

# Vulcano

DEVELOPMENT TRAJECTORY

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## ABSTRACT:

Since August 2018, Team Vulcano has worked tirelessly to create value and drive advances for the \$VULC ecosystem. All the developments Team Vulcano has made are simply laying the foundation for ground shaking changes to come in the near future. This paper gives a very brief history of Vulcano, recaps Vulcano's development of hardware, shows a potential trajectory for the establishment of asset classes and data classes based on the Vulcano blockchain, illustrates the potential of nonfungible data tokens and the data token ecosystem, lays out the methodologies for excluding bad actors from the system, and reviews new options for ensuring network integrity. The purpose of this whitepaper is to inform holders of \$VULC of the progress of Team Vulcano. It is also to serve as an introduction to newcomers to the Vulcano ecosystem.

**Keywords:** data analytics, blockchain, crypto currency, networks, sensors, data, internet of things, IoT, big data, distributed computing, digital assets



**Note:** For the purposes of this paper, we have omitted the usual 10-15 pages of material explaining the basics of blockchain technology, consensus algorithms, Satoshi Nakamoto, and the jargon of decentralization common to blockchain literature. Anyone seeking information on the basics of blockchain can easily find sources. Through leaving this data out, we are able to dive into the details of the growing Vulcano ecosystem without delay.

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This is very much a living document and may be modified going forward. Rather than posting it as a LaTeX file on GitHub as we did with the previous version, we have elected to go with this more visual layout as it will be more appealing to non-technical readers. If you notice a typo or something you believe needs to be corrected, please come visit us in **Discord** (<https://discord.me/vulcanocrypto>) or **Telegram** (<https://t.me/VulcanoCrypto>) and let us know!

We can also be contacted via email: [vulcano@vulcano.io](mailto:vulcano@vulcano.io)

**Disclaimer:** \$VULC is designed to be used as a utility token within the Vulcano ecosystem. Nothing within this document should be construed as financial advice.

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# A BRIEF HISTORY

**Vulcano (ticker: VULC)** is a community-oriented coin originally launched at the end of 2017. In August of 2018, it was relaunched under new management by a new development team which introduced masternode functionality and began the development of an ecosystem which would facilitate the growth of the community and research investment in specific domains relating to sustainability and renewable energy. Since this relaunch, the project has grown in scope as Team Vulcano works to push the envelope of possibility in terms of blockchain technology and its role in daily life.

In November of 2018, Vulcano signed its first research partnership with Rajamangala University in Thailand to support the development of their seismic sensing network. This low-cost seismometer is a critical step in helping scientists understand the movement of kinetic energy through the surface of the earth. In March 2019, this suite of sensing equipment entered the testing phase with deployments in Central Thailand.

In February 2019, the Vulcano Governance System was brought online and processed its first successful proposal for a coin burn of 450,000 VULC. This vote was conducted transparently

on the blockchain with a large percentage of masternode holders voting to conduct the coin burn.

In March of 2019, Vulcano signed a research agreement with a current research student at Johns Hopkins University for research into data compression using the Burrows-Wheeler Transformation. This is a critical step for helping create a lean data-based ecosystem.

Additionally, in March of 2019, a critical step in the road to success was made as Vulcano released a major update to the wallet, plugging security vulnerabilities common to most Proof-of-Stake currencies, as well as activating the GUI interface for the Governance system, allowing masternode holders to vote from their Vulcano wallets with a single click.

In April 2019, Vulcano Holdings, LLC (a limited-liability corporation) was granted legal standing in the State of Nevada, giving Team Vulcano a legal entity needed for more complex initiatives and to apply for listing on certain exchanges which require a legal signing entity. The establishment of the Vulcano Foundation is still in progress.



# THE FUTURE

Today, over 2.5 quintillion bytes of data are generated daily.<sup>1</sup> Of the data available in the world today, 90% has been created in the last two years. Furthermore, it is anticipated the data monetization will become a significant source of revenue as the world will create 175 ZB of data in 2025,<sup>2</sup> which is up from less than 10 ZB of data in 2015. This data is of vital importance to both the average citizen and large corporations alike. Research conducted by IBM's Institute for Business Value found that leaders were 166% more likely to make correct decisions based on data than in operating in an environment with a higher degree of uncertainty.<sup>3</sup> IBM also reports that 48% of organizations plan to allocate more IT spending towards business analytics.<sup>4</sup> However, at this point, it is challenging for these organizations to access enough data to make accurate decisions. Or rather, they have access to great amounts of extremely disorganized and unstructured data. Often, their data pipelines are limited to their own analytics collection resources. Even if they have access to broader databases, these databases are drawn from extremely narrow areas of observation. Vulcano will change this industry forever.

## **REMEMBER:** **ALL DATA IS AN ASSET**

It is for this reason that Vulcano has committed itself to the creation of a data-based ecosystem. Data is already being monetized on a global scale, but very little of this data is being monetized by the entities that generate the data itself. For example, while Alphabet Inc. drew over \$28 billion in advertising revenue in 2018, much of which is driven by consumer data such as location, previous search terms, networks, or contextual data.<sup>5</sup> Other extremely broad data sets exist in the world around us. Everything a user does in their daily life generates some form of data. Most of this data is useless to an end user, but some of it can have great value within specific contexts.

It is for this reason, that Vulcano is in the process of creating a data asset block chain platform. For the first time in history, it will be possible for users to create tokens representing data on an easy-to-use distributed and trustless platform.



# DATA ASSETS

There will be two types of data tokens supported by the Vulcano network. These two types of assets will both be exchanged across the network with ease, but have distinctly different purposes for the end-user.

The new types of tokens are:

## **Non-Fungible Data Tokens (NFDTs)**

An NFDT comes from a single identifiable source and allows data from specific time intervals and specific sources to be monetized. In the case of an NFDT, ownership of the token grants ownership of the data itself. For example, a sensor designed to collect information on the usage of a specific piece of infrastructure, such as a bridge or tunnel, might produce NFDT's which would represent statistics available during a specific window, depending on the configuration of the token. Ownership of this data could make it possible for businesses to purchase the data for their own uses. Those not possessing the token to unlock the indicated data would not be able to access or use it.

## **Fungible Data Tokens (FDTs)**

Ownership of an FDT, on the other hand, would grant partial ownership of all data within a specific data domain. For example, collective seismic data, some of which is made available for the public good, could also be monetized resulting in benefits for all those who hold the aforementioned seismically oriented tokens on the Vulcano blockchain. Ownership of these tokens would not imply ownership of specific data sets, but rather an overall interest in their use and monetization.

Assets will be created using the Vulcano Asset Creator, which will be a wallet-based application that will assets of various typed to be created on the Vulcano platform. More details will be released on this specific aspect and the in-depth requirements for token generation in the future. Token creation will have a cost on the network in \$VULC. All \$VULC used to generate new tokens will be burnt and removed from circulation permanently.



# WHY TRUSTLESS?

**There is a significant gap in the market for this sort of data-based platform.** Currently, the majority of data that is disseminated and used is collected from individual users and stored by individual businesses and institutions. As such, the collection, processing, and storage methods are not auditable and lack transparency. For specific companies and for internal usage, this is acceptable. However, there are tremendous inefficiencies which can be remedied through a much broader data collection, processing, and storage solution.

While there are other blockchain projects that are purported to allow users to contribute and monetize their data, most have a high degree of centralization which reduces their overall robustness in the face of a rapidly changing technological and regulatory environment. Additionally, the centralization factors at work in some of these other projects places the blockchain projects in a position of trust in a post-GDPR world, opening them to liability and data protection regulatory changes. Vulcano avoids this by working to construct a fully decentralized data-driven ecosystem, placing users in control of their own data and allowing them to use it as they see fit. A user who generates data from any integrated IoT devices will be able to grant access to this data and receive compensation.



# THE REAL WORLD

**Blockchain projects are not worth anything unless they DO something.** Team Vulcano believes that in order for Vulcano to have value for the real world, real world contributions must be made. The next pages are filled with examples of the Vulcano Data Assets use cases. While there are infinite examples, Team Vulcano has provided several with varying degree of detail to give an idea of how the system will work.

**Buckle up...this is where it gets interesting!**

**Example Included:**

- Closed-Circuit Electrical Data (Project Moho)
- Climate Data (Project DataBlossom)
- Logistics Data (Project HeavyLift)
- Security Data (TBD)
- Dining Data (TBD)
- Usage Data (TBD)





# AN EXAMPLE EXPLORED:

## CLOSED-CIRCUIT ELECTRICAL DATA - PROJECT MOHO A DISTRIBUTED FUTURE FOR LOCALIZED POWER USAGE MONITORING AND SETTLEMENT):

### Introduction

There is currently a gap between Feed-In Tariffs (FITs) and Energy Costs in the Thai market. As Thailand currently operates on an "Enhanced Single Buyer Model", all energy currently passes through state-owned transmission lines and meters, placing limitations on businesses. Additionally, the rates at which Small Power Producers (SPPs) and Very Small Power Producers (VSPPs) are reimbursed for electricity they feed into the grid is tightly limited and capped at 60 megawatts, though some have been approved with 90mw production limits. The electrical rates for power feeding into the grid is not limited to conventional power, but also impacts renewable energy generation as the feed-in tariffs, which are intended to facilitate new plant construction, taper off in time even if the plant can still produce additional power safely.

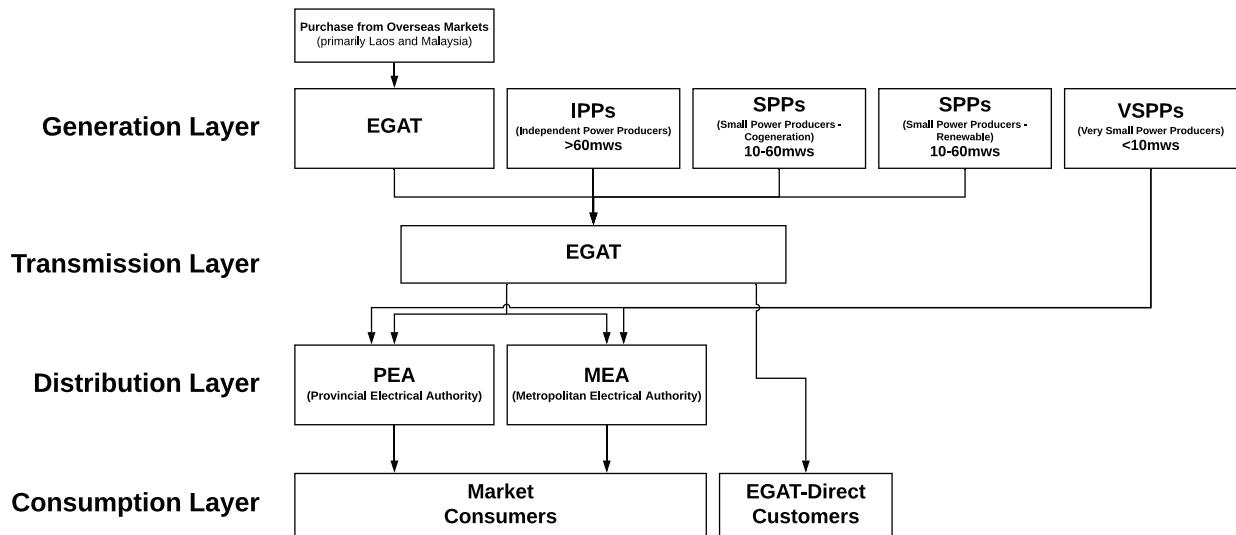
This gap can be filled by a settlement layer, which will enable SPPs and VSPPs to sell electricity to end users in their immediate vicinity through the primary grid. Up until now this was not possible as the metering technology was unreliable, and the regulatory environment was unfavorable. However, the advent of smart meter technology and the confluence of blockchain and IoT devices will enable this settlement layer to be profitably constructed, managed, and policed,

resulting in systemic increases in efficiency and profitability for all parties involved.

### Current Situation: Power Generation in Thailand

Thailand is rapidly industrializing. As it does so, its need for energy increases dramatically. Currently, while there are many IPPs, SPPs, and VSPPs, the Electricity Generating Authority of Thailand maintains a virtual state-enforced monopoly on the transmission and sale of electrical energy in Thailand. Currently, unless power is produced and used within a single property, it is purchased by EGAT at below-market rates and resold to another property, often immediately adjacent. This results in lost opportunities for power generating entities and a functional overcharging of power consumers. Additionally, there is a large loss in efficiency introduced to the system through the application of a capacity charge to ensure that maximum power draws can be accommodated by the power generation infrastructure. Often, this capacity charge represents over 50% of the monthly billing requirements for a manufacturing facility. A closer connection and synergistic cooperation between power users could result in large cost savings for the factory owners, but also lead to reduced energy consumption.

**Figure 1: Thailand's Current Electricity Supply Industry Structure**



## Blockchain in the Power Industry

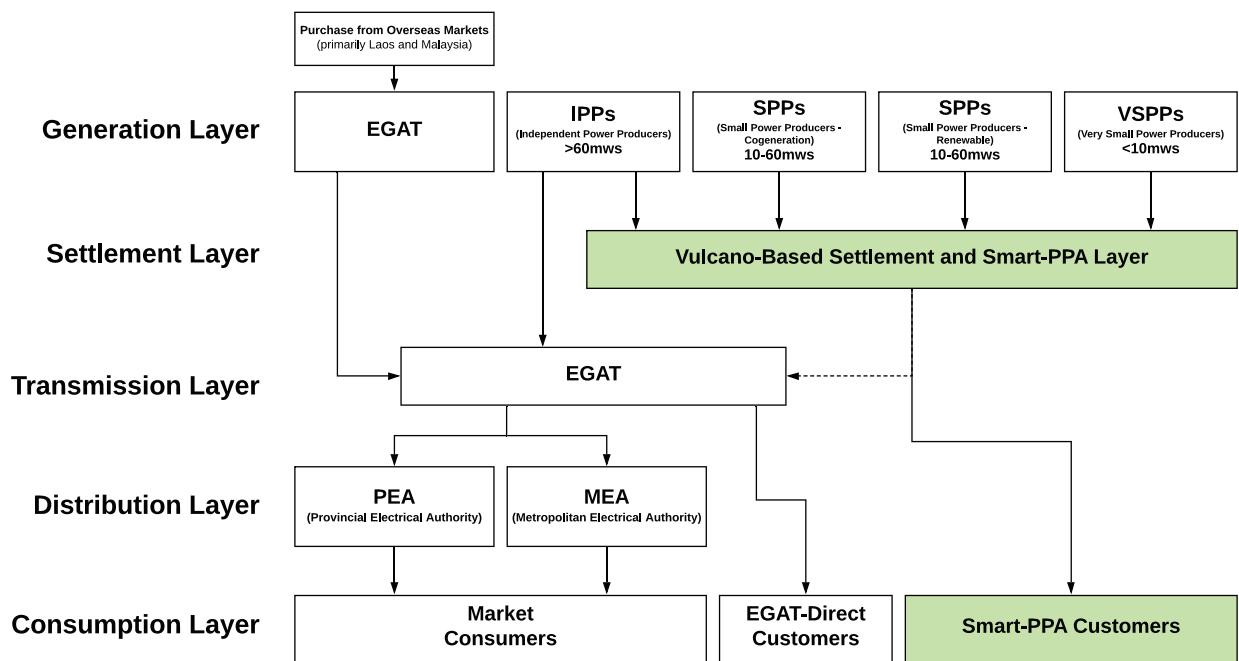
Over the past several years, there have been many projects which have been launched with the expressed intent of providing blockchain functionality for the energy industry. Unfortunately, as many of these were launched in the Initial Coin Offering craze of 2017-2018, many of them have gone dark or ceased development. Additionally, many of them are based on Proof-of-Work models such as Ethereum. This makes them expensive to operate as all transactions moving across the chain require Ethereum in order to pay miners' fees.

Additionally, the basic settlement model of most of these projects is based on the blocktime of the blockchain being used to provide the backbone for the service. In the case of Ethereum, this means that a new transaction must be issued every 15-20 seconds with an average per-transaction cost of roughly \$.10 – resulting in a per-day cost of roughly several hundred dollars, assuming that a transaction is broadcast each block. These could, of course, be batched – however, it should be noted that batching the transactions would result in reduced granularity for data being transacted. This is not taking into account times of network congestion, such as in December of 2017 when the entire Ethereum network ground to a halt due to the “CryptoKitties” craze.

## Proposal: Project Moho A New Approach to Settlement

In time to solve the problems endemic to the power generation and distribution ecosystem in Thailand, an unconventional approach must be taken. Drawing from industry best practices in deregulated energy markets and adding into them the efficiencies which can be drawn through blockchain, a solution can be found for the challenges facing stakeholders in this rapidly growing ecosystem. Phase one of Project Moho would be specifically designed to meet the needs of microgrid-based communities inside of industrial estates.

Figure 2: The Proposed Project Moho Settlement Layer Structure



As can be seen in the above illustration, an additional layer has been introduced. This settlement layer is comprised of two separate components.

### The Smart-PPA Dashboard

This would allow participants in this ecosystem to view prevailing rates being offered by their neighborhood electricity suppliers and the hours they are available. From this dashboard they would then be able to use the system to create Smart-PPAs (Power Purchase Agreements) which would be entered into the Settlement Layer. This would be an off-chain semi-centralized database to facilitate off-chain scaling of the ecosystem.

### The Settlement Dashboard

This specialized software operates on a periodic basic and provides off-chain settlement through the comparison of the Smart-PPAs entered into the system to actual usage collected from the Smart Meters within the ecosystem and written to the blockchain.

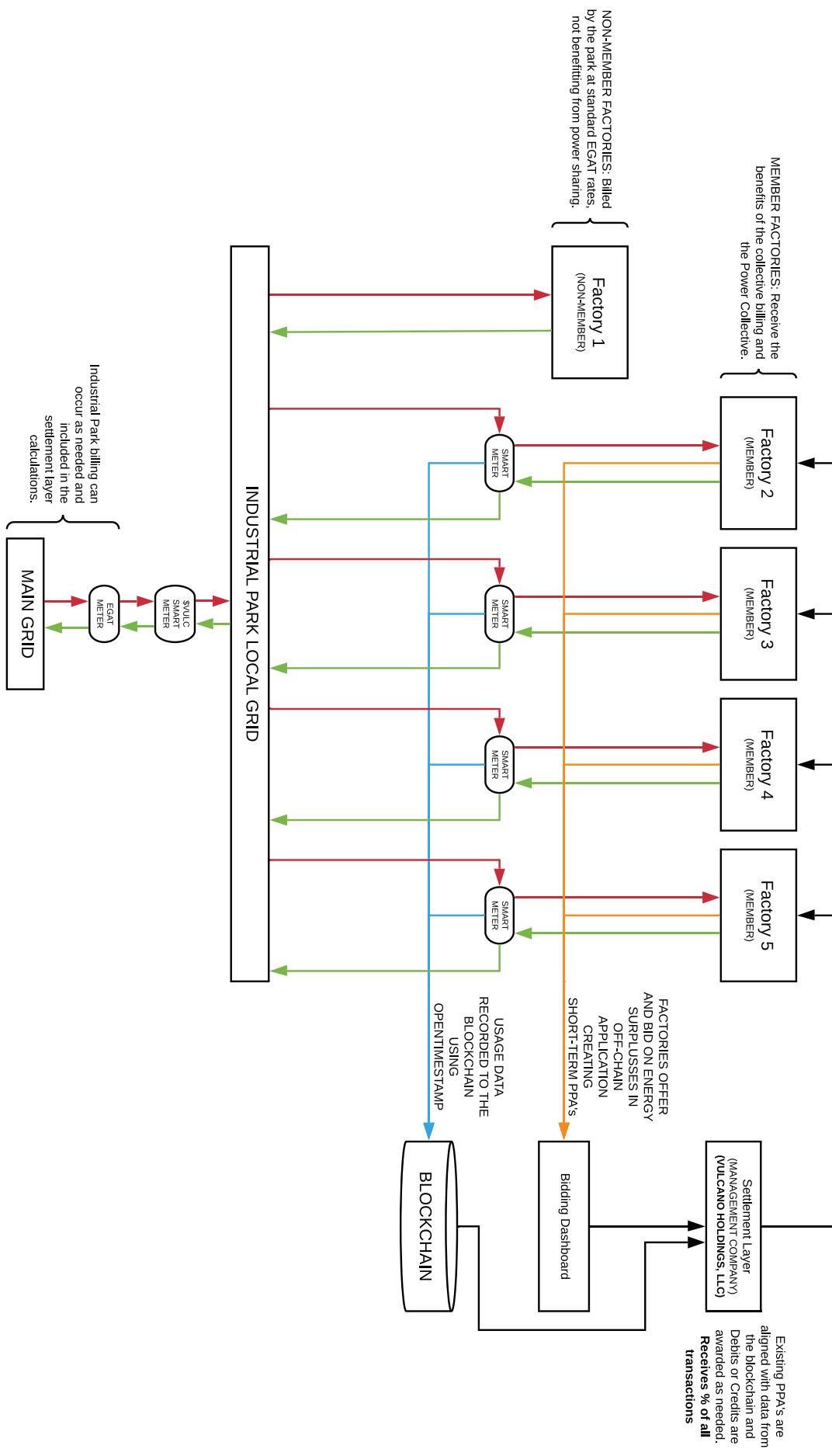
On the following page, a detailed view can be seen of the Project Moho Microgrid Ecosystem. For the purposes of this document, a single Industrial Park has been modeled.

In this ecosystem, it can be seen that both member and non-member factories would be able to interface with the local grid, but the member factories would use the Project Moho-enabled Smart Meters to do their settlement and monitor usage. As electricity flows from the point of generation to the nearest draw, only surplus or deficit in aggregate would pass through the EGAT meter, permitting the entire industrial estate to exist as its own micro-economy.

Each of these smart meters would interface directly with the blockchain. Rather than simply accounting for the amount of power used in a given block, it would rather track the flow on a per-second basis. There are multiple ways that this data could be stored, but by linking it to the blockchain, it guarantees its immutability and traceability.

This system would also make it possible to realize greater degrees of efficiency for the renewable energy generation markets, as localized generators could leverage the power of a \$VULC-powered smartgrid to handle power transmission and settlement based on their localized token. In this case, the smart meters would serve as IoT devices in the network and would be linked to specific sensors within a localized network.

**Figure 3: A Detailed View of the Project Moho Microgrid Ecosystem**





# AN EXAMPLE EXPLORED:

## GLOBAL LOGISTICS SOLUTIONS - PROJECT HEAVYLIFT A DISTRIBUTED FUTURE FOR GLOBAL SHIPPING AND SETTLEMENT:

Using NFDT's it would be possible to track the movements of a specific vehicle or package with an onboard Vulcano-enabled sensory package. This could potentially be a critical step to creating a trustless system of accountability for logistics providers. This would result in benefits for customers as it would incentivize an increase in transparency and follow-through on the part of the logistics provider. The logistics provider themselves could benefit from being able to demonstrate commitment and a record of on-time deliveries. In the long run, a system such as this could be integrated to work with existing insurance structures.

Additionally, the integration of a greater number of \$VULC-enabled IoT devices could help solve many additional problems for the logistics provider. For example, the following sensors could all be integrated with RFID-chipped cargo and could feed valuable information to both the logistics provider, their clients, and interested third parties such as insurance companies:

### Cargo Weight Data

Load weight data could be written to the blockchain at departure and at arrival to verify that the loss was not suffered en-route. This could serve as a critical piece of data for the 130-million containers shipped globally every year.

### TamperTape

A conductive strip of tape connected to an inexpensive battery-powered sensor node could be placed around goods on a pallet to alert the shipper and logistics provider if a pallet or container has been unpacked to substitute goods.

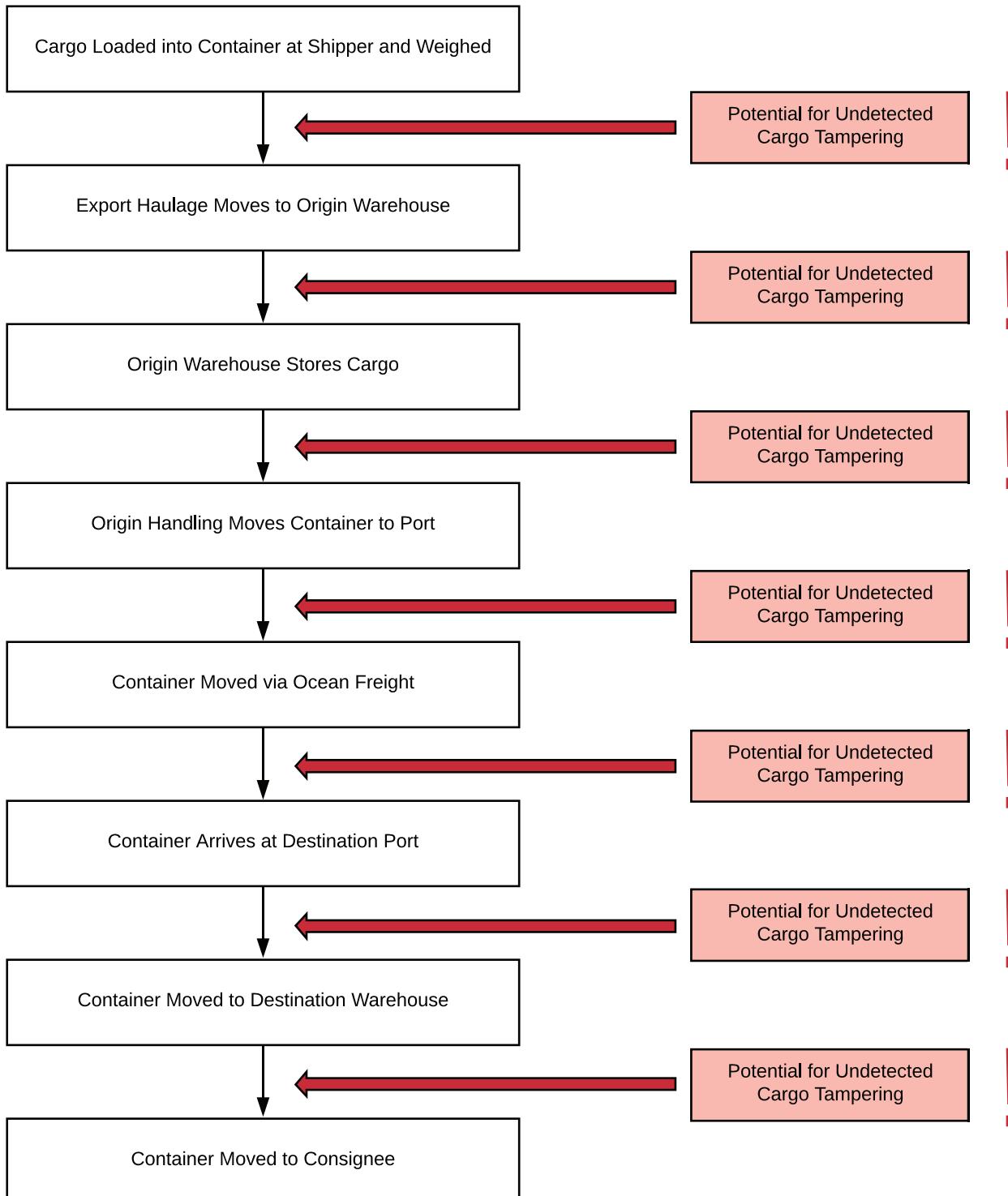
### Temperature Data

This could be critical for perishables and could serve to verify that the cargo made the transit from "A" to "B" without thawing. This is critical for the frozen food industries, which represent over \$58-billion in sales annually.

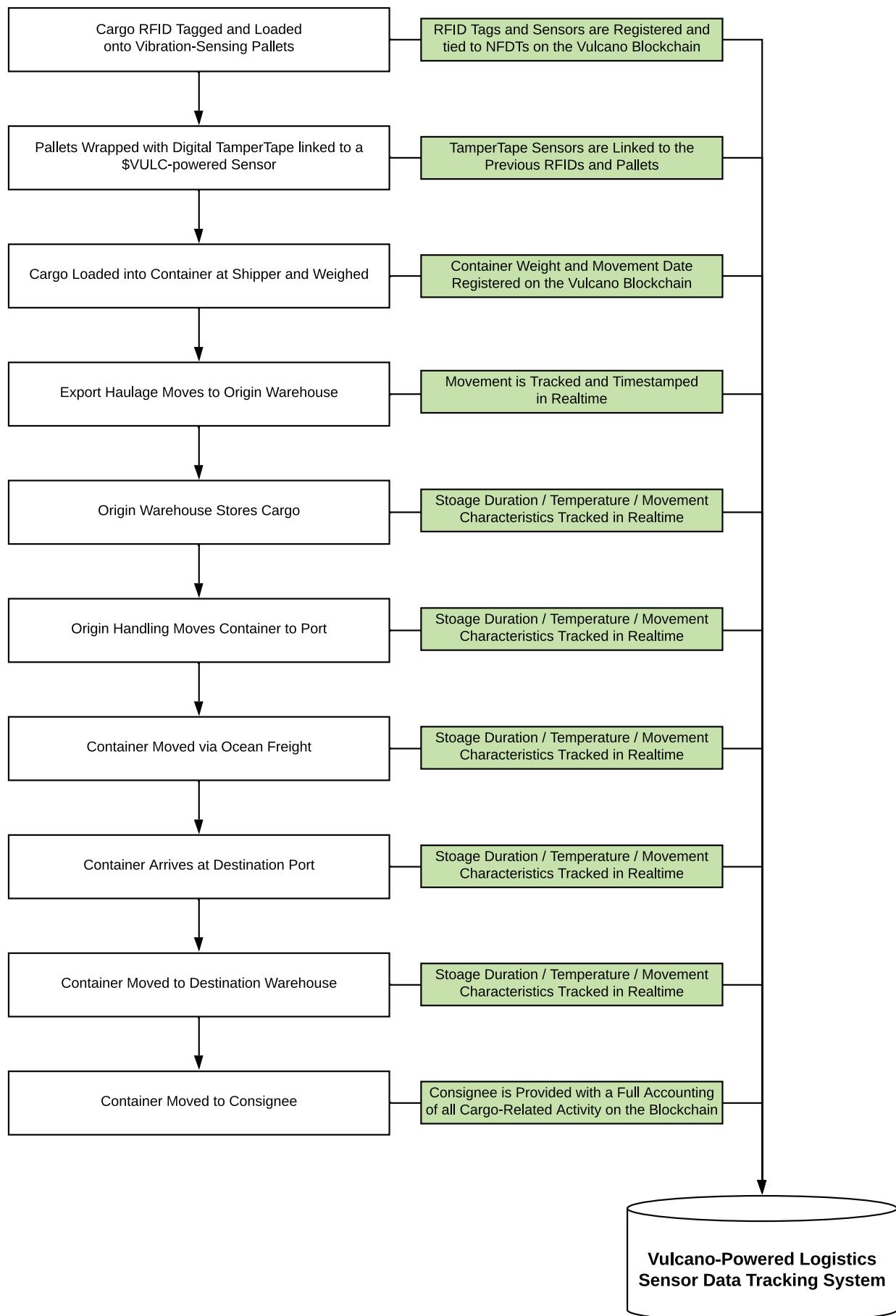
### Vibration Data

For fragile goods that should not undergo more than X vibrational force, a simple modification of the already extant Vulcano Seismic Sensor to detect vibration that might show data on handling or road conditions. For example, sensors could be installed on each pallet and would be able to detect when a single pallet was moving out of sync with its neighbors – a potential indication it was being tampered with.

As can be seen in the illustration below, there are substantial opportunities to improve security on a transported cargo. However, in order to understand a more evolved system, the existing system of import/export freight must be understood.



Now, the way that the four aformentioned features could work to secure a cargo can be explored. Please remember that these are only four of hundreds of simple implementations of the Vulcano Digital Assets System that could potentially be made to work to simplify and improve logistics.



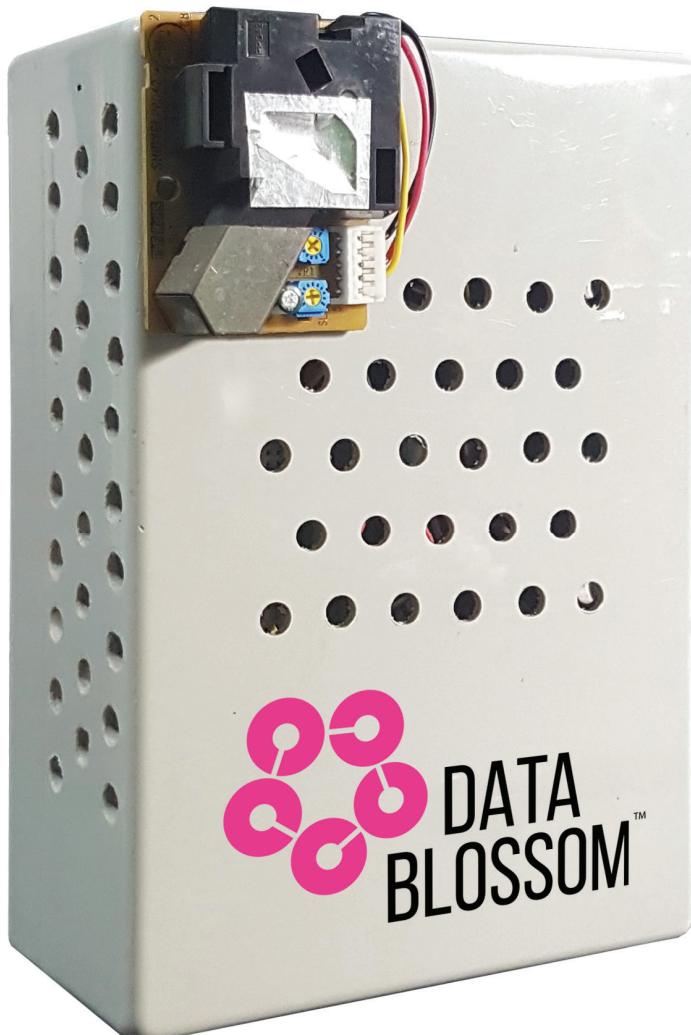
Through overlapping areas of data collection, the security of cargoes can be dramatically increased. While a specific instance of theft or disruption may not be stopped, the immutable nature of the blockchain would allow law enforcement and company assets to identify and reinforce weak areas of their logistical network. In 2018, cargo theft and supply line disruption (not counting natural disasters) accounted for over \$22 billion in losses. Developing more robust solutions to help track down and remove bad actors from the logistics equation can result in dramatically increased profits and reduced insurance entanglements.

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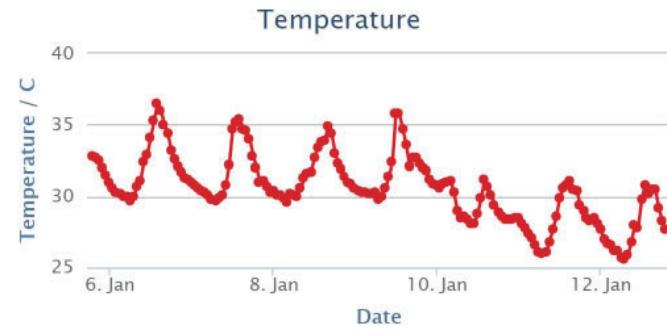
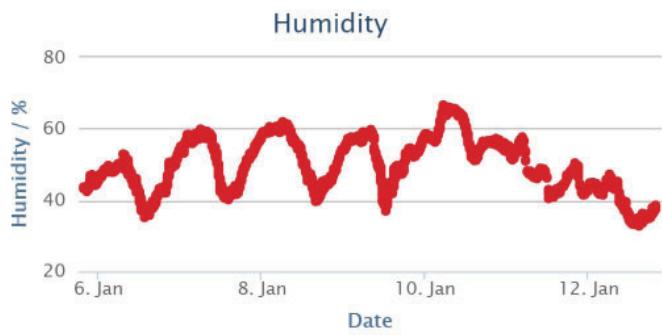
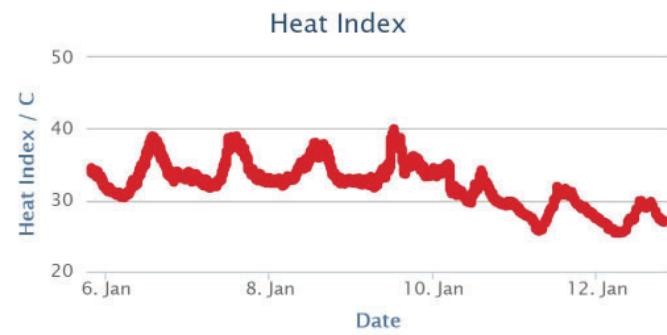
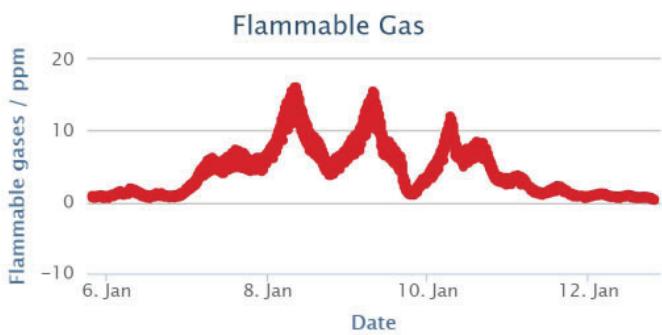
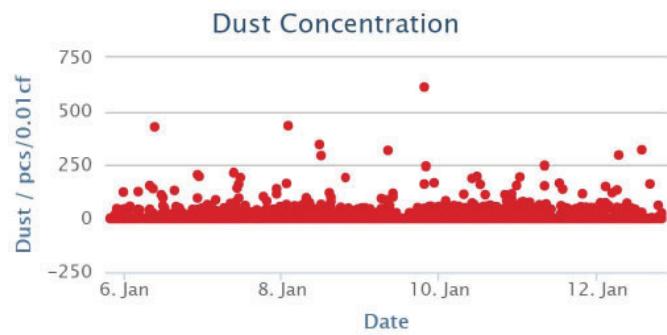
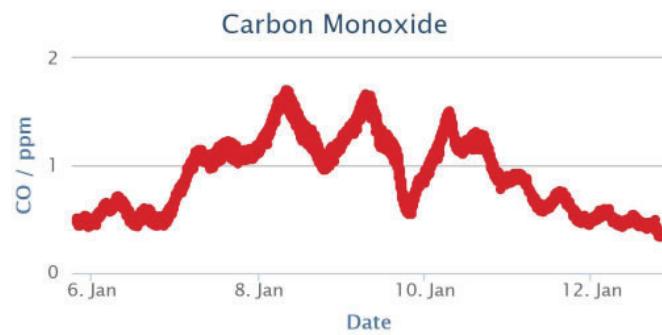
# AN EXAMPLE EXPLORED:-

## DECENTRALIZED CLIMATE DATA - PROJECT DATABLOSSOM A DISTRIBUTED MARKET FOR GLOBAL CLIMATE AND WEATHER DATA:



The first hardware component of what would become the Vulcano network was created in mid-2017 by Sorakrit Chonwattanagul under the direction of the current Team Vulcano Director, Jason "BitBender" Brink, for DataBlossom as a stand-alone system. This initial version, shown here, collected and transmitted data using a simple Arduino-based system. Currently, there are several of these units scattered throughout Bangkok which collect climate and weather data. Samples of this data are shown on the following page.

The next version, still under construction, is based on the much more robust Raspberry Pi hardware components. The switch from Arduino to Raspberry Pi will enable the installation of a blockchain ecosystem node. This hardware can support a wide variety of sensors and represents a proof of concept for the data collection model on the climate side of the equation. However, nearly any sensor could be connected to this and used to collect data.



The system, as it is currently envisioned, will function as follows: A sensor will take periodic readings from its environment. It will then transmit this data to a Vulcano Computational Node which will encrypt and erasure-encode this information before sending a hash back to the sensor which will then be encoded into the blockchain. This hash will allow the small comment area of the blockchain to be used to reference the stored data. By working in this manner, it will guarantee that the sensor data is kept anonymous, is secured for future use, and can be later monetized for business analytics purposes. This hash, written into the blockchain will also serve as Proof of Data Sent (PoDS), and will permit the payment of a token to a designated address on the network.

In this case, each sensor node will also serve a dual duty of securing the network making any attacks on the blockchain exceedingly unlikely to succeed. Once the data has been stored on the Storage Node, it will be distributed to other nodes around the world, guaranteeing that the data will be preserved. We intend to partner with other decentralized storage providers as well.

Interfacing through sensors can take place in a variety of ways. However, Vulcano intends to release both Apple and Android mobile management applications which will function as a tool to help manage sensors, as well as a wallet to allow tokens to be sent and exchanged as needed.



# OTHER EXAMPLES:

## LOCATION SECURITY DATA:

Home and corporate access control systems could benefit from the integration of Vulcano-enabled security hardware. This can be done in one of two ways:

### Per User (NFDT)

In this case, each user and session would be tracked on the blockchain using a nonfungible data token. The usage of this system for tracking this sort of data would make it possible for a truly trustless security management system to be created.

### Overall (FDT)

It would be possible to create a utility token which would not track specifics of an individual, but rather the overall usage of a system. This could be applied to security, logistics or any other industry in which access to a resource with finite quantities must be monitored and controlled.

## DINING NOISE LEVEL VERIFICATION:

Imagine being able to go to a website to check the ambient noise level at restaurants in an entirely transparent fashion. Through the use of a Vulcano-enabled Decibel Meter broadcasting the ambient noise level, it would be possible for restaurants to transparently advertise to their target demographic. The deployed sensors would collect data generally and the participating locations would receive the specific token for their local ecosystem. According to Zagat's, noise is the #2 complaint from diners in the US. Through the use of this system, this problem could be transparently solved in a distributed fashion.

## MECHANICAL WEAR AND USAGE DATA:

The Vulcano blockchain could be applied to collecting usage and health statistics for mechanical devices like elevators. Any of the over 1 million elevators in the United States or Canada could be used to provide vital data to construction engineers. Any modern vehicle could provide a wealth of information to civil engineers about road quality. Networked and Vulcano-enabled thermostats could give insight into energy usage and heating or cooling trends. By developing a methodology for the integration of these individual sensors with the Vulcano blockchain, we will allow for the aggregation and centralization of larger stores of data than have ever existed prior to the development of Vulcano.



# DATA INTEGRITY

One critical consideration in any data-driven ecosystem is the isolation and removal of bad actors. As decentralization is critical to the long-term success of a project like Vulcano, the users themselves will play a major role in the validation of data being uploaded in the respective subdomains. Each new subdomain of data added will have its own specific mesh network of reputation-based validation. In this way, users and holders of a specific token on the network will be able to vouch for one another to increase the general faith in the validity of the data provided.

Ideally, data collected from within a single ecosystem will be vetted by other members within the same ecosystem. For example, the relatively small ecosystem of radiation data collection communities in Japan will likely be able to self-police to check one another's data. Seismic data will be able to be correlated to other seismic sensing equipment around the world to determine whether the data presented is completely anomalous or within a degree of acceptability to be accepted to the network. This decentralized and trustless system will remove the requirements for a centralized data certification agency.

While this would work in an entirely decentralized fashion, specific communities would be able to invest in systems to check and verify their data. If supported by the specific data community at large, then anomaly detection neural networks could be added to the system in order to increase the degree of certainty users of the data would

have in the validity of the data. As with other decentralized systems, it would be entirely up to the users and the community to determine how far they would like to go in order to verify and validate their data sets. It is expected that the more effort a community takes to validate their data and demonstrate the validation process, the more that data would be worth on the open market.



# NETWORK SECURITY

Currently, Vulcano is a Masternode- and Proof-of-Stake-based cryptocurrency. While this will not change in general terms, there will be modifications to rewards based on the feed-in characteristics of the masternodes, creating six different ways in which one can participate in the network security and computational portions of the Vulcano ecosystem, each with their own distinct reward plans.

- **Proof-of-Data-Sent (PoDS) - Assets within the Vulcano Ecosystem:** Each asset created within the Vulcano chain and linked to IoT devices will generate its own specific token based on the rules used to establish that specific asset. For example, Project Moho may generate \$MOHO while Project DataBlossom might generate \$BLOS in exchange for the data submitted to the decentralized validation network.
- **Multi-Asset Wallet Staking:** This would be considered the “vanilla” Proof-of-Stake wallet similar to the existent Vulcano wallet. Through keeping a wallet open, a user contributes to the verification of transactions and confirms blocks. Users would be rewarded in \$VULC for their service to the network.
- **VULC Masternodes:** This would be considered the “vanilla” masternodes currently existent on the Vulcano network. These nodes have very few duties beyond those given to the typical staking wallet and are therefore able to be deployed very cheaply on relatively low-powered hardware.
- **Domain-Specific Contract Proof-of-Work:** For domain-specific neural-network training, and advanced computational tasks, Proof-of-Work will be enabled on a contract basis within the Vulcano ecosystem. In this case, the Proof-of-Work fees will be paid by the client submitting the work request through the Vulcano Computational Bidding System where the task can be picked up and completed by miners. These computational tasks can range from relatively simple physics calculations to specific artificial neural-network based computations.
- **Domain-Specific Masternodes:** Some assets within the Vulcano ecosystem will benefit from having their own masternodes to handle transactions and to provide dedicated transaction bandwidth separate from the rest of the Vulcano network. The rewards for the operation of these masternodes will be in the asset for which they are configured to support and determined by the rules input during the creation of that specific asset.
- **Vulcano Ecosystem Storage Nodes:** The massive quantities of data generated by the Vulcano ecosystem will require off-chain storage and scaling. A specific asset will be created within the Vulcano ecosystem to reward those who make storage space available. This will be explored in much greater detail in a later version of this document.

# HARDWARE DEVELOPMENT

Vulcano has funded and is developing two separate sensor-based hardware projects. These are simply the beginning of a much larger hardware ecosystem.

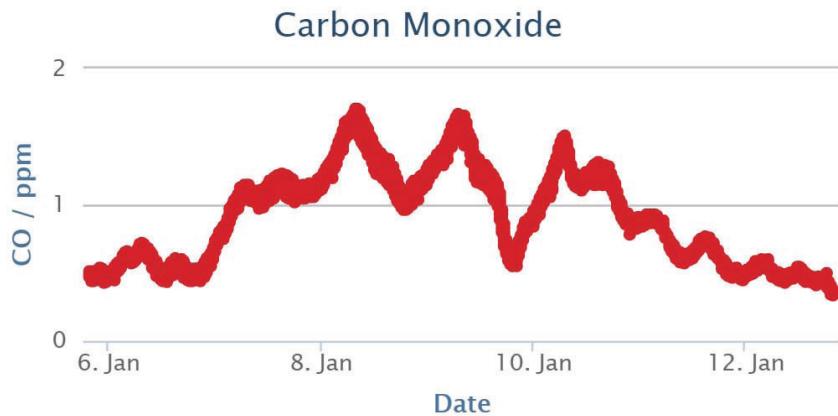
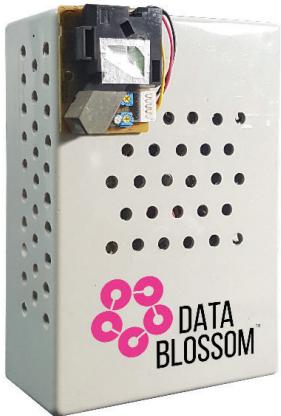
## Seismic Sensors

Starting in late 2018, Vulcano began funding research in seismic sensors at Rajamangala University in Thailand. As of April 2019, these sensors have entered testing and should enter production in early 2020.



## Weather Sensors

The DataBlossom Weather Sensor Station and network has been deployed in Bangkok. These first-generation sensors are relatively primitive but are being further developed for pick-and-place manufacturing. Ideally, these sensor kits will also enter production in late-2019 or early-2020.





# REVENUE GENERATION

Development, especially when hardware and software development are pursued simultaneously, is costly. For this reason, we are devoting a portion of our development time to creating revenue-generating services which can serve the specific needs of the community. Some options being considered are:

- **Contract Development:** Team Vulcano has not and will not ask for donations from the community. However, there are substantial costs associated with the development of this ecosystem and the attendant solutions that it will provide. Any business that sees a potential to apply these solutions and would like to investigate forming a partnership should contact Jason Brink directly at [bitbender@vulcano.io](mailto:bitbender@vulcano.io).
- **Community Expansion of VulcMart:** We are in the process of completing a radically redesigned VULCMART, which will enable users to purchase most types of digitally delivered goods. Users will also be able to list their own goods for sale on this semi-centralized marketplace. User-listed goods will be vetted to ensure they comply with regulatory concerns. A percentage of the proceeds from this will go directly to providing funding for development.
- **Vulcano Ecosystem Consultation:** As the Vulcano Platform is rolled out, the Vulcano Team will offer consultation services to entities wishing to create a token within the Vulcano ecosystem. While this service will not be required to create assets, it will serve to help maintain a high standard of reliability for those projects who choose to avail themselves of the Vulcano Ecosystem Consultation.



# FUTURE ISSUES

Development, especially when hardware and software development are pursued simultaneously, is costly. For this reason, we are devoting a portion of our development time to creating revenue-generating services which can serve the specific needs of the community. Some options being considered are:

- **Potential Rebrand:** The name “Vulcano” may prove to be something of an obstacle to future growth due to several potential trademark conflicts in the United States and abroad. Additionally, as “Vulcano” is an unconventional spelling to some people, it may prove a barrier to adoption. This is not a decision that needs to be made instantly, but it is worth considering. Team Vulcano welcomes suggestions from the community.
- **Edge Computing for Specific Domains:** In the future we will be investigating geo-localized edge computing to pre-process some data to make it easier to use within the broader ecosystem. This would be especially useful for data-domains such as climate or certain types of usage-based data that is naturally confined to a specific area.
- **Partnerships Needed:** We in Team Vulcano have set an extremely ambitious series of tasks for ourselves. We are actively seeking partnerships with other projects and businesses that could both benefit from the world we are taking on, as well as those who would contribute to the world we are conducting. There is also potential possibilities for equity shares in the companies we are establishing to service the Vulcano ecosystem.

## CONCLUSION

It has been only nine months since the Vulcano Team was brought together to take over a project that had once been without hope. In the last nine months, the Team has accomplished more than some blockchain projects have in a half-decade of operation. However, this is still only the beginning. Vulcano is still building for a greater eruption to transform the future of cryptocurrency, blockchain, and data-driven assets.

## A THANK YOU FROM BITBENDER

The blockchain and cryptocurrency fields are awash with bogus projects and people who are only in it for the money or fame. It is **GOOD** to be skeptical of projects and to push them to achieve the goals that they set out for themselves. In Team Vulcan, we know that our biggest detractors are usually the ones that push us to achieve the most.

I don't know who it was that said it, but I have always stood by the adage, "**Do it for the people who want to see you fail.**" So, in that spirit, I thank everyone who has ever told us that what we were doing wouldn't work. We are not perfect, but we **DO** work hard and will make progress towards achieving our goals.

I also want to give a **HUGE** shout out to our incredible community. You guys are **AMAZING**, and I can't possibly stress that enough. Some people I want to thank by name for their stellar community involvement are:

KrisNinakos  
Bladerunner  
Linkara6669  
Maedin  
Sakhi  
Create  
link55588  
CunningStunt  
CryptoBro

Carlos  
Gerald  
Oscar  
Zu  
TegoCryptoman  
Binkerssoft  
Tufanou1907  
PinnacleKing3005  
Brunnooo

DeadToRights  
Sasman19  
Oblivion  
CryptoYami  
CryptoPiece  
OrlandoLasso  
MiniDwarf  
Like  
Kxk

...and so so so so so many more.

Some of you may be somewhat surprised to find your names on this list, but each and every one of you has contributed to this project in ways that are extremely important. I could go on for dozens and dozens of names...each and every one of you is vital and has brought something to the project.

Also a huge shoutout to our global communities and their leaders: **NandoDejave**, **Carlos**, and **Arnold**, among others. To all of **Team Vulcan**...you guys are my heart and soul. Thank you for all that you do. I cannot possibly thank you enough!

**Now get out there and be GREAT!**

