MAPPING PROTOCOL – DRAFT **NOTES** Date 16 December 2015 Thinkers: Joseph Hentz, Gregorio Reid, James Littlejohn, dsensor@dsensor.org

Introduction
Dsensor uses Peer to Peer technology to apply the scientific method to data collected from sensors. Traditionally, truth is established in science by experiment and the process of Peer review, Dsensor updates this to a computational consensus based on the Mapping Protocol.

Mission: Science helps us make sense of the world, our environment, climate, self and even the cosmos. SenseMaking is the term applied to this mission.

Programmable Science – peer to peer networked science for the 21 century
The backbone of the scientific method is peer review. This mechanism is being made more transparent by the efforts of the open science and citizen science communities. This puts the network at the heart of science but these efforts still operate in too clean and sterile contextual environments. Programmable science operates through a MNM (Mapping Network Method). MNM include any scientific theories that can be captured in computational code. Scientific has to operate in chaotic, complex data waters as it moves out research labs and the Mapping Protocol provide technical and economic incentive mechanisms to keep the data and science honest.

Clean context –-> Myriad context

Peer review –-> Computational consensus

Clinical Trials –-> Computationally active

Computationally active -- Making decisions/actions/choices etc. on out of date information is not good, just like double spending is not good in a monetary economy.

Computational consensus – When a scientific theory has gone through all the Mapping Protocol's procedures backed the networks sensor data and CPU power and is the most truthful for its context it will be open to become computationally active by each node.

KEEPING SENSOR DATA & SCIENCE HONEST
The mapping protocol brings together a combination of technological and economics incentive mechanisms to minimize the creation of fraudulent sensor data and to prevent collusion or the creation of false nodes by a Mapper to fraudulently support their scientific theory. The Mapping Protocol combined with the Peer to Peer Network rules generates **vast complexity**. This complexity is created by the use of random sampling rules at both the node and network level. While it might be theoretically possible to unpick this complexity it will be at an un-economic cost. Secondly, the network and node AI also need to be manipulated to align to the context of each node. Given the diversity of nodes this makes a network wide manipulation costly to model or even to guess at. Each node and the network as a whole keeps an eye on the level of complexity to ensure the overall Mapping Protocol can operate to identify and populate the most truthful science.

MAPPING PROTOCOL OBJECTIVE:
For each individual node to have computationally active sensor data and scientific computations to provide the best information to make decisions and attain resolution on.

MAPPERS
Individuals putting forward a Mapping Network Method(MNM) to the network. These could be scientists, researchers, data scientists, but really anyone if with curiosity is free to participate.

Mapping Network Method (MNM)
Is the construct that pulls together a sensor data, scientific theory and computational resource. The MNM is the entity that is passed across the peer to peer network to establish truth or not.

LOCAL AI (artificial intelligence)
The governance of each node is regulated by a local AI (artificial intelligence) that co-ordinates, priorities and manages data and computations. It connects to the networks collective intelligence but has the autonomy to decide what should be computationally active.

AUTHORISATION & PRIVACY
Existing public/private key encryption user utilities will be used.

MNM PRIOIRTY
Given all the possible scientific theories that could become computationally active which ones should be selected for each node? That is the job of the MNM priority module. Given the context of the local node it decides which Mapping Containers to keep computationally active, retire or to introduce. All this performed in the context of the computational resources, technical constraints and human interaction.

MAPPING CONTAINERS
These are virtual containers that isolate each science theory and having gain authorization and priority clearance will be given access to sensor data and compute resources. These containers allow any software language code to be executed and allows for the deployment on mobile, laptop, desktop, Decentralized cryto-compute or cloud compute services.

Access to CPU resources
--**run** Computationally active new update, review, replicate 'results'
--**data API** Access to data
--**error management** apply mathematic technique to ascertain the quality and accuracy of data.

RANDSOM SAMPLER
The double spend problem in cryptocurrency - a dishonest mapper/sensor in the science world. How to disincentive bad Mappers, e.g. those that put forward a MNM and then create many nodes that support their MNM predictions thus self validating their own theory? The first a disincentive mechanism is built in at sensor data collection via the sensor library. Secondly, Random sampler module takes data from random part each nodes database. A portfolio of techniques will be used and rotated to keep complexity high. The compute cost to model this level of complexity provides the technical defense mechanism to bad mappers

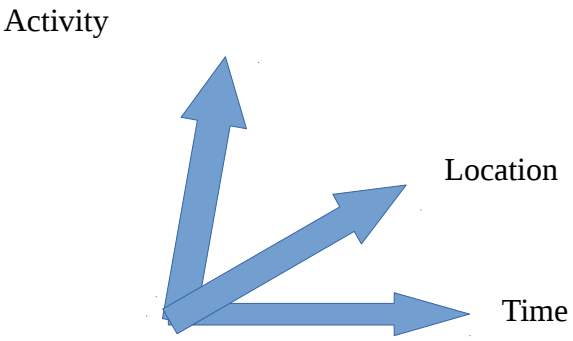
Type of randomness – context – time – volume – randomness techniques

MPM SCORING

--**Scoring**

At the heart of the Mapping Protocol is the ability to 'score' the prediction path value of the MNM put forward by a Mapper. That is to evaluate the predictive power of a theory compared to the actual outcomes. This scoring will be perform on a per node basis and across the network. The goal to achieve local and global computational consensus for each theory.

--Context
The Mapping Protocol has an even more demanding task, compare the 'scoring' of different MNM's in different CONTEXT's. In terms of activity, sensor, time, location, words, data matching intervals for the predictions. How they are updated etc.



With Activity = categorization of accelerometer or other sensor data
With Location = sensor defined data
With Time = sensor defined and past real time future time, precision, regularity, intervals etc

In short context has to be described in a sensor and add to be Mapping Method.

Context can be summarized in Kwords, Knowledge words i.e. language but should be for human consumption purposes i.e. knowledge words map to sensor context.

--Complexity How much CPU resource and time measured in a standard manner.

MAPPING ACCOUTING AUDIT TRAIL
MNM need to be accounted for from the 'seeding' them on the protocol and through out computations performed. This gives the basic information to recreate past data, computation and code settings with certainty when disputes occur.

PEER TO PEER NETWORK
The Mapping Protocol communicates with other nodes on the network vi the Peer to Peer Network Library. Further information on the workings of the network are available in its own white paper.

GAIABLOCK - reproducibility
This is a bitcoin blockchain inspired immutable ledger that secures the reproducibility of science. Each node providing a transaction audit trail combining sensor data, computation and consensus entries. Each node provide cryptographic proof of stake numbers unique to each science theory.