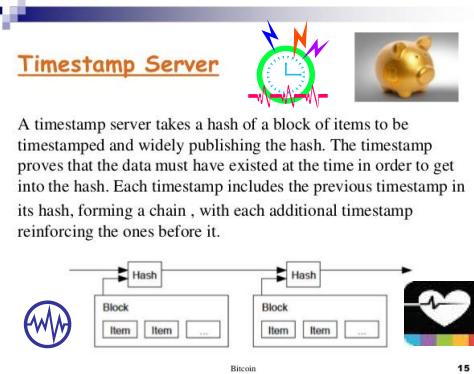
- DARPA / NATO System of Systems framework based
  - Syntax lexicon library with 300 + use cases, thousands of message sets
  - Syntax alpha-numeric brevity OPSCODES are mapped to symbol sets (A.I.)
  - NATO bases are cities transact everything described by Host Nation Agreements easily converted to Service Level Agreement smart contracts

- EPOCHS: all things internet, net of money are formed using:

- (1) Epoch time cycles
- (2) Syntax (not) used / during epoch time cycles as instructions (if, then, else)



**"In the beginning (of time), there was the word" (syntax)**



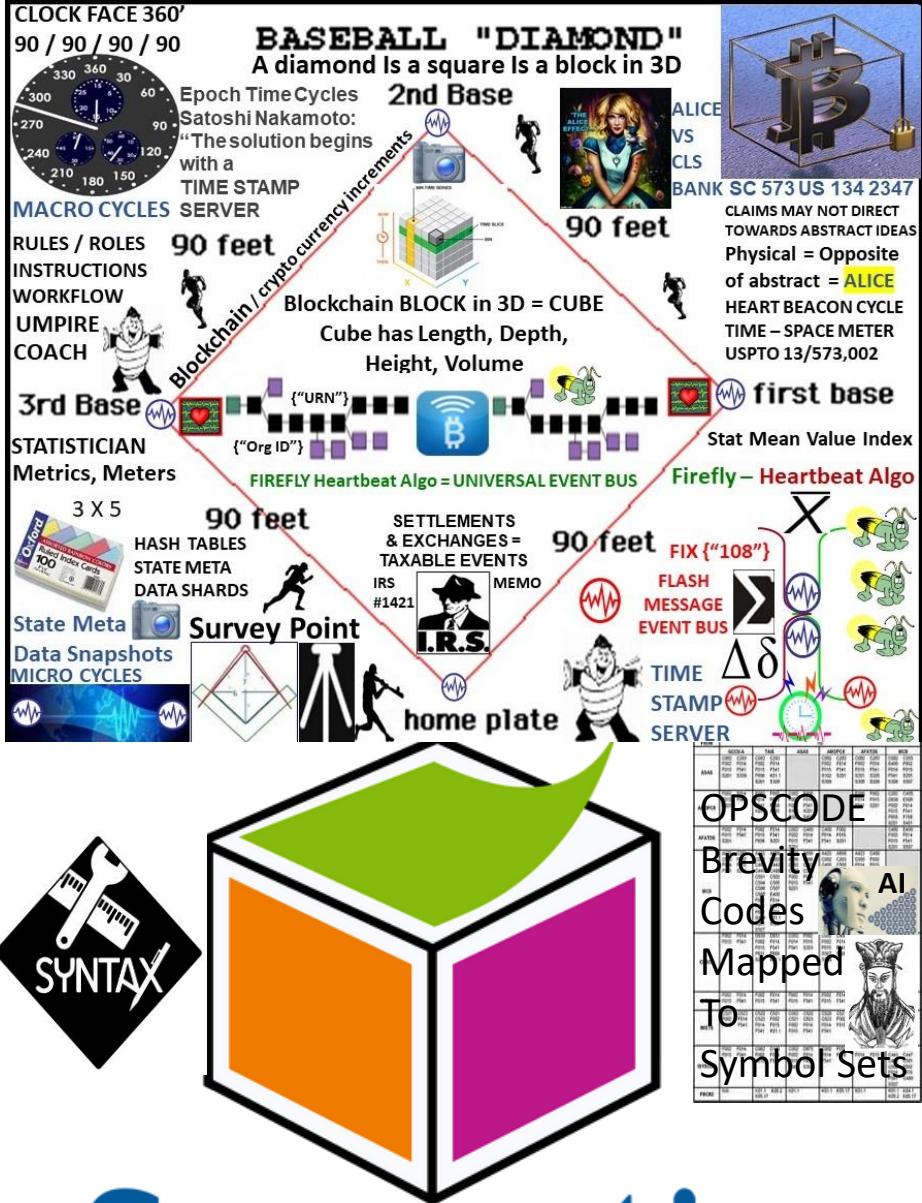
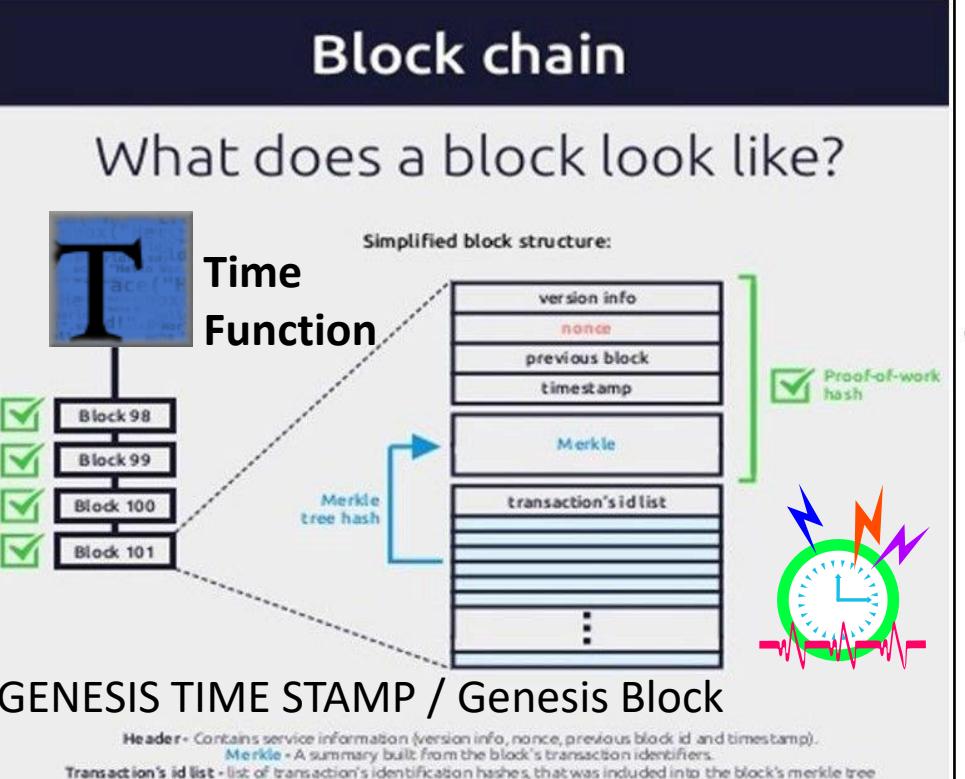
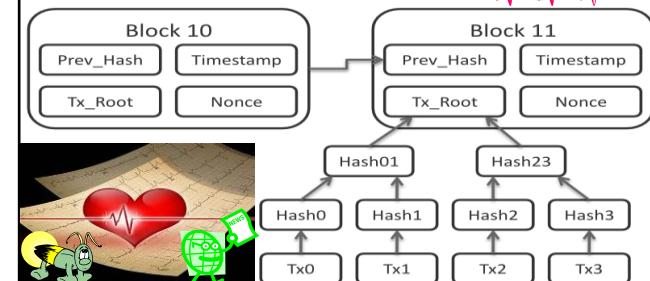


Internet / Internet of Money building blocks



**3. Timestamp Server**  
The solution we propose begins with a timestamp server. A timestamp server works by taking a hash of a block of items to be timestamped and widely publishing the hash, such as in a newspaper or Usenet post [2-5]. The timestamp proves that the data must have existed at the time, obviously, in order to get into the hash. Each timestamp includes the previous timestamp in its hash, forming a chain, with each additional timestamp reinforcing the ones before it.

**THE SOLUTION WE PROPOSE BEGINS WITH A TIME STAMP SERVER**



# Semantic blockchain



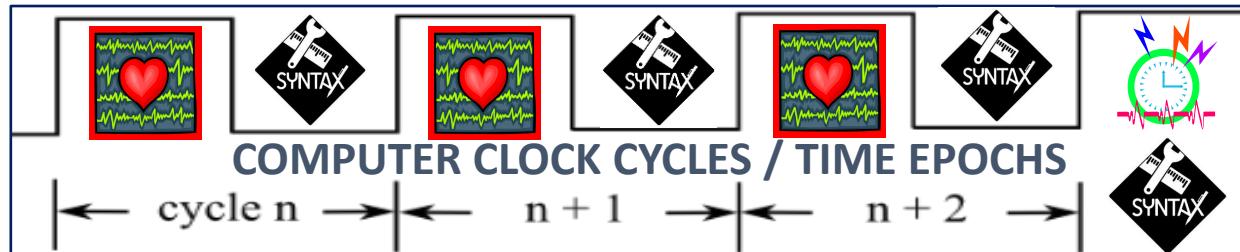
# Time Epochs / Syntax:





# Crypto Currency Programmable Blockchain Money

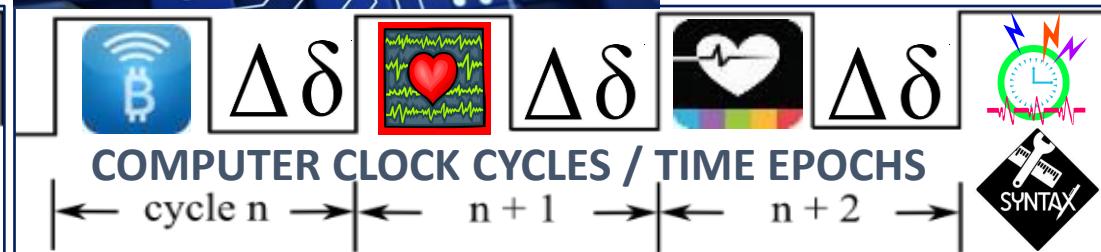
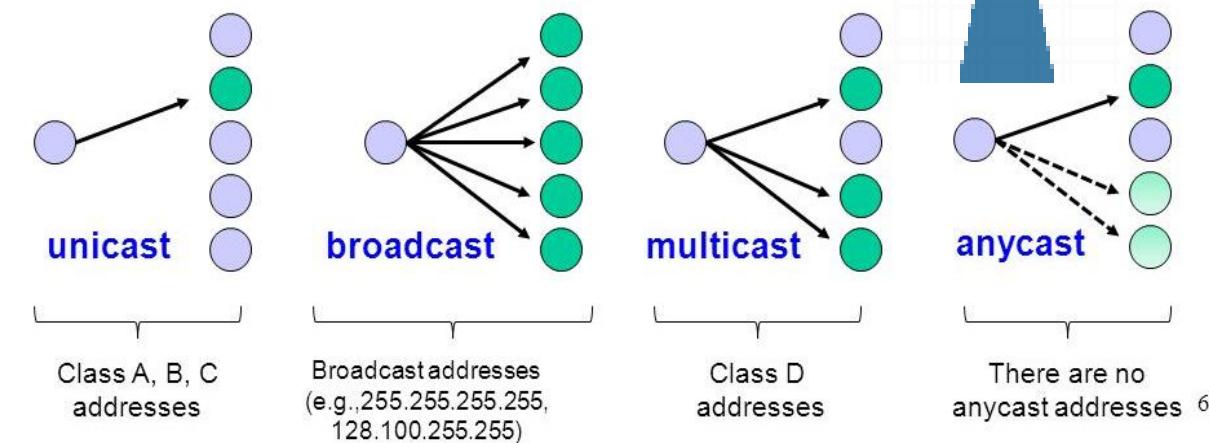
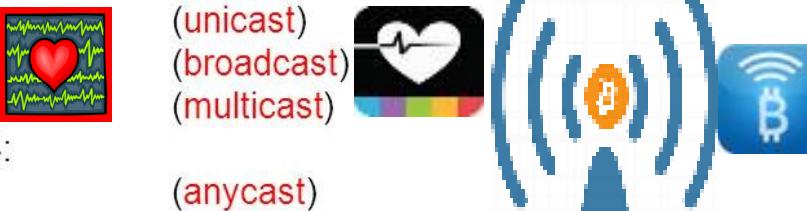
# **How the net, net of \$ actually work...**



- one-to-one
  - one-to-all
  - one-to-many

• Not supported by IPv4:

  - one-to-any

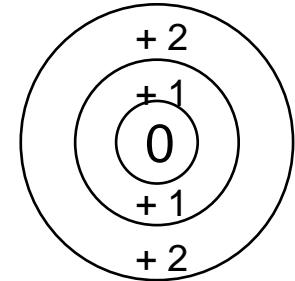
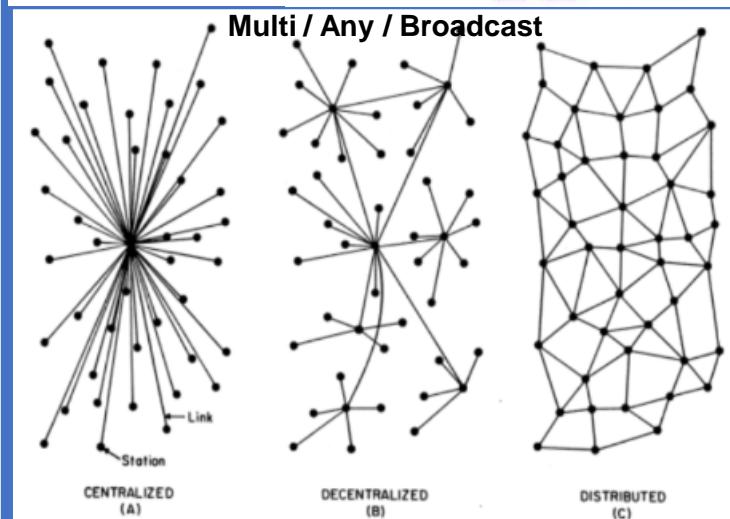


# COMPUTER CLOCK CYCLES / TIME EPOCHS

# **UNICAST =**



## Time Epochs...Time is \$\$\$



# **Null 0 = Genesis Time Epoch**

**All things internet, programmable net of money are formed using:**

## **1) Epoch Time Cycles to 2) process (not) syntax as instructions**



- FILTERS

# Sync Deltas

# Net of \$\$\$ formed with: EPOCH TIME CYCLES {"Syntax"} Instructions

"In the beginning"

"The Word"

"All things internet, Internet of money are formed using time epoch cycles to process, parse, syntax as instructions"

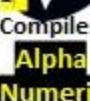
"A blockchain is a consensus-based system. It only works if all nodes reach an identical state"

"A smart contract is a piece of code stored on a blockchain, triggered by blockchain transaction reads / writes data in the blockchain's Dbase"



"Blockchain consortiums are working less on distributed ledgers and more on Contract Description Languages CDL, DAML Digital Asset Modeling Language" Coindesk Article

	INDIA	CHINA	U.S.	EUROPE	MIDDLE EAST	AUSTRALIA	ASIA PACIFIC	AMERICAS	AFRICA	OTHER
XBRL / CDL / DAML										
STOCK MIC CODES										
STRUCTURED DATA EXCHANGE TEMPLATE FORMS										
300+ USE CASES										
LOGIC / FILTERS										
SYNTAX / SYMBOL LEXICON LIBRARY										



LEXICON

Library

SYMBOLS ARE THE UNIVERSAL LANGUAGE

Coder Guide Rosetta Stone

Brevity Codes



"Bitcoin is a LANGUAGE"  
DIGINOMICS

"Bitcoin's Value is TIME itself"  
"Time is specified in units of block transaction confirmation times"



WIRED

"BITCOIN MAKES MONEY PROGRAMMABLE.  
MONEY IS SIMPLY DATA"



ALICE CORP VS CLS BANK

"claims may not be directed towards an abstract idea"



US SC 573 US 134 2347

BITCOIN BLOCKCHAIN BLOCKS, AGENTS, MOTES, BOTS, PACKETS, FRAMES, HEARTBEAT, PINGS, HOPS, BEACONS ARE METAPHORS / MEMES

USPTO 13/573,002 BASEBALL MEME PHYSICAL = OPPOSITE OF ABSTRACT



CLOCK FACE 360°  
90 / 90 / 90 / 90

Epoch Time Cycles  
Satoshi Nakamoto:  
"The solution begins with a TIME STAMP SERVER"

MACRO CYCLES  
RULES / ROLES INSTRUCTIONS WORKFLOW UMPIRE COACH

3rd Base STATISTICIAN Metrics, Meters

3 X 5 HASH TABLES STATE META DATA SHARDS State Meta Data Snapshots MICRO CYCLES Survey Point

BASEBALL "DIAMOND"  
A diamond is a square is a block in 3D

2nd Base  
Blockchain BLOCK in 3D = CUBE  
Cube has Length, Depth, Height, Volume

90 feet  
Blockchain / cryptocurrency increments

first base  
Stat Mean Value Index

FIREFLY Heartbeat Algo = UNIVERSAL EVENT BUS

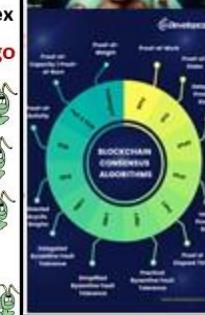
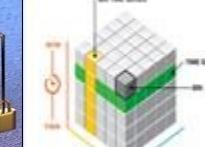
90 feet  
SETTLEMENTS & EXCHANGES = TAXABLE EVENTS IRS #1421 MEMO

90 feet  
FLASH MESSAGE EVENT BUS  
TIME STAMP SERVER  
Δδ



ALICE 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



CLOCK FACE 360'  
90 / 90 / 90 / 90



### MACRO CYCLES

RULES / ROLES  
INSTRUCTIONS  
WORKFLOW  
UMPIRE  
COACH



### 3rd Base

STATISTICIAN  
Metrics, Meters



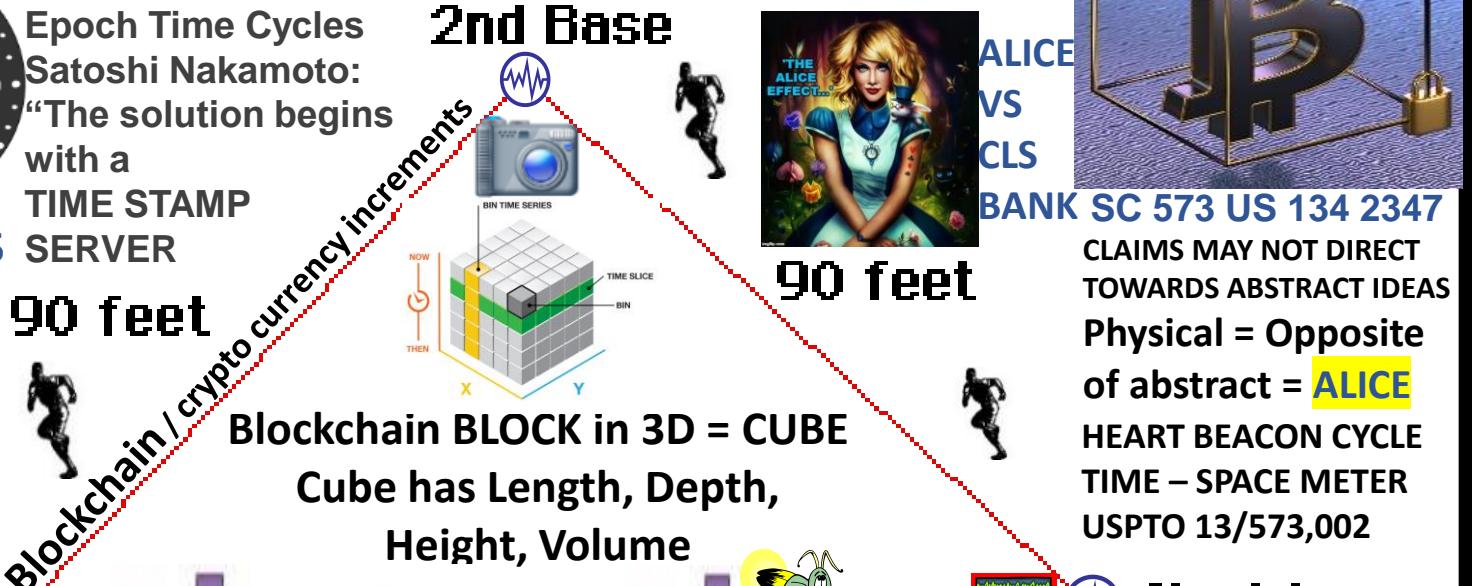
3 X 5

State Meta  
Data Snapshots  
MICRO CYCLES



Epoch Time Cycles  
Satoshi Nakamoto:  
"The solution begins  
with a  
TIME STAMP  
SERVER

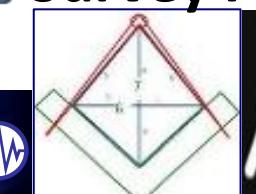
90 feet



90 feet



### Survey Point



90 feet

HASH TABLES  
STATE META  
DATA SHARDS

SETTLEMENTS  
& EXCHANGES =  
TAXABLE EVENTS



MEMO



90 feet



TIME  
STAMP  
SERVER

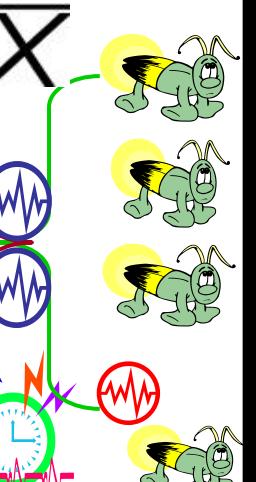
FLASH  
MESSAGE  
EVENT BUS



$\Delta \delta$



FIX {"108"}



ALICE

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

Stat Mean Value Index

Firefly – Heartbeat Algo



THE BITCOIN BLOCKCHAIN FOR DUMMIES

**What is needed is an electronic payment system based on cryptographic proof instead of trust, allowing any two willing parties to transact directly with each other without the need for a trusted third party e.g., a bank.**

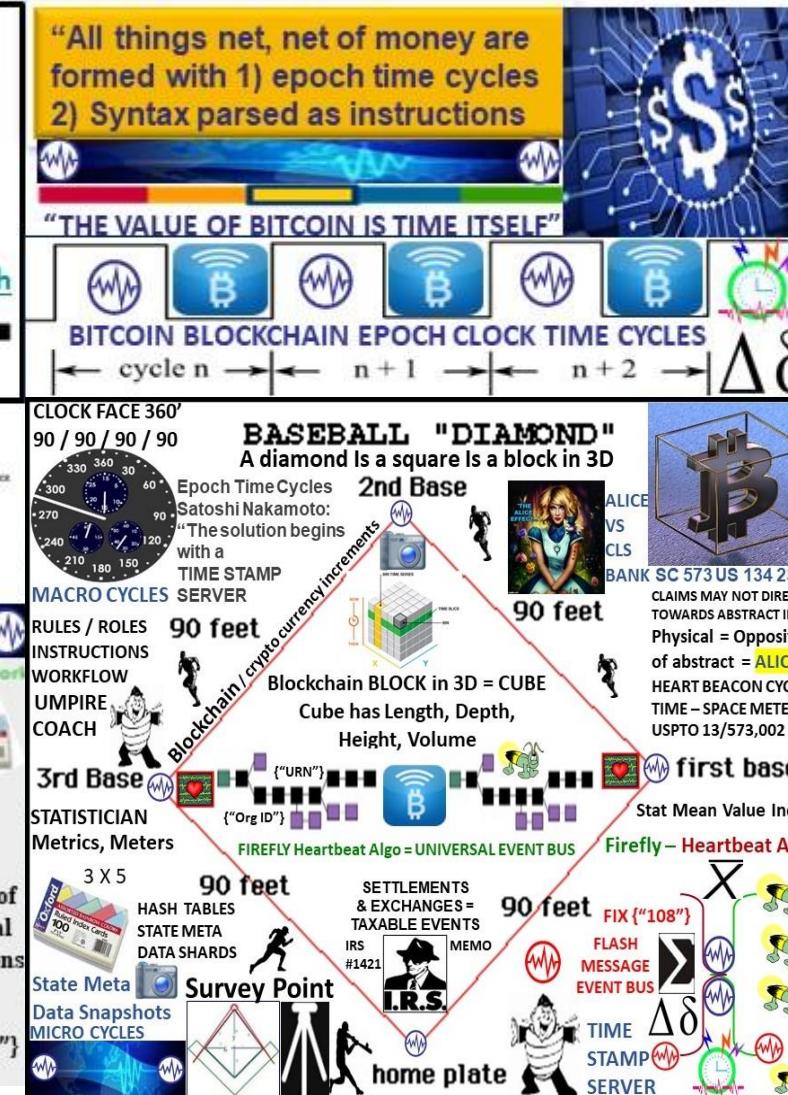
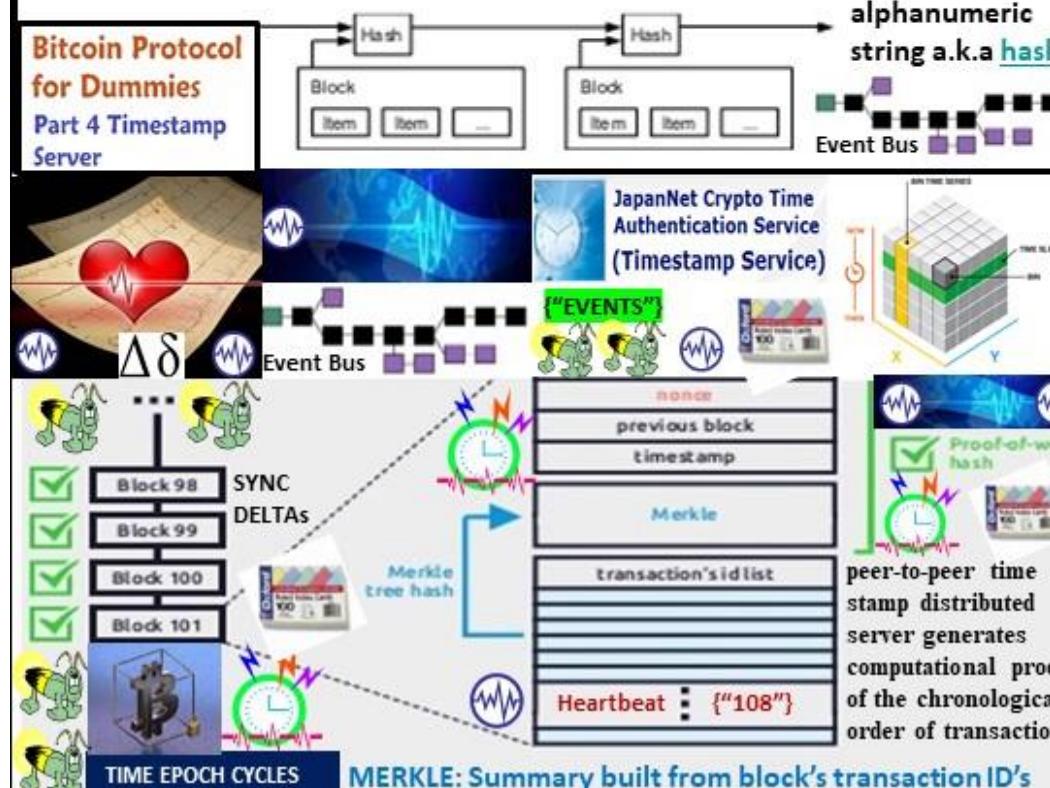
Satoshi Nakamoto Bitcoin Paper



**"THE SOLUTION WE PROPOSE BEGINS WITH A TIME STAMP SERVER."**

### 3. Timestamp Server

The solution we propose begins with a timestamp server. A timestamp server works by taking a hash of a block of items to be timestamped and widely publishing the hash, such as in a newspaper or Usenet post [2-5]. The timestamp proves that the data must have existed at the time, obviously, in order to get into the hash. Each timestamp includes the previous timestamp in its hash, forming a chain, with each additional timestamp reinforcing the ones before it.



All things internet of money are formed w CPU time cycles used to process, syntax, instruction / code



The logo consists of three blue circular icons with white wave patterns, followed by the text "USPTO 13/573,002" and "EART BEACON CYCLE TIME - SPACE METER".

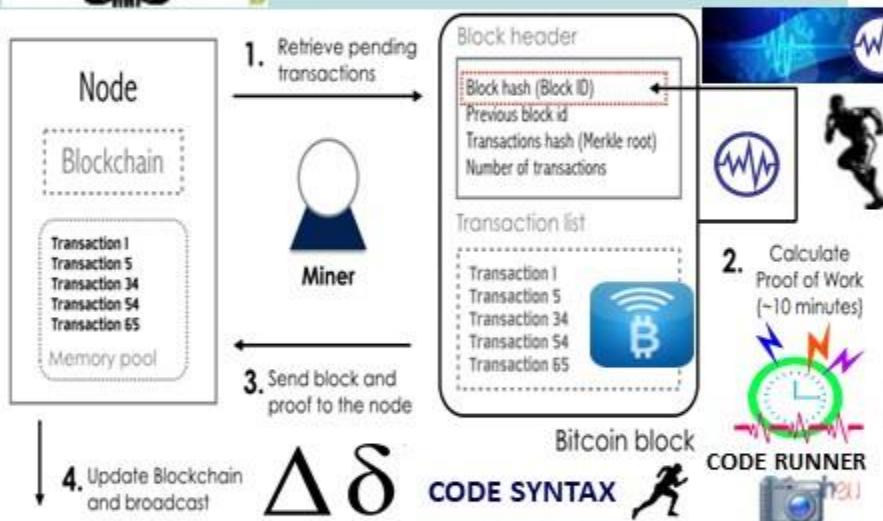


WIRED

"BITCOIN MAKES  
MONEY  
PROGRAMMABLE  
MONEY IS  
SIMPLY DATA"



Alice Corp. v. CLS Bank International, 573 U.S. 134 SCt 2347 (2014) is a 2014 decision of the United States Supreme Court about patentable subject matter (patent eligibility). [2] The issue in the case was whether certain claims about a computer-implemented, electronic escrow service for facilitating financial transactions covered abstract ideas ineligible for patent protection. The patents were held to be invalid because the claims were drawn to an abstract idea, and implementing those claims on a computer was not enough to transform that idea into patentable subject matter.



Block #2A4  
prev #473

txn 634...

txn a98...

txn 44c.

...

Block #7CF  
prev #2A4

txn 43e...

txn 12a...

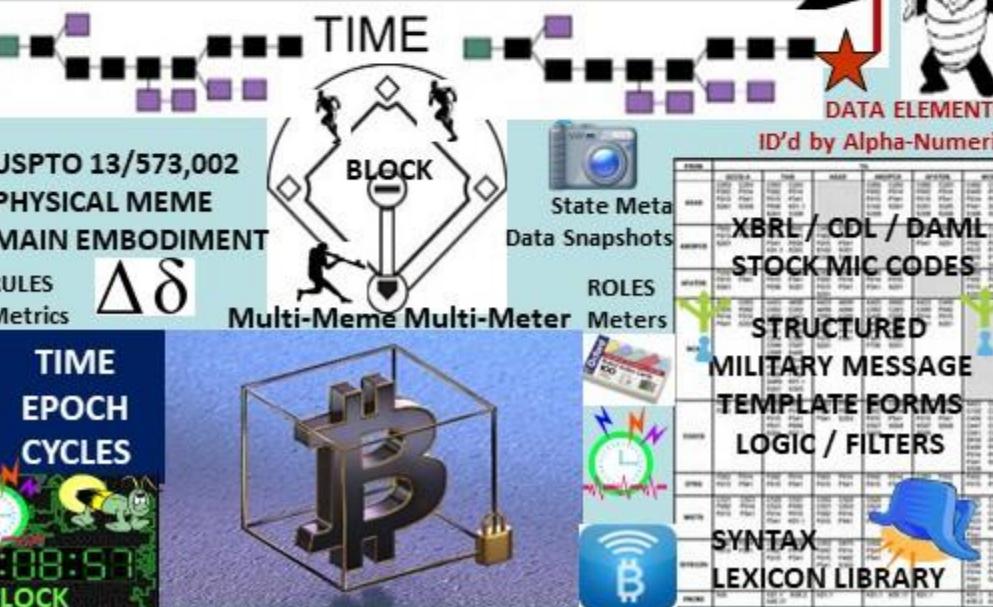
Block #8FA  
prev #7CF

txns:

- 8be...
- 839...
- 326...
- ...

**SYNTAX**

# **BLOCKCHAIN = TIME / SYNTAX**

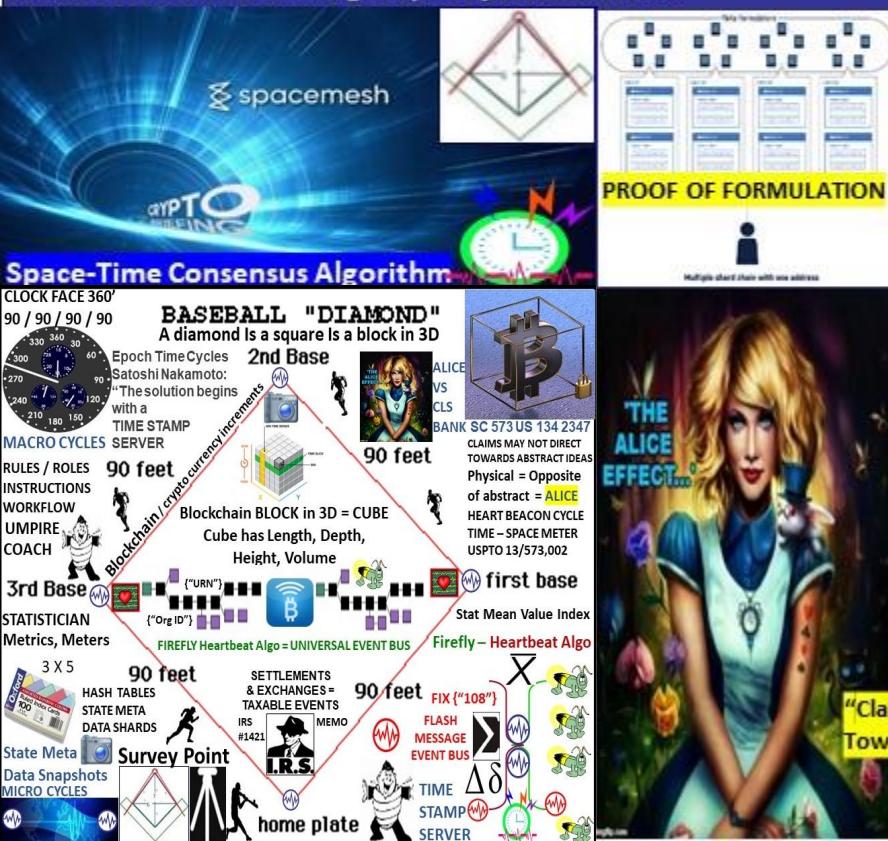


Q: What US Supreme Court Alice compliant (physical = opposite of abstract) meme describes the myriad #blockchain #consensus #algorithms the most comprehensively that uses an algorithm (based on nature) enabling distributed system of systems geo-spatial, UTZ Universal Time Zone temporal, semantic - syntactic sync / OPSCODE brevity code consensus?

#### Blockchain Consensus Algorithms & Mechanisms

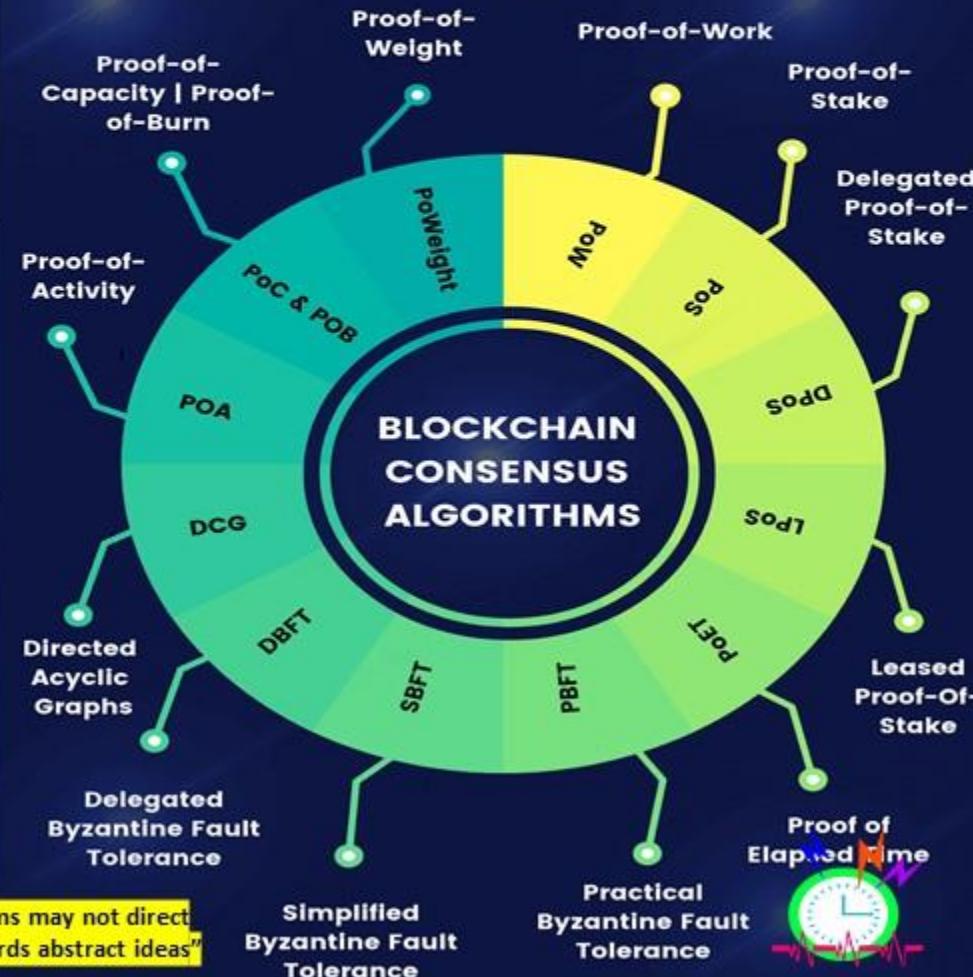
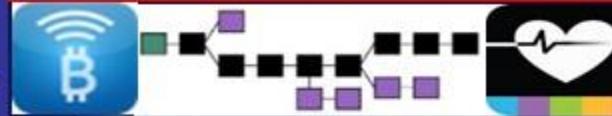
In the world of blockchain consensus algorithms, consensus is the **HEART OF THE BLOCKCHAIN NETWORK**. Its main purpose is to achieve agreement on transactions among a distributed system (s)

**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.

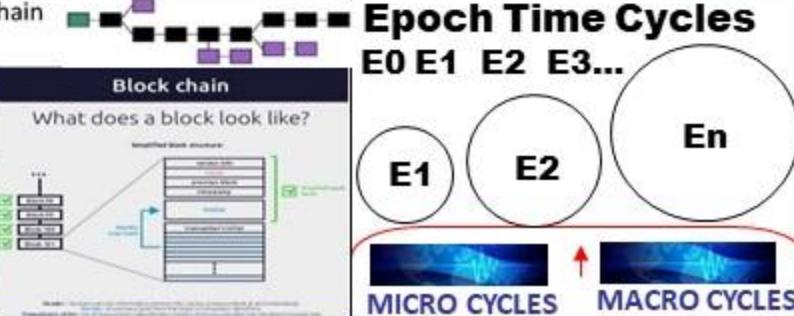


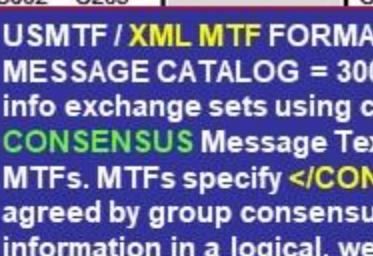
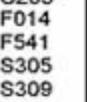
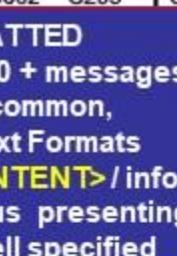
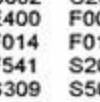
# BLOCKCHAIN CONSENSUS ALGORITHMS

## ULTIMATE GUIDE FOR BEGINNERS



SOURCE: <https://developcoins.com/blockchain-consensus-algorithms>

Interface Name	<b>HEARTBEAT</b> Administration Interface [SCOP]		
Documentation URL	<a href="http://scop.sourceforge.net/">http://scop.sourceforge.net/</a> <a href="http://linuxvirtualserver.org/software/index.html">http://linuxvirtualserver.org/software/index.html</a>		
API Information  #leT   #Big_Data 	Functionality Areas   Idea 	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  	PHP Java Erlang... 	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.	
"The external environment could update resources at random... One solution is a heartbeat: defining a default lease duration delaying updates until the next cycle"    QubitCoin Interval: Every 30 Seconds	Satoshi Bitcoin Blockchain Time Stamp Server 	Epoch Time Cycles E0 E1 E2 E3... 	

FROM		ALPHA-NUMERIC BREVITY CODES										CODE GUIDE		
	GCCS-A	C002 C203				C002 C203				C002	C203		MCS	
ASAS	C002 C203 F002 F014 F015 F541 S201 S309	C002 C203				C002 C203				C002	C203 F014 F541 S305 S309	C002 C203 E400 F002 F014 F015 F541 S201 S309 S507		
		<b>USMTF / XML MTF FORMATTED MESSAGE CATALOG = 300 + messages info exchange sets using common, CONSENSUS Message Text Formats</b> <b>MTFs. MTFs specify &lt;/CONTENT&gt; / info agreed by group consensus presenting information in a logical, well specified unambiguous layout resulting in a highly efficient info payload to overhead ratio</b>										F002	C203 C400 F015 D630 E500 S201 F002 F014	
	A423 C203 C505 F002 F014 F015 F541 S201												<b>INFOCON</b> <b>5 4 3 2 1</b> <b>INFORMATION CONDITION</b>	
	 MCS											A423 C400 C505 F002 F014 F015 F541 S201	<b>"SYMBOLS RULE THE WORLD"</b>  	

## MESSAGE CATALOG 300 + Use Cases

**Data Elements:** entity, attribute, relationship equivalents

300 + Use Cases		Information Categories and Examples						
Object Categories	Examples	Location	Movement	Identify	Status	Activity	Intent	
OOB	<b>SYNTAX LEXICON</b>	STRUCTURED DATA lat/long	EXCHANGE spd/hdg	country / alliance, type/class	Message Sets readiness	targeting, reconiterring	COA	{"Java JS"}
		Machine Trust Language MTL		CDL Contract Description Language				
Infrastructure	Comm, power, transportation, water/sewer	network, grid	throughput, flow rates,	name, part-of relationships	BDA, op levels	repair, hazards	YAML expansion plans	
Sociological	Culture, religion, economic, ethnic, government, history, languages	temples, historic structures	ER Model	Class Diagram	Relational Database	Object DBMS	XML DTD / Schema	TADILs
			Entity	Class	Table	Class	Element	Message
Geophysical	Terrain, weather, climatology, oceanography, astrometry	feature lat/long, alt/dpth	Attribute	Attribute	Field / Column	Attribute	Child Element or Element Attribute	DFI FFIRN / FFN FUDN
			Domain Value	PURCHASE CODES	Instance, Value	<b>FEDERATE</b>		DUI FUD

## Information Elements Roles

- COI Determination Org Interaction
  - Search and Discovery
  - Ontologies STANDARDS
  - Taxonomies REFERENCE
  - Metadata Attributes / Filters

(“Org\_ID”){“URN”}



FILTERS



## FILTERS

## FFUDN: Field Format Unit Designator #

## FIRN Field Format Index Reference #

## Structured military messaging ID's messages, message sets, data element, symbol fields



Firefly-Heartbeat NDN Flash Messages

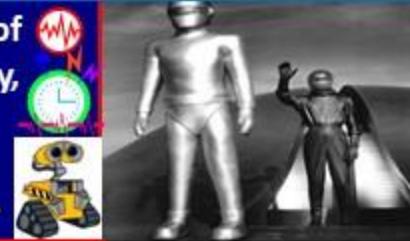
## PROCESS MESSAGE BY PRECEDENCE UNIVERSAL EVENT / ALERT MESSAGE BUS

## OPERATIONAL NODES / ACTIVITIES

DATA SYSTEM FUNCTIONS		PERFORMANCE	
1.4 - 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		2 - Estimate Type	
11.4.1.3 - Value		1.2.1 - Estimated	
	PURCHASE CODES	1.2.2 - Observed	
		1.2.3 - Predicted	
		1.2.4 - Smoothed Data	
SYMBOL	Friend	Neutral	Hostile
2525C	Partner		
11.4.1.3.5 - Surface		Competitor	
11.4.2 - Platform / Point / Fea			2 - Velocity
11.4.3 - Specific Type			1.4.1 - Horizontal
11.4.4 - Type Modifier			1.4.2 - Vertical
11.4.5 - Unit			/A Confidence
			1 - Bearing Angle
			2 - Bearing Angle Rate
			3 - Covariance Matrix



**Signal operating instructions (SOI): technical control coordination of signaling, telemetry Current situational awareness, data dictionary, network identification, channels, network directory, brevity code-words, signals. Units maintain 2 SOI copies: PEACE TIME version "Go-To-War" version = BIZ COA (s) <Org\_ID1><Org\_ID2><Org\_ID3>**



**NATO MESSAGE TEMPLATES USE DATA SETS FOR STRUCTURED DATA EXCHANGE // POSITION FIELD IN MESSAGE PROCESSED BY TABLE, FIELD # IN A CONSISTENT, PREDICTABLE ORDER = AI FRIENDLY M2M AI**

**GOAL: vide a common lexicon / syntax / term library used among FEDERATIONS identified by Federated ID**

**GOAL: Provide a common, consistent, reliable schedule to share signaling and telemetry within federations.**

**MESSAGE TEXT FORMAT :** {"URN":{"URN"}}, {"TRANSACTION ID"}, INDEX REFERENCE #: M015 STATUS : EFFECTIVE: 14-DEC-99  
**vector**  
 SEG RPT OCC CLASSNAME SETID SEQ FIELD OCCURRENCE SET FORMAT NAME  
 O 11NUPRES EXER 1 /M /O // (NU) EXERCISE IDENTIFICATION  
 C 11NUPRES OPER 2 /M /O /O /O // (NU) OPERATION CODEWORD  
 M MIOPV1 1 MSGID 3 /M /M /O /O /O /O // (NU) MESSAGE IDENTIFIER  
 M MIP OUT ORDPLAN 4 /M /O /O /O /O // (NU) PLAN ORDER REFERENCE  
 M // (NU) REFERENCED MESSAGE  
 DATE-TIME GROUP  
 M /M /M /M /C // (NU) ORGANIZATION DESIGNATOR  
 M // (NU) 1.A ENEMY FORCES / COMPETITORS  
 M // (NU) 1.B FRIENDLY FORCES / TRADE FEDERATION  
 M // (NU) 1.C ATTACHMENT / DETACHMENT  
 M // (NU) 1.D COMMANDERS EVALUATION  
 O 11NUPRES GENTEXT 12 /M /M // (NU) 1.E ENVIRONMENTAL INFORMATION  
 M 11NUPRES GENTEXT 13 /M /M // (NU) 2. MISSION K00.99 / FIX / SWIFT / E-911 Heartbeat Message  
 M 11NUPRES GENTEXT 14 /M /M // (NU) 3.A CONCEPT OF OPERATION  
 O 11NUPRES GENTEXT 17 /M /M // (NU) (3) RECONNAISSANCE SURVEILLANCE  
 O 11NUPRES GENTEXT 21 /M /M // (NU) (5) INFORMATION OPERATIONS  
 O 11NUPRES GENTEXT 28 /M /M // (NU) (5) COMMS INFORMATION SYSTEMS  
 O 11NUPRES GENTEXT 35 /M /M // (NU) 3.D COORDINATING INSTRUCTIONS  
 M 11NUPRES GENTEXT 36 /M /M // (NU) 4.A SUPPORT CONCEPT (Logistics)  
 M 11NUPRES GENTEXT 37 /M /M // (NU) 4. MATERIEL AND SERVICES  
 BLOCKCHAIN STANDARIZATION

STOCK EXCHANGE MIC CODES NDN NAMED DATA NETWORKING PRECEDENCE PROCESSING  
**FILTERS** INFOCON 5 4 3 2 1  
 NUMBERS ARE THE UNIVERSAL LANGUAGE / Symbols Rule the World"  

SYMBOLS	Friend	Neutral	Hostile	MEDICAL EVAC & HOSPITALISATION
	Partner		Competitor	- MILITARY OPERATIONS



# Electronic Product Code Information Services (EPCIS)

## GS1 Standard for creating, sharing visibility event data



REGISTERED  
ORGANISATION  
VOCABULARY

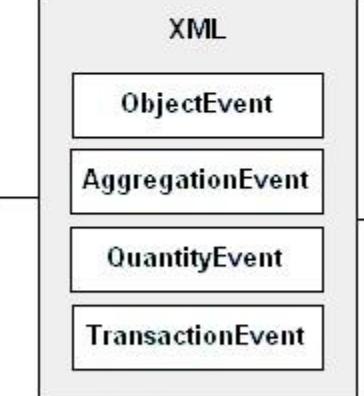
Edge

# epcis

## EPCIS DATA MODEL



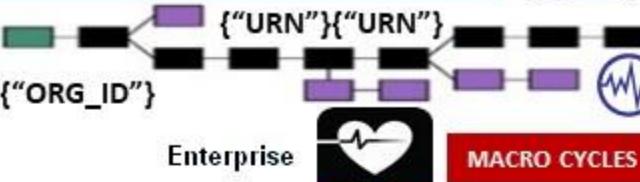
SERVICE LAYER



Core Business Vocabulary (CBV)

- What identifiers of object(s) or entities / subject of the 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

MICRO  
CYCLES



HBC  
SYSTEM OF SYSTEMS  
TIME-SPACE SYNC

$\Delta\delta$



Proximity Wireless Sensor Networks in Combination With RFID ... on reading tag in RF-field the router sends heartbeat message

RFID Configuration TCP/IP heartbeat message

STRUCTURED DATA EXCHANGE /  
STRUCTURED MILITARY MESSAGES

FROM	F002	F004	F006	F008	F010	F012	F014	F016	F018	F020	BATTLEFIELD DIGITIZATION	NET-CENTRIC WARFARE
ARMED	F002	F004	F006	F008	F010	F012	F014	F016	F018	F020	ARMED	ARMED
ARMOR	F002	F004	F006	F008	F010	F012	F014	F016	F018	F020	ARMOR	ARMOR
AFISTON	F002	F004	F006	F008	F010	F012	F014	F016	F018	F020	AFISTON	AFISTON

STRUCTURED MILITARY MESSAGES

BIZ USE CASES

ALPHA NUMERIC BREVITY CODES

SYNTAX LEXICON CODE GUIDE

1st Compiler DESIGN Still the BEST

MESSAGE DATA SETS

TEMPLATES / FORMS

ROLES / RULES ("FILTERS")

NETOPS SOP

ROSETTA STONE

!st Compiler

DESIGN

Still the BEST

MESSAGE

DATA SETS

TEMPLATES /

FORMS

ROLES /

RULES

("FILTERS")

NETOPS SOP

ROSETTA STONE



CLOSER IS CHEAPER

CLOSER IS FASTER

$\Delta\delta$



$\Delta\delta$

# SOFTWARE DEFINED NETWORKING

NETOPS

Command Syntax

REST State Transfer

COMMAND SYNTAX  
STATE TRANSFER  
Unicast / Multicast  
Flow Tables / Workflow

Dynamic Network

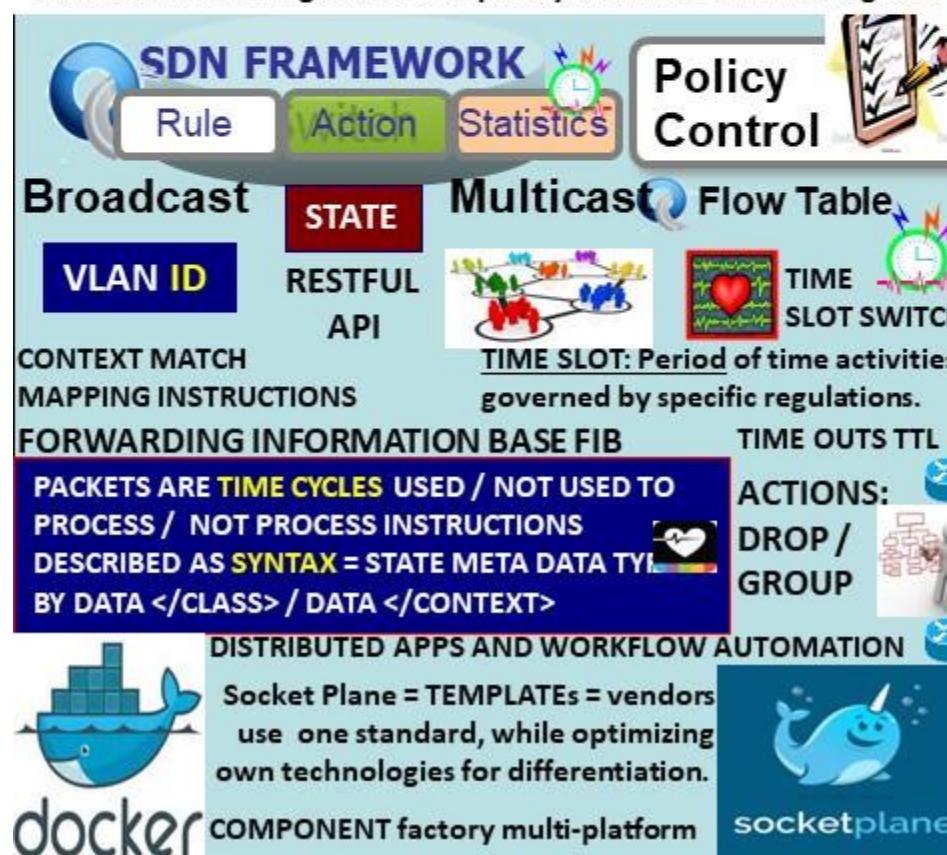
Configuration Management

## NET CENTRIC WARFARE SYSTEM OF SYSTEMS TELEMETRY

COMMON COMPONENTS, BUILDING BLOCKS USED WITHIN FEDERATION PROMOTING COMMON GOALS, PROCESSES

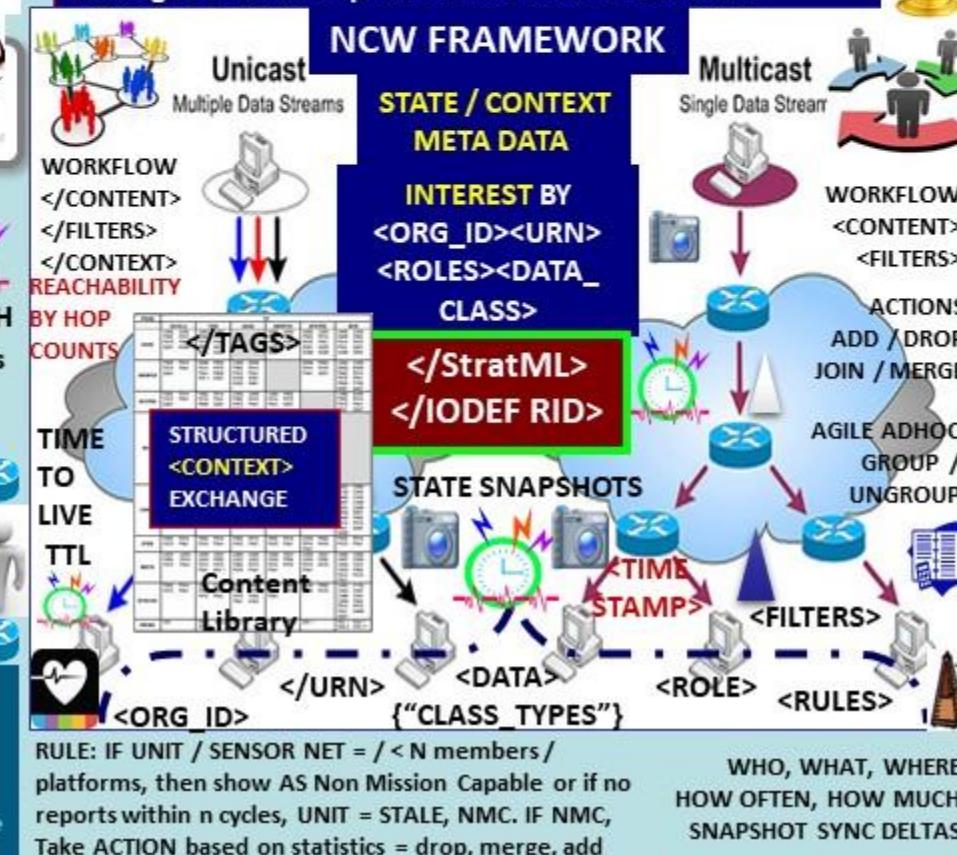
- SDN is a *framework* to allow network administrators to *automatically* and dynamically manage and control a *large number* of network devices, *services*, topology, traffic paths, and packet handling (quality of

**DevOps model** and tools to enable scale, programmable agility, and policy-driven automation, and provides network virtualization to mask network configuration complexity with set of networking APIs



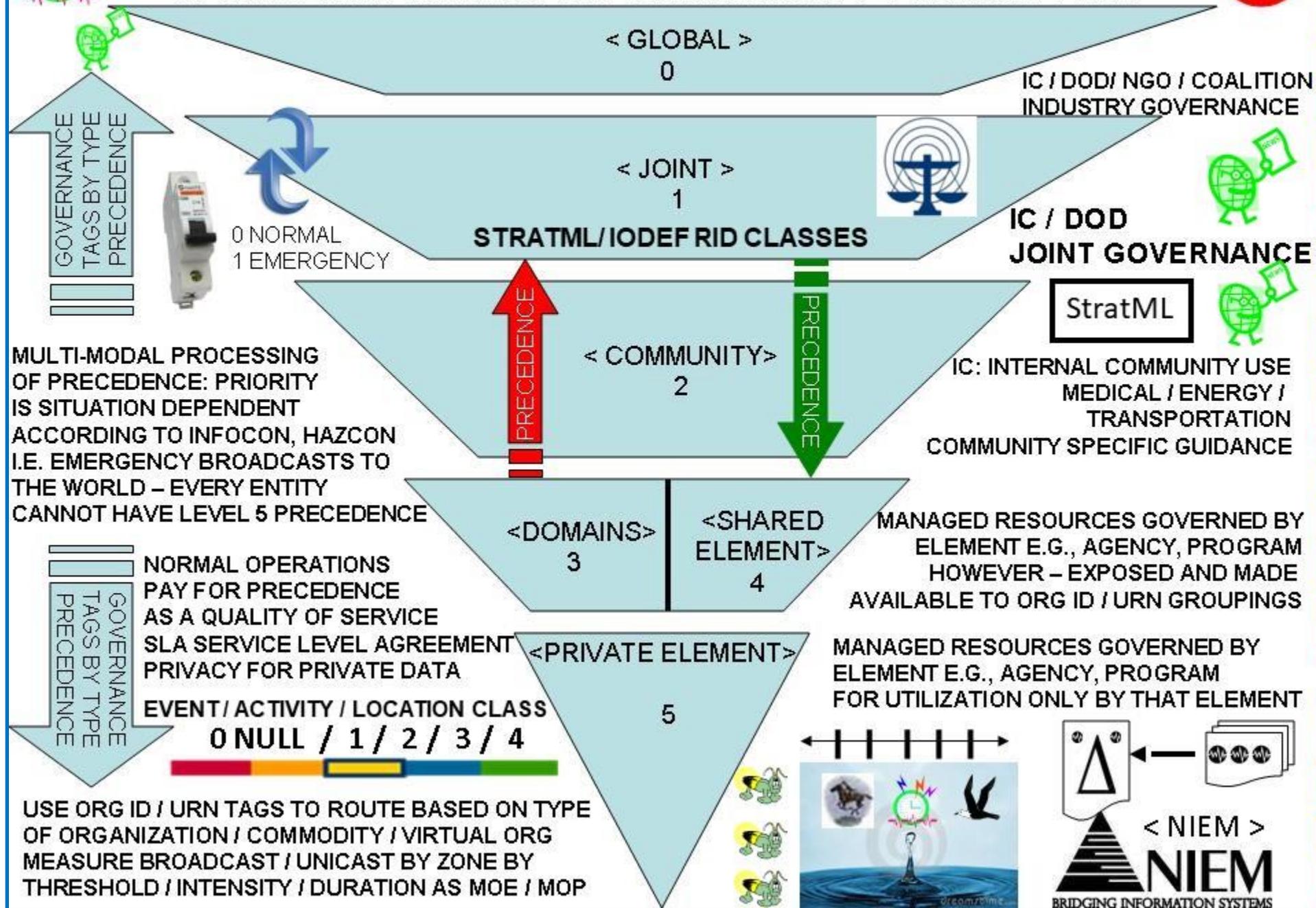
Netcentric / "network-centric" participating in a continuously evolving, complex community of people, devices, information and services interconnected by a network to optimize resource management and provide information on events and conditions.

Net-centric Enterprise Architecture : "massively distributed architecture with components, services available across and throughout an enterprise's entire lines-of-business."





## ENABLE MAPPING OF GOVERNANCE / MANAGEMENT RESOURCES BY PRECEDENCE SHOWN IN GEO-SPATIO INTENSITY DASHBOARD VIEWS



# GEO-SPATIAL TEMPORAL INTENSITY METRICS, METERS, VECTORS

vector

INFOCON / DEFCON ALERT EVENTS INFORM STAKEHOLDERS OF STATUS CHANGE i.e., NORMAL TO ELEVATED, HIGH OR SEVERE. ALERT LEVELS ARE ARBITRARY BUT MUST BE CONSISTENT e.g., 3 OR 5 FOR MACHINE TO MACHINE PROCESSING

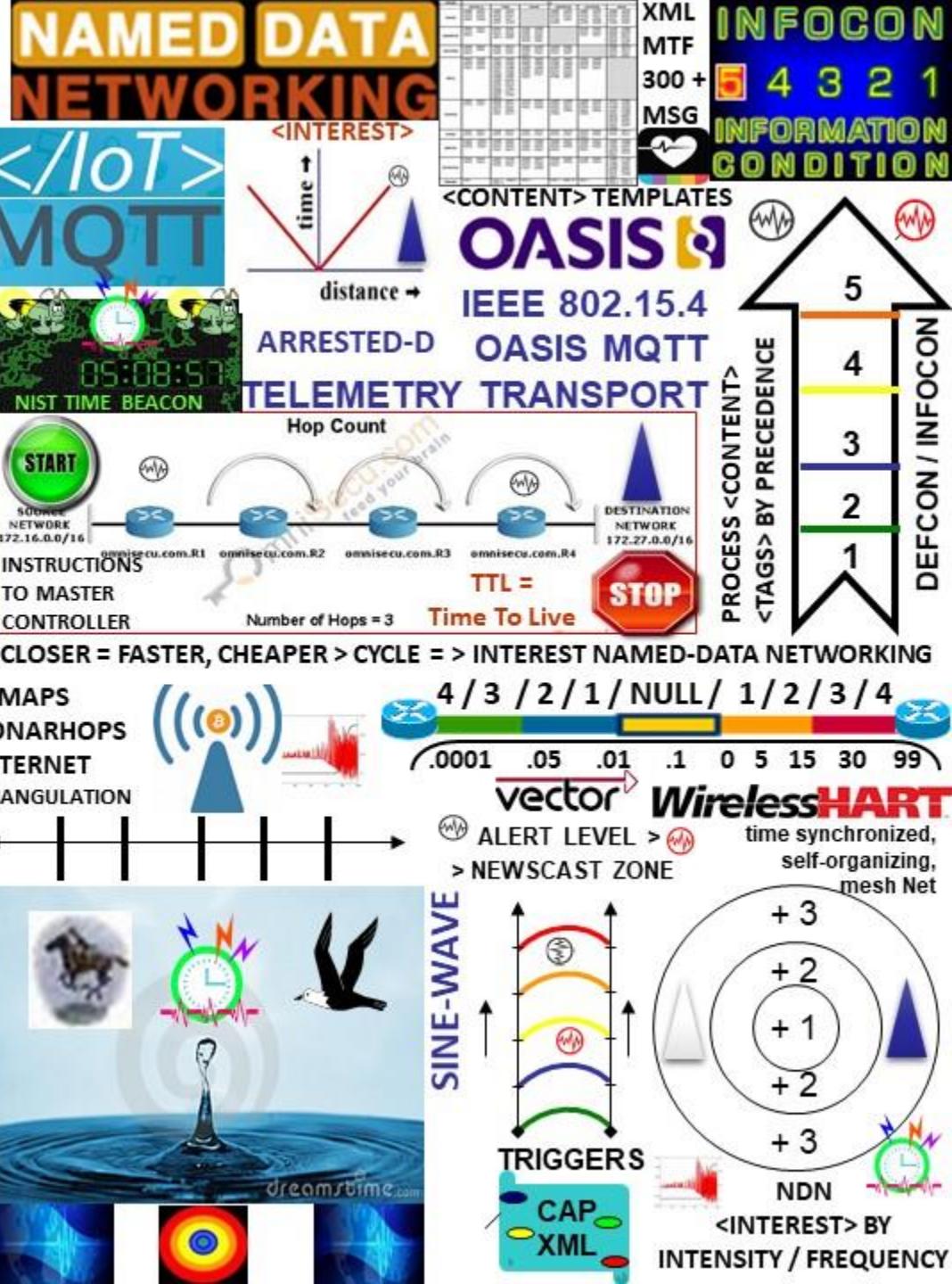
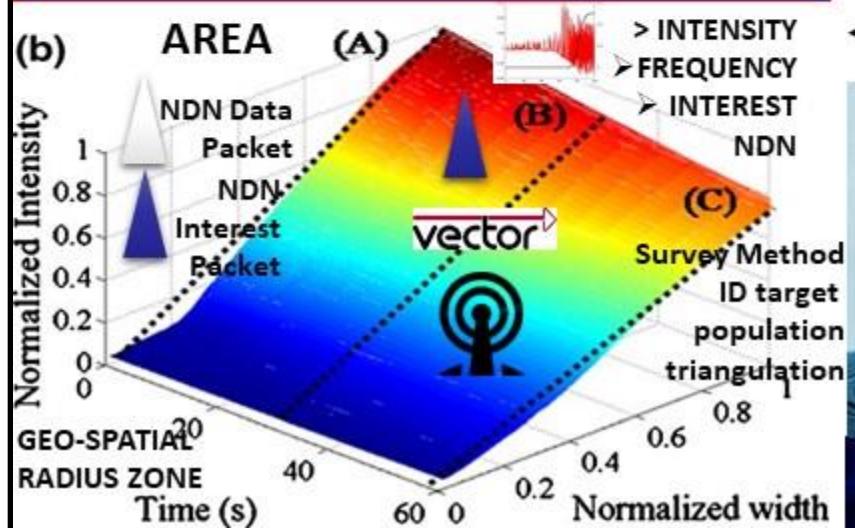
Geo-Spatial Temporal Intensity NOVEL METRICS / METERS:

Paul Revere = linear, sequential



TCP/IP hop by hop counts, by hop controls

Water Drop = AREA / INTENSITY Cyclic Frequency



# Situational Awareness Reference Architecture (SARA)

: Identity, Inventory, Activity, and Sharing <http://ics-isac.org/sara/>



ICS-ISAC



**IDENTITY:** <UUID> = Devices, sensors  
Federation  
Gateway

<ORG\_ID> Organizations

<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

**INVENTORY:** Uniform Resource Name <URN>

<URN><URN>  
<URN><URN>  
<URN><URN>



<COMMODITY><WATER><ENERGY><AVAILABLE UNITS>

GEO-SPATIAL TEMPORAL INTENSITY METRICS

UNIFIED EVENT / ALERT TRIGGER / THRESHOLDS

GEO-SPATIAL TEMPORAL  
INTENSITY METRICS / METERS



**ACTIVITY:** <EVENT><ALERT> <TIME\_STAMP><ORG\_ID><URN>

CONTENT LEXICON  
ROSETTA STONE

NDN

<GEO\_LOC\_GPS><STATUS>  
<Halt><Moving><Stale><Ready>

AVALANCHE

**SHARING:**

COMMON <TAGS>  
<Organizational\_ID>  
Resource Names <URN>  
<Time\_Stamps>  
<State-Meta\_Data>  
<DATA\_CLASS\_TYPE>  
<Heartbeat\_snapshots>



WELCOME TO THE FS-ISAC SECURITY AUTOMATION GROUP. OUR VISION IS  
A FEDERATED NETWORK OF STIX-BASED REPOSITORIES SHARING INTELLIGENCE IN  
REAL-TIME. AVALANCHE: STRENGTH IN NUMBERS, SECURELY SHARE INTELLIGENCE

NIST CYBER SECURITY FRAMEWORK

CYBER SECURITY CONTENT  
LEXICON ROSETTA STONE

MIL-STD  
2525A

STRUCTURED  
<CONTENT>  
TEMPLATES

<TAG>  
LIBRARY

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



NAMED DATA  
NETWORKING  
<Content> Centric



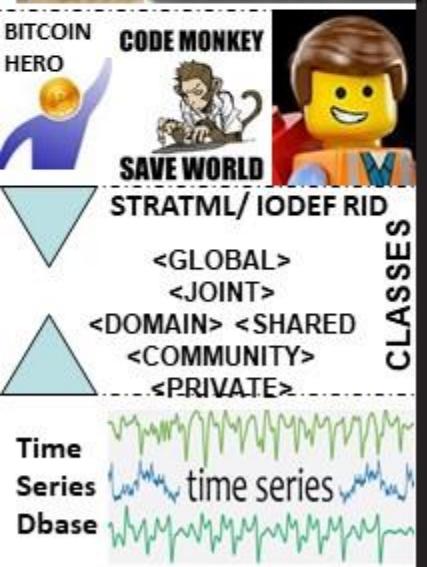
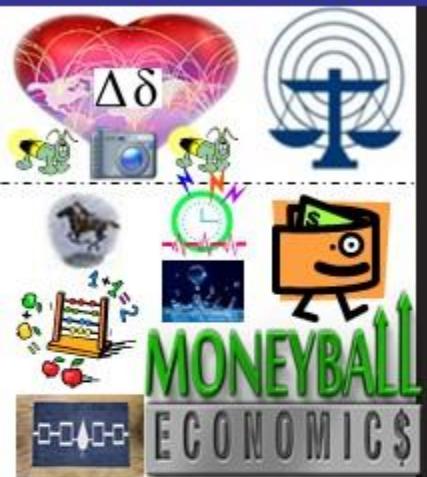
# How 'Bitbanks' Could Solve Bitcoin's Volatility Problem

## 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



**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.



## HOW GAMIFICATION WORKS:

### 5 COMMON MECHANICS

#### POINTS



Measure a user's achievements in relation to others

Can double as currency to exchange for rewards

#### BADGES



Reward achievements visually

#### LEVELS



Encourage users to progress and unlock new rewards

#### LEADERBOARDS



Organise players by rank

#### CHALLENGES

Encourage engagement by offering specific tasks to complete

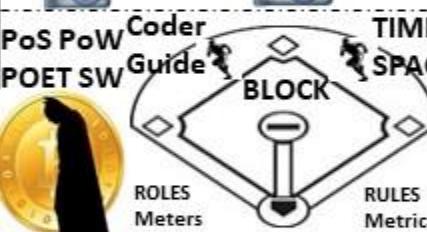
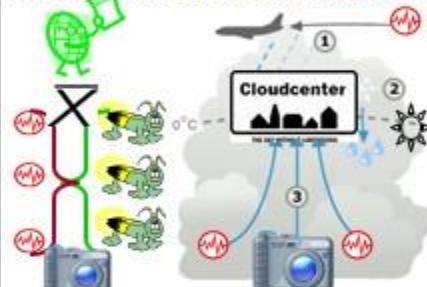
### 4 MAIN WAYS TO DRIVE ENGAGEMENT

#### ACCELERATED FEEDBACK CYCLES

#### CLEAR GOALS AND RULES OF PLAY

#### A COMPELLING NARRATIVE

#### CHALLENGING BUT ACHIEVABLE TASKS





## PROOF-OF-WORK



THE PROBABILITY OF MINING A BLOCK IS DEPENDENT ON HOW MUCH WORK IS DONE BY THE MINER



TIMESTAMP marks the point that work started. Additionally, it contributes to the uniqueness of the work by an individual miner

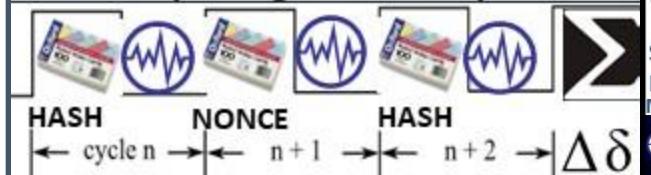


THROTTLE equivalent to difficulty. State •target = maximum value of 8 bytes Snap (2^64) divided by the difficulty.

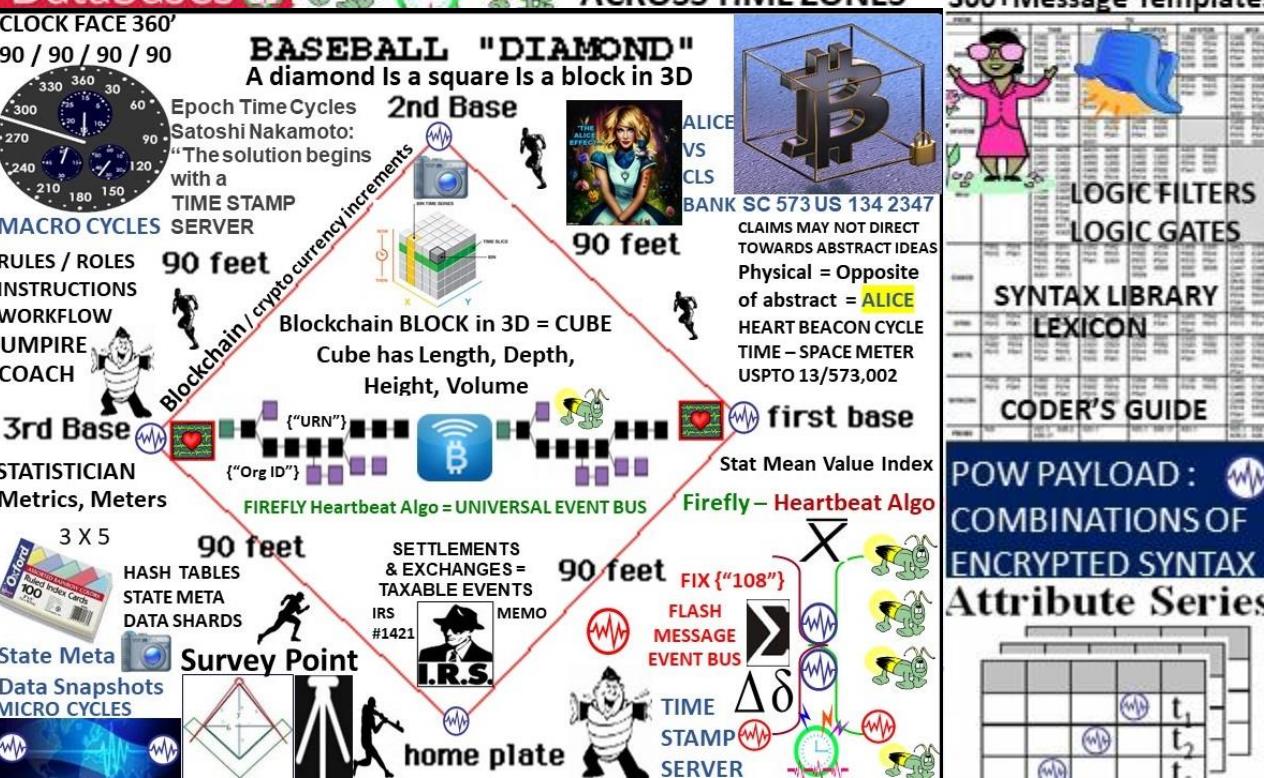
NONCE increments from 0..N until the target is met.



GUESS stores the guess  
Effectively, it begins at infinity.



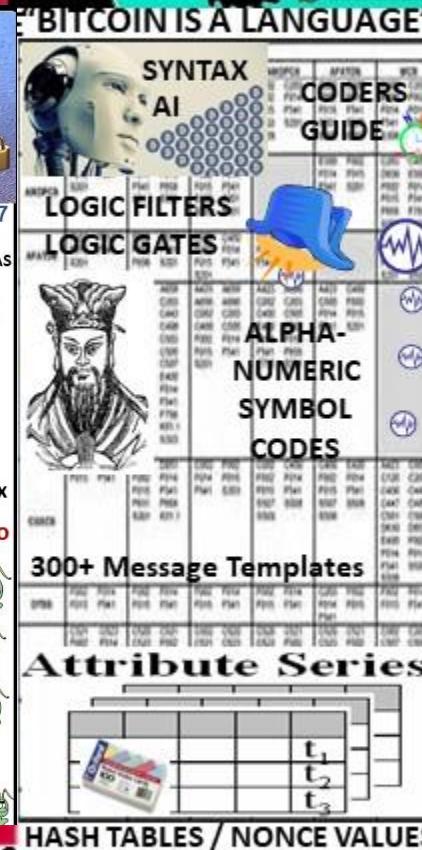
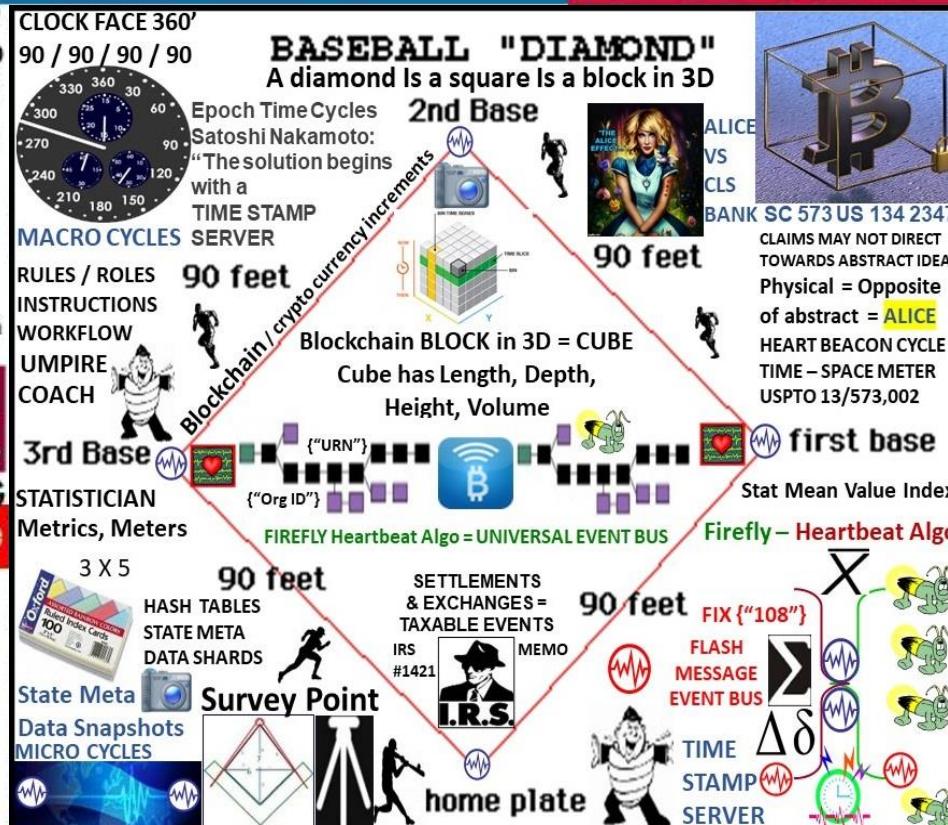
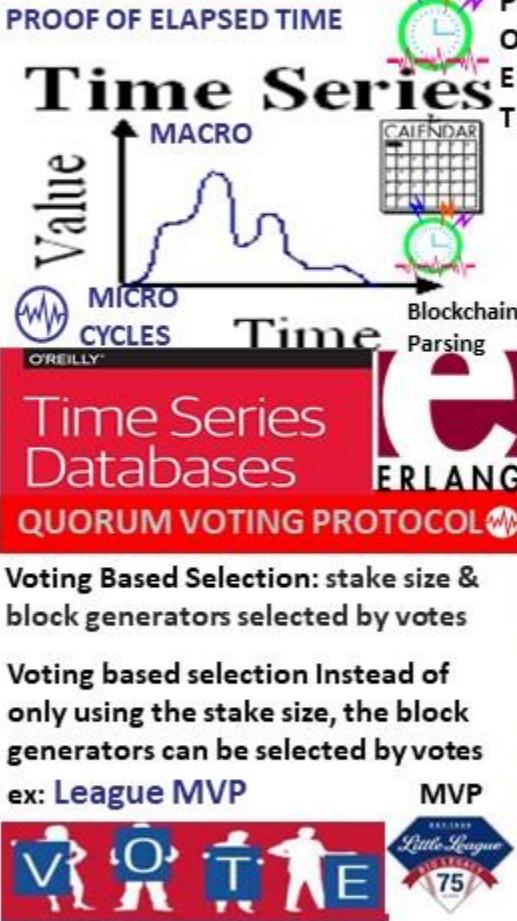
**Proof-of-Work:** users perform some form of work to participate. Work must be difficult for the client but easy for the server/network to verify. POW determines the approximate time between blocks = rate that new bitcoins are created. Work is submitted as a message/timestamp payload with a nonce value. Payloads are made unique through use of public key encryption or address. Nonce allows checking the work without retracing all the procedural steps.





# SAWTOOTH LAKE POETIC CONSENSUS PROOF OF ELAPSED TIME: POET

"PoET for 'Proof of Elapsed Time', is a lottery protocol that builds on trusted execution environments (TEEs) provided by Intel's [Secure Guard Extensions] to address the needs of large populations of participants. The second, Quorum Voting, is an adaptation of the Ripple and Stellar consensus protocols and serves to address the needs of applications that require immediate transaction finality."



Capture ledger's state  $\Delta\delta$   
Transaction language  
changes ledger state  
Consensus, transaction acceptance protocol

**STATE:** stored data at a given instant in time

**STATE CHANNELS:** blockchain interactions

which could occur on the blockchain, but instead get conducted off of the blockchain, without significantly increasing the risk of any participant.

1. Part of the blockchain state is locked via multisignature or smart contract convention, so that a specific set of participants must completely agree with each other to update it.

2. Participants update the state amongst themselves by constructing and signing transactions that could be submitted to the blockchain, but instead are merely held onto for now. Each new update "trumps" previous updates.

3. Finally, participants submit the state back to the blockchain, which closes the state channel and unlocks the state again (usually a different configuration than it started with)



**NEW UPDATES OVERWRITE THE PREVIOUS:** simplest way is to have any unlocking attempt start a timer, during which any newer update can replace the old update (restarting the timer). When the timer completes, the channel is closed and the state adjusted to reflect the last update received. The length of the timer would be chosen for each state channel, balancing the inconvenience of a long channel closing time with the increased safety it would provide against internet connection or blockchain problems. Alternatively, one could structure channel with a financial penalty so anyone publishing an inaccurate update to the blockchain will lose more than gain by pretending later transactions didn't happen.



# TWAP Algorithm Manages Bitcoin Price Volatility Algorithm

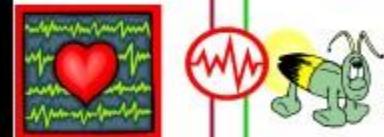
**TWAP GOAL:** provide a Time Weighted Average Price Benchmark



FIREFLY HEARTBEAT ALGO  
STAT MEAN VALUE INDEX



STATE META  
DATA SNAPSHOTS



**TWAP Works To gauge trading performance, many traders in different asset classes (equity, fixed income, currency) often use average price as a benchmark. The two common ways to calculate an average are a time-weighted average price (TWAP) and a volume-weighted average price (VWAP). TWAP is the average price of a bitcoin over the course of a specified period of time i.e., Heart Beacon Cycle**

The algorithm trades over a desired time, either 1, 6, 12 or 24 hours and will give you a TWAP over that time period. For example, set the TWAP algorithm to sell 12 bitcoins over 12 hours, the algorithm will sell throughout the period, aiming to get a 12-hour TWAP

VWAP is price multiplied by number of bitcoins traded, then divided by the total number of bitcoins traded during a time period. The time-weighted average price algorithm is matched to closest HB

Firefly Heartbeat Sync nodes strive to sync in a distributed system. Nodes emit periodic "heartbeat" events at approximately the same time. There is no need to sync during a cycle as long as the cycle length is bounded & nodes eventually agree. HBC's improvement is stipulating a clock cycle value e.g., 5, 10, 15..

# What happens if we think about Bitcoin through the lens of *land*?

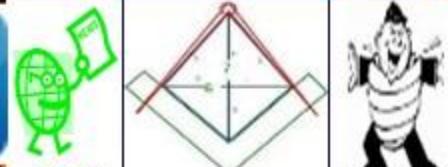
SC ALICE CORP VS CLS BANK: "claims may not direct towards abstract ideas"

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.



Memo #1421: Purchased Bitcoins are treated akin to property

Plots A, B, C represent 3 unspent transaction outputs controlling N Bitcoins



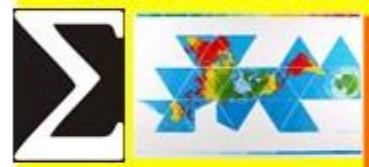
TRIANGULATION



EUCLIDIAN GEOMETRY



Mined Bitcoins



$\Delta\delta$

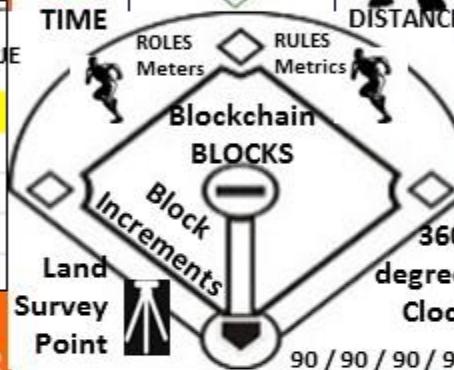
Unmined Bitcoins



Un-mined coins – think of them as parcels of land on "Bitcoin Island" not yet released:



IDMaps-SONARHOPS distance estimation query-reply service



- End-state Bitcoin quantity will be fixed like land

"Bitcoin as protocol of ownership, not transfer"

Coins never travel, but simply switch owners"



HEART BEACON CYCLE

USPTO 13/573,002

SURVEY METHODS

IDMaps assists Network Time Protocol (NTP) servers establish long term peering relationships



IDMaps / SonarHops collects distance data & builds virtual Internet distance maps & estimates distance between IP address pairs



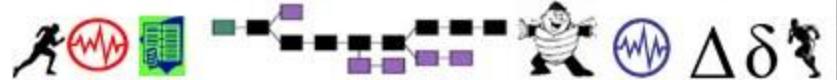
IDMaps Distance Metrics:  
latency (round-trip delay)  
available bandwidth estimation

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





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 might change over time. Network Economies: Economic System as Configurable Parameters

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.



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.

## Autonomous Device Coordination Framework



Registration

Authentication

Proximity based rules

Consensus based rules

## FEDERATION AGREEMENTS

Contracts

## PROCEDURAL TEMPLATE

Checklists

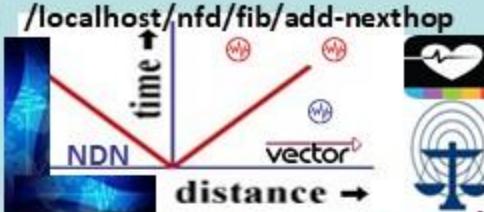
## FEDERATION

<UUID><ORG\_ID><URN>  
LDAP DIRECTORYPhysical proximity  
Social proximity  
Temporal proximity

Agreements

Payments

Barter



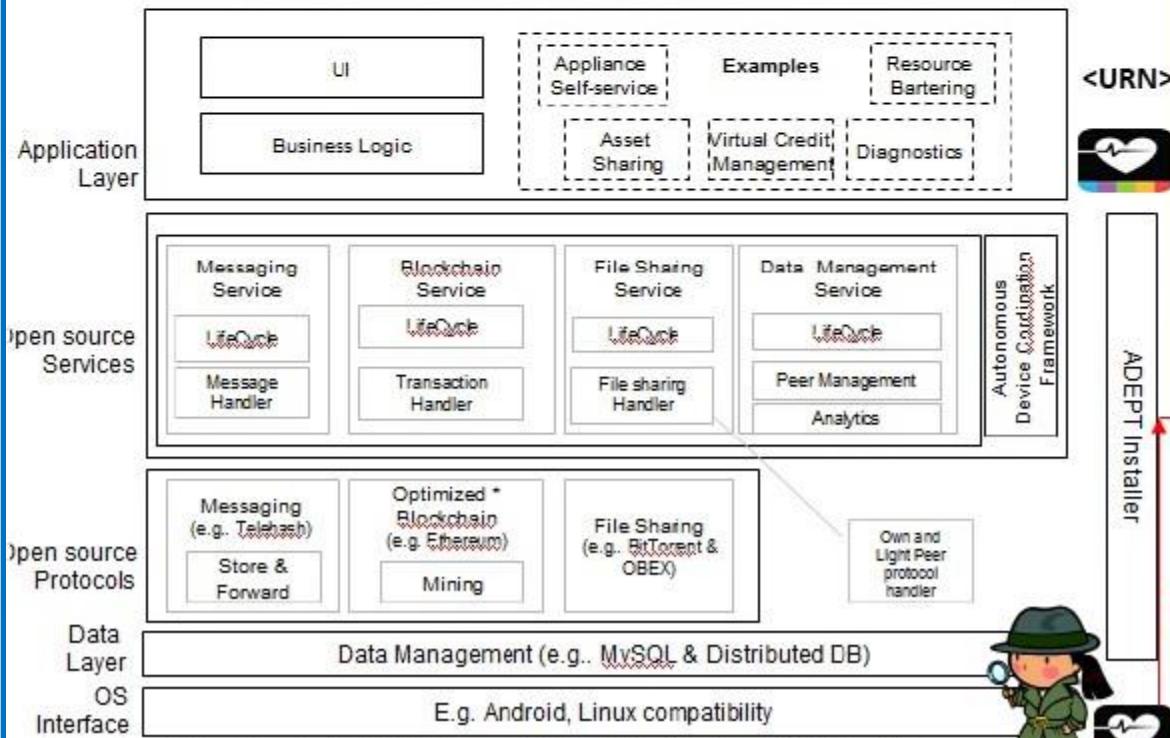
PAYMENTS BASED ON GEO-SPATIAL TEMPORAL METRICS / METERS  
<URN> DESCRIBES COMMODITIES ETC BY UNIFORM RESOURCE NAME BY </INTEREST>



ASSET SHARING WITHIN FEDERATION

BUSINESS LOGIC = WORKFLOW &lt;XML\_Wf&gt;

## ADEPT Standard Peer Architecture – Logical View



\* Could be optimized to hold the complete blockchain. Function of ADEPT Installer



FILE SHARING = CYCLIC SYNC DELTA LEDGER / DOCUMENT REFRESH



OPEN SOURCE = HBC = PROTOCOL AGNOSTIC

DATA LAYER: STATE META DATA TIME STAMPED BY <UUID><ORG\_ID><URN> & DATA PREPPED & "DATA WRANGLING PRIOR TO FUSION CENTER ENHANCED ANALYTICS / PROTECTS BANDWIDTH"

**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



## NIST QUANTUM ENCRYPTION RANDOMIZATION BEACON

UNPREDICTABLE SAMPLING

SECURE AUTHENTICATION

SECURE MULTI

PARTY /

AUTHENTICATION

Entropy

Entanglement

Source

RANDOM  
NUMBER  
GENERATOR

Bell  
Test

NIST time

Crypto-hardening

& Time stamp

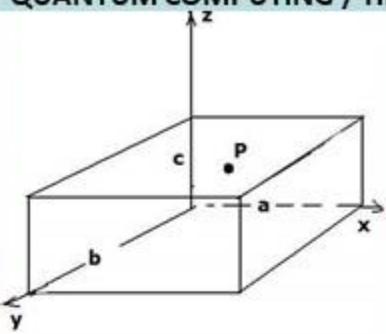
Entropy

PBR Data

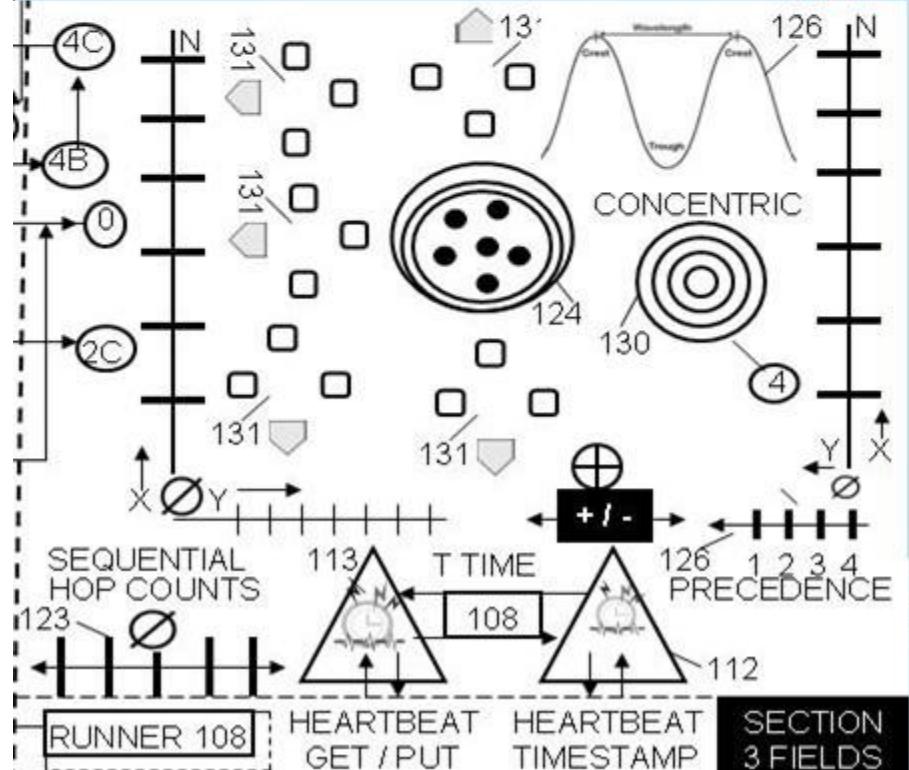
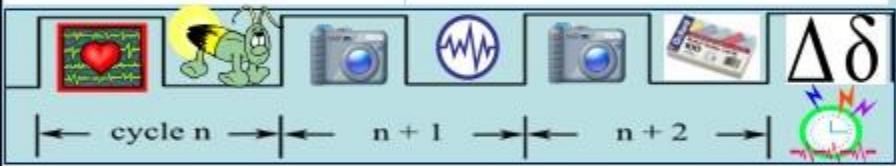
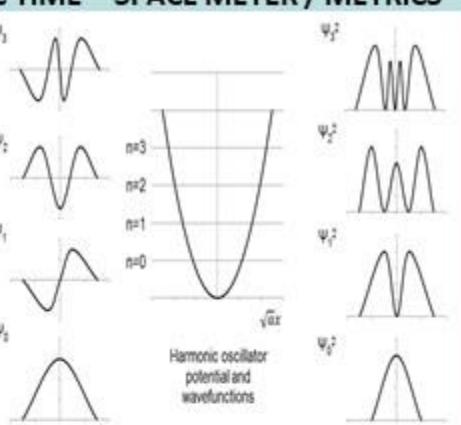
Analysis

Entropy

## QUANTUM COMPUTING / HBC TIME – SPACE METER / METRICS



A particle 'P' in a 3-dimensional box, representing a simple quantum mechanical system.



#QuantumComputing USct Alice Corp Vs CLS Bank compliant memes:  
In quantum computing, a qubit (or quantum bit (sometimes qbit) is a unit of quantum information—the quantum analogue of the classical binary bit. A qubit is a two-state quantum-mechanical system, such as the polarization of a single photon: the two states are vertical polarization and horizontal polarization. In a classical system, a bit has be in one state or the other. Quantum mechanics allows a qubit to be in a superposition of both states at the same time, a fundamental quantum computing property

US Sct Alice Corp Vs CLS Bank Physical memes

Linear sequential "Paul Revere" meme = horizontal polarization

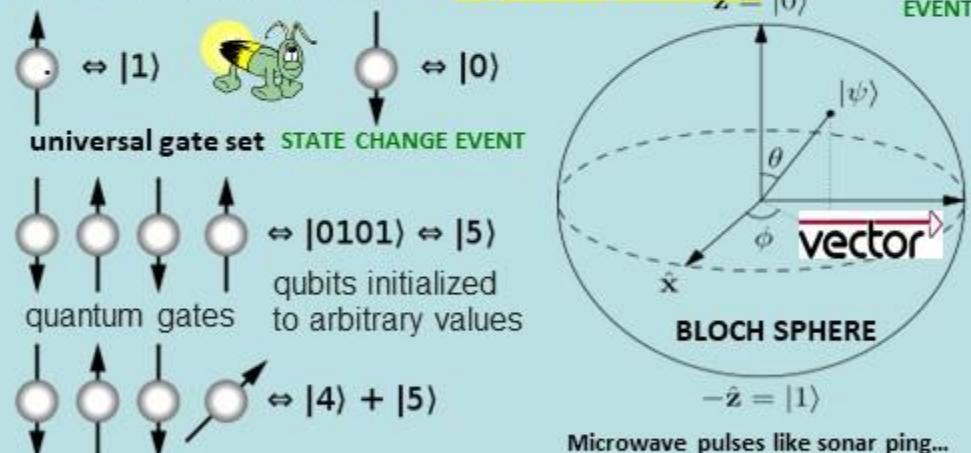
Vertical polarization vectors from a known point 0 null Sonar Hop meme



particle representation / samples



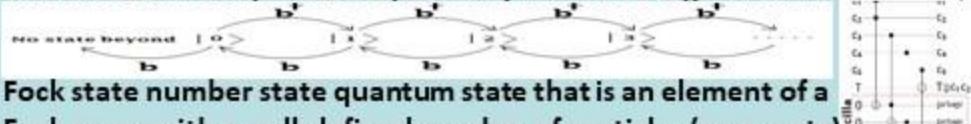
Instead of each bit having two potential states — on or off — a quantum bit or qubit has three. It can be on, off, or both, and you only know which one it is once you look at it. How can you tell if a bit of data is correct if looking at it might change its state?



Microwave pulses like sonar ping...  
qubits can be in a superposition of all the clasically allowed states

$$|00\rangle = \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \end{bmatrix}, |01\rangle = \begin{bmatrix} 0 \\ 1 \\ 0 \\ 0 \end{bmatrix}, |11\rangle = \begin{bmatrix} 0 \\ 0 \\ 0 \\ 1 \end{bmatrix}$$

silicon device movement is controlled through use of microwave pulses. As an electron spins up, a binary value of 1 is generated, when the electron spins down, a binary value of 0 is generated.



Fock state number state quantum state that is an element of a Fock space with a well-defined number of particles (or quanta)



