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Using Blockchain to Aggregate and Share Misconduct Issues across the Accounting Profession FREE

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SUMMARY

A perennial challenge in the accounting profession is how to aggregate and share instances of practitioner misconduct among numerous relevant parties. At present, both the American Institute of Certified Public Accountants (AICPA) and National Association of State Boards of Accountancy (NASBA) offer solutions for centralized collection of misconduct, but both likely experience issues with incomplete reporting from key constituents. I propose a novel use of blockchain technology to address this issue, such that all key parties in the accounting profession leverage an accountancy blockchain to aggregate and share instances of practitioner misconduct across the country on a nearly real-time basis. Such a network creates an immutable record of misconduct and allows key constituents in the accounting profession to work together and share information as peers without the risk of one party taking control of the ledger. I close by discussing blockchain-specific roadblocks to realizing this proposed model.

Keywords: blockchain, accounting profession, misconduct, state boards of accountancy, monitoring, AICPA, NASBA

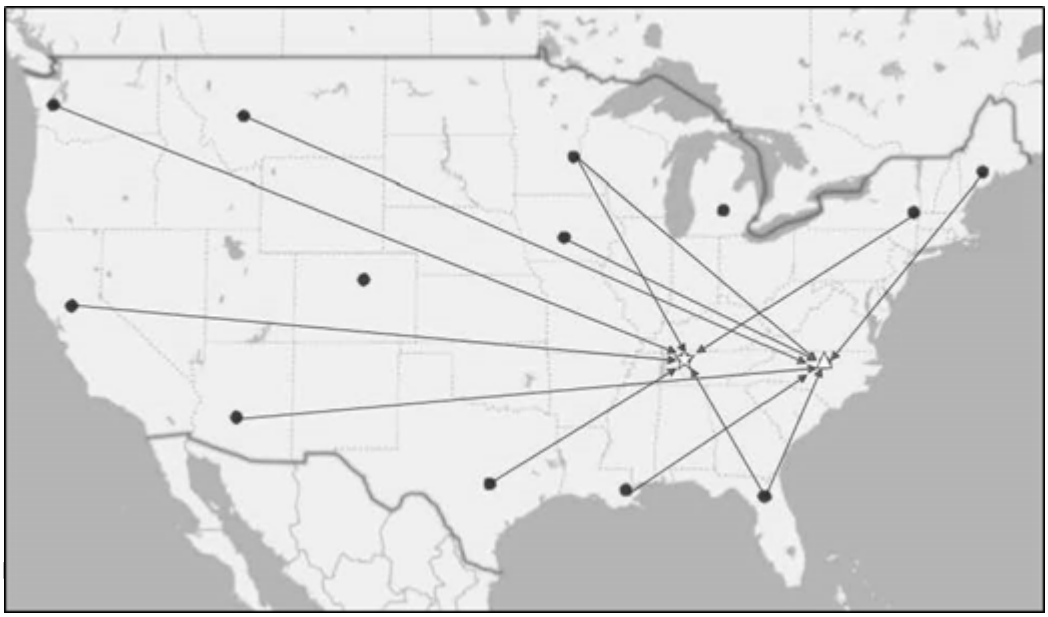
INTRODUCTION

A perennial challenge in the accounting profession is how to aggregate and share instances of practitioner misconduct among numerous relevant parties. For example, each state and territory in the United States has a board of accountancy (or equivalent) and CPA society that might identify instances of practitioner misconduct, but so too might the Internal Revenue Service (IRS), Securities and Exchange Commission (SEC), or the Public Company Accounting Oversight Board (PCAOB). Certainly, practitioner misconduct identified by one of these parties is of interest to many of the others. However, a recent study found that these parties vary in their level of reporting misconduct to a central authority, the American Institute of Certified Public Accountants (AICPA) (Jenkins, Popova, and Sheldon 2016). This creates a fragmented monitoring environment that poses an unnecessary risk to the accounting profession in not having (timely or complete) information on the pervasiveness of misconduct issues, thus

leaving the profession in a lagged reactionary mode. Although there have been recent calls for the profession to improve regulatory effectiveness and steps have been taken to increase practitioner transparency (e.g., Form AP), more can be done (**U.S. Department of the Treasury 2008**; **PCAOB 2018**). In this paper, I describe how blockchain technology is poised to help the accounting profession achieve more real-time aggregation and sharing of practitioner misconduct. I also highlight several challenges in implementing such a blockchain.

Today, each state and territory in the United States has a board of accountancy (or equivalent) that controls the licensing of certified public accountants (CPAs), along with a CPA society that helps promote the interests of the profession and provides additional services to practitioners (e.g., continuing professional education). However, there are concerns of too little communication and sharing among these parties in different states (**U.S. Department of the Treasury 2008**). This means a practitioner's misconduct in one state might not be made known in another state in which she/he practices or is licensed. The AICPA has worked to address this issue by aggregating misconduct issues reported by state boards, state CPA societies, and other parties such as the IRS, SEC, and PCAOB (**Jenkins et al. 2016**). Similarly, the National Association of State Boards of Accountancy (NASBA) created the Accountancy Licensee Database (ALD) to serve as a clearinghouse for state boards to report licensing and conduct issues across the accounting profession (**NASBA 2018**). However, both the AICPA and NASBA likely experience issues with reporting fragmentation, which leads to a single party not having the full picture of CPA misconduct across the country. See **Figure 1** for a visual representation of this fragmentation. Blockchain offers a unique solution to the issue of aggregating misconduct issues without relying on a central party or authority to serve as a clearinghouse. However, before examining how this might work, it is important to review a few basic elements of blockchain technology.

FIGURE 1



Current State of Misconduct Aggregation and Sharing

This figure represents the current state of aggregation and sharing of accounting practitioners' misconduct across the United States. The dots represent a sample of state boards of accountancy (or equivalent), the star represents the National Association of State Boards of Accountancy (NASBA) as headquartered in Nashville, TN, and the triangle represents the American Institute of Certified Public Accountants (AICPA) as headquartered in Durham, NC. The specific reporting relationships as visualized might not represent the reality of certain states (i.e., that Florida reports misconduct to both the NASBA and AICPA, and Colorado does not report). Instead, this visualization is intended to show the fragmented reporting environment currently faced by the accounting profession, in which some states do not report misconduct to a national body for aggregation, while others might report to the NASBA, AICPA, or both. In any case, fragmented reporting persists and leaves no party with a complete picture of the misconduct of accounting practitioners across the country.

The full-color version of Figure 1 is available, see Appendix A for the link.

BASICS OF A BLOCKCHAIN

Blockchain is a network of nodes (i.e., users' computers) working together as peers to produce an immutable transaction history that can be made viewable to the public (**Nakamoto 2008**; **Swan 2015**; **D. Tapscott and A. Tapscott 2016**; **Drescher 2017**). It is also commonly known for being the technology and public ledger used to support Bitcoin (**Nakamoto 2008**). Here, public ledger means that anyone who wants to view the immutable transaction history is free to do so (**Swan 2015**; **Drescher 2017**). In building a blockchain, there has to be underlying code to establish the rules and logic that define the network. Users who wish to participate in that network download the open source code and begin using their own computational resources (i.e., electricity and computer processing power) to help maintain that blockchain (**Swan 2015**; **Drescher 2017**). In fact, a blockchain depends upon many nodes to run the code that maintains the distributed peer-to-peer network (i.e., nodes can be geographically disbursed; all nodes play the same role; a single node does not run or own the blockchain). From a simplistic point of view, nodes participate in the blockchain by broadcasting new transactions to the other nodes and validate new blocks of transactions by solving complex puzzles (called a proof-of-work) (**Drescher 2017**). Once the puzzle is solved, the new block of transactions is chained to the existing blocks through a series of hash functions (hence, block-chain) (**Drescher 2017**). Nodes are also critical for coming to a consensus on the true history of blocks (and transactions) maintained on the blockchain (**Drescher 2017**).

With that background in mind, I focus the remainder of this paper on the potential of blockchain to assist in the aggregation and sharing of misconduct issues.

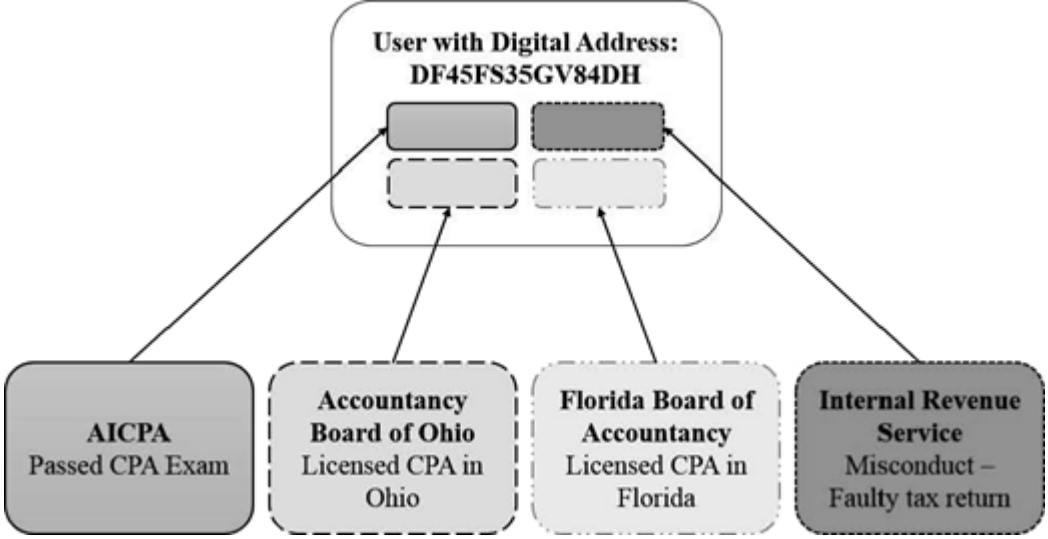
PROPOSED MODEL

The first step toward using blockchain to better aggregate and share instances of misconduct across the accounting profession is to identify unique practitioners. One way to accomplish this is to have the AICPA issue a unique identifier for every individual who passes the CPA exam. However, given that blockchain was originally developed to avoid central powers or dependency (**Nakamoto 2008**; **Swan 2015**; **Tapscott and Tapscott 2016**; **Drescher 2017**), another approach would be to have every CPA and CPA candidate create an account on a blockchain built to support the accounting profession, perhaps named the Accountancy Blockchain.

On the Accountancy Blockchain, practitioners would not be identified by their names, but rather by their digital address/account (i.e., an address unique to each practitioner, much like an email address) (**Drescher 2017**). Upon passing the CPA exam, the AICPA could assign an "exam passed" endorsement to the practitioner's account.[1] From there, practitioners who pass the CPA exam could apply for a state CPA license to be granted to their account. Under this approach, state boards of accountancy could quickly verify that the individual passed the CPA exam and could then grant a license once other state-specific criteria were achieved (the license could also be an endorsement of the user's account, similar to what I described in passing the CPA exam). There is no limit on the number of states that could endorse an account as holding a CPA license (i.e., user accounts could have valid CPA licenses from several states). However, this also means there is no limit on the number of parties that could participate in monitoring the conduct of practitioners.

Many parties are interested in protecting themselves from employing, or contracting work to, risky practitioners, which creates a collective incentive to gather and share information on practitioner misconduct. With the Accountancy Blockchain, for example, state boards of accountancy that identify and properly validate misconduct could assign a sanction to a practitioner's account (e.g., a suspension of his/her license), while other interested parties such as the IRS, SEC, and PCAOB could do the same.[2,3] The result is a practitioner account that carries irrevocable evidence of (1) having passed the CPA exam, (2) being licensed in a particular state, and (3) having misconduct reported by key constituents in the accounting profession. As such, people evaluating a practitioner (i.e., potential clients, regulators, peer-review firms, licensing boards, etc.) could review the activity for a specific practitioner account and decide (1) which reports from monitoring parties they deem relevant, and (2) if they still want to use that practitioner.[4] See **Figure 2** for an example of how a user's account on the blockchain would look after this series of events.

FIGURE 2



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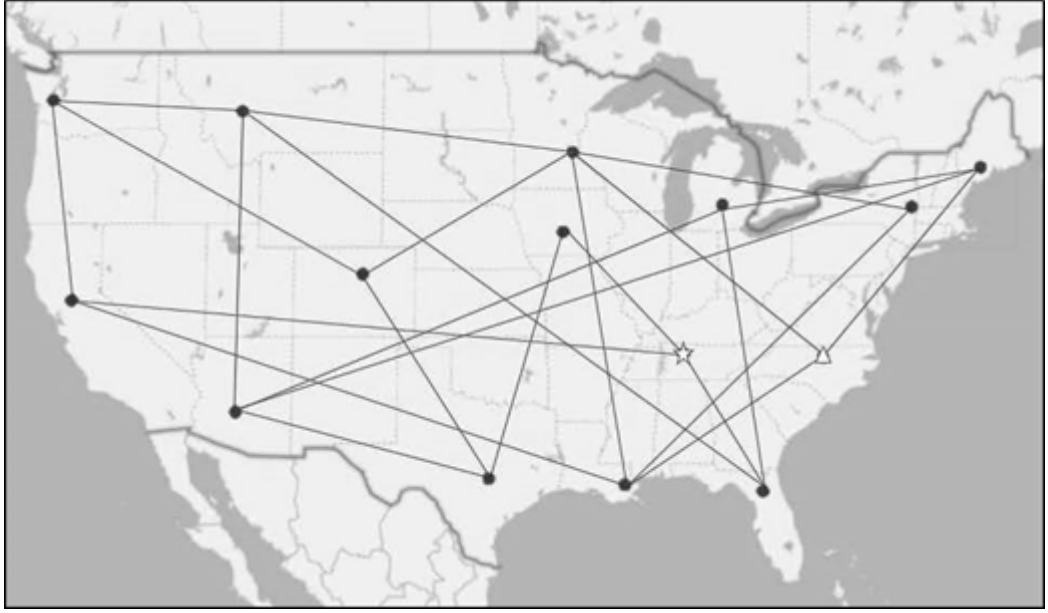
Example Practitioner Account on the Proposed Blockchain

This figure provides an example of how a practitioner's account on the blockchain could be endorsed and flagged by various parties. For example, the AICPA could endorse the account as having passed the CPA exam, and then specific boards of accountancy could endorse the account as being licensed in a that particular state. As for tracking misconduct, parties such as state boards, state CPA societies, the IRS, SEC, and PCAOB could assign an instance (or instances) of misconduct to the account. Asymmetric cryptography used by the blockchain would ensure that these parties are in fact who they purport to be.

The full-color version of Figure 2 is available, see Appendix A for the link.

With this structure in place, it becomes the task for key constituents of the accounting profession (e.g., state boards, state CPA societies, AICPA, NASBA, IRS, SEC, PCAOB) to join the blockchain and record validated instances of practitioner misconduct. Under this format, no single party maintains any centralized control of the blockchain, which also means no party has to recognize any other as being in a position of control on the blockchain. All participating parties would have full transparency into the history of sanctions across the profession and could view the newest reported issues in almost real time.[5] See **Figure 3** for a visual representation of this network, and notice that in contrast to **Figure 1**, all parties are (at a minimum) indirectly linked and do not rely on a central party to maintain interconnectedness.

FIGURE 3



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Proposed State of Misconduct Aggregation and Sharing Using Blockchain

This figure represents a proposed model in which blockchain technology aides in the aggregation and sharing of misconduct issues identified across the accounting profession in the United States. The dots represent a sample of state boards of accountancy (or equivalent), the star represents the National Association of State Boards of Accountancy (NASBA) as headquartered in Nashville, TN, and the triangle represents the American Institute of Certified Public Accountants (AICPA) as headquartered in Durham, NC. In contrast to **Figure 1**, this visualization shows a link (direct or indirect) between all governing parties in the accounting profession (more exist, but this is a simplified visual). Specifically, geographically dispersed parties communicate and share information with no central controlling party (i.e., it is a distributed peer-to-peer network). As such, there is no central authority or clearinghouse, but rather a sharing of information among peers so that every participating party has a full history of transactions (i.e., instances of misconduct) shared on a public ledger. This proposed state gives near real-time access to misconduct issues reported by various constituents, provides a single history of misconduct at a national level, and alleviates the risk of one party taking control of the ledger.

The full-color version of Figure 3 is available, see Appendix A for the link.

The code for this blockchain would be shared freely among members of the accounting community, and there would be no cost to join and no continued subscription fee. As with other blockchains, the cost of participation is using electricity and computational power to support the continued growth of the blockchain. Further, if any party joins and then leaves the blockchain, the blockchain remains unaffected and maintains the same history of transactions.

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If a goal of the accounting profession is to maintain transparency and to hold practitioners accountable for their actions, this model helps key constituents work together toward that goal

without the risk of one party taking control of the ledger. Further, this Accountancy Blockchain provides real-time insight into misconduct issues reported across the country, and all stakeholders in the accounting profession would be able to query their CPA for current/past conduct issues. This would also help establish a single record of misconduct issues and the data could be studied at a national/regional/local level for trends in misconduct. For identified trends, the state boards/CPA societies/AICPA or regulatory bodies could determine their role in responding to emerging misbehaviors (e.g., by changing the focus in training courses).

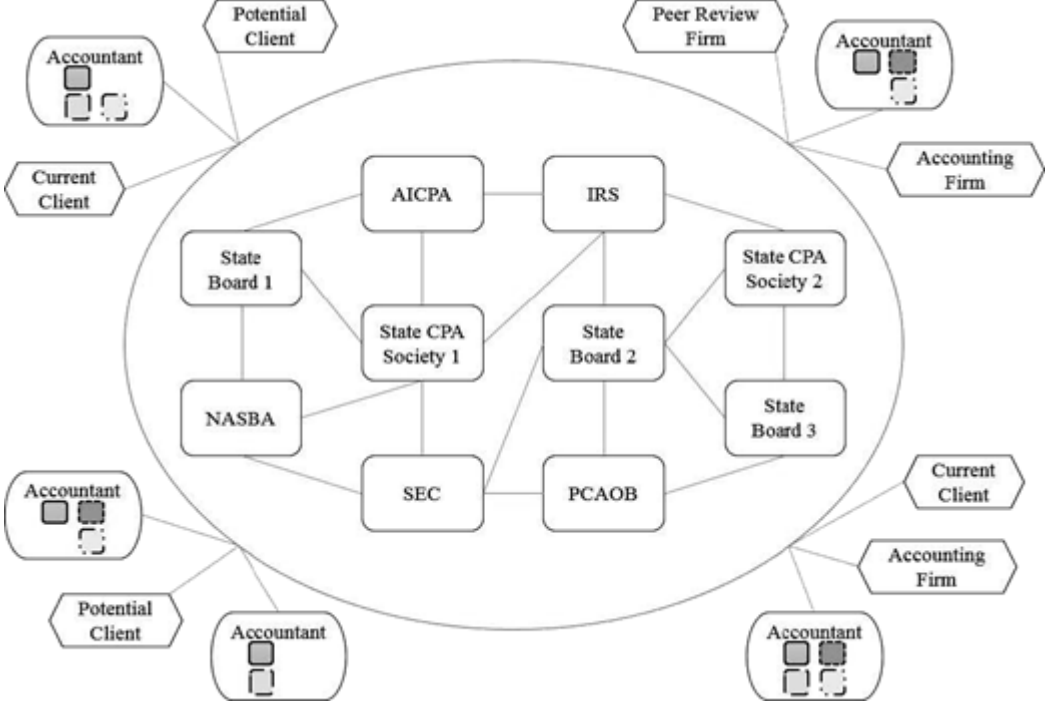
POTENTIAL ROADBLOCKS

As described, there is great potential in an Accountancy Blockchain. However, there are also pressing issues that could prevent such a step forward for the accounting profession. While not intended to be an exhaustive list or discussion, some of the more pressing issues include (1) what kind of blockchain to use, (2) who identifies and maintains the parties with unrestricted access to the blockchain, (3) how would participation in supporting the blockchain be incentivized, and (4) who designs this blockchain (and thus pays for its development)?

Issue 1: What Kind of Blockchain Would Be Used?

There are public and private blockchains, which differ based on who has read access to the underlying data and transaction history (**Drescher 2017**). The described blockchain would likely be best suited as a public blockchain in that everyone could view the transaction history and submit a query based on a practitioner's digital address. However, concerning the ability to add new transactions to the blockchain, this ledger would benefit the most from being restricted, meaning only approved parties could add transactions to the blockchain. This would help prevent unverified issues of misconduct from being recorded on the blockchain, and write access would be restricted to key constituents such as state boards of accountancy, state CPA societies, the AICPA, NASBA, and accounting regulatory bodies (i.e., the SEC, PCAOB, IRS). These parties with privileged access would provide the electricity and computational power to maintain the blockchain, while parties with read-only access could simply view the underlying dataset. See **Figure 4** for a visual representation of this proposed blockchain.

FIGURE 4



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Network Design and Access Privileges for the Proposed Accountancy Blockchain

This figure shows the proposed network design and access privileges for the Accountancy Blockchain (cf. **Drescher 2017**). The parties inside the main oval (i.e., state boards, state CPA societies, IRS, etc.) have privileged access to enter new transactions to the blockchain, which could include recording practitioner misconduct, or endorsing a practitioner's account as having passed the CPA exam (AICPA), or being licensed in a particular state (state board of accountancy). These same parties would support the continued existence and growth of the blockchain in that they would host nodes (i.e., computers) with the underlying code and thus be the primary sources of electricity and computational power for the blockchain. Parties outside the main oval would have read-only access (i.e., view only) to the historical transactions recorded on the blockchain, and would not be responsible for providing electricity or computational power to maintain the blockchain. As such, various stakeholders in the accounting profession could view a near real-time history of a practitioner's endorsements (i.e., CPA exam, state license, or reported misconduct) and use this information as part of countless decision-making scenarios.

The full-color version of Figure 4 is available, see Appendix A for the link.

Issue 2: Who Would Identify and Maintain the Parties with Unrestricted Access?

Part of the appeal of blockchain is that there is no central element of control (**Nakamoto 2008**). As such, once a party is designated as the approver of who has permissioned access on the blockchain, part of that appeal is diminished. However, to prevent unverified instances of misconduct, this is a necessary step. The party that controls granting access should be as independent as possible, meaning they would not themselves be in a position to report conduct

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violations (i.e., they should not be one of the parties previously named as having the potential for privileged access). The granting body would need to be independent and objective, in fact and appearance, from biases as to who should be granted privileged access. Such a group could be faculty at a private or public university, a committee of representatives from across the privileged groups, or a law firm hired to execute on the guidelines of who should be considered a privileged party.

Issue 3: How Would Participation in Supporting the Blockchain Be Incentivized?

An underlying question in maintaining blockchains is how to incentivize parties to use their computing and energy resources to support the blockchain. For example, with Bitcoin, nodes are rewarded with bitcoins for solving complex hash puzzles that add new blocks to the blockchain (**Drescher 2017**). In the case of an Accountancy Blockchain, there is no obvious financial incentive to expend resources. However, all parties to this blockchain should have a vested interest in gaining transparency into misconduct issues of practitioners across the country. As such, perhaps the incentive is a reverse incentive, in that parties that do not contribute to maintaining the blockchain have their permissioned access revoked. Only parties that actively work to add new blocks to the blockchain may keep their access to this national dataset of misconduct issues.[6]

Issue 4: Who Designs This Blockchain and Thus Pays for Its Development?

This is a challenging issue, in that an independent party would need to develop the blockchain so there is no perception of bias in the underlying code or ruleset. One solution would be to have a university fund the development of this blockchain, with the reward being the distinction of having created the blockchain used to support the entire accounting profession in the United States. Alternatively, a group of faculties could propose the idea to stakeholders across the profession to raise funds to put the process into motion.

CONCLUSION

There are shortcomings with the current aggregation and sharing of misconduct across the accounting profession (**Jenkins et al. 2016**). Blockchain can help combat aggregation and sharing issues with its (near) real-time updates, immutable and searchable ledger, and configuration that prevents a single party from taking control of the ledger. While such a reality is likely several years away, it is important to be thinking in terms of what issues currently face the accounting profession that could be alleviated with a blockchain. As the technology matures and as a broader audience becomes familiar with the functionality and potential of the tool, blockchain will undoubtedly find its way into mainstream accounting applications. Perhaps, it will become as pervasive as I describe in this paper, such that all parties of the accounting profession will have to maintain a presence on our profession's own blockchain.

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1 Proof that the AICPA granted this "exam passed" endorsement is part of asymmetric cryptography, which is beyond the scope of this paper. In brief, only those with access to the AICPA's account could assign such an endorsement, and it could then be verified that specific endorsements came from the AICPA.

2 To help automate the process of sanctioning a practitioner for misconduct issues, this blockchain could leverage smart contract functionality (small software programs) to define the term of punishment and/or the steps required for lifting the sanction (cf. **Swan 2015**; **Tapscott and Tapscott 2016**). These smart contracts would automatically lift once the terms of the sanction were met or once the practitioner achieved all required remediation activities (e.g., specific number of approved continuing professional education hours). Further, in working to understand the pattern in types of misconduct, the blockchain could leverage software that reads and classifies the misconduct descriptions based on a common framework like the AICPA's Code of Professional Conduct or another agreed-upon classification system deemed useful to the accounting profession.

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3

A key design feature of the Accountancy Blockchain is that only approved parties could participate in assigning attributes to practitioners' accounts (e.g., certifications or misconduct issues). This should help reduce occurrences of misconduct assigned in error. However, if a practitioner were to see an erroneous issue assigned to his/her account, the practitioner could reach out to the assigning party to challenge the issue and potentially have it removed.

4

To examine the attributes of a specific CPA's account, users (the public) could query the Accountancy Blockchain using a free online blockchain explorer program, similar to those currently available to query accounts and transactions on the Bitcoin blockchain. Here, users could search for a specific CPA and then view relevant attributes of that CPA's account, such as the credentialing history and any open misconduct issues (including who assigned the misconduct issues to the account).

5

Under this model, there is a possibility that multiple parties might report the same instance of misconduct against a CPA. While I am not aware of a technical solution to prevent such double reporting, one solution would be for constituents to adopt a reporting protocol that requires thorough descriptions of misconduct issues. In this way, users who search for a CPA should be able to identify when multiple parties report on the same issue given the descriptions of the associated misconduct (which could include details on the date, location, and affected parties).

6

Parties that do not work to maintain the blockchain could be identified, potentially, as those that do not periodically solve the proof-of-work. The details of proof-of-work are beyond the scope of this paper, but it is the mechanism used to add new blocks to a blockchain. In short, if all participating constituents used similar computational resources to support the Accountancy Blockchain, then each party should periodically (and almost randomly) be the first to solve a proof-of-work.

APPENDIX A

ciia-52184_Figures 1-4: http://dx.doi.org/10.2308/ciia-52184.s01

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