MYBIT

Tokenizing Smart Energy, AI, and Ownership

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Abstract

Due to flaws in centralized systems, asset management (specifically ownership) has not progressed with other industries and is still fragmented in outdated, closed systems. For It to be fully secured and managed in an efficient manner the systems must be decentralized. In the past few years, technological advancements have made decentralization possible utilizing various Blockchain technologies. Through decentralized ownership, many revolutionary models become possible such as the tokenization of smart (decentralized) energy and AI (specifically autonomous mobiles).

This paper describes our implementation to securely create a decentralized digital footprint of asset ownership, authenticate and transfer revenue streams based on ownership, and tokenize energy and AI infrastructure in an immutable, transparent, cryptographically secured, and highly auditable Blockchain Ledger application.

The approach has four core components: 1) The ability for users to register and transfer ownership of assets on the Blockchain, 2) the ability to secure these assets in a Smart contract powered Trust or Will, 3) the ability for sustainable technologies to be tokenized by manufacturers and individuals to remove financial barriers to entry, and 4) the ability to vastly reduce the complexity of authenticating decentralized revenue streams.

The Blockchain is used to securely record ownership transactions that are impossible to later repudiate or manipulate. Later in this paper we will discuss the various Blockchain protocols chosen for the initial MyBit application.

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1. Centralized vs Decentralized

1.1. Centralized model

Centralized models rely heavily on one party (company, individual, server, etc.) to manage and make core decisions.

A large majority of models today are centralized (some may include decentralized components but as a whole do not fit the criteria of a truly decentralized model). **Examples of centralized models** include businesses where the owners (or managers) make the core decisions, government organizations, and IT systems that hold all user information and company data. Even peer to peer companies such as Uber and AirBnB do not fit under the decentralized classification because all users are routed through the service provider for all activity.

The largest **advantage of the centralized model** is the ability for highly efficient decision making. This is due to owners typically deciding the vision, operations, and all other aspects of business while employees follow these objectives. If a mission critical issue arises, core decision makers can meet, discuss, and implement a resolution strategy rather quickly and efficiently.

1.2. Core Issues with the Centralized Model

Flaws of the centralized model include a) bureaucracy in decision-making which slows down innovation. If a majority of the employees or customers want to see a change, it is ultimately up to the owners (or managers) to make the final decision. b) single point of failure risk. If something happens to the service provider it affects employees, customers, and other affiliated parties which creates unnecessary risk for participants. c) the model is not designed for innovation. Due to the bureaucratic structure where employees lack the ability to partake in the decision making process it creates obstacles for implementing innovative updates.

1.2.1. Fragmentation and Opaqueness in asset ownership

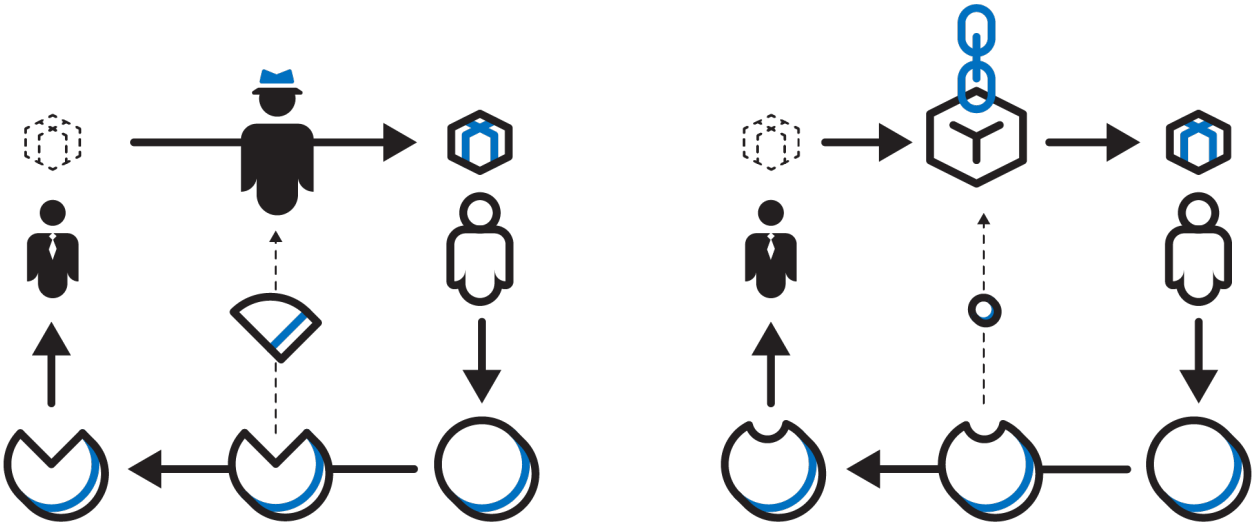
The absence of efficient technology solutions surrounding Asset Management hinder the ecosystem. The current systems do not adequately facilitate asset management making the process unnecessarily time consuming and expensive for all parties involved. Lack of transparency and counterparty risk adversely affect secondary market transactions and securing assets (in Trusts or Wills). Nearly all facets of business are moving to a digital environment to provide an easier and cost-effective solution for both individuals and companies alike, yet the Asset Management industry is finding it difficult to keep pace with the transformation.

Communication transcends borders, mobile money and electronic banking enable the instant transfer of funds, FMCGs and services can be easily purchased online, yet the process of managing assets remains expensive and cumbersome.

1.2.2. Reliance on Third Parties

Trusted third-parties have existed for decades to facilitate and secure transactions while keeping a piece of it for themselves. With Ethereum smart contract technology a majority of these roles can be replaced with computer code that is guaranteed to be executed as written, without error. It is important to understand that Blockchain does not completely eliminate the need for oversight or a third-party in every situation; however, it changes how a lot of business models in the future will need to function to remain relevant and profitable. Models that include brokers, escrow agents, or other third-parties that currently profit from facilitating a transaction will have to transition into providing an actual

service of value rather than being able to “skim” percentages of each transaction. This is due to Blockchain technology providing a faster, cheaper, and more secure method of transfer.



As you can see above in the above figure, increased automation in a particular transactional process (the fewer human hands it needs to touch to be completed) results in more money being retained by transaction participants.

1.2.3. Not a secure way to manage records

Records are held by trusted-third parties and are not continuously audited or checked for validity. This creates an unsecure method of managing these ownership rights as well as an inefficient way to retrieve the data for verification and/or transfer purposes. A common “hack” in today’s society is data manipulation, the altering of records (data) to produce a different outcome. For example, if a financial analytics firm had even a small fraction of their data altered it could completely change the output of their algorithms. Another example is where record ownerships are altered enabling an individual or group to fraudulently sell the asset. These cyber attacks go largely unnoticed because there are not many cost-effective nor efficient solutions for countering them.

With Blockchain technology you have a preventative measure against these data manipulation attacks built directly into the functionality in that each transaction is revalidated before the next one can be written to the chain. This is a core reason

why we believe Blockchain technology to be the optimal solution for implementing a digital asset (and ownership) platform.

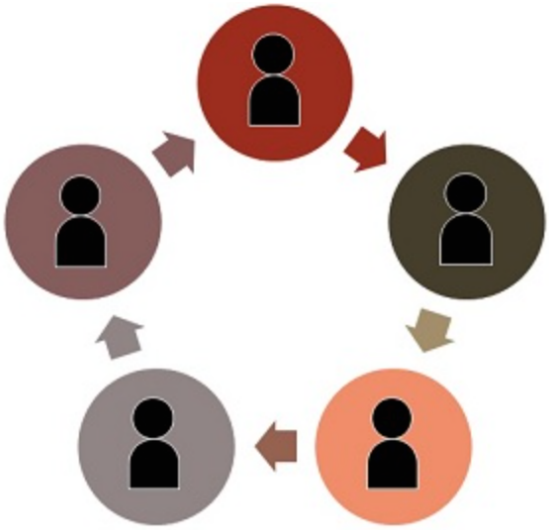
1.2.4. Lack of transparency creates auditing and compliance issues

Since data is often kept in closed-systems unavailable to the public, people must rely on third-parties to correctly (and regularly) conduct audits. Unfortunately, if it is not mandated from a regulatory body, audits are very rarely conducted because they do not provide tangible economic value. It would be too time consuming (with no clear cash value) for auditors to analyze records of entities that were not mandated to do so.

If the records were easily available to the public, it would resolve much of this issue. There is also potential for problems to arise from lack of transparency and accessibility of data for governing bodies. For this reason (and lack of adequate reporting tools), peer to peer commerce is one of the leading issues to regulators. If a transparent and auditable Blockchain ledger solution was implemented and became the standard in transactional reporting, it would increase both the accuracy and efficiency of the entire process while not requiring additional reporting work to be completed by the users of peer to peer services.

1.2. Decentralized model

Truly decentralized models rely on the entire network of participants to make decisions and run the business.



Very few organizations follow truly decentralized models to date. Prior to the recent emergence of Smart Blockchain Technology decentralization was not feasible. Over the upcoming years you will most likely see a massive shift into decentralized models. According to Johnston's Law, "Everything that can be decentralized, will be decentralized." Current **examples of decentralized models** include Bitcoin, Ethereum, Augur, Steem, Iconomi, and Waves. The foundational structure of these will be explained in the Blockchain 2.0 and decentralized application sections further in this paper.

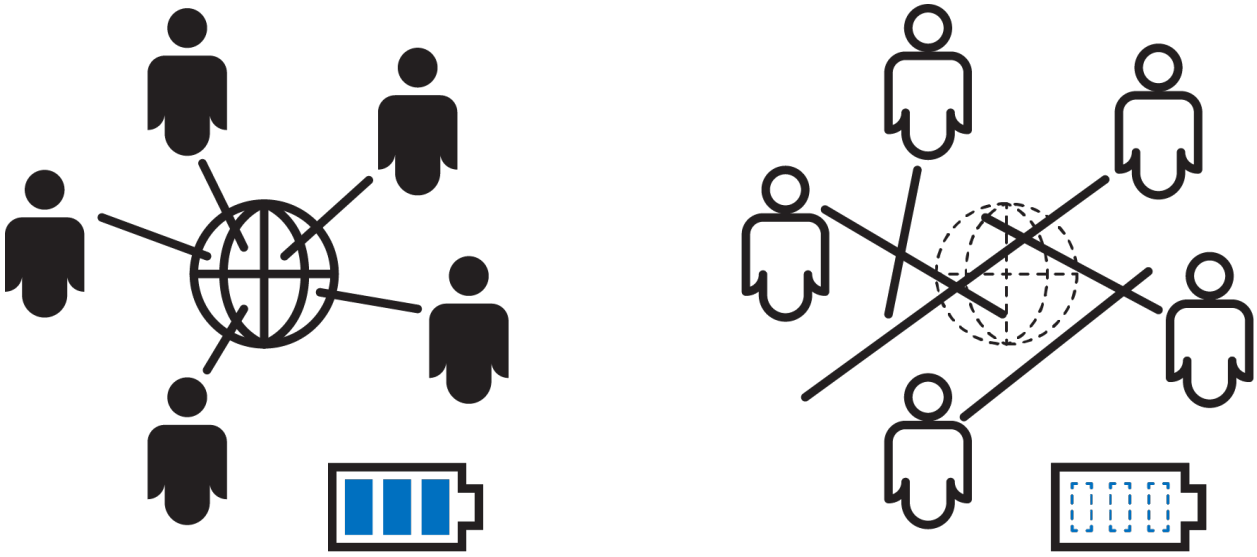
The biggest **advantages of the decentralized business model** are a) no single point of failure risk. Since there is no service provider (or centralized party) which the network relies on to function properly, if one (or several) network participants are corrupted or leave the network it will not affect functionality nor the other participants. b) incorporates truly democratic principles by providing every participant an equal say in the vision, development, and objective of the organization. c) fuels innovation via the enablement of experts from a variety of verticals to equally participate in operations and suggest changes.

A **disadvantage of the decentralized model** is that organizational issues have the potential to arise during the decision-making process if there is a lack of

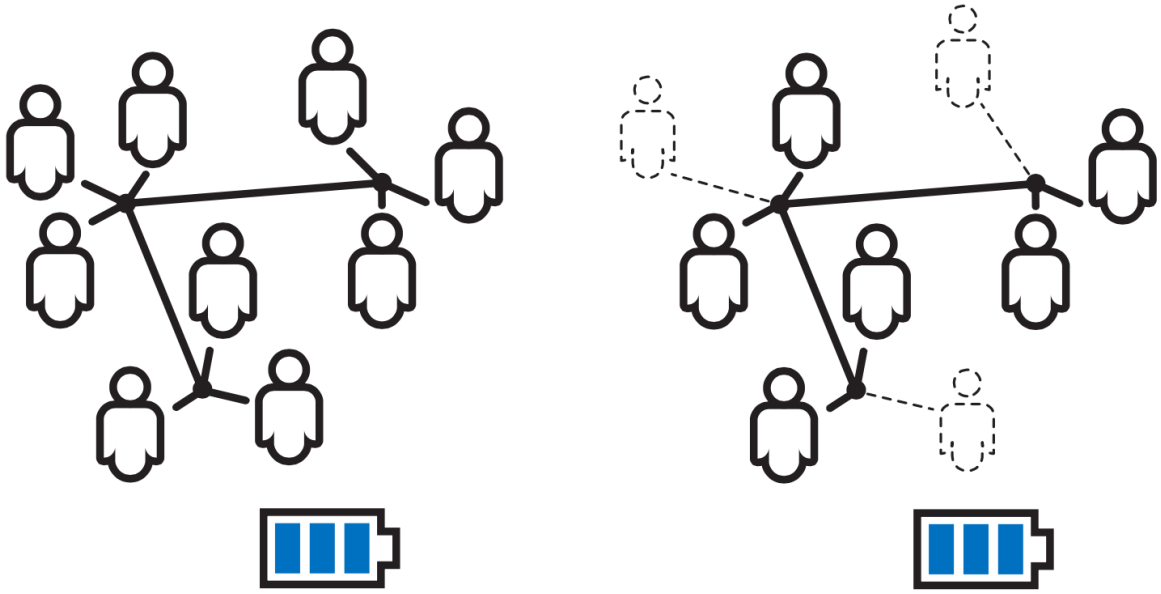
agreement among members. This issue is addressed and made much more manageable with **Blockchain Consensus Technology**.

1.3. Centralized vs Decentralized Comparison

If the service provider (AirBnB platform for example) is removed, all of the users are affected and unable to continue utilizing the service. This creates a single point of failure risk.



In the decentralized model there is not a reliance on a single service provider in which all users must be routed through for the system to function thus eliminating a single point of failure risk. The actions, roles, and responsibilities of the service provider are written in computer code therefore ensuring execution according to community dictated decisions (commonly referred to as Consensus).



Consensus is a vital characteristic of decentralized application architecture which requires that a majority of users must agree on any core change to the business model before it can be implemented. Whereas, in a centralized model, if a company decided to update an aspect of their business operations such as raising fees, changing terms and conditions, or altering their model in any way, it could be completed without the approval of users.

1.4. When does Decentralization make sense?

Not all models would benefit from a fully decentralized structure. It may not be optimal for a large multi-national corporation that has investment holdings, manages supply chains for computer component distribution, provides consulting services, and has thousands of businesses relying on their services. If something were to go wrong, it is critical that the MNC is able to react as quickly and efficiently as possible. This requires a core (centralized) group to handle these important decisions. While this approach is usually more viable, it still has the single point of failure risk if decision makers do not act in the best interest of the company or "go rogue."

While organizing the multi-national corporation itself with a decentralized model does not usually make sense, it may streamline operations to implement a decentralized model to some lines of business within the MNC. The MNC could

decentralize their investment technology and protocols to increase transparency, streamline processes such as dividends and other disbursements, and eliminate a single point of failure risk such as an upset employee intentionally making adverse investment decisions to damage the company. Supply chains and inventory management could also be decentralized to cut costs and open the doors to innovation. The people who usually are most knowledgeable about specific problems and inefficiencies are not typically the business owners and decision makers, but rather the employee(s) who work directly in the respective sector. This creates a conundrum where the decision makers often are not fully aware nor experienced in the field, yet the employees who have experience usually do not have a voice in the outcome. Decentralized models work to bridge this gap via streamlined communication and consensus protocols.

In the majority of circumstances, it would be in the best interest of an organization with multiple lines of business to take a centralized model approach. Decentralized models are most viable for specific applications and departments where achieving objectives is more reliant on transparency, innovation, and risk-aversion, and not as reliant on fast decision making.

1.5. Why is our platform better suited for a Decentralized model?

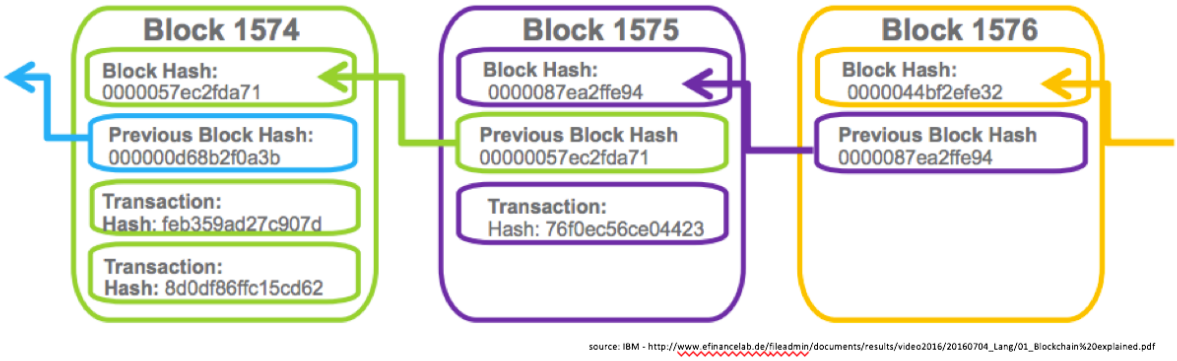
Centralization creates a single-point of failure risk. When you are dealing with potentially billions, if not trillions, of ownership records and revenue streams, the data and revenue streams become vulnerable to fraud and mismanagement if one entity controls it all. It also creates security flaws that can (and statistically will) be exploited.

By utilizing a decentralized model, a single point of failure risk is removed. Data is governed and maintained by network participants (nodes) and all data is fully replicated across all network peers. Also, Democratic principles are ingrained in the core (code) of the platform providing all participants with a voice regarding the future of the application. This results in innovation at the foundational level. This creates a unique opportunity for managing assets and ownership that is more secure, efficient, and reliable than any other solution for digitalizing assets and ownership.

2. Intro to Blockchain

A Blockchain is a data structure that makes it possible to create a tamper-proof digital ledger of assets and transactions which are shared among a distributed network of users. Blockchains utilize advanced cryptography to allow each participant on the network to interact with the ledger in a secure way without the need for a central authority.

Once a block of data is recorded on the Blockchain ledger it is often referred to as immutable in that it is extremely difficult to change or remove due to the fact that all past transactions are continuously revalidated before an addition can be added. When a user wants to add to a Blockchain, participants in the network (all of which have copies of the current Blockchain) run algorithms to evaluate and verify the proposed transaction (all of this happens in the background in a matter of seconds). If a majority of nodes agree that the transaction looks valid, (identified information matches the Blockchain's history) then the new transaction is approved and written to the Blockchain.



Transactions are grouped into 'blocks', then stored forever in a 'chain' by linking each new block chronologically with the hash of the preceding block

2.1. Bitcoin

Bitcoin is often referred to as the first "killer" decentralized (Blockchain) application. Since it was launched in 2009, it has had 100% uptime with zero network breaches which is remarkable. A common misconception regarding major Bitcoin hacks is the Bitcoin network itself that was exploited; that was not

the case. The hacks that have gained much attention were Bitcoin exchanges starting with Mt. Gox and including Bitstamp, Bitfinex, as well as other small platforms. These hacks, which lead to millions of dollars worth of Bitcoin being stolen, had nothing to do with the security of the Bitcoin network, but rather how the exchanges managed user account access and private keys.

2.2. Bitcoin 2.0: Blockchain application Layer

Commonly referred to as Bitcoin 2.0 technology, the Blockchain application layer is a set of bitcoin-derived technologies designed to further the functionality, scalability, and performance of the Bitcoin Blockchain.

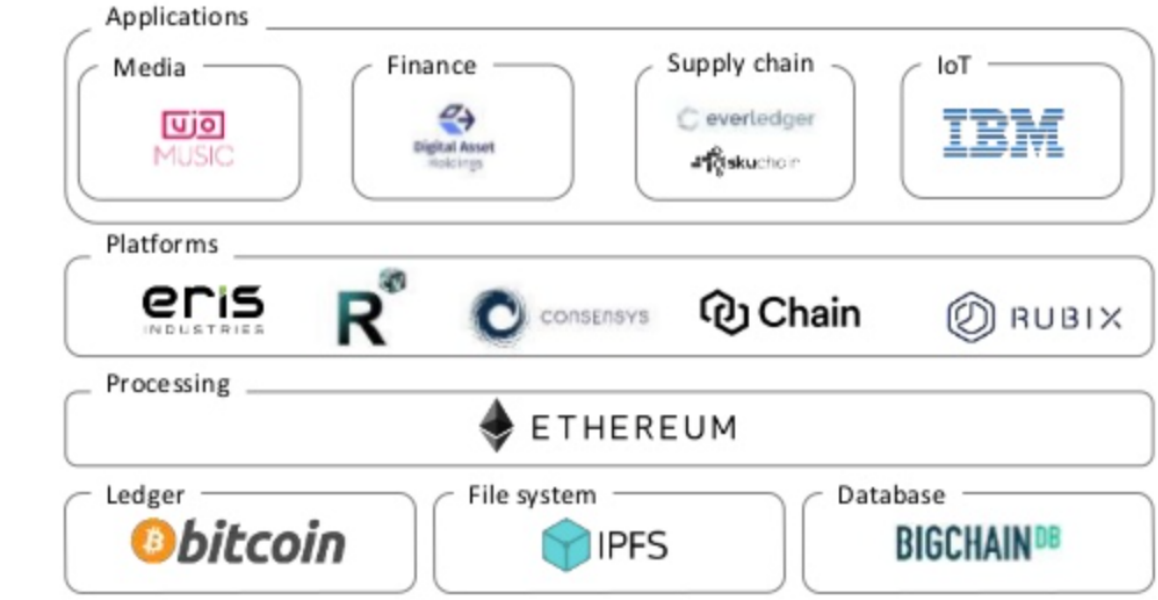
With Blockchain application layer technology, we have seen the emergence of smart contracts. **Smart contracts** are computer protocols that facilitate, verify, or enforce the negotiation or performance of a contract, or that make a contractual clause unnecessary. Smart contracts usually have a user interface and often emulate the logic of contractual clauses which can be partially or fully self-executing, self-enforcing, or both. Smart contracts aim to provide security superior to traditional contract law and to reduce other transaction costs associated with contracting.

Other innovations that have accompanied Blockchain application layer technology are increased performance such as faster block processing times, ability to process more transactions in a single block (blocksize), and more efficient algorithms to secure the network that are not as resource heavy as Bitcoin's proof of work algorithm. Other application layer technologies facilitate interacting with the Blockchain such as easily deploying on various environments, SDKs to interact with common application programming languages, and advanced consensus technologies to manage organization of network participants. New applications are constantly emerging that cater to a specific need or area.

2.3. Decentralized Applications (DApps)

DApps are decentralized ledgers that enable efficient value transfers and trustworthy storage because they are secure even in the face of actively malicious attackers. These systems are distributed, massively redundant, fault-tolerant databases.

Below is a diagram of a generalized **Decentralized Application Stack**. Our stack slightly differs for reasons of stability and performance which we outline in detail in the “Tech Stack” section further in this paper.



For an application to be considered a DApp it must meet the following criteria:

1) The application must be completely open-source, it must operate autonomously, and with no entity controlling the majority of its tokens. The application may adapt its protocol in response to proposed improvements and market feedback but all changes must be decided by consensus of its users.
2) The application's data and records of operation must be cryptographically stored in a public, decentralized blockchain in order to avoid any central points of failure.
3) The application must use a cryptographic token (bitcoin or a token native to its system) which is necessary for access to the application and any contribution of value from miners should be rewarded in the application’s tokens. The application must generate tokens according to a standard cryptographic algorithm acting as a proof of the value nodes are contributing to the application (Bitcoin uses the Proof of Work Algorithm).

2.4. Decentralized Consensus

Decentralized consensus breaks the old paradigm of centralized consensus when one central database rules transaction validity. A decentralized scheme, on which the bitcoin protocol is based, transfers authority and trust to a decentralized virtual network and enables its nodes to continuously and sequentially record transactions on a public "block," creating a unique "chain": the Blockchain. Each successive block contains a "hash" (a unique fingerprint) of the previous code; therefore, cryptography (via hash codes) is used to secure the authentication of the transaction source and removes the need for a central intermediary. The combination of cryptography and Blockchain technology together ensures there is never a duplicate recording of the same transaction.

There are two common **mechanisms by which DApps can establish consensus**: the **proof of work**, PoW, mechanism and the **proof of stake**, PoS, mechanism.

With the proof of work mechanism, decisions about changes in a DApp are made based on the amount of work that each stakeholder contributes to the operation of the DApp. Bitcoin uses this approach for its daily operations. The mechanism for establishing consensus through PoW is commonly referred to as mining.

With the proof of stake mechanism, decisions about changes in the DApp are made based on the percent ownership that various stakeholders have over the application. For instance, the vote of a stakeholder who controls 10% of the tokens issued by a DApp carries a 10% weight.

These two mechanisms can be used in parallel. Such a combination allows a DApp to operate with less energy consumption than proof of work alone and allows it to be more resistant to 51% attacks.

DApps have the potential to become self-sustaining because they empower their stakeholders to invest in the development of the DApp. Because of this, it is conceivable that DApps for payments, data storage, bandwidth, and cloud computing may one day surpass the valuation of multinational corporations like Visa, Dropbox, Comcast, and Amazon that are are currently active in the space.

3. Ethereum

3.1. What is Ethereum

Ethereum is an open source public blockchain-based distributed computing platform, featuring smart contract functionality. It provides a decentralized virtual machine, the **Ethereum** Virtual Machine (EVM), that can execute peer-to-peer contracts using a token called ether.

Smart contracts are applications that run exactly as programmed without any possibility of downtime, censorship, fraud, or third party interference.
These apps run on a custom built blockchain, an enormously powerful shared global infrastructure that can move value around and represent the ownership of property. This enables developers to create markets, store registries of debts or promises, move funds in accordance with instructions and many other things that have not yet been invented, all without a middle man or counterparty risk.

Effectively, Ethereum aims to take the promise of decentralization, openness, and security that is at the core of blockchain technology and integrate with nearly everything that can be computed.

3.2. Functionality

Ethereum enables developers to build unstoppable applications with smart money and smart execution of tasks. On traditional server architectures, every application has to set up its own servers that run their own code in isolated silos, making sharing of data difficult. If a single app is compromised or goes offline, many users and other apps are affected. On a Blockchain, anyone can set up a node that replicates the necessary data for all nodes to reach an agreement and be compensated by users and app developers. This allows user data to remain private and apps to be decentralized which is how the Internet was supposed to be designed.

3.3. Resource Efficiency

Ethereum has plans to migrate the network from proof of work to proof of stake in the near future. Proof of stake provides a large resource efficiency over proof

of work since it does not rely on specialized supercomputers (ASIC Miners) to secure the network and validate transactions.

Proof of work is extremely inefficient in terms of energy which makes it very expensive. This incentivizes miners to centralize the hashing power in what is referred to as mining pools. This is clearly not desirable for a network whose goal is to minimize the need to trust third parties and centralized powers.

Proof of stake is not reliant on mining; its focus is validation.
In PoS, each validator owns a stake in the network (ether in the case of Ethereum) that they bond. Bonding stake means you deposit money into the network, which is used as a form of collateral to vouch for a block. In PoW a chain is valid because of workloads behind it, while in PoS you trust the chain with the highest collateral.

Consider Bitcoin as an example of a Blockchain secured with **a proof of work algorithm**. Each block in Bitcoin consists of two parts:

• block header of key parameters, including block creation time, reference to the previous block and the Merkle tree root [4] of the block of transactions
• block list of transactions.

To reference a specific block, its header is hashed twice with the SHA-256 function [5]; the resulting integer value belongs to the interval [0, 2^256 − 1]. To account for different possible implementations, we will use a generic hashing function hash(·) with a variable number of arguments and range [0, M]. For example, arguments of the function can be treated as binary strings and merged together to form a single argument that can be passed to the SHA-256 hashing function. The block reference is used in the proof of work protocol; in order for a block to be considered valid, its reference must not exceed a certain threshold:

$$\text{hash}(B) \leqslant M/D,$$

where $D \in [1, M]$ is the target difficulty. There is no known way to find B satisfying (1) other than iterating through all possible variables in the block header repeatedly. The higher the value of D, the more iterations are needed to find a valid block; the expected number of operations is exactly D.

The time period T (r) for a miner with hardware capable of performing r operations per second to find a valid block is distributed exponentially with the rate r/D (see Appendix A):

$$P\{T(r) \leqslant t\} = 1 - \exp(-rt/D).$$

Consider n Bitcoin miners with hash rates r1, r2, ..., rn. The period of time to find a block T is equal to the minimum value of random variables T (ri) assuming that the miner publishes a found block and it reaches other miners immediately2. According to the properties of the exponential distribution, T is also distributed exponentially:

$$P\{T \stackrel{\text{def}}{=} \min(T_1, \ldots, T_n) \leqslant t\} = 1 - \exp\Big(-\frac{t}{D}\sum_{i=1}^{n} r_i\Big);$$

$$P\{T = T_i\} = \frac{r_i}{\sum_{j=1}^{n} r_j}.$$

The last equation shows that the mining is fair: a miner with a share of mining power p has the same probability p to solve a block before other miners.
In proof of stake algorithms, inequality (1) is modified to depend on the user's ownership of the particular PoS protocol cryptocurrency and not on block properties. Consider a user with address A and balance bal(A). A commonly used proof of stake algorithm uses a condition as

$$\text{hash}(\text{hash}(\text{Bprev}), \text{A}, \text{t}) \leqslant \text{bal(A)M/D},$$

where
- Bprev denotes the block the user is building on,
- t is the current UTC timestamp.

For various reasons, some cryptocurrencies use modified versions of (2) which we discuss in the corresponding sections. Unlike (1), the only variable that the user can change is the timestamp t in the left part of equation (2). The address balance is locked by the protocol; e.g., the protocol may calculate the balance based on

funds that did not move for a day. Alternatively, a **PoS** cryptocurrency may use unspent transaction outputs as Bitcoin does; in this case, the balance is naturally locked. A proof of stake protocol puts restrictions on possible values of t. For example, if t must not differ from the UTC time on network nodes by more than an hour, then a user can attempt no more than 7200 values of t. Thus, there are no expensive computations involved in proof of stake.

Together with an address A and a timestamp t satisfying (2), a user must provide a proof of ownership of the address. To achieve this, the user can sign the newly minted block with his signature; in order to produce a valid signature, one must have a private key corresponding to the address A.
The time to find a block for address A is exponentially distributed with rate bal(A)/D. Consequently, the (2) implementation of proof of stake is fair: the probability to generate a valid block is equal to the ratio of user's balance of funds to the total amount of currency in circulation. The time to find a block for the entire network is distributed exponentially with rate Σ bal(a)/D.

Thus, if the monetary supply of the currency Σ bal(a) is fixed or grows at a predictable rate, the a difficulty D should be known in advance:

$$D = \frac{1}{T_{ex}} \sum_{a} \mathbf{bal}(a),$$

with Tex denoting the expected time between blocks. In practice, D needs to be adjusted based on recent blocks because not all currency owners participate in block minting.

3.4. Security

In the event of a major hack, Ethereum has proved to be successful at mitigating risk to network participants. Ethereum itself has never been hacked, only services built on it have, very similar to the misconception of the Bitcoin network being hacked (discussed previously in this paper) when in fact, it was security issues with exchanges that held Bitcoin and the private keys of users.

4. Internet of Value

Similar to how the internet streamlined and secured the transfer of information (communication technologies), Blockchain enables for asset ownership (and transfer) & core business functions. The Blockchain is often heralded as the world's first internet-scale open platform for value-exchange.

"Blockchain can bring the experience of a continuously connected, seamless, multi-device computing layer, with an overlay for payments —not just basic payments, but micropayments, decentralized exchange, token earning, digital asset invocation and transfer, and smart contract issuance and execution — as the economic layer that the Web never had."
- Melanie Swan 1

Transferring money was solved by Bitcoin and surrounding technologies; however, Blockchain can open up doors for ownership and asset management. Bitcoin was an audacious idea. Until cryptocurrencies came along, no one had the ability to transmit value at a distance without the permission and support of a third party. This revolutionary idea of instant value transfer is the core of what blockchain technology makes possible. The blockchain is being heralded as the fifth disruptive computing paradigm, which would bring with it an ubiquitous experience of value exchange on the web.

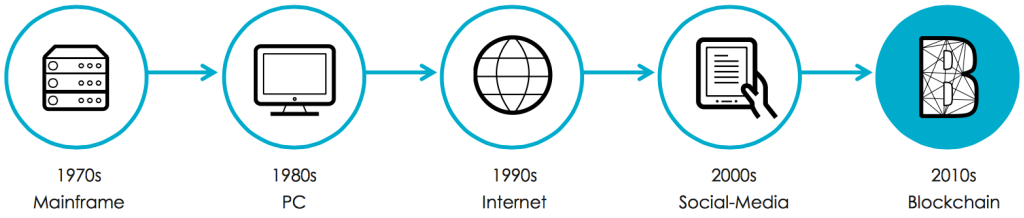


Figure 1: A new paradigm for computing

In an increasingly digital age it is imperative that money and assets can flow freely and securely on a global scale transcending borders. This streamlines business functions creating unparalleled efficiencies. Think about how communication was first revolutionized through the transition from physical mail services to electronic communication with email and instant messaging & collaboration platforms such as Slack. These innovations enabled individuals and companies to securely communicate and transact on a global scale in a fraction of the time. Electronic trading and transfers were other examples of large accomplishments that increased the speed and accessibility of financial services. As Bitcoin (or other

Blockchain-derived means of monetary exchange) begins to play a bigger role in the world economy, it further increases ones' ability to securely transact quickly and affordably. The next piece of the puzzle is enabling the same for the transfer of assets. With the combination of communication, money, and assets flowing freely on a global scale it unlocks further potential of the internet and fundamentally changes economics as we know it.

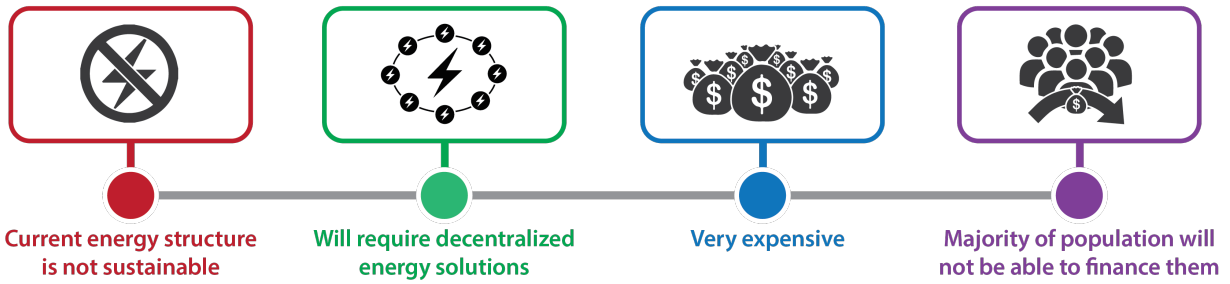
Figure (Left): A trusted third-party actually controls the ownership rights of your asset and you must go through them to do anything with it (typically with a fee involved). If you want to transfer money, stock, or a commodity, a fee is involved for having the "manager" of the asset complete the transaction as instructed.

Figure (Right): The owner has full control of the asset and can do with it as he/she pleases without going through a third-party. The computer code executes the desired transaction instantly for free (or an extremely minimal platform fee compared to traditional transfer methods) without the need for paying someone to complete it.

5. The Problem

5.1. The amount of energy needed to power AI machinery will exceed what traditional power grids can produce.

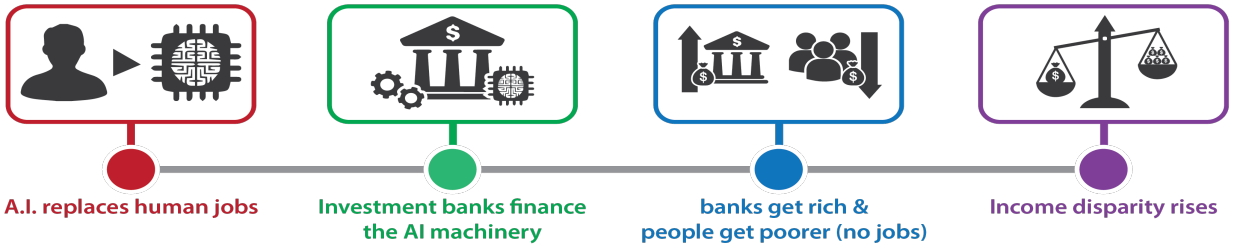
Since the current energy structure is not sustainable (scalable at speed), it will require decentralized energy solutions. Traditional financing models would only enable a small fraction of the population to own / participate in the decentralized solutions.



With the rise in global demand for energy, traditional grids will soon be unable to produce enough energy to meet those demands. This exponential growth in energy usage can be contributed to the AI & IoT revolution as well as emerging markets maturing.

5.2. AI (specifically autonomous mobility) is going to replace the need for human labour.

With the rise of AI, traditional workers will be displaced exacerbating unemployment and income disparity. Many workers will be unable to be retrained for an AI-oriented workforce and this will produce societal backlash which will outweigh efficiency benefits of AI.



For example, let's take a look at Uber, which is a capital light company. For Uber to get involved with self-driving vehicles it will involve a major investment into AI infrastructure. While this is normal in business and completely viable for companies to obtain these investments with the financing help of investment banking partners, it must also be looked at from a socioeconomic perspective. Millions of drivers will be unemployed and Uber's fleet will be owned by a small group of elite banks which can set (and change) the market price with minimal to no opposition. This is something extremely important to prevent before it happens, as it will lead to further income disparity between the rich and the not rich.

6. The Solution

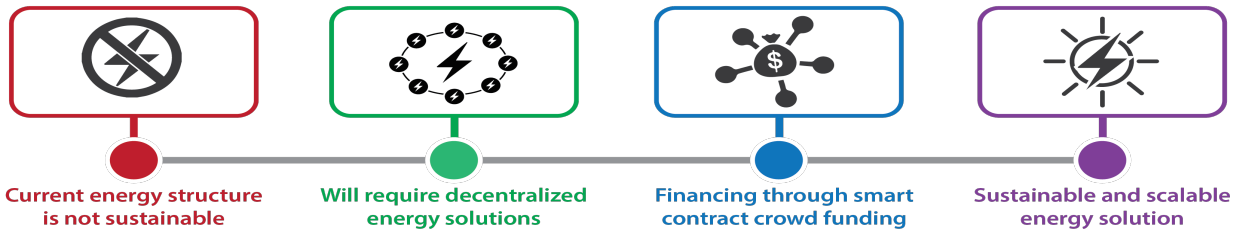
MyBit uses Blockchain tokenization to create a new asset class for investing in Decentralized Energy and AI infrastructure. This is made possible through Ethereum and governed by smart contract logic.

Our Core Values include:

- Sustainability (Clean energy)
- Accessibility (vastly reducing financial barriers to entry)
- Scalability (to meet rising power demands globally)

6.1. Tokenize Decentralize Energy Infrastructure

Centralized financing systems have worked well for most of history, but we are reaching a tipping point where they will no longer be able to scale with demand. Our proposed solution is to utilize Ethereum's Blockchain and smart contract functionality to enable decentralized crowdfunding and revenue sharing for infrastructure that is already generating revenue. This enables energy infrastructure to scale as needed to keep up with growing demand. It is not restrictive to location (from a financial infrastructure perspective), incentivizes investors with real-time revenue distributions, and enables decentralized energy solution providers to sell more units.



- Removes financial barrier to entry by crowdsourcing the purchase of decentralized grids in exchange for per-usage revenue sharing
- Enables faster access to capital (than traditional financing mechanisms such as bank loans and other debt instruments)
- This creates a highly scalable (at speed) & sustainable energy model

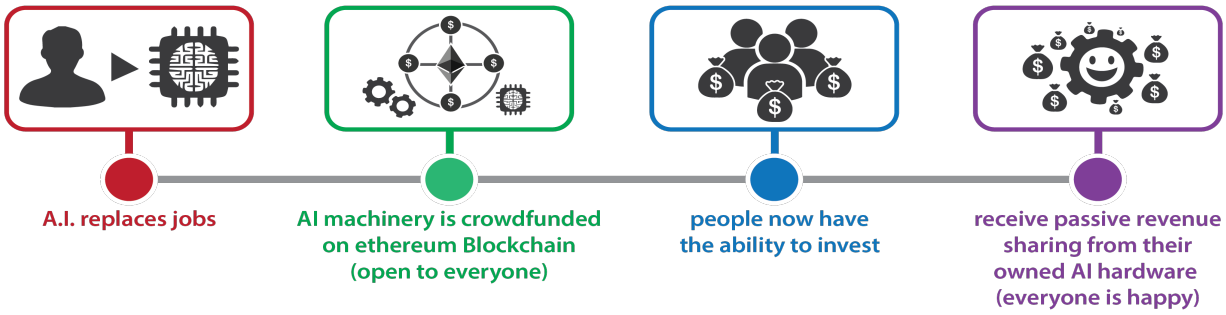
6.2. Provide new revenue streams by Tokenizing AI

We are taking a proactive approach to help drive this disruptive transition in the way of socioeconomic benefit, rather than towards an increasing income disparity between classes. By the time this is a reality, it will be too late to implement a solution that changes anything drastically. We shape the future with what we do today.

For example, if a company wishes to acquire AI hardware to automate their machinery, they take the following steps. First is the registration of these physical assets (the machines) on the Blockchain using technology developed in the phase 1 release of MyBit. Once registered this enables the issuance of tokenized shares that are made available to the general public (with the option for restrictions imposed by the issuing authority). Upon completion of share purchasing, a smart contract automatically sends these funds to the equipment supplier to purchase the machinery and ownership stake is recorded in a transparent and auditable Blockchain ledger. This purchasing process, governed by smart contract technology, removes the human step of manually transmitting payment which eliminates the risk of misappropriation of funds (that the issuing authority will not use the funds to purchase the hardware). Lastly, the stakeholders can hold their shares and receive automated revenue distributions from work the machine completes, or they have the option to sell these shares on the open market.

This process creates a new tradable asset class with liquidity that has never been seen before for these types of revenue sharing investments. Existing Blockchain exchanges can easily add these assets for free market trading, or dedicated platforms can be designed to cater to this new type of asset. Early stage investments, real-estate, and other forms of investment where revenue sharing is involved are often illiquid which creates unnecessary investor risk by requiring them to hold the investment for an often unspecified amount of time. This technology creates liquidity from the very beginning and the assets can be exchanged for cash as needed. It also creates a more secure and streamlined investing environment for early stage ventures or typically illiquid investments due to ownership validation built directly into the Blockchain. Traditionally shares of these types of investments are issued in paper and a ledger is kept by the issuing company. To ensure that someone is not fraudulently selling shares they do not actually own (by forging share certificates), the issuing company must be contacted as a verification measure. With Blockchain technology, this verification

process is already completed and unnecessary for investors to conduct manually which creates efficiency in direct peer to peer transactions.



- This enables faster access to capital so companies can enter the AI space more effectively.
- By opening the ability to have ownership with revenue-sharing to a broader audience, it allows anyone the chance to receive residual revenue distributions

6.3. Application Overview

This application is designed to demonstrate how assets can be modeled on the Blockchain using the scenario of asset management and decentralized revenue streams.

Let's assume in our scenario assets are modeled using Blockchain technology with the following attributes:

Type	**Attribute**
Alphanumeric	AID (Asset ID)
Unsigned int	AIN(Asset Identification Number)
Name of the asset	Asset
String	Description
String	Date of Registration

Identity of genesis owner (issuer)	Registered by
Identity of current owner(s)	Current Owner(s)
Identity of beneficiary(s)	Beneficiary (if any)
Cryptographic hash of the supporting document	Identification Document (optional*)

The application is designed to allow participants to interact with the income-generating assets by creating, updating, storing, querying, participating in revenue sharing, and transferring them as their permissions allow.

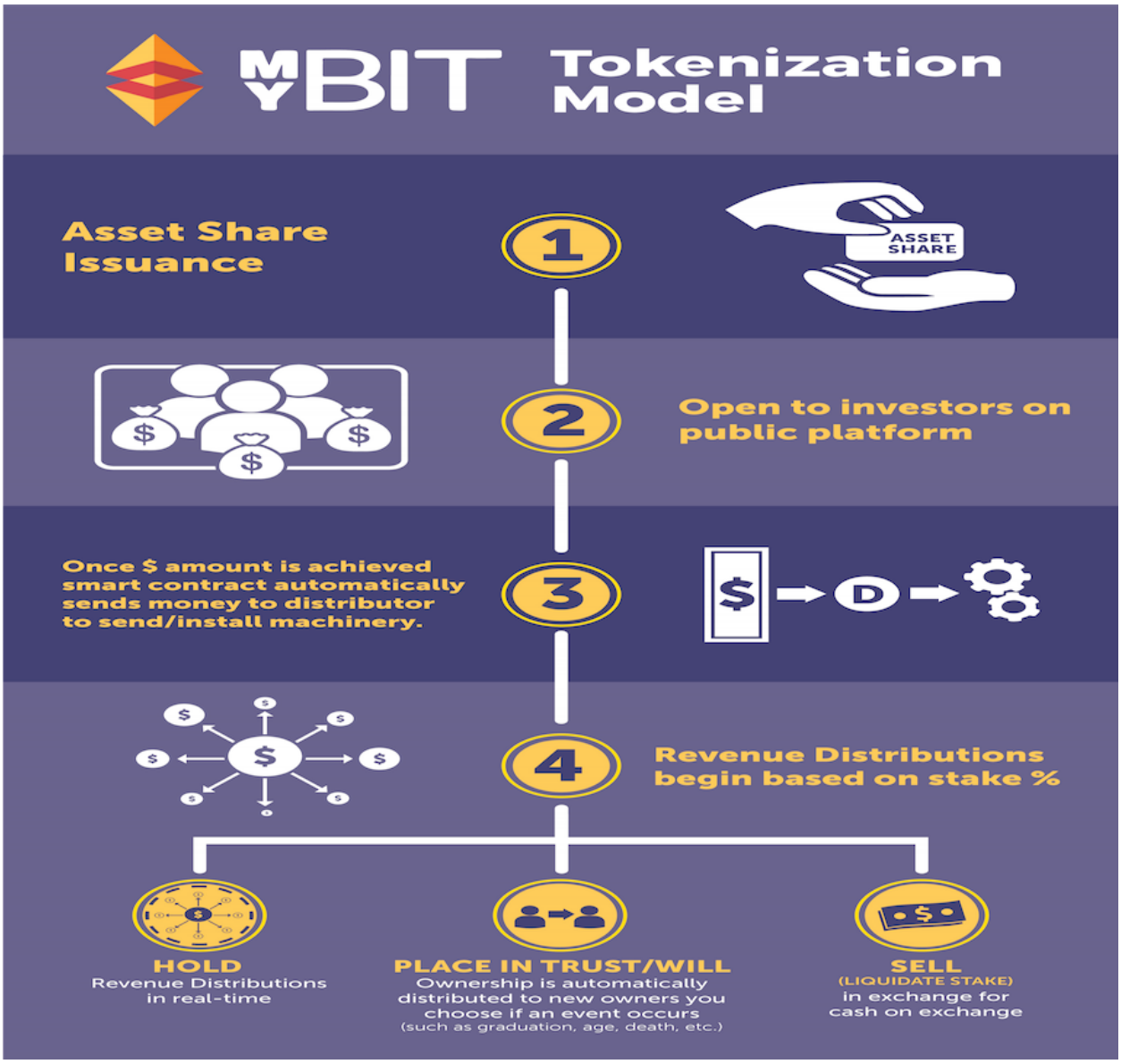
Technical Execution	**Contracts needed**	**Permissions**	**Participants**
Refer to Section 6.10.1	TrustManager*	Read, trigger events	Owner(s), Beneficiary(s)
Refer to Section 6.4	AssetManager	Trigger events	Validating Authority*
Refer to Section 6.4	AssetManager, IdentityManager	Create	Issuer
Refer to Section 6.4	AssetManager, IdentityManager	Read(Verify ownership), Update, Transfer	nth Purchaser, nth Investor
Refer to Section 6.5	FinanceMgmt	Input: Inv. Output: Ownership stakes	Buyer
Refer to Section 6.4		Transfer, Decommission	Current Owner(s)
Refer to Section 6.5	FinanceMgmt	Input: Read(revenue data) Output: Distribute profits	nth owner
Refer to Section 6.4	AssetManager, IdentityManager	Read, Update, Transfer	Beneficiary(s)

The concept taken here (as an example of decentralized asset management) defines how smart contracts can be utilized to manage current assets, implement event-driven ownership distribution, participate in revenue sharing of income-generating assets, and buy/sell revenue channels.

6.4. Technical flow of Asset life cycle

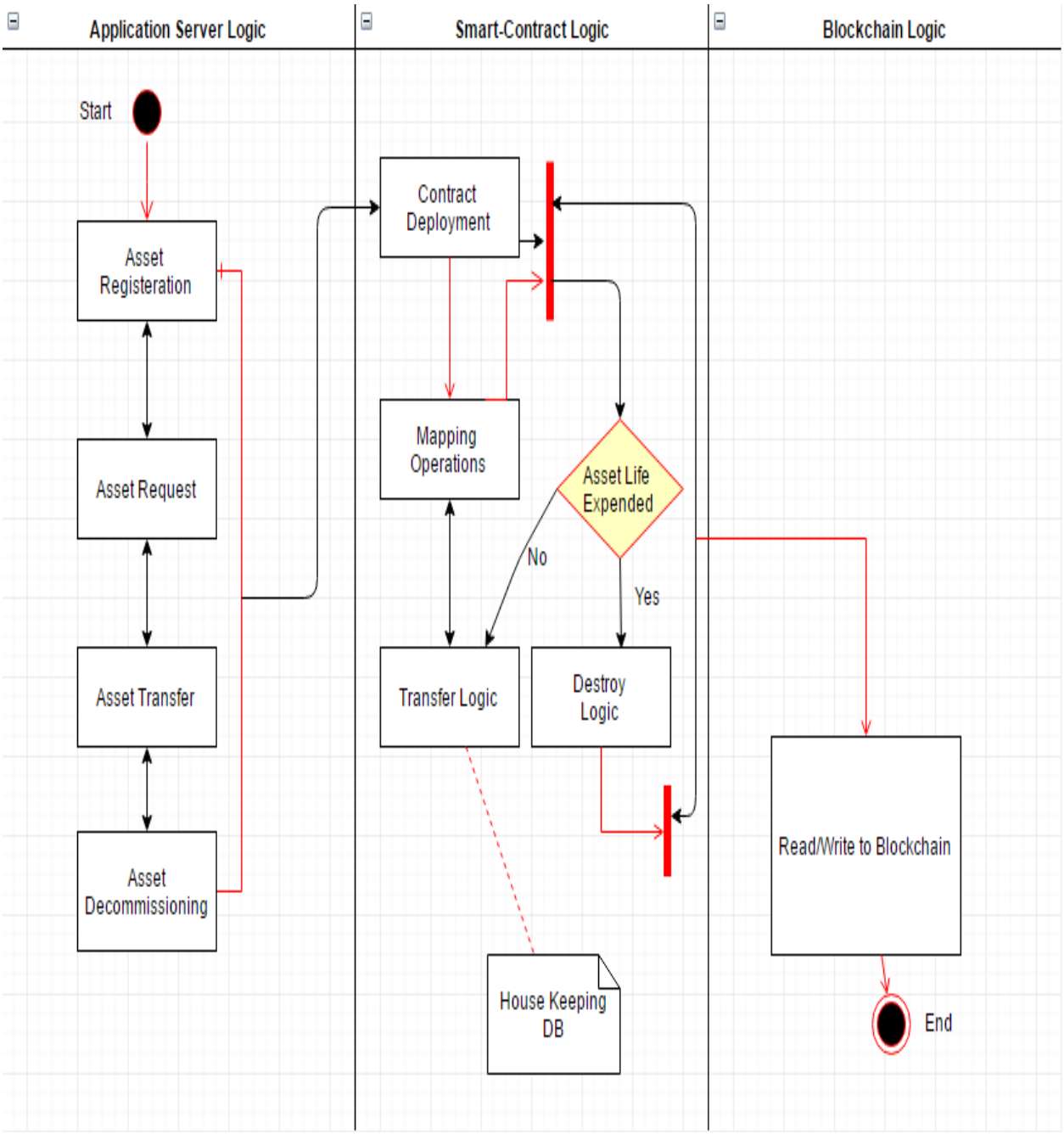
1. Asset is created by the Initiator using the Asset Management contract. Details of the Initiator are recorded on the Blockchain. These contracts develop two sandboxed containers (like a table) on the Blockchain which are linked by public address (hash) of Initiator account.
2. In case of an error in asset creation, the Initiator will be able to update the asset, but a trail of updates will still be recorded on the ledger.
3. Details of the Asset should contain a unique identifier that can distinguish the asset. Supporting documents can also be uploaded.
4. Initiator (as a seller now) can decide to enable asset financing in the form of crowdfunding. Upon completion profit distributions will begin once asset begins generating revenue.
5. Each investor will instantly become a partial-owner (assuming the fundraising goal was achieved, otherwise any input values would be returned). In this step the owners can also elect to register his/her beneficiary with the Trust Manager contract.
6. Buyer has the capability to verify the ownership of the asset and identity of the issuer from the Blockchain using our contract logic.
7. Assuming each buyer will check with the system to verify asset ownership, fraud will be easily detected.
8. Trail of ownership will be updated on the Blockchain with each transfer transaction. Current owner and beneficiary information will also be updated.
9. Validated Authority may or may not be implemented for each transaction as it depends on the level of control required for Business logic.
10. With each completed transaction a Bill of Sale will be generated by Backend Server. Required data will be pulled directly from the ledger.
11. In case of untimely death, on submission of required documents with regulator, it can trigger an event on the ledger which would execute the Trust smart contract and transfer the ownership seamlessly to the beneficiary.
12. If an asset's life is expended, the current owner can also decommission the asset on the ledger.

6.5. Process Example

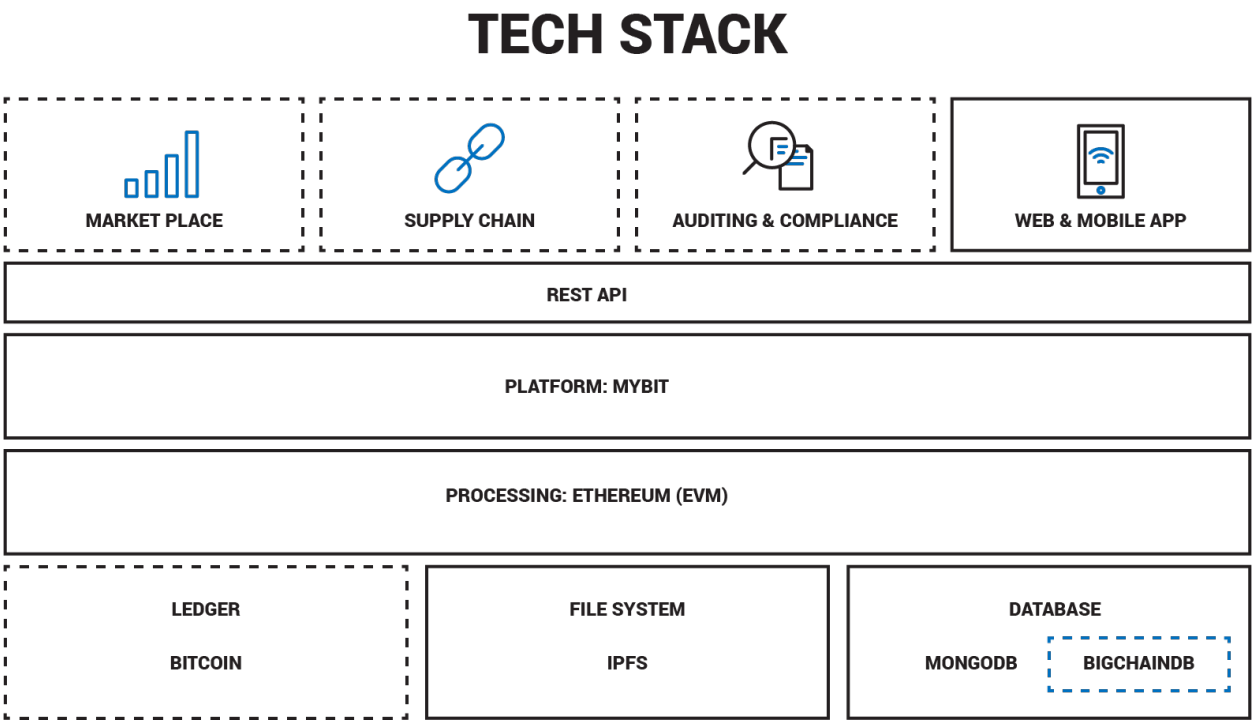


6.6. Architectural Flow

All Application interactions occur over REST protocol. The application interacts with smart contracts over RPC using an HTTP endpoint.


Application Server Logic
Smart-Contract Logic
Blockchain Logic
Start
Asset Registeration
Asset Request
Asset Transfer
Asset Decommissioning
Contract Deployment
Mapping Operations
Asset Life Expended
No
Yes
Transfer Logic
Destroy Logic
House Keeping DB
Read/Write to Blockchain
End

6.7. Tech Stack



At the **Database** level of our technology stack our end goal is to integrate BigchainDB, an enterprise grade decentralized Blockchain Database. However, we must wait for a stable release so we are planning to use MongoDB as a housekeeping database until Bigchain is production ready. We chose MongoDB since they are a top-tier and highly reliant distributed database (the next best thing to decentralized) and Bigchain is developing their solution in cooperation with MongoDB so the transition from MongoDB into BigchainDB will be much easier than if we chose another database solution from the start. For BigchainDB to be decentralized, nodes must be maintained by various sources so we will be highly selective on the Blockchain foundations we choose as candidates, with final approval deriving from MyBit network consensus of all our participants.

For our **file system** we have chosen the inter-planetary file system (IPFS) as it is the most notable decentralized file storage initiative with founders visions' that align much with those of our team.

We may elect to use the Bitcoin Blockchain as a **ledger** where transactional data is hashed and stored since it is the oldest, most secure, and trusted Blockchain to date. Limitations may arise due to Bitcoin's throughput capacity and high latency,

which is the reason we are not planning to include in our MVP release, but may choose to incorporate as its technology advances to manage scale.

For **processing** we are using Ethereum as our platform's engine to enable rich and highly functional smart contract logic which is a backbone of our platform. We are keeping in mind that Ethereum has plans in the near future to migrate to proof of stake (from proof of work) with their Casper release and are developing our solution to easily adapt to that transformation.

The MyBit **platform** will expose a rich **Rest API** to enable the development of **services** utilizing MyBit's functionality. The Web and Mobile interfaces we are developing will rely on this API as well as provide the community options to develop solutions such as advanced analytics, market places, supply chain applications, and much more. We will utilize the Mist Browser for the MyBit web application and status.im OS for mobile to enhance user experience and accessibility.

6.8. Compliance

Please see investment terms and conditions on our website, http://mybit.io.

6.9. IP Protection

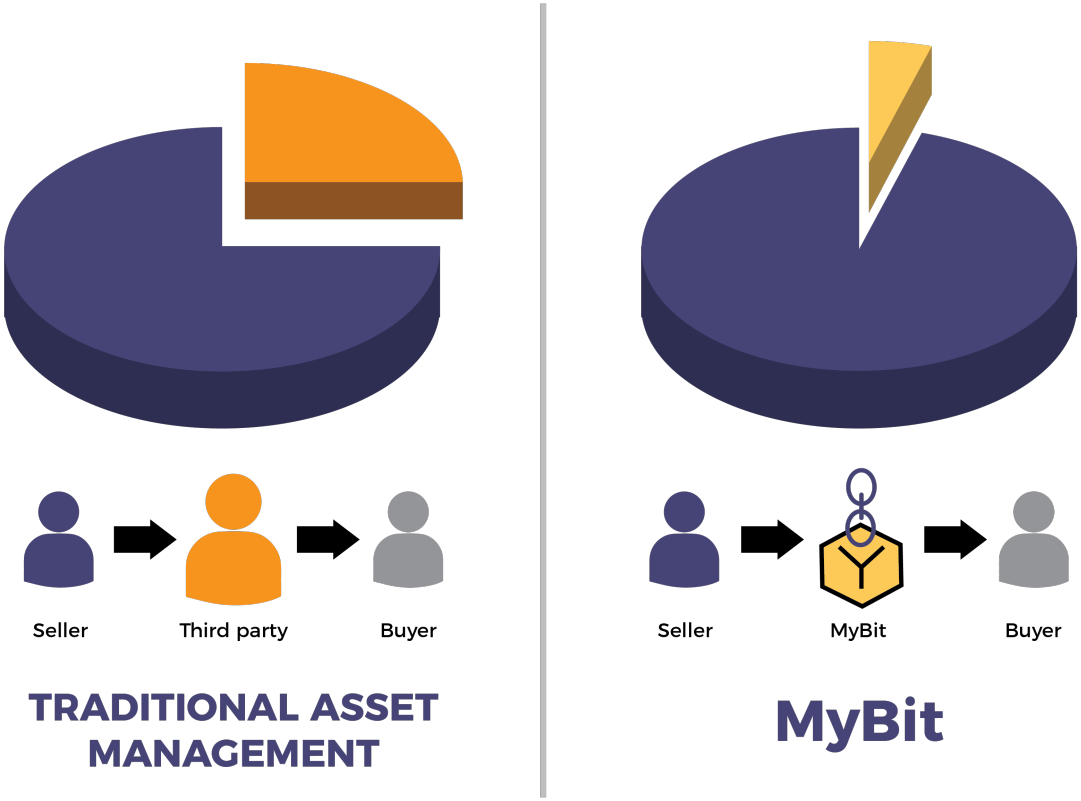
True Blockchain Technology is open sourced (publicly available for people to review). Decentralized Applications MUST be open sourced to function appropriately and provide the necessary levels of transparency; therefore, the structure of this DApp will be open source. What enables us to protect our platform from replication will be the proprietary integrations that facilitate (and largely automate) the registration process of assets and facilitate the implementation into existing company infrastructure in the Energy and AI sectors.

6.10. Integration Examples / Use Cases

6.10.1. Smart Trusts

Overhead maintenance expenses of traditional Trusts can be extensive to have trustees (administrator of the Trust) manage and govern them based on provided

terms. Smart Trusts are governed by irrefutable computer code to make the process much cleaner, affordable, and manageable.



The trustee's role can be replaced by smart computer code (Trust contract) that is guaranteed to execute as instructed by the trustor (creator of the trust) without the exorbitant fees and reliance on a third-party. Since this scenario does not involve the delivery of a physical asset, but rather the delivery of a revenue stream based on event-driven execution, Blockchain-governed smart contracts are a viable solution.

6.10.2. P2P Energy Trading

While excess production can typically be sold back to traditional power companies, we are firm believers that peer to peer commerce is much more beneficial for buyers/sellers and the ecosystem as a whole.

We are intending to partner with exchanges and p2p platforms to commoditize the decentralized production of clean energy. This will enable a pricing system based on true supply vs demand without a third-party (traditional energy provider) fixing the price to their benefit.
A dedicated whitepaper will be prepared for this section as we approach this phase of development and/or integration with existing providers.

6.10.3. Infrastructure Investment Swaps

Preliminary market research shows huge interest in the addition of an energy infrastructure swap to traditional trading platforms and exchanges both in the Blockchain industry and mainstream. We find immense value in the ability to "liquidate" a cash-flow driving asset.

In traditional investment models, profits are not truly realized until an asset is paid off, sold, etc. and the initial principal is not available to the investor until after this period. This decentralized model utilizing Blockchain tokenization creates liquidity from the beginning, which is an immensely valuable and powerful function.

6.10.4. Machine to Machine Payments

Addressing storage issues present in decentralized energy production can be resolved through an intelligent-AI layer between grids, autonomous mobiles, and other "smart" protocols. We believe that in a future phase of technology innovation, machine to machine (AI) optimization will be able to near-almost completely replace traditional (centralized) energy infrastructure. We only say "near-almost" because it is wasteful to not utilize existing infrastructure – even if it involves an alteration to their current model.

This process of machine to machine payments assumes an AI layer is enabling machines to act in a highly efficient and optimized mannerism. An autonomous mobile (self-driving car for example) would know (automatically) the closest source of renewable energy with an excess production to go there and "refuel." This would create efficiency and security on many levels. First, if the network was 100% optimized there would be no excess storage. Of course, realistically a near-perfect (>90%) optimization would be the end goal. It also takes the risk of human to human or human to machine transfer of monies out of the equation,

thus creating a highly streamlined model. Lastly, this creates constant buy and sell-side liquidity for the MyBit Token (as explained in section 7.7.).

6.11. Profit Sharing

Please refer to "MyBit Token Document" for a full analysis of monetization and revenue distributions.

6.12. Execution Strategy

Step 1: Creation of a Global Registry (with built in management tools)
Enable the registration and secure storage of ownership data of physical assets onto the Blockchain and the ability to govern those assets with smart contract logic.

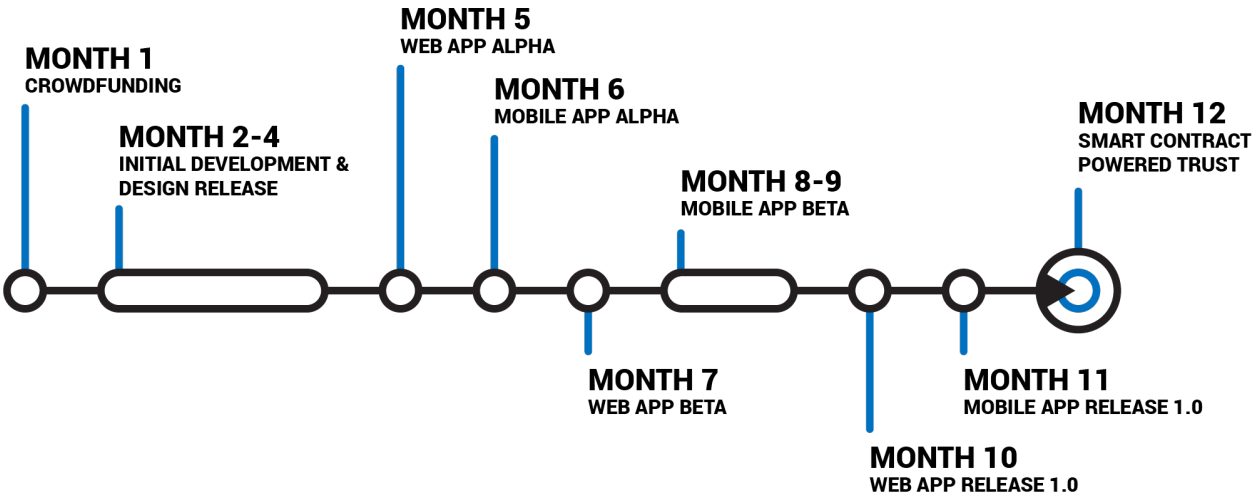
Why? This step is needed to be able to:

- Adequately secure – remove single point of failure risk present in current systems by implementing a decentralized architecture
- Manage ownership – implement smart contract logic to govern assets, including the automated distribution of ownership in Trusts and Wills.
- Tokenize physical assets in the most efficient manner – Blockchain offers a democratic and transparent system for auditing transactions and making highly secure payments with minimal fees.

Step 2: Tokenize Decentralized Energy and AI

- Ability for companies and individuals to issue shares for an asset they wish to acquire.
- Govern the above with a smart contract to ensure funds are used for purchasing the indicated item and not fraudulently taken (removing the need for an escrow)
- Revenue distributions managed by smart contract (fully transparent and real-time)
- Liquidity to trade ownership stake or hold to receive revenue distributions (achievable through partnerships with exchange/trading platforms)

6.13. Milestones



7. Token Model

7.1. Overview: (Why decentralized over traditional)

Blockchain issuance has built in ownership validation, secure transfer capabilities without needing third party escrows to ensure delivery, auditing capabilities, and automated revenue distribution functionality. This makes it easier, faster, more secure, and overall superior to traditional systems. Payments can flow on chain and revenue automatically distributed based on shareholder percentages without risk of external manipulation. It also enables machine to machine payments (think self-driving mobiles using a decentralized energy grid to charge, paying for usage in real-time, then having that revenue distributed to owners of the energy grid instantly. An added benefit is that all transactions are auditable as they happen.

Traditional Funding Formula: 18 month funding window, offer product free with great community support, once a large market share is obtained raise prices and cut support. [Single point of failure risk the entire time, no liquidity, barrier to entry]

Decentralized Funding Formula: 3-6 month funding window, product remains same price unless majority of community agrees to change it, community is an

intricate component so support is always there. [once built, runs on its own, liquidity from beginning, no barrier to entry]

The major aspect we are addressing is that we do not want a centralized group of investors who control the direction of the company to be able to make changes to the fee structure or pricing model that are not in the best interest of the users.

7.2. Pricing Model

Official Deal Sheet will be posted on our website, http://mybit.io

7.3. Escrow Guidelines

Our goal is to limit investor risk to the extent reasonably possible. To do this we are mirroring the escrow release schedule to traditional financing rounds (Pre-Seed, Seed, Series A, B, C, etc.). If at any time we do not meet development expectations, then the remaining funds still held in escrow will be returned to contributors.

Important Note: We are basing the tranches with a minimum and maximum value since the total amount raised will not be officially realized until the close of the crowdfunding round. Minimum value is the absolute minimum it would take to develop, maximum is set in place so funds are never spent frivolously. Any value above the minimum enables the allocation of additional resources to increase the speed of development, final delivery, and marketing (phases 4,5,6) so monetization can be realized faster by tokenholders.

Release 1: Min. 50.000 , Max. 150.000
Inv. Risk Exposure*: 3.750%
Use of Funds: Development of Registry, legal, incurred promotional debt (from crowdfund), basic PR
Monetization*: Registering new assets & transferring ownership will require a fee paid in MyB. Due to being a decentralized registry it offers immense value to existing registry service providers by eliminating the risk associated with data manipulation attacks as well as efficiency in transferring ownership in terms of reconciling.

Release 2: Min. 100.000 , Max. 200.000
Inv. Risk Exposure*: 5%
Use of Funds: Development of asset management tools, basic PR
Monetization*: Creating a blockchain-ifyed Trust or Will requires a fee paid in MyB, as well as a fee if an ownership transfer is executed. This provides value by removing the friction of asset management (event-driven ownership distribution) and vastly reducing cost-barriers to entry enabling access to a large, untapped market.

Release 3: Min. 150.000 , Max. 400.000
Inv. Risk Exposure*: 10%
Use of Funds: Development of asset tokenization functionality, moderate PR
Monetization*: Issuing shares of an asset (registered or unregistered) requires a fee paid in MyB. Additionally, a very small (fractional) percent of all monies flowing through the platform will be taken as a fee.

Release 4: Min. 250.000 , Max. 1.000.000
Inv. Risk Exposure*: 25%
Use of Funds: Optimizing platform for integration with existing decentralized energy providers, obtaining partnerships, intense marketing.
Monetization*: By facilitating the integration of our platform into existing energy providers it greatly increases our credibility and potential to gain market share rapidly. This will lead to increased revenue from monetization methods in phases 1,2,3.

Release 5: Min. 250.000 , Max. 1.000.000
Inv. Risk Exposure*: 25%
Use of Funds:
Monetization*: Partnering with autonomous mobile companies through streamlined integrations enables our potential market share to exponential grow as that industry gains traction. This will lead to increased revenue from monetization methods in phases 1,2,3.

Release 6: Remainder of Funds , Min. 10,00 , Max. N/A
Inv. Risk Exposure*: 31.25%

Use of Funds: Ongoing operational expenses. If final milestone is reached, then funds will also be used for targeting emerging markets.
Monetization*: Gaining market share in new markets to grow the number of active users thus increasing monetization models from the previous development stages.

*Inv. Risk Exposure is the percentage of capital at risk during each phase. It is determined per release stage based on percentage released compared to total raised. Since there is a monetization strategy in place starting with the first phase, the project is not deemed a failure if the remaining phases are not completed (in that monetization will still occur). Risk exposure is calculated assuming crowdfund sells out for a total of Euro 4.000.000. Please note that this total is not fixed due to volatility in Ethereum price.

*Monetization will occur in the form of revenue distributions based on network stake (percent of tokens held compared to total token supply). Please note that the value will be calculated *after* any related network processing fees are subtracted. Our goal is to design revenue sharing to be as near-real-time as possible (in the subsequent Block); however, at this time we can place no guarantees on the speed of distributions.

7.4. Crowdfunding Milestones

(50.000+) Creation of Registry

A secure registry of ownership utilizing Ethereum Smart Contracts (as the core) will be created with the ability to register, transfer, and query assets + ownership information.

(250.000+) Management Tools

Smart contract templates will be designed and implemented into the registry technology to enable the management of owned assets (including secure storage in a Blockchain-ifyed Trust, distribution to new owners triggered by an event, and multi-signature ownership).

(500.000+) Tokenization Functionality

The ability to issues tokenized shares for any asset will be added to the platform. It will also include real-time revenue distribution functionality based on

percentage of Asset owned. These shares will be tradable with other network participants.

(1.000.000+) Decentralized Energy Sector Roll-out

Platform will be optimized to easily integrate with Decentralized Energy solutions providers in the European market to facilitate gaining market share rapidly. While we cannot guarantee any future partnerships this will be our top priority.

(2.000.000+) AI Sector Roll-out

The ability to tokenize autonomous mobiles for both commercial and consumer use will be implemented and partnerships will be our first priority once functionality is integrated. If we are unable to partner with any exchanges to facilitate the trading of shares we will build a basic interface to enable p2p swaps.

(3.000.000+) Expansion into Emerging Markets

Resources will be allocated to entering emerging markets beginning with Northern Africa. Penetrating these markets often result in extensive expenditures in legal/compliance, cultural marketing strategy, infrastructure, and other operational expenses; therefore, we cannot provide a fixed number of markets that will be targeted.

7.5. Business Model

[Additional information will be added to this section]

- Tokens issued to raise funds for development
- Once deployed, tokenholders receive real-time revenue distributions and have the option to sell their holdings on an open exchange.
    - Monetization occurs in the form of micro-fees for every action taken on the MyBit network including: registration of an asset, transfer of ownership of an asset, tokenization of an asset, funding of an asset, and all revenue distributions processed by the MyBit platform.

7.6. Go to Market Strategy

[Additional information will be added to this section]

Our goal is to target assets that already have revenue streams that can be tapped into so tokenholders will be able to realize profits from their investments rapidly. Industries Include:

- Decentralized Energy Grids (Europe followed by emerging economies)
- Autonomous Mobiles (Commercial, building, cleaning, etc.)
- Autonomous Mobiles (Residential, driving, flying, etc.)

7.7. Buy/Sell Side Support

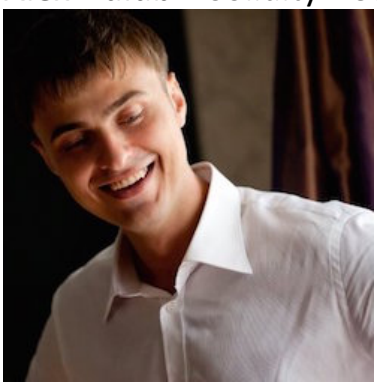
Our goal is high levels of liquidity on the MyBit Token (MyB) market. This is achieved through the laws of supply & demand, P2P energy trading, and machine to machine payments.

Through the laws of supply and demand, as we gain more market share, the demand for MyB increases thus creating buy-side liquidity. P2P energy trading creates steady liquidity on both sides of the market. Machine to Machine payments create constant sell-side liquidity.

8. Team

Our team brings a fantastic mix of Software Engineers, Blockchain Technocrats, Design Experts, Consumer Product Marketing & Branding Specialists, and Enterprise Application Sales Strategists.

Alex Dulub – Solidity Developer



Alex brings 10+ years experience in designing high-performance and functional enterprise applications. Several years ago he began to focus on Blockchain and Decentralized technologies of which he has created various, custom cryptocurrency and smart contract solutions for a wide range of business applications.

Pedro Barros – Full Stack Developer

Pedro has 6+ years experience as an engineer and has built applications ranging from simple mobile apps to robust enterprise software. His specialties include Angular2, Ionic, Ruby on Rails, Nodejs, and cloud application deployment, to name a few.

Ian Worrall – Decentralized Solutions Architect / Entrepreneurial Background in Finance and SaaS

Ian has been involved full-time in the Blockchain industry since early 2013 when he began a small mining operation that grew rapidly. Since then he has managed a company that builds custom software for small businesses up to large corporations. His true passion is decentralized applications and the potential they have to disrupt traditional business models.

Jacob DeBenedetto – UI/UX Designer

Jacob brings 5+ years of software development and graphic design to the team. He has experience designing and implementing incredible user interfaces across a variety of application verticals.

Thomas Pollan – Enterprise Business Applications / Sales & Strategy Background

Mr. Pollan has over 30 years of business consulting and business start-up experience. Mr. Pollan's roles have included Senior Director, Client Principal with Hewlett Packard Enterprise, Senior Partner with Accenture, and founder and President of Pollan Enterprises, a multi-million dollar holding company for new start-up businesses.

Garrett MacDonald – Blockchain Design / Entrepreneurial Background in Bitcoin and Blockchain

Garrett is a passionate innovator who has been involved in the Bitcoin/Blockchain industry since 2011. He crowdfunded what became a million-dollar bitcoin mining company when he was in high school, and has advised for various startups and corporations. Now he is focused on making the world's energy situation sustainable using Blockchain.

9. Community

Transparency and interactions with our community are our core principals. We want to keep the community updated with every major milestone achievement, issue, resolution, and updates. Bi-monthly releases will be sent out to all network participants on a private channel and regular AMA sessions will be hosted on Reddit or Slack.

We want to give everyone a chance to be involved by contributing code, sales, marketing, Beta testing, etc. to help drive this to success.

“In this new world there are no more winners & losers, everyone succeeds or fails together so let’s join forces & kick some butt!” – Ian

For a full list of our social channels please see below:
Facebook: https://www.facebook.com/MyBitDApp/

Twitter: https://twitter.com/MyBit_DApp
LinkedIn: https://www.linkedin.com/company/mybit?trk=biz-companies-cym
Slack: https://mybit-dapp.slack.com/
Reddit: https://www.reddit.com/user/MyBit_DApp/
Medium: https://medium.com/@MyBit_Blog
YouTube: https://www.youtube.com/channel/UCtLn7Vi-3VbsY5F9uF1RJYg

10. Conclusion

This paper has introduced Mybit, a decentralized asset management platform which enables the ability to tokenize smart energy & AI infrastructure, which provides a more efficient and secure method to administer ownership and decentralized revenue streams. It has the potential to disrupt traditional systems, offering immense value to both individuals and companies. It removes the friction and financial barrier to entry in the financing of sustainable energy solutions and has socioeconomic benefit to the AI revolution. MyBit functionality is designed to be a building block for future asset management and decentralized revenue systems.

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