

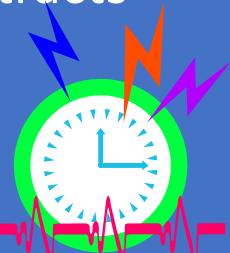
- Economic Framework systemic incentives:



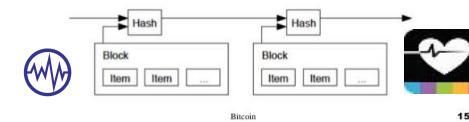
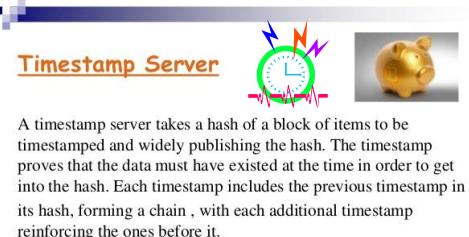
- DARPA / NATO System of Systems framework based
  - Syntax lexicon library with 300 + use cases, thousands of message sets
  - Syntax alpha-numeric brevity OPSCODES are mapped to symbol sets (A.I.)
  - NATO bases are cities transact everything described by Host Nation Agreements easily converted to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



## Genesis Block

**The first block of a blockchain**

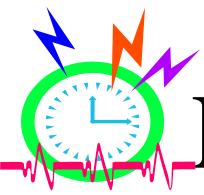
### GENESIS BLOCK

BLOCK 0	BLOCK 1	BLOCK 2
Proof of work 00000009573vvv Previous block 00000006ee733 Transaction Id54fhx Transaction Id54fhx Transaction Id54fhx	Proof of work 00000006ee733 Previous block 00000009573vvv Transaction Id54fhx Transaction Id54fhx Transaction Id54fhx	Proof of work 00000006ee733 Previous block 00000006ee733 Transaction Id54fhx Transaction Id54fhx Transaction Id54fhx
No data on previous block transaction because there was no previous block		

The Genesis Block is the ancestor to every block in the blockchain.

The first ever Genesis Block, from the Bitcoin blockchain, was mined in 2009.

XBRL / CDL / DAML	STRUCTURED DATA EXCHANGE	LOGIC / FILTERS
STOCK MIC CODES	TEMPLATE FORMS	300+ USE CASES
SYNTACTIC INTEGRITY	SYNTAX / SYMBOL LEXICON LIBRARY	



# Epoch Time Cycles / Syntax

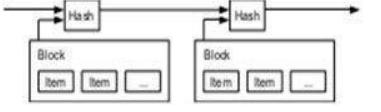


Internet / Internet of Money building blocks

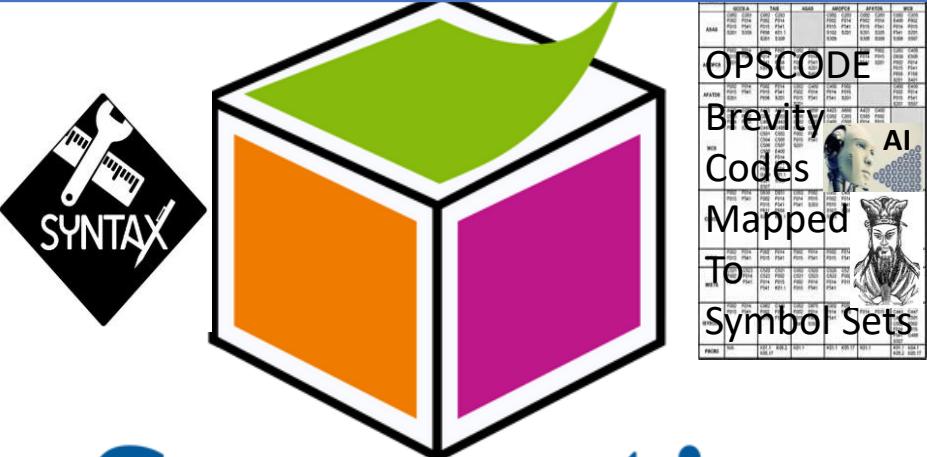
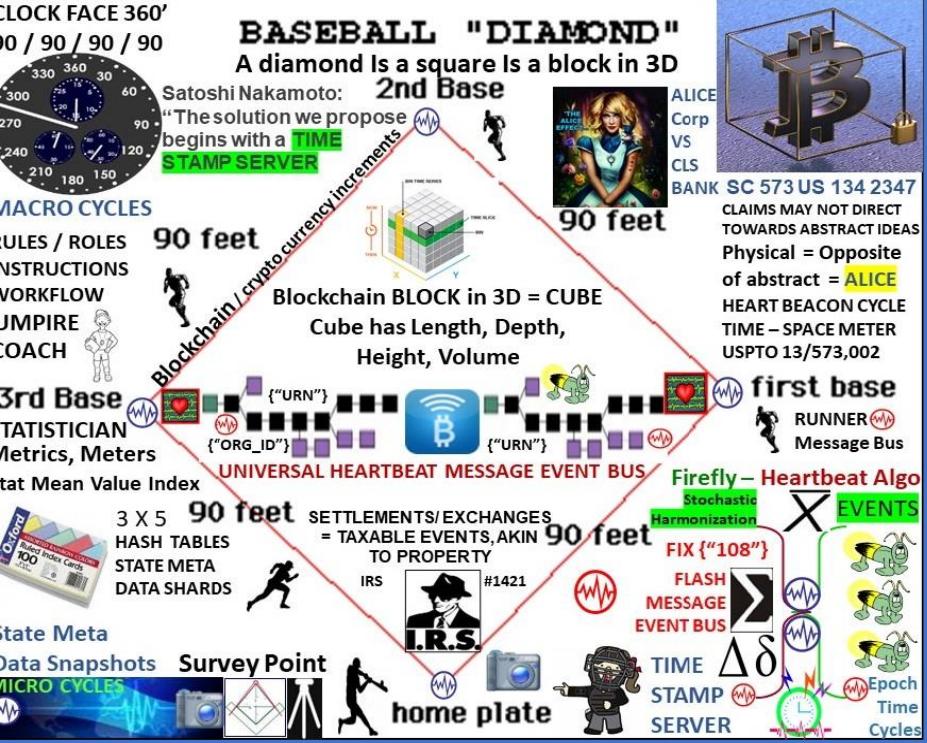
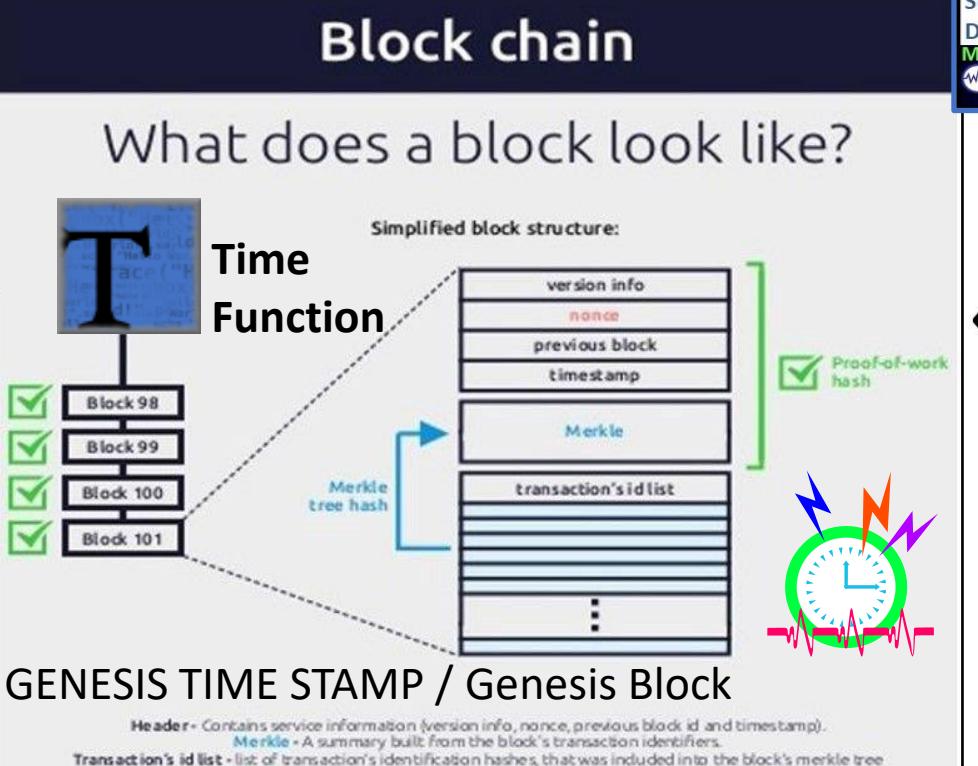
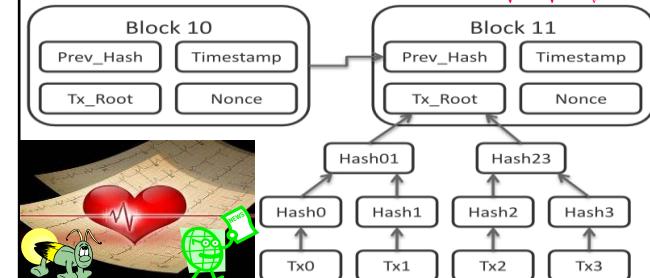


### 3. Timestamp Server

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

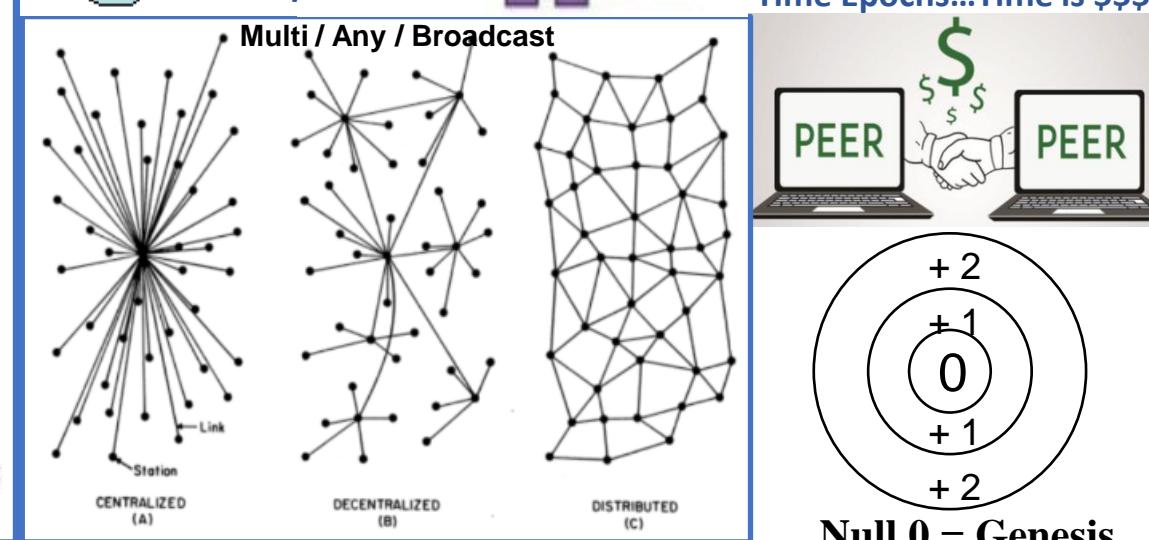
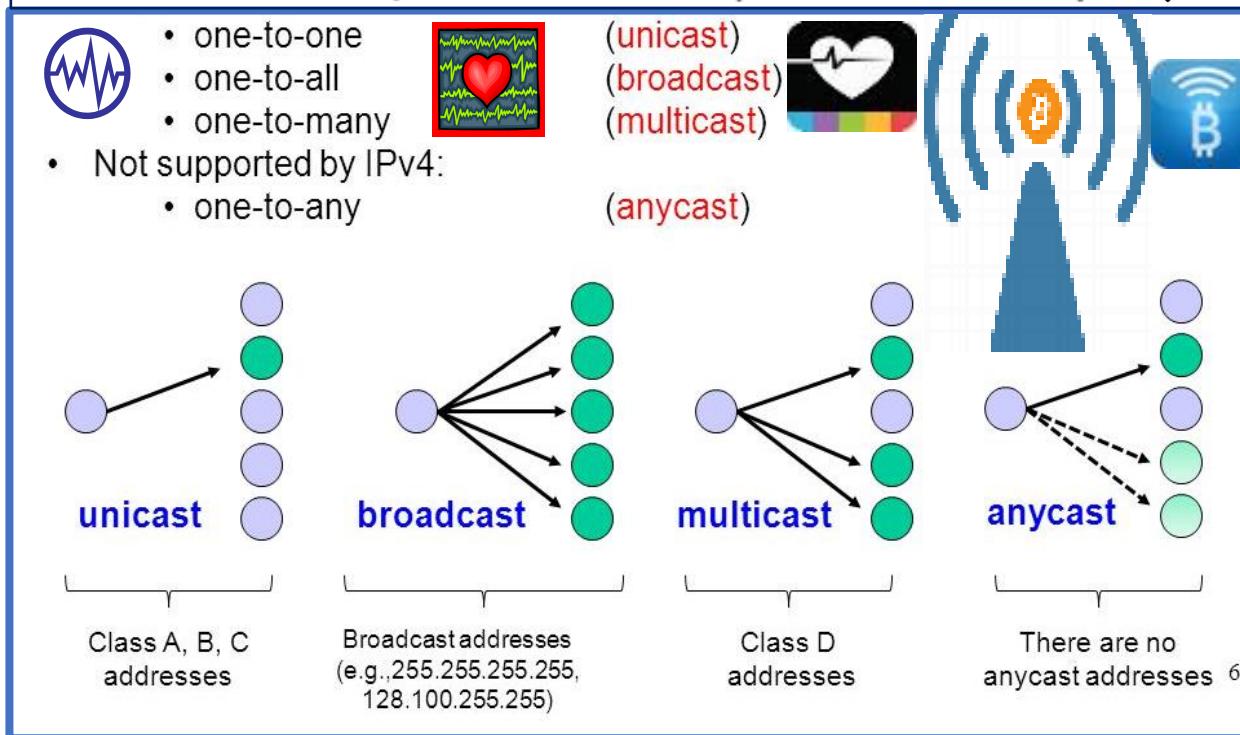
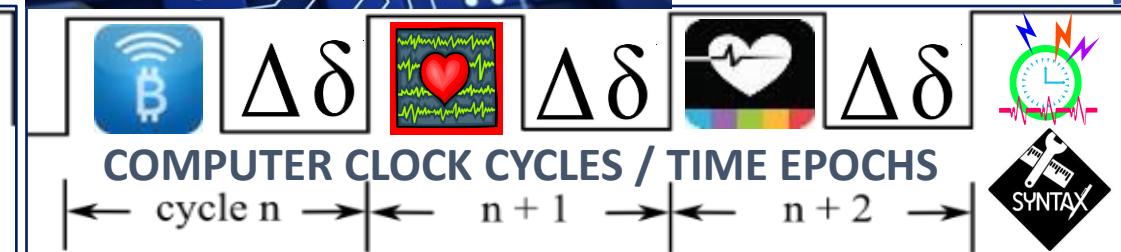
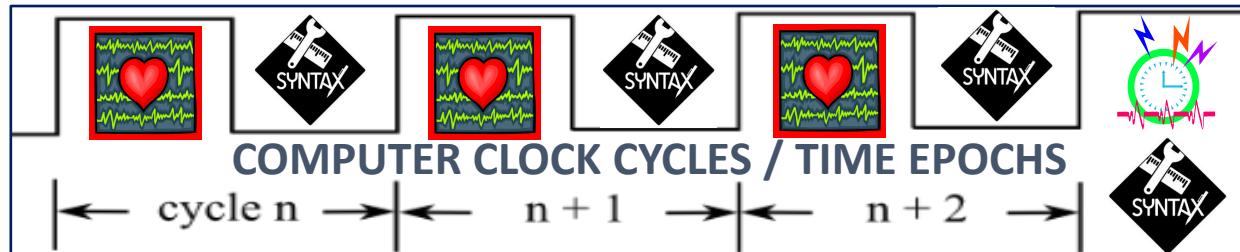


# Time Epochs / Syntax:



Crypto Currency  
Programmable  
Blockchain Money

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



Null 0 = Genesis  
Time Epoch



- FILTERS  
- Workflow

Sync  
Deltas  
 $\Delta\delta$



All things internet, programmable net of money are formed using:  
1) Epoch Time Cycles to 2) process (not) syntax as instructions

# 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

XBRL / CDL / DAML
STRUCTURED DATA EXCHANGE TEMPLATE FORMS
300+ USE CASES
LOGIC / FILTERS
SYNTAX / SYMBOL LEXICON LIBRARY



LEXICON Library



SYMBOLS ARE THE UNIVERSAL LANGUAGE

Alpha Numeric Brevity Codes

Coder Guide Rosetta Stone



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



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: 2nd Base

"The solution we propose begins with a TIME STAMP SERVER

90 feet

Blockchain / crypto currency increments

Blockchain BLOCK in 3D = CUBE

Cube has Length, Depth,

Height, Volume

SETTLEMENTS / EXCHANGES

= TAXABLE EVENTS AKN TO PROPERTY

IRS #1421

TIME STAMP SERVER

FLASH MESSAGE EVENT BUS

FIX {"108"}

TIME STAMP SERVER

90 feet



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

Firefly – Heartbeat Algo

X EVENTS

SETTLEMENTS / EXCHANGES

= TAXABLE EVENTS AKN TO PROPERTY

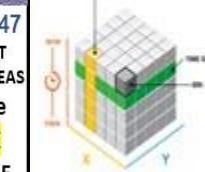
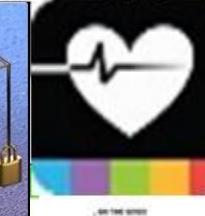
IRS #1421

TIME STAMP SERVER

FLASH MESSAGE EVENT BUS

FIX {"108"}

TIME STAMP SERVER



CLOCK FACE 360'  
90 / 90 / 90 / 90



MACRO CYCLES

RULES / ROLES

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3 X 5

HASH TABLES

STATE META

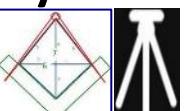
DATA SHARDS

State Meta

Data Snapshots

Survey Point

MICRO CYCLES



# BASEBALL "DIAMOND"

## A diamond Is a square Is a block in 3D

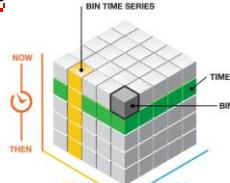
### 2nd Base

Satoshi Nakamoto:  
"The solution we propose  
begins with a **TIME  
STAMP SERVER**"

90 feet



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



90 feet



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



UNIVERSAL HEARTBEAT MESSAGE EVENT BUS

90 feet



SETTLEMENTS / EXCHANGES  
= TAXABLE EVENTS  
AKIN TO PROPERTY



#1421



90 feet



home plate

Firefly – Heartbeat Algo

Stochastic  
Harmonization

FIX {"108"}

FLASH

MESSAGE

EVENT BUS



TIME

STAMP

SERVER



EVENTS

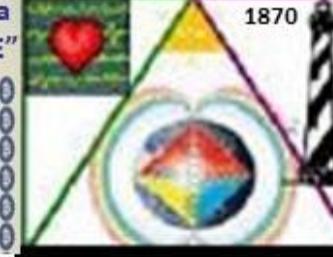


Epoch

Time

Cycles

# 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

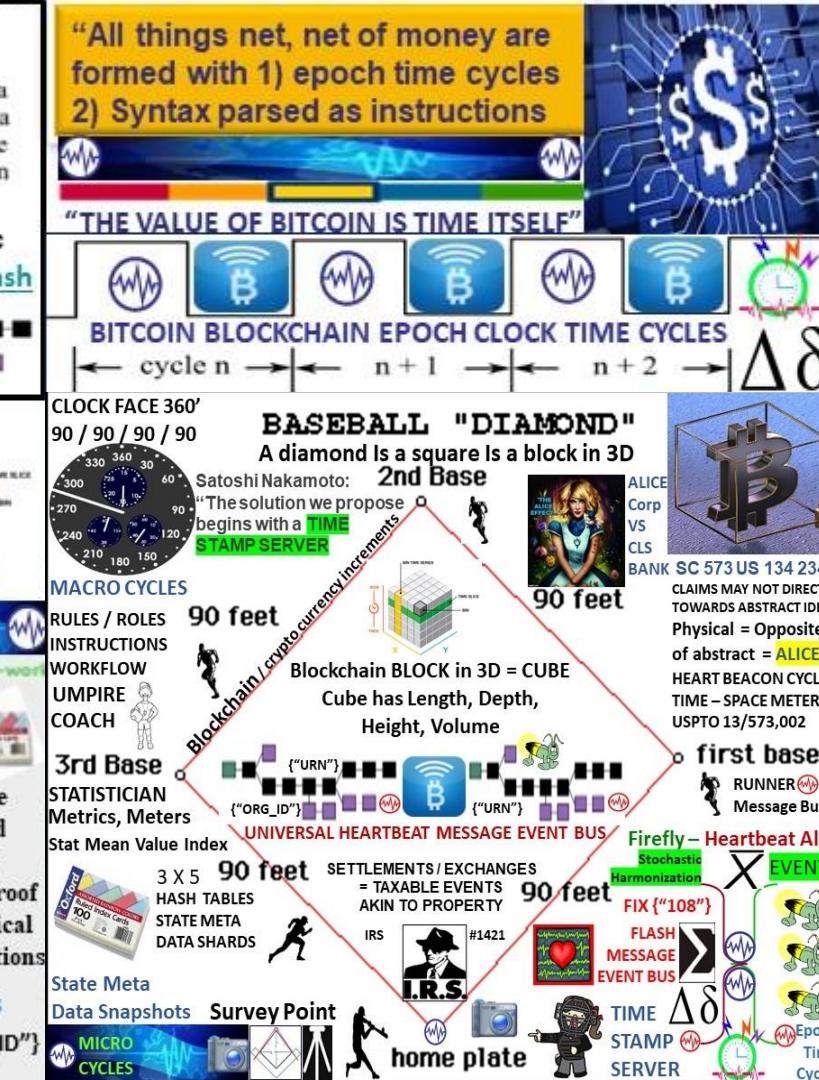
Satoshi Nakamoto

Craig WRIGHT  
a.k.a.

THE VALUE OF  
BITCOIN IS  
TIME ITSELF

Wright Brother's 1<sup>st</sup> Flight  
Cape Hatteras Outer Banks

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



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



USPTO 13/573,002  
HEART BEACON CYCLE  
TIME – SPACE METER



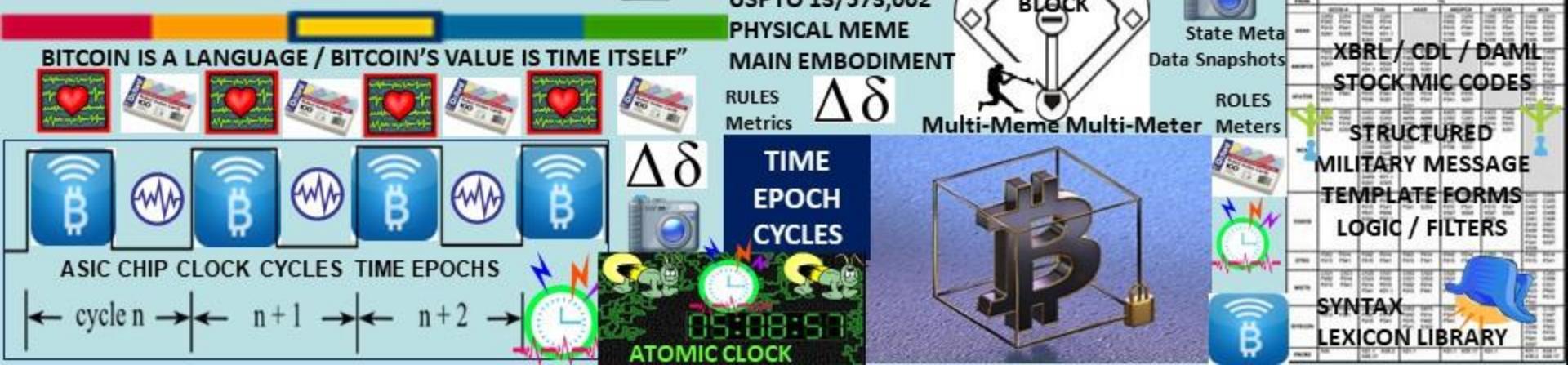
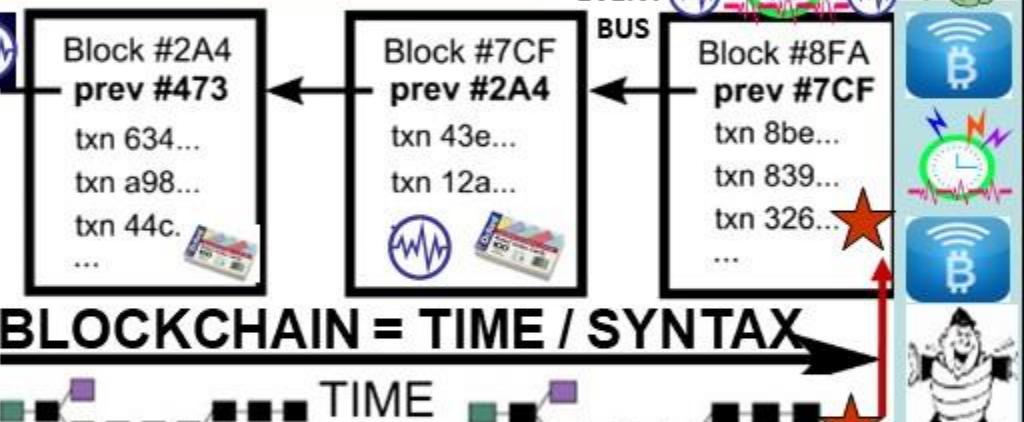
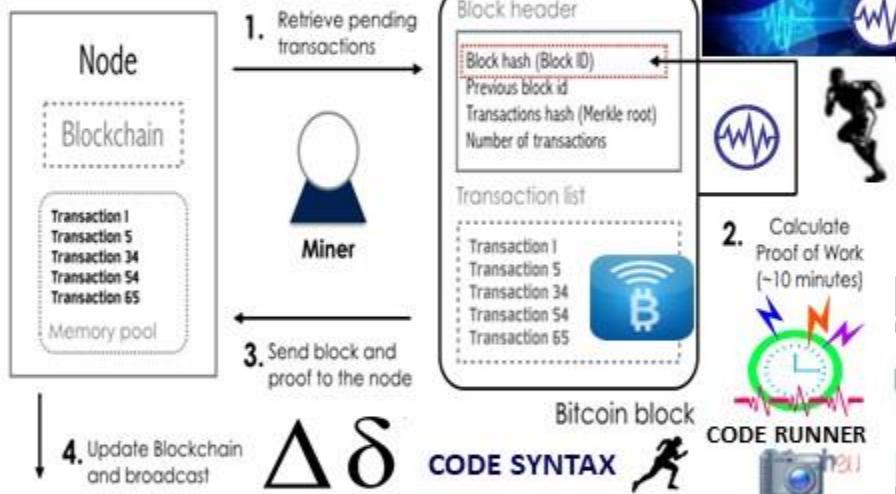
"Bitcoin is a Language"

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.

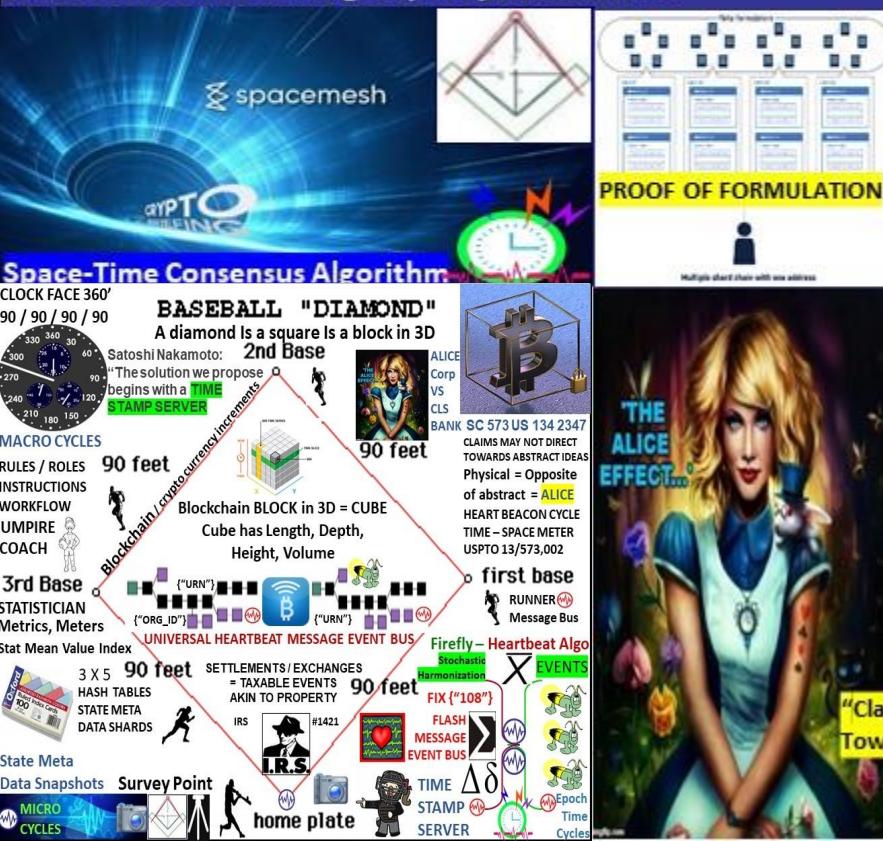


Q: What US Supreme Court Alice compliant (physical = opposite of abstract) meme describes the myriad #blockchain #consensus #algorithms the most comprehensively that uses an algorithm (based on nature) enabling distributed system of systems geo-spatial, UTZ Universal Time Zone temporal, semantic - syntactic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

#### Blockchain Consensus Algorithms & Mechanisms

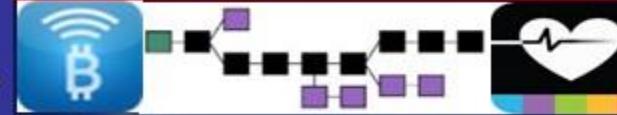
In the world of blockchain consensus algorithms, consensus is the **HEART OF THE BLOCKCHAIN NETWORK**. Its main purpose is to achieve agreement on transactions among a distributed system (s)

**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

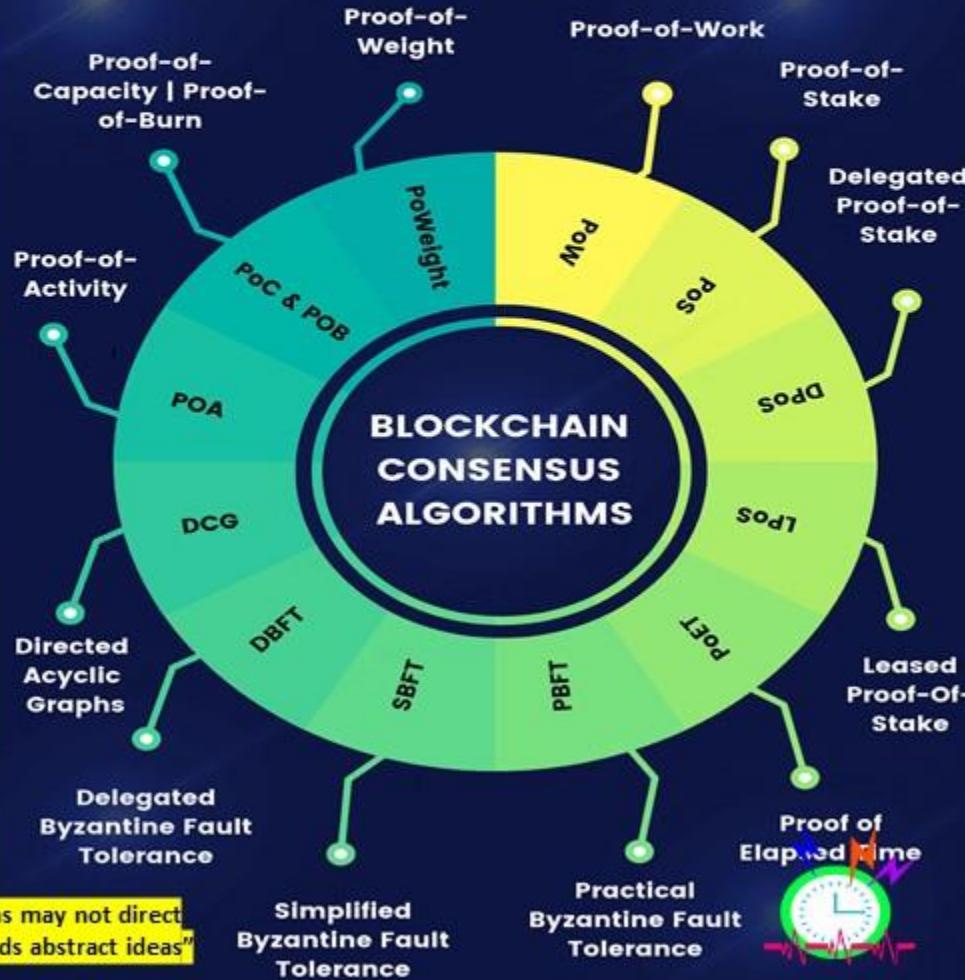
### ULTIMATE GUIDE FOR BEGINNERS



Developcoins

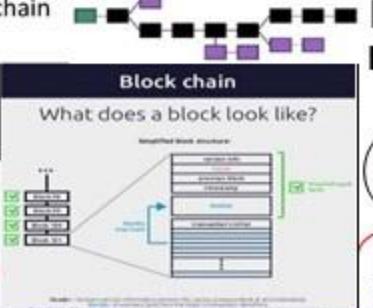
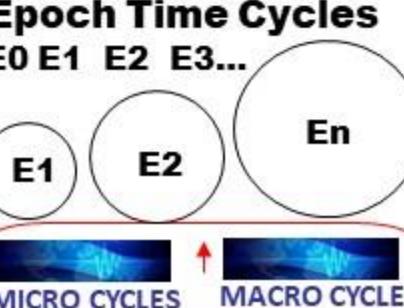


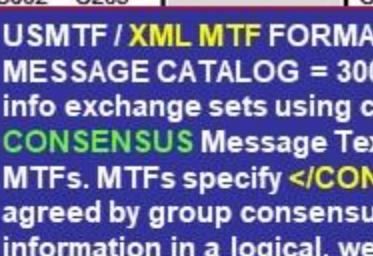
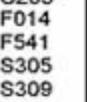
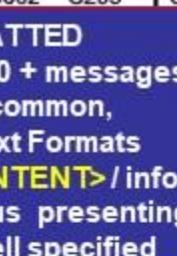
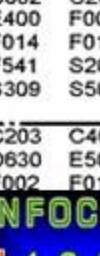
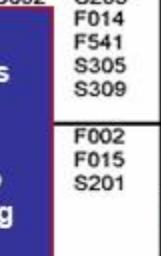
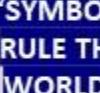
Developcoins



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

www.developcoins.com

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    #Big_Data 	API Operation Count 	Web service access type Network Effects / A.I.	Web application, front end to [network, device, system, blockchain] heartbeat
LANGUAGE / PLATFORM BINDINGS  #Big_Data 	PHP Java Erlang... 	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.  
"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   What does a block look like? 	Epoch Time Cycles E0 E1 E2 E3...  E1 E2 En  MICRO CYCLES MACRO CYCLES	

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

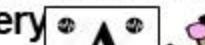
**Data Elements:** entity, attribute, relationship equivalents

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	FFRN / FFN / FUDN
			Domain Value	PURCHASE CODES	Instance, Value	<b>FEDERATE</b>		DUI

## Information Elements Roles

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

(“Org\_ID”){“URN”} FILTERS





## FILTERS

## FUDN: Field Format Unit Designator #

## FIRN Field Format Index Reference #

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



 NDN 

Firefly-Heartbeat Flash Messages

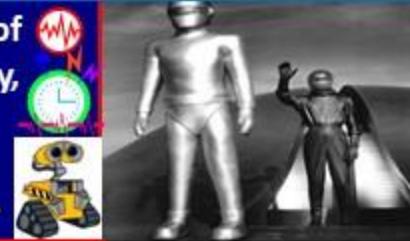
## PROCESS MESSAGE BY PRECEDENCE UNIVERSAL EVENT / ALERT MESSAGE BUS

## 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			3 - Velocity
11.4.3 - Specific Type			1.4.1 - 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



**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 INFORMATION CONDITION  
 SYMBOLES Friend Neutral Hostile MEDICAL EVAC & HOSPITALISATION  
 Partner Competitor - MILITARY OPERATIONS  
 NUMBERS ARE THE UNIVERSAL LANGUAGE / Symbols Rule the World"



INFOCON  
5 4 3 2 1  
INFORMATION CONDITION

# Electronic Product Code Information Services (EPCIS) GS1 Standard for creating, sharing visibility event data



REGISTERED  
ORGANISATION  
VOCABULARY

Edge

# epcis

## EPCIS DATA MODEL

WebLogic  
RFID Edge  
Server

Custom  
RFID  
Application

SERVICE LAYER

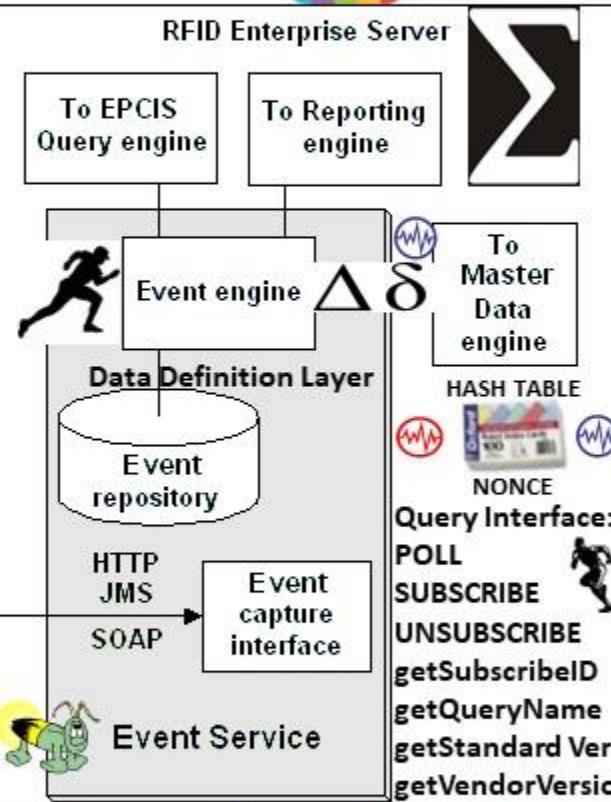
XML

ObjectEvent

AggregationEvent

QuantityEvent

TransactionEvent



## 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



CLOSER IS CHEAPER  
CLOSER IS FASTER

$\Delta\delta$



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	TO	BATTLEFIELD DIGITIZATION	NETWORK CENTRIC WARFARE
AIRBORNE	ASAT	ASAT	ASAT
ASAT	AIRBORNE	ASAT	ASAT
ASAT	ASAT	ASAT	ASAT

FROM	TO	SYSTEM OF SYSTEMS	BEST PRACTICE
ASAT	ASAT	ASAT	ASAT
ASAT	ASAT	ASAT	ASAT

FROM	TO	BATTLEFIELD DIGITIZATION	NETWORK CENTRIC WARFARE
ASAT	ASAT	ASAT	ASAT
ASAT	ASAT	ASAT	ASAT

FROM	TO	BATTLEFIELD DIGITIZATION	NETWORK CENTRIC WARFARE
ASAT	ASAT	ASAT	ASAT
ASAT	ASAT	ASAT	ASAT

FROM	TO	BATTLEFIELD DIGITIZATION	NETWORK CENTRIC WARFARE
ASAT	ASAT	ASAT	ASAT
ASAT	ASAT	ASAT	ASAT

FROM	TO	BATTLEFIELD DIGITIZATION	NETWORK CENTRIC WARFARE
ASAT	ASAT	ASAT	ASAT
ASAT	ASAT	ASAT	ASAT

FROM	TO	BATTLEFIELD DIGITIZATION	NETWORK CENTRIC WARFARE
ASAT	ASAT	ASAT	ASAT
ASAT	ASAT	ASAT	ASAT

FROM	TO	BATTLEFIELD DIGITIZATION	NETWORK CENTRIC WARFARE
ASAT	ASAT	ASAT	ASAT
ASAT	ASAT	ASAT	ASAT

FROM	TO	BATTLEFIELD DIGITIZATION	NETWORK CENTRIC WARFARE
ASAT	ASAT	ASAT	ASAT
ASAT	ASAT	ASAT	ASAT

1st Compiler  
DESIGN  
Still the BEST



# SOFTWARE DEFINED NETWORKING

NETOPS

Command Syntax

REST State Transfer

COMMAND SYNTAX  
STATE TRANSFER  
Unicast / Multicast  
Flow Tables / Workflow

Dynamic Network

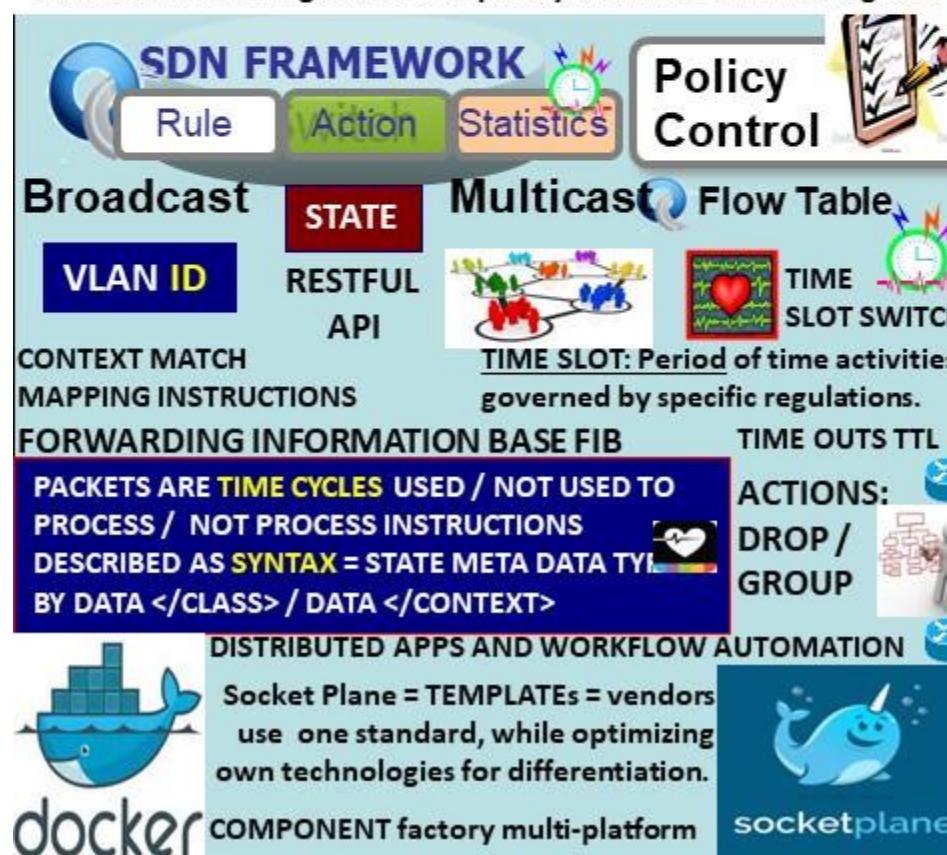
NETOPS

NET CENTRIC WARFARE  
SYSTEM OF SYSTEMS TELEMETRY

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

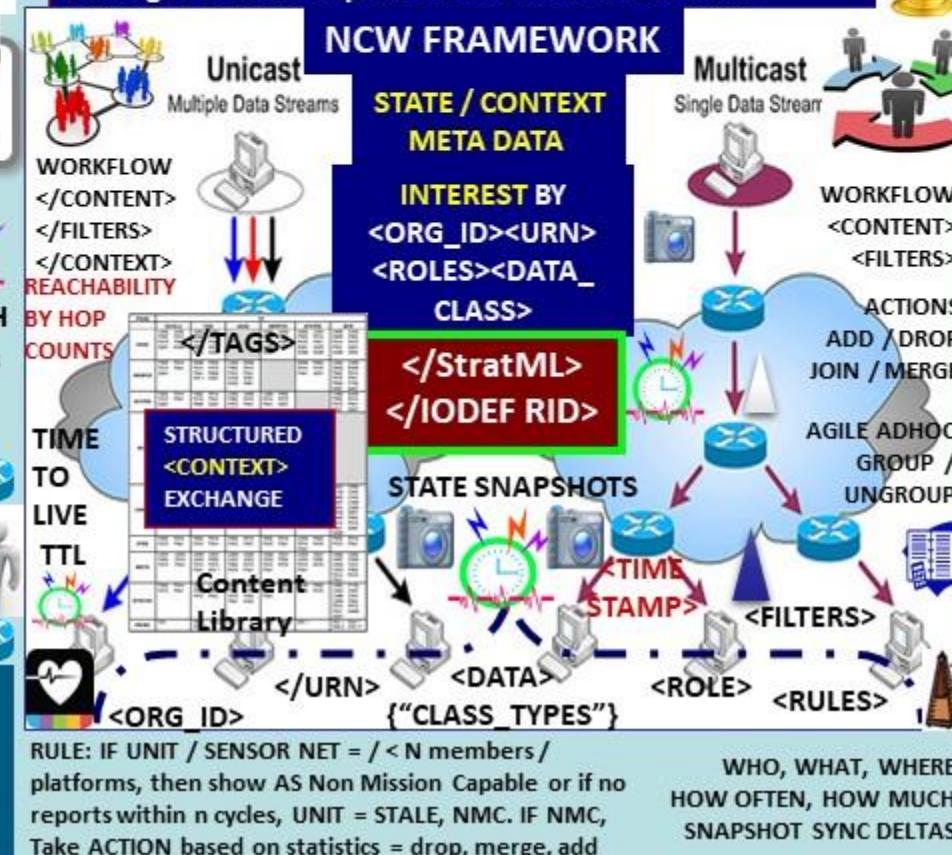
- SDN is a *framework* to allow network administrators to *automatically* and dynamically manage and control a *large number* of network devices, *services*, topology, traffic paths, and packet handling (quality of

**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



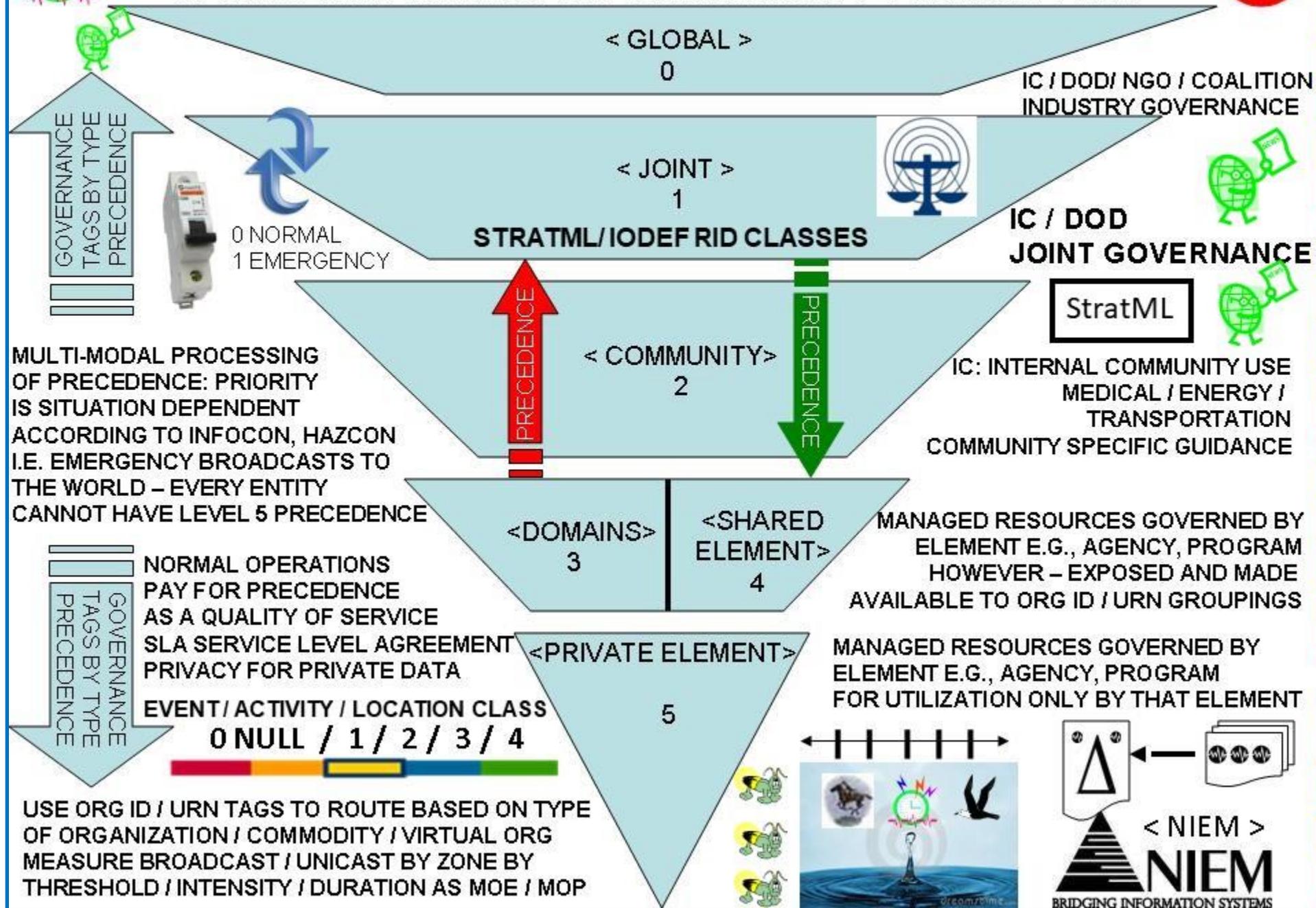
Netcentric / "network-centric" participating in a continuously evolving, complex community of people, devices, information and services interconnected by a network to optimize resource management and provide information on events and conditions.

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

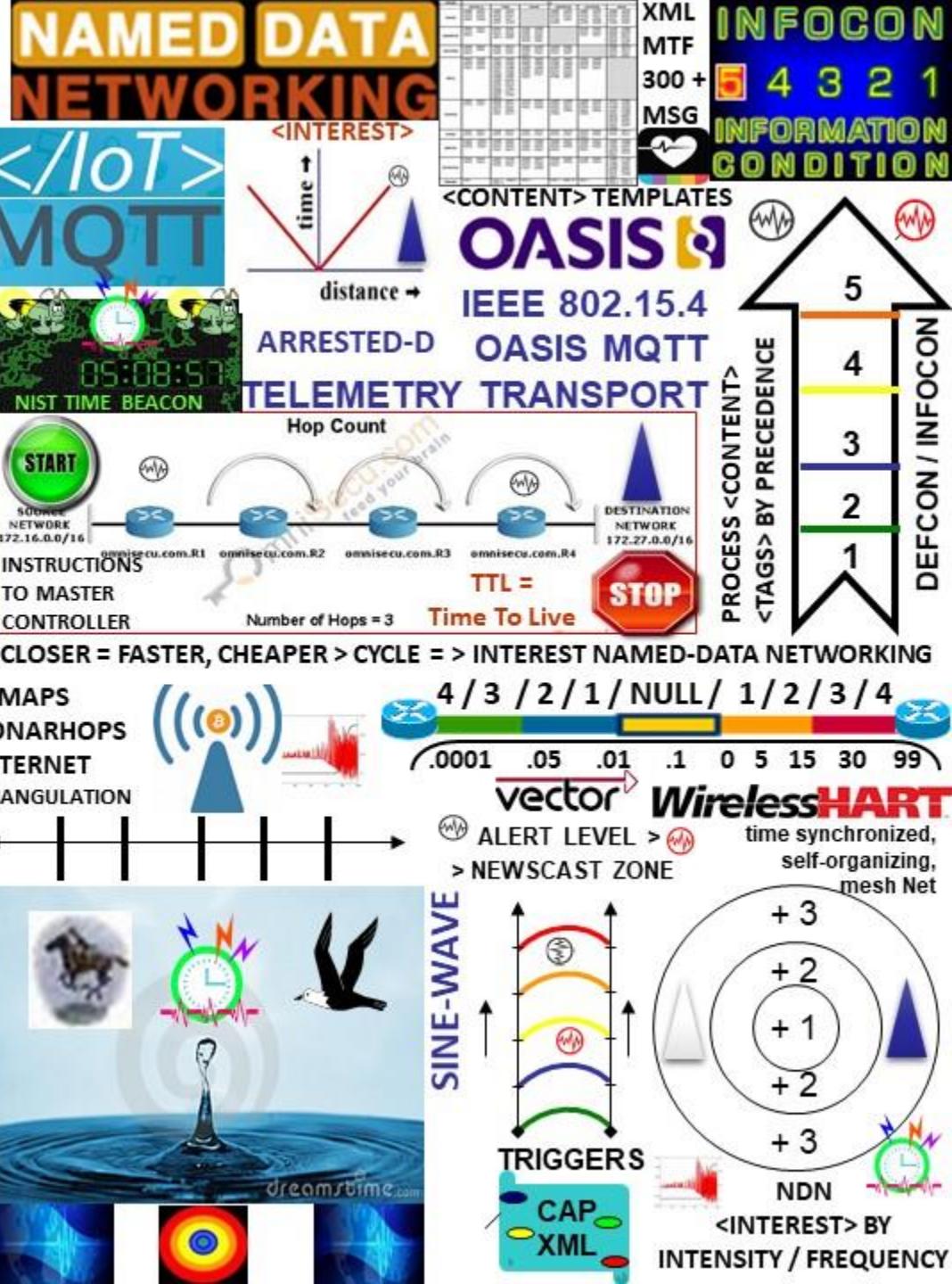
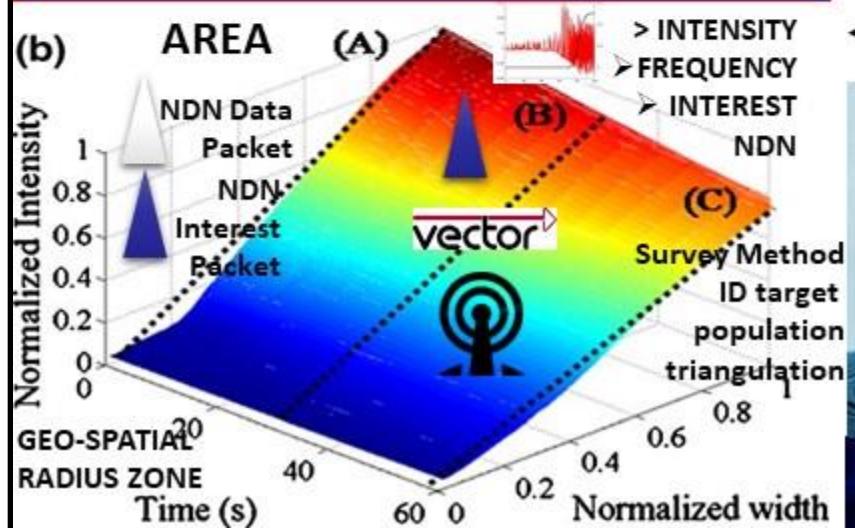
Geo-Spatial Temporal Intensity NOVEL METRICS / METERS:

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>



**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

<TAG> LIBRARY  
TEMPLATES

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



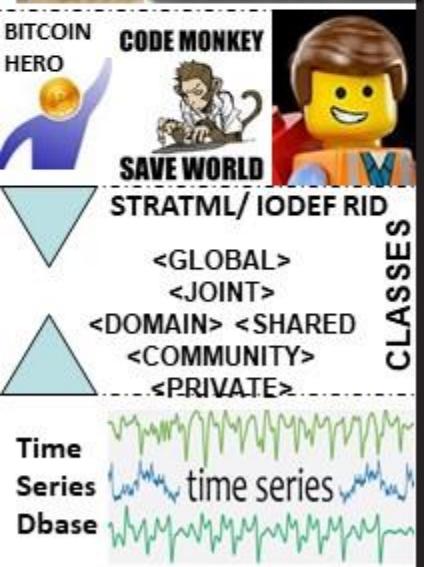
# How 'Bitbanks' Could Solve Bitcoin's Volatility Problem

## 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

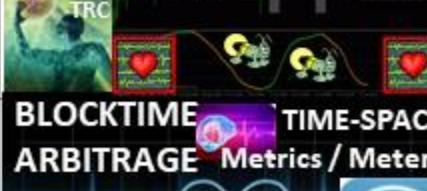
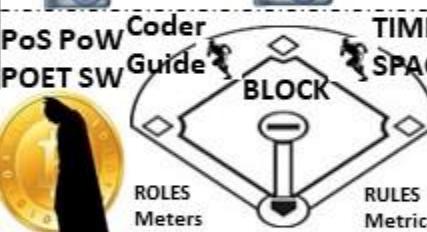
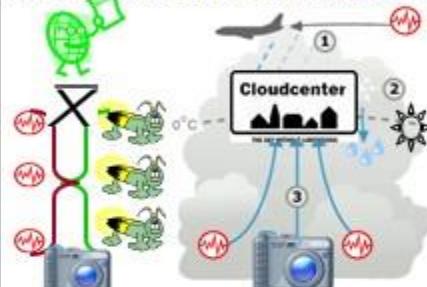
### 4 MAIN WAYS TO DRIVE ENGAGEMENT

#### 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



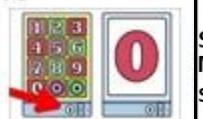
TIMESTAMP marks the point that work started. Additionally, it contributes to the uniqueness of the work by an individual miner



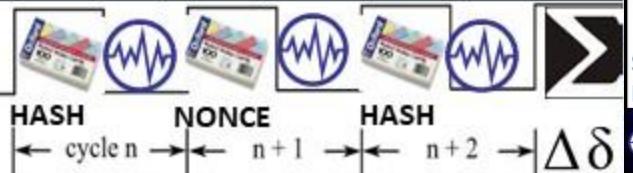
THROTTLE equivalent to difficulty. State  
•target = maximum value of 8 bytes Snap  
( $2^{64}$ ) divided by the difficulty.

Shots

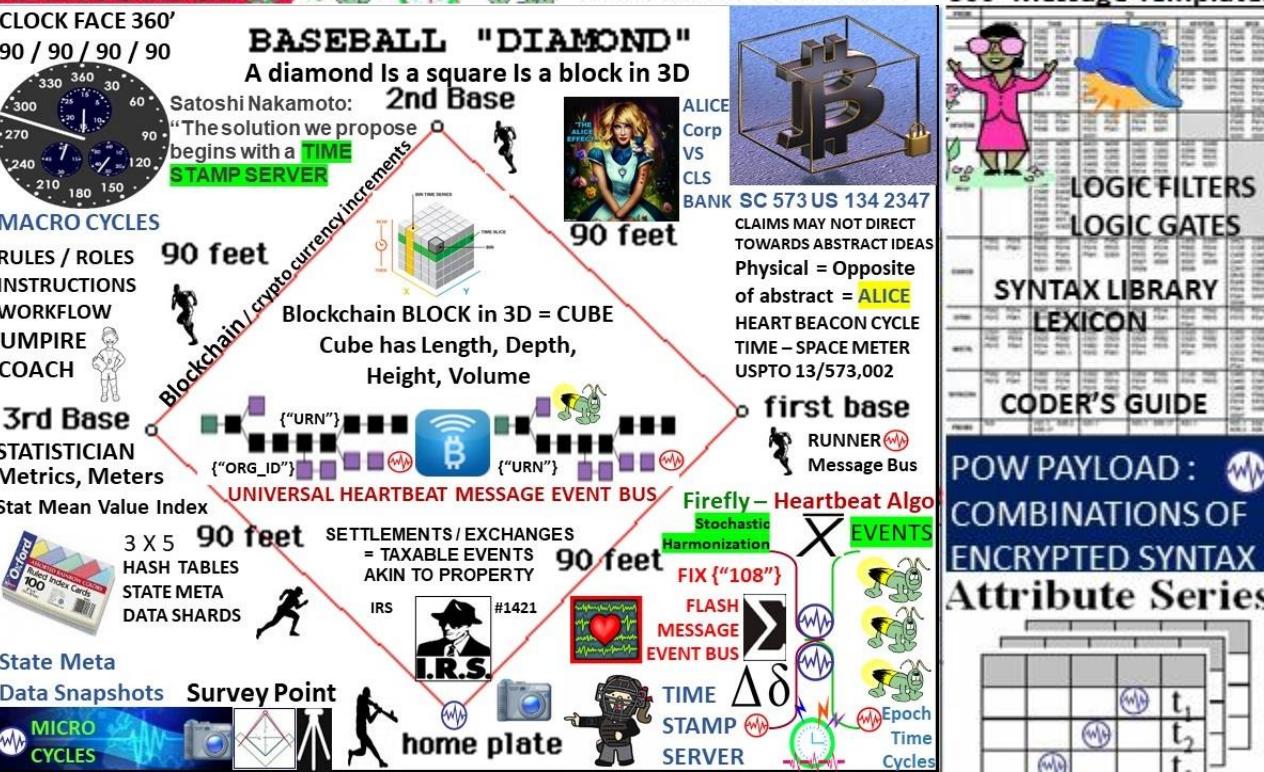
NONCE increments from 0..N until the target is met.



GUESS stores the guess  
Effectively, it begins at infinity.



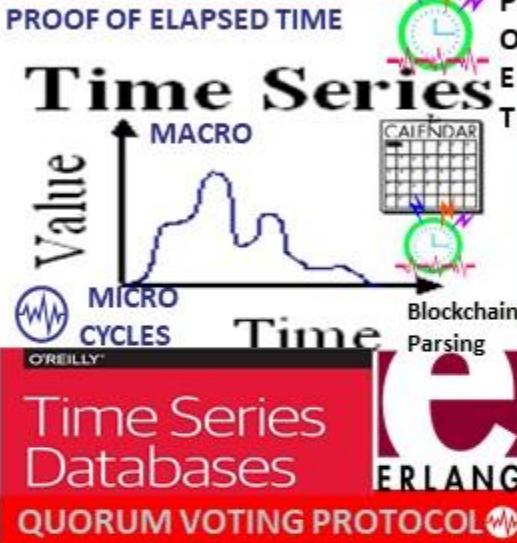
**Proof-of-Work:** users perform some form of work to participate. Work must be difficult for the client but easy for the server/network to verify. POW determines the approximate time between blocks = rate that new bitcoins are created. Work is submitted as a message/timestamp payload with a nonce value. 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."



Voting Based Selection: stake size & block generators selected by votes

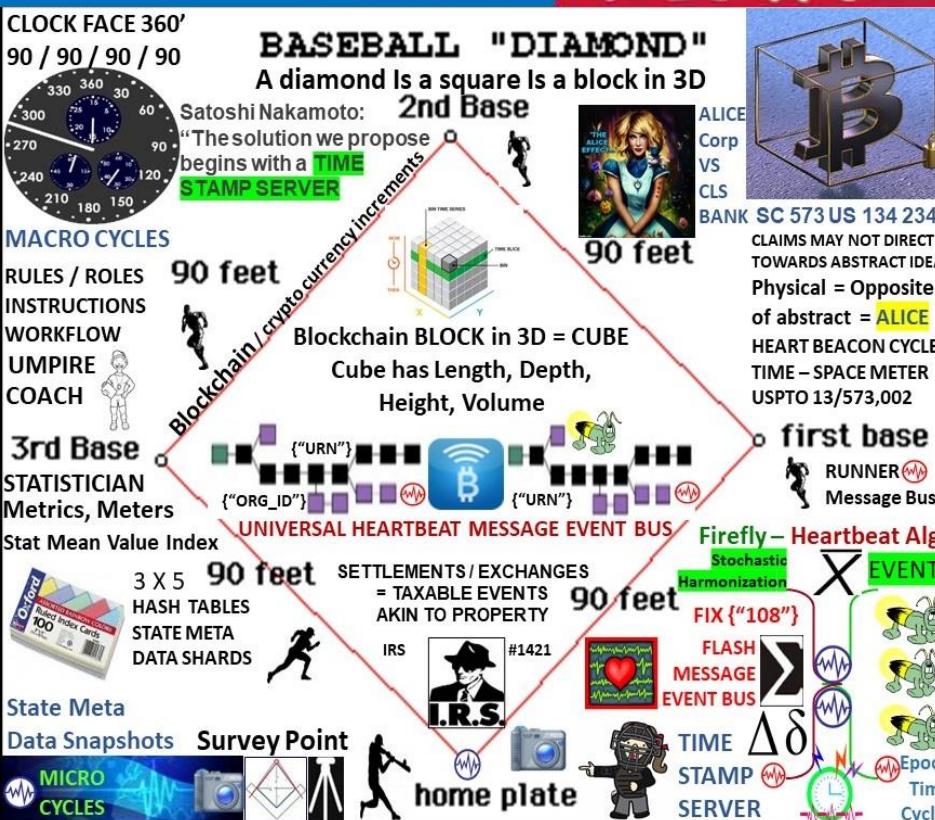
Voting based selection Instead of only using the stake size, the block generators can be selected by votes  
ex: League MVP

MVP



Robert's Rules quorum = minimum # of voting members who must be present at meetings to conduct business of the group

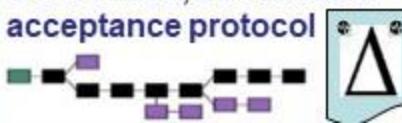
TOURNAMENT LEAGUE BOARD



## FIREFLY-HEARTBEAT FLASH MESSAGES UNIVERSAL EVENT BUS



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.

CLOCK FACE 360°  
90 / 90 / 90 / 90



MACRO CYCLES

RULES / ROLES

INSTRUCTIONS

WORKFLOW

UMPIRE

COACH

3rd Base

STATISTICIAN

Metrics, Meters

Stat Mean Value Index

90 feet

3 X 5 HASH TABLES

STATE META

DATA SHARDS

SETTLEMENTS / EXCHANGES

= TAXABLE EVENTS

AKIN TO PROPERTY

IRS #1421

I.R.S.

home plate

TIME STAMP SERVER

FLASH MESSAGE EVENT BUS

TIME STAMP SERVER

Δδ

FLASH HEARTBEAT MESSAGES

HEARTBEAT STATE META-DATA

SNAPSHOTS EVERY

10, N MIN MICRO TO

MACRO ECON CYCLE

HASH TABLES

STATE SNAPS

SYNTAX

Time Series

Value

Time

t<sub>1</sub> t<sub>2</sub> t<sub>3</sub>

Geo Spatial

Temporal Series

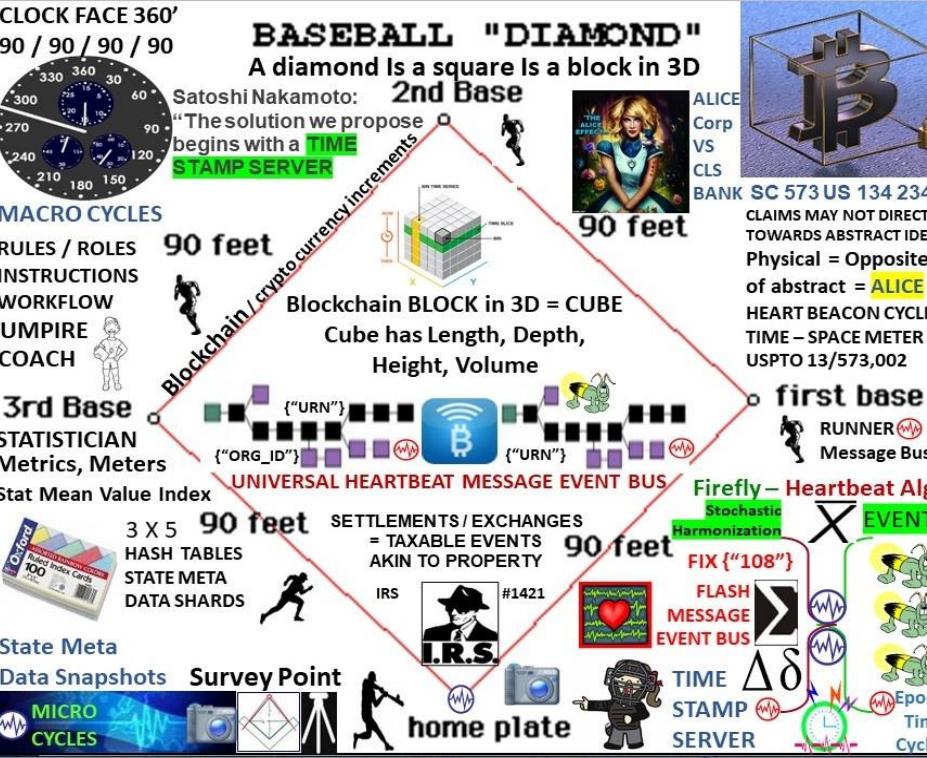
Attribute Series

META-DATA

t<sub>1</sub> t<sub>2</sub> t<sub>3</sub>

Firefly - Heartbeat synchronization: nodes in a distributed system generate periodic, local "heartbeat" events approximately at the same time with a goal of all nodes starting / ending cycles at the same time eventually = HB CYCLE

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

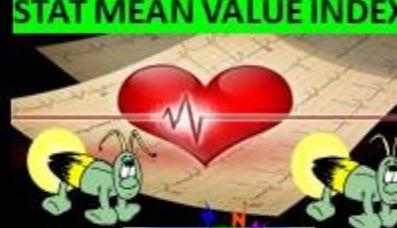


# TWAP Algorithm Manages Bitcoin Price Volatility Algorithm

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



FIREFLY HEARTBEAT ALGO  
STAT MEAN VALUE INDEX



STATE META  
DATA SNAPSHOTS



STATE SAMPLE

**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*?

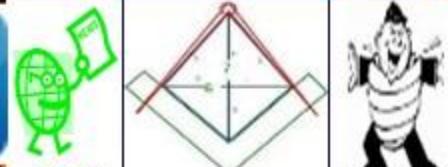
SC ALICE CORP VS CLS BANK: "claims may not direct towards abstract ideas"

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

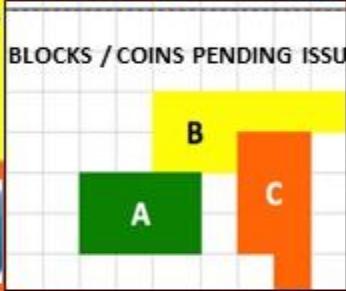
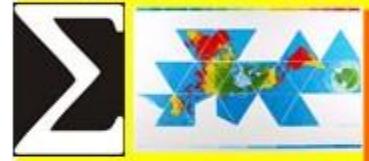
Plots A, B, C represent 3 unspent transaction outputs controlling N Bitcoins



TIME      ROLES      DISTANCE

Meters      Metrics

## Mined Bitcoins



## 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"

Step 1: prove coin ownership <Org\_ID> Coin Issuer

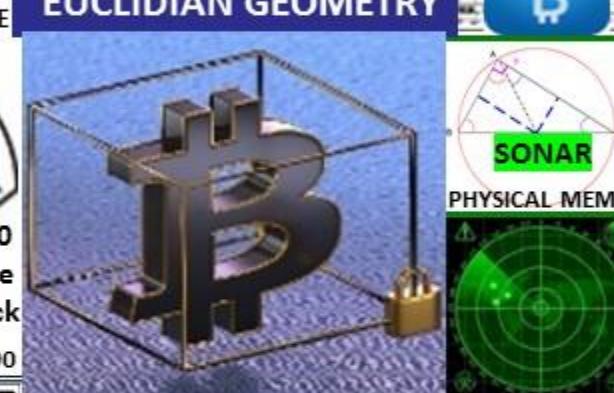
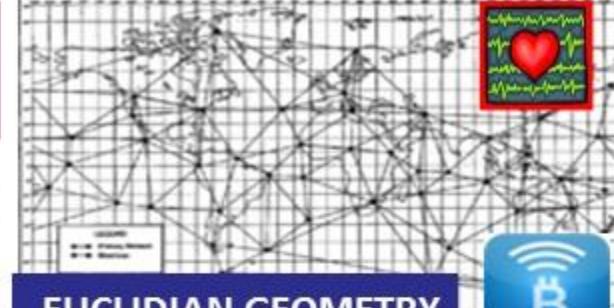
Step 2: coins sent where, when Lat-Long, Time Stamp

Step 3: specify ownership <Org\_ID> issuing agent

Step 4: Issuing Org of Record adjudicates w buyer

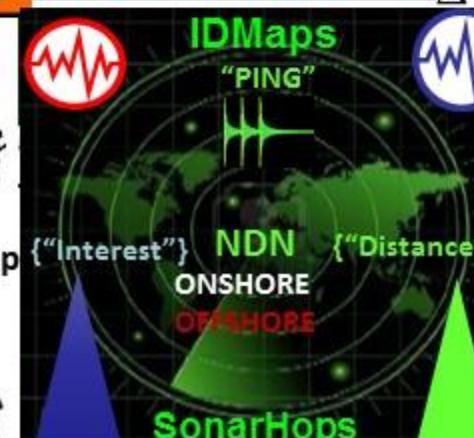


TRIANGULATION



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

HEART BEACON CYCLE

USPTO 13/573,002

SURVEY METHODS



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  
AGREEMENTSPROCEDURAL  
TEMPLATE

Contracts

Checklists

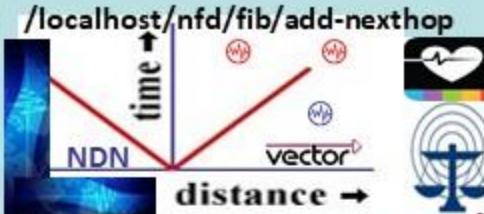
## FEDERATION

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

Agreements

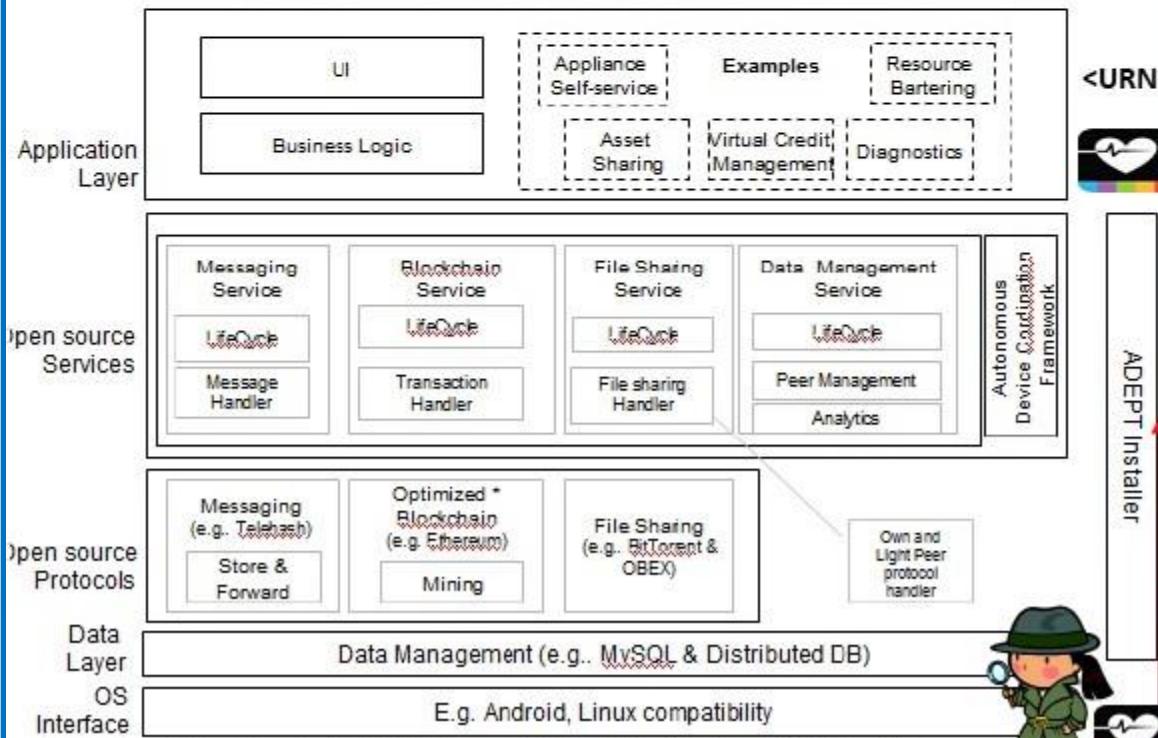
Payments

Barter



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

## ADEPT Standard Peer Architecture – Logical View



**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

Database

message

Syntax

Lexicon



SEC REGULATION:  
{"Org\_ID"}  
In the clear  
Issuing Org tracks  
User Accounts  
NIST Cyber  
BEACON =  
Non-Repudiation

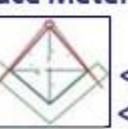


NON  
REPUDIATION  
{"ORG\_ID"}  
{"USER\_ID"} Encrypted w QRB  
ETFs  
NATO / OTAN  
IDMaps SonarHops  
Distance Estimation Service



USPTO 13,573,002 Heart Beacon Cycle Geo-spatial, temporal Intensity

Metrics and Time - Space Meter uses PHYSICAL Memes / Metaphors



NDN

</Interest>  
</Distance>

SURVEY METHODS  
+ TRIANGULATION  
Euclidian Geometry

Geodesic System Routing Info Base RIB

ACCOUNT BELONGS TO </Org\_ID>

RESOURCE TYPE: <URN><URN><URN>

DEVICE / SENSORS <UUID><UUID>

OFFSHORE BEACONS  
NDN

ONSHORE NDN  
</interest></distance>

Higher-level services collect distance

data to build virtual distance map

State of Internet & estimates distance

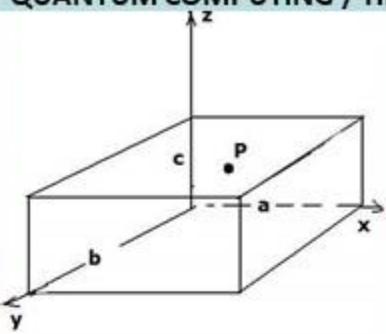
between any IP address pair

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. Stochastic Harmonization

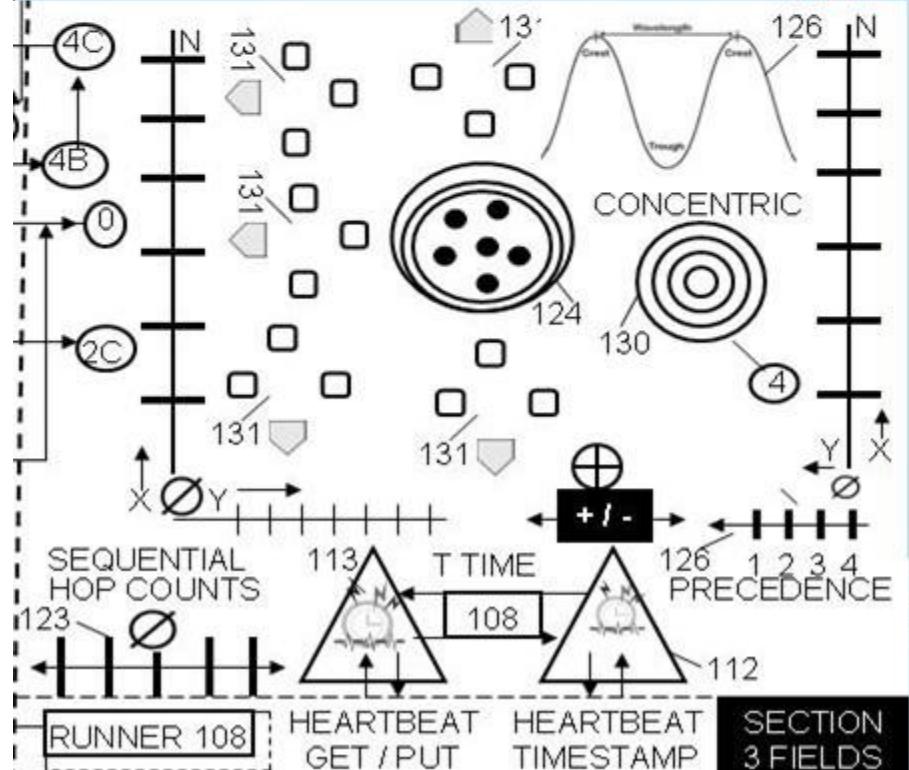
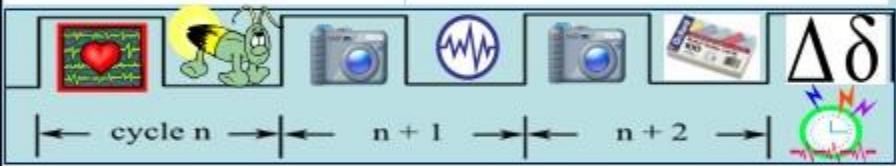
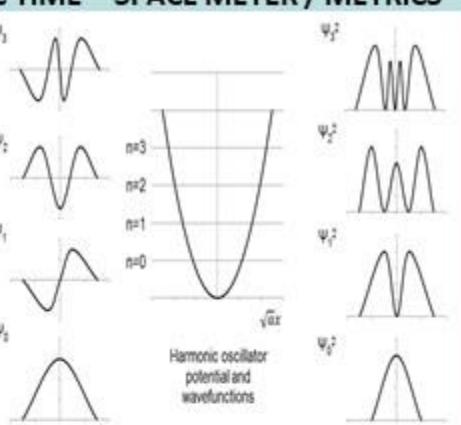


The proposed Universal Timezone System would do away with all these different time zones and instead use a single global time zone.

## 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 to 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

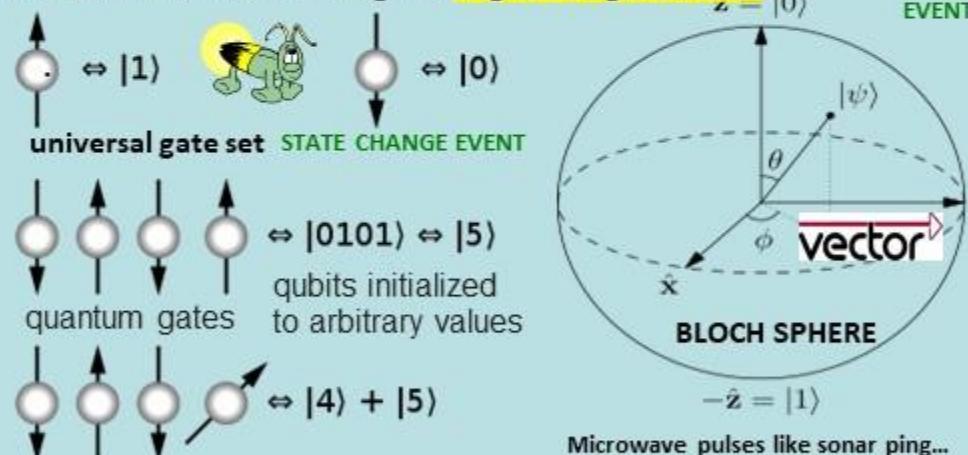
Vertical polarization vectors from a known point 0 null Sonar Hop meme



particle representation / samples



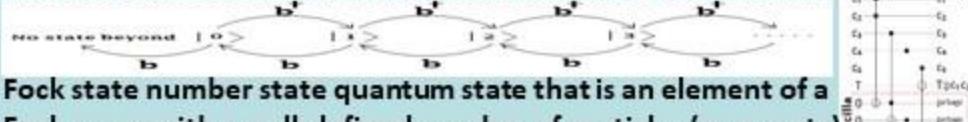
Instead of each bit having two potential states — on or off — a quantum bit or qubit has three. It can be on, off, or both, and you only know which one it is once you look at it. How can you tell if a bit of data is correct if looking at it might change its state?



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)



