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# REVOLUTIONIZING MORTGAGE LENDING WITH WEB3 AND INDUSTRY NON-PROFIT

UNLEASHING BLOCKCHAIN'S POTENTIAL

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## 2 ABSTRACT

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This white paper unveils a groundbreaking approach to revolutionize the mortgage lending landscape using the power of Web3 technology. The relative newness of the technology, and unresolved business model conflicts are two key inhibitors for broad application of Web3 technologies. Both of these hurdles can be overcome by developing a consortium or other form of non-profit framework that focuses on (i) open & interoperable standards development for Web3 technology, and (ii) addresses inherent business model conflicts by establishing a newer shared governance and shared revenue model for Web3.0 technologies in the US residential mortgage industry. The framework envisions a regulated and compliant layer 0 and layer 1 blockchain<sup>2</sup>, under the stewardship of the industry non-profit, as the foundation for a transparent and collaborative ecosystem. With a focus on equitable control and avoidance of undue influence, this model eliminates centralization pitfalls. This paper highlights the prevalent challenges in the mortgage sector, underscores the benefits of blockchain innovation, and elucidates how the industry non-profit's role is pivotal in reshaping mortgage lending. The roadmap for implementing this transformative model is detailed, along with the potential ripple effects that could reshape the mortgage industry and extend its impact beyond traditional confines.

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<sup>1</sup> The moniker is a convenient shorthand for the project of rewiring how the web works, using blockchain to change how information is stored, shared, and owned. <https://hbr.org/2022/05/what-is-web3>

<sup>2</sup> Layer 0 and Layer 1 are terms used to describe different components within a blockchain architecture.

Layer 0: This refers to the underlying infrastructure and protocols that support the entire blockchain ecosystem. It includes things like the consensus mechanism (e.g., Proof of Work or Proof of Stake), network protocols, and cross-chain communication protocols. Layer 0 focuses on the foundational aspects that enable the functioning of the entire blockchain network.

Layer 1: This is the base layer of a blockchain that encompasses the main blockchain protocol itself. It defines the fundamental rules, data structure, and functionality of the blockchain. Layer 1 blockchains include networks like Bitcoin and Ethereum, where transactions and smart contracts are processed on the main blockchain layer.

In essence, Layer 0 provides the framework for blockchain networks to operate, while Layer 1 is the actual blockchain protocol where transactions and other activities occur.

## 3 INTRODUCTION

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The mortgage industry is facing several challenges, including historically high costs, inefficiencies, lack of trust in data, and a lack of transparency. In this context, blockchain technology offers a promising solution to streamline the mortgage process and reduce costs, while maintaining the security and transparency of mortgage lending with full data transparency, true data attestation, improved data governance, and decentralized ownership of the key data attributes that facilitate the process workflow to ultimately close on a mortgage loan.

## 4 INDUSTRY CHALLENGES

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### 4.1 MANUFACTURING INEFFICIENCIES

Enormous amounts of capital have been invested in technology by lenders over the last decade, but the technology has yet to fulfill its promises of cutting costs and reducing the time in the origination process. The most recent data places the average cost to originate a loan at just over \$11,000, a historical high.

Even with advances in Loan Origination Systems (LOS), Point of Sale Systems (POS), and a host of digitally sourced products, automation tools, and eClosing technology, many, if not most processes remain largely manual or manually initiated, with majority of the lift serving to improve the borrower experience. But often neglected, the time needed for a loan to move from application to closing is also part of the borrower's experience, as is repetitious requests to the borrower for additional documentation and information. There is continued heavy reliance on documents, Optical Character Recognition (OCR) technology, data entry, and "stare and compare" between documents and data. Most automation is centered within the LOS and does not provide automated cohesion within the greater eco-system. This limits the availability of streamlined interactive automation between systems and processes outside of the LOS.

These inefficiencies ultimately translate to higher costs, passed on largely to the consumer; historically low profit margins; and unnecessary over-extended origination timelines.

## 4.2 TRUSTED DATA

One of the most oft cited issues in the mortgage industry today is “trusted data”. The current state of data capture relies upon the centralized collection and curation of data and documents via the LOS. It is then systematically passed to other entities in the eco-system in monolithic datasets, typically accompanied by large collections of documents.

Because the data is not directly from the source, its veracity must be verified, leading each entity to perform exhaustive due diligence and re-verification of the data to arrive at a satisfactory level of trust. With each subsequent “passing of the ball”, the next entity must go through a similar process. This represents one of the initial human chokepoints within the origination process, -endless “swivel chairing” of data validation by individuals back and forth, often resulting in delays on the front end of an originated application.

Certain data inputs may lose fidelity and underlying detail when it becomes summarized or manipulated in the LOS, leading to reliance on information contained in physical and digital documents, much of which must be extracted using costly and time-consuming OCR processes. As data passes from entity to entity through the life of the loan, there is risk of degradation of the original data leading to reduced data integrity throughout the life of an originated loan.

These repetitive processes add unnecessary overhead, mostly realized in human capital, that collectively inflate the cost across the entire life of the loan.

## 4.3 DATA AVAILABILITY

Trusted data is far from the only issue eluding the industry from a data perspective. Access and availability of data provides a challenge across much of the ecosystem. The GSEs enjoy not only fairly exclusive, arguably monopolistic, access to underlying data, achieved through reissue services with service and

data providers across the mortgage landscape, they also have amassed incredibly enormous data stores over the last few decades that is used with exceptional success to drive their systems automation. Additionally, it arms their Mortgage-Backed Securities (MBS) with great depth of visibility. Although there is almost immeasurable opportunity that could fuel breakthrough advancement and propel the mortgage industry into new frontiers, this is unfortunately not feasible within current technology infrastructure due to the incentivization of harvesting & collecting data stores at scale for the private sector.

As an example, Private Label Securities (PLS) have recently cited “lack of data” as the central issue preventing their growth. With data availability like or rivaling the MBS market, PLS could once again become a viable alternative in capital markets.

Entities in the process that assume short- and long-term risk positions, such as mortgage insurance providers and warehouse lenders, could expand their risk modeling with much greater depth in data and provide accelerated automation.

## 5 BLOCKCHAIN TECHNOLOGY FOR MORTGAGE LENDING

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Blockchain technology can provide several benefits for the mortgage industry, including increased transparency, reduced risk of fraud, and improved efficiency. Some specific ways in which blockchain technology can justify its use in the mortgage industry:

- Increased transparency: Blockchain technology allows for a secure, decentralized ledger to capture metadata of all events & transactions that occur within a defined workflow, making it easier for all authenticated parties involved in a mortgage transaction to have visibility into the status and history of the loan, while implementing better data governance regarding accessibility via a Web3 concept known as “token-gating”<sup>3</sup>. No

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<sup>3</sup> Token gating, also known as token gating mechanics, refers to a system where access to certain features, content, or functionalities is restricted or granted based on the possession or ownership of a specific token or cryptocurrency. This mechanism is often utilized in decentralized applications (dApps) and platforms to incentivize users to hold or use a particular token.



longer will the industry be reliant on a few key players who have, over time, monopolized control of their massive “data fiefdoms”, we can introduce readability for all with strict appendage controls to bring increased transparency, reducing the risk of fraud and improving the data integrity and accuracy of mortgage information to be benefited by all.

- Improved efficiency: Any event within mortgage transactions that requires a human data entry, we can automate via the use of smart contracts<sup>4</sup>, reducing the time and cost required to close a loan. We can improve the failure of automated data attestation in current state by leveraging novel concepts presented by Web3 to automatically validate verifiable personal information (VOI, VOA, VOE, etc.) while remaining GDPR, CCPA, etc. compliant without ever risking the exposition of personal data to non-authenticated entities. Establishment of singular identity rails for true Self-Sovereign Identity<sup>5</sup> can ensure that borrowers only need to submit their personal information once, then only need to update these attributes on an annual basis while the information follows them for the rest of their digital lives – establishing the first known concepts of singular digital identity that ceases to exist today.

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<sup>4</sup> A smart contract is a self-executing digital contract with the terms of the agreement between parties directly written into lines of code. These contracts automatically execute and enforce themselves when certain conditions are met. Smart contracts run on blockchain platforms like Ethereum, utilizing the decentralized and tamper-resistant nature of blockchains to ensure transparency, security, and immutability of the contract's execution.

Smart contracts can automate a wide range of processes, from simple actions like transferring digital assets when payment is received to more complex actions like triggering multi-step processes based on predefined conditions. Because they operate on a blockchain, smart contracts eliminate the need for intermediaries and reduce the potential for disputes, as the code's execution is predetermined and verifiable.

In essence, smart contracts enable trustless and automated interactions between parties, streamlining various business and transactional processes in a secure and efficient manner.

<sup>5</sup> Self-sovereign identity (SSI) is a concept in which individuals have full control over their own personal identity data without the need for a central authority or intermediary. It allows individuals to own, manage, and share their identity information in a secure and private manner.

In a self-sovereign identity system, individuals can create and manage their digital identities using decentralized technologies like blockchain. They can store their personal data, credentials, and attributes in a secure digital wallet, and then choose when and with whom to share this information. This approach shifts the power dynamic from centralized entities, like governments or corporations, to the individual, enabling greater privacy, control, and portability of personal data.

Self-sovereign identity systems aim to address issues related to data breaches, privacy concerns, and identity theft by giving individuals more agency over their own information. These systems are designed to be interoperable, allowing different services and platforms to recognize and verify an individual's identity without relying on a single, centralized identity provider.

- **Reduced risk of fraud:** The decentralized and secure nature of the blockchain can make it more difficult for fraudsters to manipulate the data associated with a mortgage loan. We can grant permissioned access to a set of authenticated (KYC/AML) entities, individuals, and organizations to ensure only the appropriate parties have access to data as they need it, when they need it, without ever having to rely on private data companies as sources of truth for individual record keeping. We can return the power of data control back to the consumer rather than the primary real estate private sector companies that constrain the industry today. The transparency provided by the blockchain can help detect any fraudulent activity more quickly and accurately and truly validate that data is correct by multiple parties vs the reliance of the “say so” of a single entity as such is the case in today’s state.
- **Improved security:** The blockchain uses cryptography<sup>6</sup> to secure its data, making it much more difficult for unauthorized parties to access sensitive mortgage information. With the passing of metadata only to facilitate quicker transaction speeds, data is never at risk in being corrupted, lost, stolen because the data is never truly stored on chain – a stark deviation from today with at risk API attacks or private sector data warehouses having their on-premises or cloud-based infrastructures hacked. This increased security can help protect the personal and financial information of borrowers and lenders.
- **Access to real-time information:** With blockchain technology, all parties involved in a mortgage transaction have access to real-time information, allowing for faster and more accurate decision-making. Certain blockchains offer transaction speeds of validating events upwards over 15,000 transactions per second, rivaling the speed of financial credit card processors – a benefit that is urgently needed to expedite the speed to close a loan that is not realized today with even the quickest of API or cloud-based SaaS services serving the real estate industry.

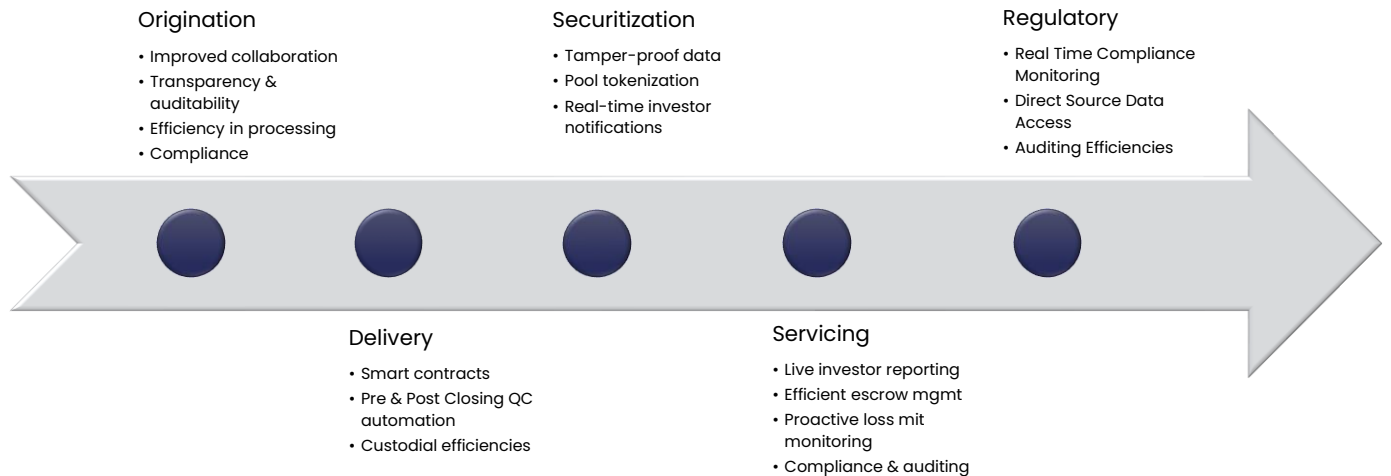
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<sup>6</sup> Cryptography is the practice and study of techniques for secure communication and data protection in the presence of adversaries or potential attackers. It involves using mathematical algorithms and methods to convert information into a form that is unintelligible to unauthorized individuals, making it possible to transmit and store sensitive data securely.

Overall, the use of blockchain technology in the mortgage industry can help increase transparency, reduce risk, and improve efficiency, making it a valuable tool for the industry.

## 6 POTENTIAL USES AND BENEFITS

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The above are examples of benefits the use of blockchain, smart contracts, decentralized applications (dApps) and other Web 3 technologies can bring to the mortgage origination process and life of loan. Naturally, this would have substantial impacts in lowering the overall costs not just within the origination process, but the downstream cost savings in the secondary market coupled with greater liquidity and investment, also have the potential to not only lower costs to the borrower, but possibly on lowering overall interest rates. Many of these benefits would additionally increase the profitability for lenders and returns to investors. Lastly, it would streamline the origination process, vastly reducing the time for a loan to go from pre-qualification or application to closed, funded, and delivered.

Though many have touted that blockchain could reduce this time to minutes, they typically overlook required regulatory timing in the process. As an example, a Closing Disclosure (CD) must be issued to the borrower at least three business days prior to closing, which puts the minimum achievable time at three to five days, notwithstanding timing around initial disclosures. Additionally, if the loan does not receive a property inspection waiver from the GSEs, time will still be required for scheduling and performing the property inspection as part of the appraisal process. Regardless, reducing the total time to less than ten days is still a massive reduction over the current average of fifty days.

## 7 CHALLENGES TO IMPLEMENTING BLOCKCHAIN IN MORTGAGE LENDING

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### 7.1 TECHNOLOGY MATURITY

Blockchain technology was introduced with the launch of Bitcoin in January 2009. Bitcoin's creator, Satoshi Nakamoto, published a whitepaper titled "Bitcoin: A Peer-to-Peer Electronic Cash System" in October 2008, outlining the concepts of a decentralized, trustless, and immutable ledger that would later be referred to as the blockchain. This makes the technology just fourteen years old at this point, relatively new in the grand scheme of things.

Since the introduction of Bitcoin, blockchain technology has been rapidly evolving, with innovations in efficiency, the creation and emergence of smart contracts, DeFi <sup>7</sup>and Non-Fungible Tokens (NFT)<sup>8</sup>, tokenization<sup>9</sup>, new consensus

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<sup>7</sup> DeFi stands for "Decentralized Finance," which refers to a financial ecosystem built on blockchain technology and decentralized networks. In a DeFi ecosystem, traditional financial services such as lending, borrowing, trading, and investing are provided using decentralized protocols and smart contracts, eliminating the need for intermediaries like banks or financial institutions.

<sup>8</sup> A non-fungible token (NFT) is a type of digital token that represents ownership of a unique item, asset, or piece of content using blockchain technology. Unlike cryptocurrencies such as Bitcoin or Ethereum, which are fungible and interchangeable with one another, NFTs are distinct and cannot be exchanged on a one-to-one basis due to their uniqueness.

<sup>9</sup> Tokenization is the process of converting real-world or digital assets into tokens on a blockchain. These tokens represent ownership, access rights, or other attributes of the underlying asset. Tokenization allows for the fractional ownership, transferability, and efficient management of assets that might otherwise be illiquid or difficult to divide.

mechanisms<sup>10</sup>, supply chain management and identity verification. And it continues to evolve with new Web3 concepts emerging consistently.

As such, in an industry such as the mortgage industry which has yet to introduce this technology in any notable scale, and still largely relies on Web2<sup>11</sup> technologies, there is a general and relative lack of expertise and, more importantly, understanding of Web3 and blockchain technologies. This leads to challenges and risks in not just the technical implementation of the technology, but pitfalls with business model challenges, and difficulties with change management and adoption.

## 7.2 TECHNICAL CHALLENGES

### 7.2.1 Replicating Web 2 Concepts in Web 3

One of the foremost risks that can lead to failure of a Web 3 implementation on fulfilling its promises is approaching the design and implementation in a manner that replicates existing Web 2 processes and concepts. This frequently occurs when Web 2 teams attempt to undertake Web 3 projects based on limited, learned knowledge of Web 3. This leads to effectively moving all of the existing issues and constraints from one technology to another.

### 7.2.2 Too Many Chains

With numerous, disparate entities currently researching and developing blockchain technologies within the mortgage and financial sectors, both public and private, the risk exists to either replicate, or even compound the issues that exist in the Web 2 mortgage eco-system today that Web 3 technology seeks to solve.

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<sup>10</sup> A consensus mechanism is a protocol or set of rules used in blockchain networks to achieve agreement among participants on the state of the network. In a decentralized and distributed environment, where multiple nodes maintain copies of the blockchain ledger, consensus mechanisms ensure that all nodes agree on the validity of transactions and the order in which they are added to the blockchain.

<sup>11</sup> Web2, often referred to as the "Social Web" or the "Read-Write Web," refers to the evolution of the World Wide Web from its static and informational beginnings (Web1) to a more dynamic, interactive, and user-centered platform. This transition occurred roughly from the late 1990s through the early 2000s and brought about significant changes in how people used and interacted with the internet.

If a multitude of blockchains materialize, each focused only on specific functional areas of the overall mortgage process, there will be an arduous and monumental task of connecting these chains into the connective tissue needed to make up the entirety of a mortgage transaction, setting back efforts by years, and possibly leading to abandonment. Additionally, this will likely result in the need for large amounts of data to be passed between chains, hindering the transparency and availability of data. And finally, it will largely suppress the full realization of the efficiencies that blockchain would bring.

### 7.2.3 Existing or New?

Many blockchain efforts underway in the mortgage space are pursuing development on existing blockchains. Although one can argue this is the quickest and lowest cost avenue to market and works well for putting individual or grouped functional elements on chain, in the broader context of having the entire mortgage life of loan on chain, there are risks that should be taken into consideration.

The first is the overall complexity of a mortgage transaction, one the most complex of any financial transactions. Most existing chains are designed around the transfer of basic assets, i.e., cryptocurrency or NFTs. These are relatively simplistic in nature when compared to a mortgage transaction. Using an existing chain would require extensive work on a forked chain<sup>12</sup> to design to and address the complexities required to manage the entire life cycle of a mortgage transaction.

Second, all mortgage assets fall under the purview of federal regulation, and a significant portion of these assets are either federally guaranteed or insured. As a result, the federal government holds an inherent interest in the stability and integrity of these assets.

While regulations surrounding cryptocurrency, crypto exchanges, and specific categories of NFTs are necessary to safeguard consumers and ensure financial security, it's essential to maintain a clear distinction between regulating the assets and regulating the underlying technology. The focus should be on establishing

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<sup>12</sup> A forked chain, also known as a blockchain fork, occurs when a blockchain network splits into two separate chains with their own transaction histories. This can happen due to changes in the protocol or disagreements within the network's community.

regulations that directly pertain to the assets themselves, rather than imposing regulations on the foundational technology driving innovation.

However, introducing federally regulated and guaranteed mortgage assets into an ecosystem that includes unregulated assets could potentially create unintended consequences. There is a risk that regulatory efforts targeted at asset-specific protections might inadvertently spill over and impact the innovative technology that enables these assets.

## 7.3 INDUSTRY CHALLENGES

### 7.3.1 Fear of the Unknown

With the industry still largely lacking in understanding of this emerging technology and what it can bring, the foremost challenge is without question a fear of the unknown. From Lenders to Technology providers, questions far outweigh answers.

- Business Disruption - The fear of potential disruptions to existing operations and processes can hinder their willingness to embrace change.
- Transition Costs - Implementing blockchain technology requires significant investment in terms of technology, resources, and training. Lenders may be concerned about the upfront costs and potential financial burden associated with transitioning to a new system.
- Transition Challenges - Transitioning from legacy systems to blockchain-based platforms could disrupt day-to-day operations and workflows, leading to temporary productivity losses. This can be a significant concern for incumbents with well-established processes.
- Perceived Complexity - Blockchain technology can be complex to understand, especially for non-technical stakeholders. Lenders may be apprehensive about the steep learning curve and the need to educate their teams about blockchain concepts
- Data Security Concerns - Lenders handle sensitive borrower data, and there may be concerns about the security of blockchain networks and the potential exposure of confidential information. The challenge is to demonstrate that blockchain's decentralized and encrypted nature enhances data security rather than compromising it.
- Integration Complexities - Legacy systems and processes are deeply entrenched in the mortgage industry. Integrating blockchain with existing

systems can be complex and time-consuming. Lenders may worry about disruptions to their day-to-day operations during the integration process.

- Regulatory Uncertainty - The mortgage industry is heavily regulated, and new technologies can introduce regulatory challenges. Lenders may fear potential compliance issues and legal hurdles associated with adopting blockchain solutions.
- Loss of Control - Transitioning to a blockchain-based system may involve sharing data and decision-making with other stakeholders in the ecosystem. Lenders might be hesitant to relinquish control over their proprietary systems and data. LOS providers, historically regarded as the system of record, will face uncertainty as to the future of their models.
- Market Disruption - Blockchain has the potential to disrupt the competitive landscape of the mortgage industry. Established lenders may worry about the emergence of new players and business models that leverage blockchain's capabilities to gain market share. Likewise, incumbent technology providers will have concerns about how blockchain will disrupt their entrenched market positions.
- Revenue Erosion - Established players in the mortgage industry have built revenue streams around proprietary technology and data models. Adopting blockchain could disrupt these models, leading to concerns about revenue erosion as the industry shifts towards open and shared ledger solutions.

### 7.3.2 Change Management

Change Management has always proved difficult in the mortgage industry. The mortgage industry is accustomed to its traditional methods, and employees are typically resistant to change. Shifting to blockchain requires a cultural shift, and lenders must navigate resistance from employees who are comfortable with the status quo.

To exacerbate this further, as with the lack of expertise on the technical side, lenders will face a similar issue with finding or training staff who can not only effectively manage the implementation, but also redesigning processes and procedures. When combined with resistance, this could certainly lead to not only uncertainty and delay but have major impacts on widespread adoption. These situations very often lead to blaming the technology for the failure.



### 7.3.3 M&A and Market Consolidation

Incumbents with substantial resources might opt for mergers and acquisitions to capitalize on the potential of blockchain. This could lead to a few dominant players controlling the technology, further entrenching existing players and their business models.

As established providers consolidate their market presence, new entrants and innovative startups might find it challenging to compete, limiting diversity, and stifling potential breakthroughs.

Profit-driven models by incumbent technology providers in the mortgage industry could have several potential impacts on the adoption and implementation of blockchain technology:

- **Selective Adoption** - Incumbents may prioritize blockchain applications that align with their profit motives, potentially leaving out certain aspects that could benefit the entire industry. This selective adoption could hinder the holistic transformation that blockchain can bring to the mortgage ecosystem.
- **Competitive Advantage** - Incumbents with profit-driven motives might leverage blockchain technology to gain a competitive advantage over smaller players or new entrants. This could create an uneven playing field and limit the ability of smaller players to innovate and compete.
- **Fragmentation** - If each incumbent pursues their own blockchain initiatives independently, it could lead to fragmentation within the industry. Different blockchain implementations might not be compatible with each other, which goes against the goal of fostering collaboration and standardization.
- **Data Silos** - Incumbents aiming for profit might develop proprietary blockchain solutions that prioritize their internal data silos. This could restrict the free flow of data and collaboration.
- **Lack of Interoperability** - Profit-driven models may not prioritize interoperability with other players, causing data interoperability challenges and limiting the potential benefits of a unified blockchain ecosystem.
- **Exclusion of Smaller Players** - Smaller players in the industry might not have the resources or technical expertise to develop their own blockchain solutions.

If incumbents control the landscape, smaller players might struggle to participate and compete effectively.

- Innovation Constraints - Profit-driven models may discourage open innovation and sharing of ideas. The focus could shift towards protecting proprietary interests rather than collaborating on innovative solutions.
- Limited Industry-wide Impact - Blockchain's potential to create industry-wide efficiencies and improvements might be compromised if the technology is primarily used to optimize existing profit centers instead of driving transformative change.

In the traditional business paradigm, the approach of M&A might initially appear to streamline operations by creating larger, more dominant players. However, this approach faces significant challenges in the context of blockchain implementation in the mortgage sector. One of the most pressing issues is the persistence of conflicting business models and economic incentives among these merged entities.

Blockchain technology thrives on transparency, immutability, and shared control. Yet, under the M&A approach, the potential for conflicts of interest and competition within the merged entities remains, hindering the realization of a truly collaborative and efficient blockchain ecosystem. This is particularly true when different entities possess varying degrees of market power and competitive agendas.

## 7.4 TRUST

Trust in the blockchain will be paramount to industry adoption. In this case, the trust aspect is in the ownership, control, governance, stewardship, and maintenance of the chain. If control of the blockchain is absolute or over-concentrated with any one entity, or a handful of entities whether it be public sector or private industry, it could create a lack of trust in the technology by the broader industry.

Control by an individual private entity would call impartiality into question, and not provide the opportunity for the industry to participate in the decision-making process. Instead, it would likely be a process of providing feedback and requests that would then be at the sole discretion and availability of the controlling party.

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## 8 PROPOSED SOLUTION

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With all of this considered, the proposed approach to create and provide a balanced, representative, regulated foundational mortgage blockchain that fosters adoption and fuels innovation is through the formation of an industry non-profit organization.

### 8.1 THE CASE FOR A NON-PROFIT UTILITY MODEL: ALIGNING INTERESTS

Herein lies the crucial differentiator of the non-profit utility model proposed. By establishing a non-profit organization dedicated to advancing the mortgage blockchain ecosystem, it eliminates the inherent conflicts that can arise from profit-oriented enterprises. The non-profit structure ensures that all stakeholders, regardless of their market position, work together towards a common goal: the widespread adoption and success of the blockchain framework.

A non-profit utility model aligns the economic incentives of all participants. It fosters an environment where industry players collaborate rather than compete, resulting in shared benefits and mutual growth. Moreover, it eliminates the need for dominance and market control, shifting the focus towards creating a sustainable and innovative ecosystem that benefits all participants – from lenders and borrowers to investors and regulators.

### 8.2 OVERCOMING INDUSTRY CHALLENGES

The non-profit governance model offers a strategic approach to addressing many of the industry challenges in the context of blockchain adoption in the mortgage industry:

#### 8.2.1 Fear of the Unknown

Educational initiatives and awareness campaigns by the non-profit can help address misconceptions and provide clear explanations about blockchain's benefits.

- Business Disruption - Facilitate gradual adoption strategies to minimize operational disruptions during the transition.
- Transition Costs - Guide cost-effective implementation and resource allocation, alleviating financial concerns.
- Transition Challenges - Guidance can help streamline the transition process, minimizing productivity losses for incumbents.
- Perceived Complexity - Educational efforts can simplify blockchain concepts for non-technical stakeholders.
- Data Security Concerns - Emphasis on security best practices and audits will enhance data protection confidence.
- Integration Complexities - Guidance to offer strategies for seamless integration, assuaging fears of operational interruptions.
- Regulatory Uncertainty - Provide insights into regulatory considerations, offering clarity on compliance matters.
- Loss of Control - Collaborate on decision-making processes, ensuring stakeholders' participation and control.
- Market Disruption - Highlight how blockchain fosters innovation and can create new opportunities for all players.
- Revenue Erosion - Guidance will emphasize how blockchain can create new revenue streams and business models.

### 8.2.2 Change Management

The non-profit can provide comprehensive change management support and bridge the expertise gap.

- Change Management - Develop tailored change management strategies to ease transitions and manage resistance.
- Expertise Shortage - Offer training programs and resources to develop expertise in blockchain implementation and process redesign.
- Cultural Shift - Guidance can help lenders navigate cultural shifts, making the transition smoother and more acceptable.

### 8.2.3 M&A and Trust

The non-profit's impartial and collaborative governance model will ensure transparency, shared control, and industry involvement. The collaborative approach will ensure equitable participation, compatibility, and industry wide benefits.

- Neutral Platform - Serves as a neutral platform where incumbents and emergent players can collaboratively develop and implement blockchain solutions. This collaborative approach helps overcome conflicts by focusing on industry-wide benefits rather than individual profit motives.
- Shared Vision - The non-profit's mission centers around fostering innovation, transparency, and efficiency in the mortgage industry. By emphasizing a shared vision of advancing the industry as a whole, the non-profit helps participants align their interests and minimize conflicts arising from profit-driven motivations.
- Fair Revenue Distribution - Establish revenue-sharing models that ensure a proportional distribution of value among ecosystem participants. This approach incentivizes data sharing, collaboration, and participation while minimizing the potential for monopolistic or exploitative behavior by incumbents.
- Long-Term Sustainability - Focus on sustainability and industry growth encourages participants to prioritize long-term benefits over short-term profit gains. This orientation reduces the incentive for profit-driven models that might hinder industry-wide progress.
- Ethical Framework - Establish an ethical framework that guides participants' behavior and decision-making. By promoting principles of fairness, transparency, and responsible innovation, the non-profit helps create an environment where profit-driven models align with broader industry goals.
- Open-Source Approach - Adopt an open-source model for blockchain development, allowing participants to contribute and collaborate openly. This approach encourages a sense of shared ownership and discourages profit-driven monopolies, fostering healthy competition and innovation.
- Industry-Wide Participation - Inclusivity encourages both incumbents and newcomers to actively engage in shaping the blockchain ecosystem. This collective involvement ensures that profit-driven models are balanced with the broader industry's interests and needs.
- Ecosystem Stewardship - The non-profit's role as an ecosystem steward includes monitoring market dynamics and preventing any participant from exploiting the system for excessive profit. This oversight helps maintain a level playing field and prevent monopolistic practices.
- Educational Initiatives - Raise awareness about the benefits of collaboration and shared value creation. By showcasing successful case studies, best practices, and positive outcomes of collaboration, the non-profit can inspire participants to prioritize industry growth over individual profit.

- **Long-Term Viability:** The non-profit can strategically position itself as a guardian of the industry's long-term viability. This perspective encourages participants to consider the sustainability of their actions and models, reinforcing the idea that a healthy industry ecosystem will benefit everyone.

Overall, the non-profit governance model's emphasis on collaboration, transparency, shared value, and industry growth helps mitigate conflicts arising from profit-driven models. By creating an environment where participants recognize the greater advantages of cooperation, the non-profit paves the way for a balanced and mutually beneficial blockchain ecosystem in the mortgage industry.

## 8.3 FORMATION OF THE INDUSTRY NON-PROFIT

### 8.3.1 Composition



The organization should include diverse representation from stakeholders in the mortgage industry, including lenders, servicers, investors, service providers, technology providers, and other relevant participants. It should also include experts in Web3 and Blockchain technology.

### 8.3.2 Charter/Activities

The non-profit organization would be committed to fostering collaboration, innovation, and equitable access within the mortgage industry through the development, governance, and promotion of a blockchain-based ecosystem. The mission would be to create a transparent, secure, and efficient platform that enhances the entire mortgage lifecycle, benefiting all stakeholders involved.

It should envision a mortgage industry transformed by blockchain technology, where data is shared openly, processes are streamlined, and barriers to entry are reduced. The vision is to establish a unified ecosystem that promotes fairness, trust, and equal opportunities for all participants, from borrowers to lenders, technology providers, and beyond.

It should operate with integrity, transparency, and a commitment to the betterment of the mortgage industry. It upholds the values of collaboration, fairness, inclusivity, and technological advancement. The non-profit serves as a steward of the blockchain ecosystem, dedicated to promoting positive change while safeguarding the interests of all participants.

- Technology Development and Governance - Dedicated to the design, development, and continuous improvement of a layered blockchain architecture specifically tailored to the mortgage industry's unique needs. It ensures the integrity, security, and efficiency of the blockchain while adhering to industry standards.
- Interoperability and Standardization - Aim to establish open interoperable standards that enable seamless data exchange and communication among diverse stakeholders in the mortgage ecosystem. This includes lenders, technology providers, regulators, borrowers, and more.
- Education and Awareness - Actively educates industry participants about the benefits, capabilities, and potential of blockchain technology. It provides resources, workshops, and training to bridge the knowledge gap and empower stakeholders to leverage the technology effectively.
- Collaboration and Partnership - Fosters collaboration among industry players by facilitating partnerships between lenders, technology providers, regulators, and other stakeholders. It encourages collective problem-solving, knowledge sharing, and cooperative innovation.

- **Equity and Inclusivity** – Committed to ensuring that the benefits of blockchain technology are accessible to all, regardless of size, location, or technological expertise. It advocates for the inclusion of smaller players and underserved populations, promoting diversity and equal participation.
- **Governance and Decision-Making** – Employs a transparent and democratic governance model that involves all stakeholders in decision-making processes. It ensures that control over the blockchain ecosystem is distributed equitably, preventing concentration of power.
- **Regulatory Advocacy** – Engage with regulators, policymakers, and industry associations to advocate for blockchain-friendly regulations that facilitate innovation while ensuring consumer protection, data privacy, and compliance.
- **Research and Innovation** – Invest in research to explore new possibilities for blockchain technology within the mortgage industry. It encourages innovation through pilot projects, hackathons, and initiatives that showcase the potential of blockchain solutions.

### 8.3.3 Governance

Selecting the board of governors for the mortgage blockchain non-profit requires a thoughtful and transparent process to ensure effective governance and representation of diverse stakeholders.

- **Define Representation** – Clearly define the categories of stakeholders that should be represented on the board. This may include lenders, borrowers, investors, technology providers, regulatory experts, and other relevant industry participants.
- **Nomination Process** – Establish a nomination process that allows individuals or organizations to nominate potential board members. Consider soliciting nominations from industry associations, members, and relevant stakeholders to ensure a broad pool of candidates.
- **Selection Committee** – Form a selection committee responsible for reviewing nominations and evaluating candidates based on their qualifications, expertise, experience, and commitment to the non-profit's mission. The selection committee should consist of individuals with diverse backgrounds and industry knowledge.



- Elections or Appointments - Depending on the non-profit's governance structure, board members may be elected by members or appointed by existing board members. Consider a staggered board term to ensure continuity and avoid a complete turnover of the board at once.
- Transparency and Diversity - Promote transparency throughout the selection process to build trust and confidence among stakeholders. Strive to create a diverse and inclusive board that reflects different perspectives and interests within the mortgage industry.
- Expertise and Skills - Seek individuals with expertise in areas such as blockchain technology, mortgage lending, regulatory compliance, data privacy, finance, and other relevant domains. A well-rounded board with diverse skills can effectively guide the non-profit's initiatives.
- Industry Collaboration - Collaborate with industry associations, stakeholders, and industry leaders to identify potential candidates and encourage them to participate in the nomination process.
- Nominee Engagement - Engage with potential board members to ensure they understand the responsibilities and expectations associated with serving on the board. Allow candidates to present their qualifications and vision for the non-profit.
- Voting or Confirmation - Depending on the governance structure, conduct voting or seek confirmation from the existing board or members to finalize the selection of board members.
- Term Limits and Evaluation - Establish term limits for board members to ensure regular rotation and fresh perspectives. Conduct periodic evaluations to assess the board's performance and make any necessary adjustments to improve governance.

Ultimately, the key is to create a board of governors that is committed to the non-profit's mission, has the expertise to guide its strategic direction, and represents the interests of various stakeholders in the mortgage industry. The selection process should prioritize transparency, diversity, and inclusivity to build a strong and effective governing body for the mortgage blockchain non-profit.

#### 8.3.4 Sustainability

Naturally, as a Non-Profit organization, it would employ a not-for-profit revenue model. Funding for its activities and sustainability could be achieved through several sources.

- Membership Fees – All members of the organization would pay regular, ongoing minimum membership fees.
- Loan Level Fee – A reasonable, loan level charge for loans originated and managed on the blockchain could be leveraged.
- Contributions from industry stakeholders.
- Grants
- Revenues generated through services specifically provided by the organization.

The Non-Profit must maintain a transparent financial model to ensure the organization's financial sustainability without profit motives.

### 8.3.5 Risks and Challenges

As with any endeavor, this proposed approach does present the potential for risks and challenges:

- Decision-Making Challenges – In a collaborative non-profit governance model involving diverse stakeholders, reaching consensus on important decisions might be time-consuming and challenging. Differing priorities and perspectives could lead to delays in implementing crucial updates or changes.
- Lack of Agility – A large and diverse board of directors could potentially slow down decision-making processes due to the need for consensus and alignment among various stakeholders. This might hinder the ability to quickly respond to market changes or emerging technologies.
- Conflict of Interest – Board members representing different industry sectors might have conflicting interests that could impact the decision-making process. Balancing these interests while maintaining the non-profit's mission and objectives could be complex.
- Resource Allocation – Funding and resource allocation within the non-profit could lead to disagreements among stakeholders, potentially hindering the development and growth of the blockchain platform.

- Innovation Bottlenecks - While collaboration is valuable, it might also lead to a conservative approach to innovation. Balancing the need for industry-wide standardization with the potential for stifling innovative solutions can be a challenge.
- Regulatory Compliance - Regulatory bodies might have varying expectations and requirements for the blockchain technology, leading to potential conflicts between the non-profit's goals and regulatory mandates.
- Data Privacy Concerns - Sharing sensitive mortgage data within the collaborative environment could raise privacy and security concerns. Ensuring robust data protection mechanisms and compliance with relevant regulations becomes critical.
- Coordination Complexity - Coordinating efforts among various regulatory bodies, government agencies, industry associations, and private entities might prove complex, leading to potential delays in implementation and operational challenges.
- Resistance to Change - Established industry players might be hesitant to adopt new technologies or change existing processes. Convincing them to embrace the blockchain solution could require significant effort and resources.
- Loss of Control - Depending on the structure of collaboration, stakeholders might feel that they are giving up control over critical decisions and strategies, leading to a lack of ownership and commitment to the initiative.

To mitigate these risks, a strong governance framework, clear communication channels, conflict resolution mechanisms, and a focus on the overall industry benefit will be crucial. Regular stakeholder engagement and transparency in decision-making can help build trust and ensure the success of the collaborative non-profit governance model.

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## 9 LEVERAGING SUCCESSFUL PRECEDENTS

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In the pursuit of creating a non-profit utility model for the mortgage blockchain ecosystem, it is worth noting that successful precedents exist for similar endeavors within the industry.

## 9.1 FHFA'S GSE LOAN PERFORMANCE DATA UTILITY

One notable example is the Federal Housing Finance Agency's (FHFA) initiative to establish a common industry mortgage data utility through the GSE loan performance data.

The FHFA's GSE loan performance data utility is a shining testament to the power of transparency, collaboration, and shared data in the mortgage sector. By making loan performance data broadly accessible and freely available to the industry, the FHFA has fostered a level of trust and transparency that has positively impacted the entire ecosystem. This initiative has been widely embraced and recognized for its ability to enhance industry insights, facilitate risk management, and enable better decision-making across the mortgage value chain.

The success of FHFA's data utility highlights the potential of a non-profit approach to create a shared infrastructure that benefits all participants, irrespective of their market position. By extrapolating this success to the realm of blockchain technology, we can envision an ecosystem where comprehensive mortgage data, securely and transparently stored on a blockchain, drives unparalleled efficiency, innovation, and collaboration.

Incorporating the principles that have made the FHFA's initiative a resounding success, our proposed non-profit utility model stands to benefit not only industry players but also taxpayers and society at large. Improved transparency and trust in the data behind mortgages can mitigate risks, strengthen investor confidence, and enhance the overall integrity of the mortgage industry. By building on the foundation of proven successes, we aim to elevate the mortgage ecosystem to new heights of efficiency, fairness, and innovation.

The FHFA's GSE loan performance data utility serves as a compelling example of the positive outcomes that can arise from shared data and collaborative efforts within the mortgage industry. This precedent underscores the potential of a non-profit utility model in creating a blockchain-powered ecosystem that transcends barriers, promotes innovation, and instills a higher level of trust and transparency. By building on the lessons learned from successful precedents, we can shape the future of the mortgage industry in ways that benefit all stakeholders and contribute to a more secure and prosperous financial landscape.

## 9.2 MISMO (MORTGAGE INDUSTRY STANDARDS MAINTENANCE ORGANIZATION)

MISMO stands as a beacon of collaborative industry transformation through its establishment as a non-profit organization dedicated to standardizing mortgage data and processes. Founded by a diverse range of stakeholders, including lenders, servicers, investors, and technology providers, MISMO embodies the power of collective wisdom and cooperation.

MISMO's primary mission revolves around creating and maintaining standardized data formats, protocols, and best practices for the mortgage industry. By offering a neutral platform for industry players to collaborate, MISMO enables the creation of consistent, interoperable, and efficient communication pathways across the entire mortgage lifecycle.

MISMO's impact resonates far beyond the surface level of standardization. By providing a shared language and framework, MISMO empowers lenders, servicers, and technology innovators to seamlessly exchange data, streamline operations, and enhance transparency. This unified approach eliminates silos, accelerates decision-making, and fosters innovation by removing barriers that previously hindered efficient communication.

MISMO's non-profit status and inclusive approach have proven to be catalysts for industry-wide innovation. By promoting a collaborative environment where competitors collaborate for the common good, MISMO spurs the creation of new products, services, and technologies that elevate the mortgage experience for all stakeholders.

MISMO's role as a neutral standard-setting organization helps establish trust across the mortgage ecosystem. Lenders, investors, and regulators gain confidence in the accuracy and consistency of data exchanged, leading to informed decision-making, and reduced operational risk.

Through MISMO's efforts, the mortgage industry achieves heightened market efficiency. Standardized data exchange simplifies compliance with regulations, reduces errors, and facilitates seamless transitions in mortgage processes, ultimately improving the experience for borrowers and increasing market liquidity.

MISMO's work contributes to the industry's resilience by ensuring adaptability to evolving technologies and regulatory changes. Its standardization efforts future-proof the industry against obsolescence, making it easier to integrate new tools, respond to market shifts, and innovate at the speed of technological advancement.

In summary, MISMO serves as an emblem of successful non-profit collaboration, demonstrating how a shared commitment to standardization can reshape an entire industry. Its inclusive approach, dedication to neutrality, and focus on innovation have made it a cornerstone of the mortgage ecosystem, showcasing the immense potential of uniting diverse industry participants under a common vision for positive transformation.

### 9.3 MERS (MORTGAGE ELECTRONIC REGISTRATION SYSTEM)

MERS (Mortgage Electronic Registration Systems) is a prime example of a public utility in the mortgage industry. Established in the 1990s, MERS was created to streamline the mortgage process by electronically tracking and recording mortgage ownership changes. Its framework demonstrates how a centralized utility can bring efficiency to a complex ecosystem. Here's a breakdown of its features:

Nature as a Public Utility - MERS operates as a centralized registry that records mortgage assignments and transfers. It provides a transparent and easily accessible platform where mortgage lenders can electronically register and track changes in ownership. This model fosters collaboration and simplifies the process for lenders, servicers, and investors.

- Efficiency - MERS simplifies the transfer of mortgage ownership by allowing members to electronically record and track changes, reducing paperwork and manual processes.
- Cost Savings - The streamlined process leads to cost savings for lenders and other participants by eliminating the need for physical recordings and associated administrative efforts.
- Transparency - MERS provides a transparent and standardized platform, making it easier to verify ownership and track changes, reducing confusion and disputes.
- Real-Time Updates - MERS offers real-time updates, ensuring accurate and up-to-date ownership information is available to all authorized parties.

- Collaboration - The utility model encourages collaboration among various stakeholders in the mortgage industry, creating a shared platform for streamlined processes.
- Public Utility Comparison - Similar to the FHFA's GSE Loan Performance Data Utility and MISMO, MERS serves as a common platform that benefits the industry by enhancing transparency, reducing friction, and providing a standardized framework. MERS' success demonstrates the potential of a public utility approach in the mortgage sector.

By leveraging the strengths of MERS' public utility model, the proposed non-profit blockchain initiative could create a similar collaborative platform for the mortgage industry. This approach aligns with MERS' success in addressing industry challenges through shared infrastructure and standardized processes.

## 10 THE CASE FOR A NEW, CORE, FOUNDATIONAL MORTGAGE BLOCKCHAIN

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A core, foundational blockchain is necessary to provide a singular thread for all mortgage transactions that are done on the blockchain. This does not suppose that there will not be multiple blockchains playing a role in the greater ecosystem. This is a certainty, but it should be with intent of design and necessity. But to fully bring the benefits to bear, a foundational chain is necessary.

The potential benefits to building a new layer 0 core chain specifically for the mortgage market are as follows:

- Customizability - A dedicated mortgage blockchain can be designed to specifically to meet the needs and requirements of the mortgage industry rather than trying to fit into an existing public chain that may not be optimized for this use case.
- Increased Security - Security protocols can be specifically designed around the sensitive nature of mortgage information and who has access, the type of access, and for how long to the data that is moving throughout the chain solution.

- Regulatory and Policy Alignment – A dedicated mortgage blockchain can be designed to better align with existing regulations and policies, as well as shape new regulation without friction or encroachment into other blockchain driven industries. As a federal utility, we would have the first instance of regulatory compliance and governance via code – a concept only able to be brought forth by Web3 where current technologies do not possess the capability to satisfy.
- Lower Costs – Using a dedicated mortgage blockchain could potentially lower costs associated with implementing and maintaining the technology.
- Volume and Energy Expenditure – The number of transactions that would occur in a mortgage blockchain would be exponentially lower than those seen on larger public chains. Therefore, depending on the consensus mechanism, would be a far more energy efficient chain if self-contained. Additionally, being on an independent chain would shield the mortgage market from large volumes and spikes in other segments.
- Scalability – An independent chain would be able to scale specifically around the needs of the mortgage segment without competing against scale needs of other segments.

## 10.1 DESIGN

Determining and creating the initial design considerations for this model will require engaging top experts, architects, and advisors in Web3 in a variety of disciplines. Of importance is ensuring this cohort is not representative of a single or individual blockchain or technology provider, so that as many potential technology agnostic approaches can be considered in the design, security, governance, and scalability of the solution. This will also include experts and advisors in regulatory and legal capacities. We also want to be wary of the deep Web3 experts who call themselves “degens” as their core Web3 ethos centers around the true decentralization of industries. As we know, certain industries such as what is being proposed in this paper require the need of government regulation for the benefit of the societies that they serve. Thus, it is incumbent on us to find the Web3 experts that have a favorable lens towards government regulation that harnesses the power of Web3 to improve the industry.



Additionally, numerous subject matter experts from across lending, service providers, servicing, capital markets, industry organizations and other areas of expertise will be required to inform the design.

## 10.2 DEVELOPING THE LAYER 0 AND LAYER 1 BLOCKCHAIN

Developing the layer 0 and layer 1 blockchain involves a meticulous and strategic approach that prioritizes design and architecture before selecting the appropriate partners for technical infrastructure and development. Unlike common practices that rush into selecting blockchain providers prematurely, this approach emphasizes the need for a well-thought-out design to guide every subsequent step.

Rather than making hasty decisions based solely on blockchain providers, it should be recognized that the design and architecture stage serves as a critical foundation. It not only shapes the overall structure of the blockchain but also informs key decisions such as selecting development partners, identifying optimal data providers, and establishing robust technical infrastructure.

This sequential approach ensures that each component of the blockchain ecosystem aligns seamlessly with the overarching design principles and goals. By first defining the scope, security measures, interoperability requirements, and scalability needs, we gain a comprehensive understanding of the solution's intricacies.

With this holistic view in place, we then proceed to carefully select the blockchain provider that best aligns with the established design parameters. Furthermore, we identify the most suitable partners for blockchain development, leveraging their expertise and experience to bring the design to life. Additionally, data providers are chosen based on their ability to supply accurate and reliable information that complements the blockchain's objectives.

By allowing design to drive decision-making, we ensure a cohesive and efficient blockchain implementation. This approach minimizes the risk of misalignment, reduces costly changes in later stages, and maximizes the potential for successful collaboration among all ecosystem participants. This method emphasizes the power

of informed choices, setting the stage for a robust, purpose-driven layer 0 and layer 1 blockchain solution that aligns seamlessly with the industry's needs and aspirations.

## 11 INVOLVEMENT OF REGULATORY BODIES AND AGENCIES

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It is critical, to ensure successful execution and implementation of this model, to engage all potential regulatory and agency participants in the very beginning stages. With the number of cross and interagency involvement, and the frequent conflicts that can develop between them, it is imperative to secure consensus as early as possible. Additionally, this will allow for the avoidance of pitfalls, addressing needed legislation or regulation, and other unexpected blocks that could jeopardize the entire endeavor.

Building a dedicated mortgage blockchain cooperatively between government and private industry would require coordinated involvement across numerous regulatory bodies and agencies. This includes:

- Central Bank - The central bank would play a key role in establishing and enforcing regulations for the mortgage blockchain, especially regarding monetary policy and financial stability.
- Financial Regulators - Financial regulators, such as the Securities and Exchange Commission (SEC) or the Financial Industry Regulatory Authority (FINRA), would be involved in ensuring that the mortgage blockchain is being used in a compliant manner and that the financial industry is following regulations.
- Government Agencies - Several government agencies, such as the Federal Housing Finance Agency (FHFA), the Government National Mortgage Association (GNMA), the Department of Housing and Urban Development (HUD), the Federal Housing Administration (FHA), the Veterans Administration (VA), the Federal Home Loan Bank (FHLB), and the Federal Reserve, would be involved in the development and implementation of the mortgage blockchain, as the technology would have significant impact on the mortgage industry and the economy as a whole.

- Mortgage Industry Standards Maintenance Organization (MISMO) – Integrating the mortgage blockchain non-profit closely with MISMO is critical for the standardization and interoperability of the blockchain platform within the mortgage industry. MISMO is a recognized standards-setting organization in the mortgage industry that develops and maintains data standards to promote efficiency, consistency, and accuracy in mortgage transactions
- Mortgage Bankers Association (MBA) – Close collaboration with the MBA would be highly beneficial for the mortgage blockchain non-profit, given MBA's prominent role as a leading trade association representing the mortgage banking industry.

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## 12 THE CASE FOR CONSUMERS

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Naturally, this would not be complete without looking at the most important beneficiary in all of this: The Consumer. Implementing blockchain technology to drive the mortgage industry offers significant benefits to consumers. These advantages center around transparency, security, and efficiency, enhancing their overall experience and financial wellbeing.

- Transparency and Accountability – Blockchain's transparent and immutable ledger ensures that all transaction records are accessible and tamper-proof. This transparency provides borrowers with a clear view of their mortgage journey, from origination to servicing and beyond. They can verify the accuracy of information and monitor the progress of their application in real-time. This increased visibility fosters trust between borrowers and lenders, reducing the likelihood of disputes and misunderstandings.
- Data Security and Privacy – Borrowers share sensitive personal and financial information throughout the mortgage process. Blockchain's cryptographic security features ensure that this data remains encrypted and tamper resistant. This heightened data security minimizes the risk of data breaches and unauthorized access, safeguarding borrowers' personal and financial information from potential threats.
- Streamlined Application Process: Blockchain streamlines the mortgage application process by eliminating redundant paperwork and manual verifications. Borrowers can securely upload and share necessary documents, reducing the time and effort required to complete their application.

Additionally, smart contracts automate certain steps, such as verifying income and employment, leading to quicker loan decisions and reduced processing times.

- **Efficient Closing Process** - Blockchain-enabled smart contracts facilitate a more efficient and transparent closing process. Borrowers and lenders can execute and enforce contractual agreements automatically, reducing the need for intermediaries and minimizing delays. This efficiency leads to quicker property ownership transfers and reduced closing costs for borrowers.
- **Ownership and History Verification** - Blockchain's ability to securely store property ownership records ensures that borrowers can easily verify property histories and titles. This verification process eliminates potential disputes over ownership and property liens, providing borrowers with peace of mind when making one of the most significant financial transactions of their lives.
- **Lower Costs and Fees** - By reducing the need for intermediaries, paperwork, and manual processes, blockchain has the potential to lower operational costs for lenders. These cost savings could translate into reduced fees and closing costs for borrowers. Additionally, the transparency of blockchain reduces the likelihood of hidden fees or unexpected charges, ensuring that borrowers have a clear understanding of the costs associated with their mortgage.
- **Empowerment and Control** - Blockchain puts borrowers in greater control of their financial transactions and information. Borrowers can manage their mortgage application, track the progress, and access relevant documents directly through blockchain-based platforms. This empowerment fosters a sense of control and ownership over the mortgage process.
- **Preventing Fraud and Identity Theft** - Blockchain's secure identity verification mechanisms help prevent fraud and identity theft. Borrowers can securely share their identity and financial information with lenders without the risk of it being compromised. This added layer of security protects borrowers from potential scams and unauthorized access to their personal data.
- **Expanding Credit Availability** - Blockchain technology has the potential to expand credit availability in the mortgage industry, especially for underserved and marginalized populations. By addressing existing barriers and streamlining processes, blockchain can contribute to a more inclusive lending environment and empower individuals who might have faced difficulties accessing credit through traditional channels.

Incorporating blockchain into the mortgage industry aligns with the broader trend towards digitization and innovation in financial services. The benefits offered by

blockchain technology are poised to transform the mortgage experience for borrowers, enhancing transparency, security, and efficiency throughout the entire mortgage lifecycle. As the mortgage industry evolves, borrowers stand to gain substantial advantages by embracing this revolutionary technology.

## 13 THE FUTURE

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### 13.1 ENABLING INNOVATION

The proposed foundational mortgage blockchain opens the door to a realm of transformative innovation that holds the potential to reshape the landscape of the mortgage industry and adjacent sectors. By establishing a secure, transparent, and collaborative platform, this approach paves the way for groundbreaking advancements and new possibilities:

- **Web 3-Based Application Development** – With the foundation of a mortgage blockchain, a new era of Web 3-based applications and fintech solutions can emerge. These applications can leverage the unique features of blockchain technology, such as decentralized data storage, smart contracts, and tokenization, to create innovative tools that streamline processes, enhance efficiency, and drive unprecedented levels of automation.
- **Fintech Evolution** – The mortgage industry is just the beginning. The proposed blockchain infrastructure has the potential to fuel fintech innovation beyond mortgages. Developers and entrepreneurs can harness the power of this platform to create innovative financial products, services, and marketplaces that transcend traditional boundaries. This ripple effect can lead to the birth of entirely new segments within the broader financial ecosystem.
- **Accelerated Technological Advancements** – The foundation of the mortgage blockchain provides a catalyst for accelerated advancements in technology. As participants collaborate, share insights, and build upon the blockchain's capabilities, the pace of technological progress can accelerate. This innovation feedback loop can lead to continuous improvements, enhancements, and refinements that drive the industry forward.
- **Cross-Industry Synergies** – The transformative potential of the mortgage blockchain extends beyond the confines of the mortgage industry. Adjacent sectors, such as real estate, insurance, supply chain management, and more,

can tap into the capabilities of the blockchain to reimagine their processes, increase transparency, and unlock new value. This cross-industry synergy can lead to the creation of entirely new business models and ecosystems.

- Entrepreneurial Opportunities - The proposed blockchain approach opens up entrepreneurial opportunities for startups and innovators. As the blockchain ecosystem grows, individuals and teams can explore uncharted territories, develop novel solutions, and create value-added services that cater to the evolving needs of the industry and its stakeholders.

In summary, the future envisioned by the proposed mortgage blockchain is one of boundless innovation, where the convergence of cutting-edge technology, collaborative spirit, and visionary thinking creates an environment ripe for disruptive breakthroughs. By fostering a fertile ground for creativity and exploration, this approach sets the stage for a future characterized by continuous evolution and advancement in the realms of finance, technology, and beyond.

## 13.2 ARTIFICIAL INTELLIGENCE (AI) AND MACHINE LEARNING (ML)

Implementing the proposed blockchain solution in the mortgage industry could indeed serve as an enabler for AI adoption. The transparency, accuracy, and real-time data availability offered by the blockchain could provide a solid foundation for AI algorithms to operate effectively. Here are some ways in which the blockchain could facilitate AI integration:

- Data Quality and Consistency - The blockchain's immutable nature ensures that data is accurate and consistent across all participants. AI algorithms heavily rely on clean and reliable data for training and decision-making, which the blockchain can provide.
- Real-time Data Access - Blockchain's real-time data updates and accessibility can enhance AI models that require up-to-date information for decision-making, risk assessment, and predictive analytics.
- Data Sharing and Collaboration - The decentralized nature of the blockchain allows different entities to securely share data while maintaining control over access permissions. This could facilitate collaboration and data sharing for training AI models without compromising data privacy.
- Trust and Security - Blockchain's security features, such as encryption and tamper-proof records, can enhance the security of data used by AI

algorithms. This is especially important when handling sensitive borrower information.

- Smart Contracts - Smart contracts can automate various processes and interactions within the mortgage ecosystem. AI models could interact with smart contracts to execute tasks automatically, such as verifying compliance or initiating loan processing based on predefined rules.
- Fraud Detection: AI-powered fraud detection models can benefit from blockchain's transparency and audit trail capabilities. Suspicious activities and anomalies can be detected more effectively using AI algorithms working on trustworthy data.
- Efficiency and Automation - AI can be integrated into various stages of the mortgage lifecycle, from credit risk assessment to customer support chatbots. The blockchain's streamlined and automated processes can complement AI's capabilities.
- Personalized Services - AI algorithms can analyze borrower data and preferences to provide personalized offers and recommendations. The blockchain can ensure that the data used for personalization is accurate and consent based.
- Regulatory Compliance: AI models can assist in ensuring regulatory compliance throughout the mortgage process. The blockchain's transparency and traceability can support AI-generated reports and audits.

However, integrating AI into the mortgage blockchain ecosystem would also come with its challenges. It requires careful consideration of data privacy, ethical AI practices, regulatory alignment, and the readiness of AI technologies for the mortgage domain. Collaboration among data scientists, AI experts, mortgage professionals, and regulators would be essential to harness the full potential of AI within the blockchain framework.

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## 14 CONCLUSION

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In conclusion, this whitepaper introduces an innovative vision for the future of mortgage lending that leverages the power of industry non-profits and blockchain technology. By establishing a regulated and compliant layer 0 and layer 1 blockchain under the stewardship of the industry non-profit, this model ushers in a transformative era for the mortgage industry. The collaborative approach ensures transparency, security, and equitable control, ultimately enhancing the efficiency of mortgage lending and transcending traditional barriers. This visionary model has the potential to reshape the landscape of mortgage lending, while also inspiring novel applications of blockchain technology across the broader financial sector. As this paradigm shift gains momentum, it holds promise to pave the way for unprecedented advancements and opportunities.



## ABOUT THE AUTHOR

Devin Caster brings over three decades of mortgage industry experience, rising from an entry-level processor to VP of Operations for a top-ten Wholesale Lender. A member of MISMO for nearly two years, he was elected as Co-Chair of the MISMO Blockchain Community of Practice, reinforcing his reputation as a forward-thinking industry leader.

Surviving the 2008 financial crisis as Director of Operations and Technology at American Pacific Mortgage, he transitioned into product management, leading innovative projects at Calyx and CoreLogic. An early advocate for technology in mortgage operations, Devin developed pricing engines and automated underwriting systems that significantly enhanced operational efficiencies.

Currently overseeing multiple products at CoreLogic, his focus is on driving the industry forward through emerging technologies like blockchain. Devin is not just a mortgage industry veteran; he's an innovator and futurist committed to technological evolution and process optimization.