Preparing Florida for Blockchain – *Is Now the Time?*

The Florida Technology Council, by Cyndy Loomis, et al.

The Challenge - Should Florida state agencies start preparing for blockchain technologies? That is a question frequently asked of the Florida Technology Council (FTC) since there are innovators investing time and money in blockchain, while others are waiting for it to become a proven technology. The vast amount of media attention given to blockchain has also made it a difficult topic for government officials to ignore. As part of its educational mission, FTC posed this question to a panel of expert technologists to assist the State of Florida in determining what, if anything, state agencies should be doing now to prepare for blockchain.

What is Blockchain? - The biggest challenge facing blockchain today is articulating the concept in terms that decision-makers can understand. At its core, blockchain is distributed digital ledger technology in which information is replicated across a network in a way that the records cannot be altered.

For a blockchain beginner, think about an accounting ledger in the 1800's whereby transactions were written in ink and only a centralized trusted person could add new transactions to the ledger. Now imagine that this ledger was digital and replicated across the globe through a distributed network of trusted entities. These entities could view and add new transactions to the ledger, but not change any prior ones creating an immutable (unchangeable) chain of records. As trusted entities gain access, the chain of record is repeated and housed in multiple trusted locations allowing there to be a decentralized chain of record.

For a more technical definition, Hyperledger describes blockchain as, "A peer-to-peer distributed ledger forged by consensus, combined with a system for "smart contracts" and other assistive technologies. Together these can be used to build a new generation of transactional applications that establishes trust, accountability, and transparency at their core, while streamlining business processes and legal constraints. Think of it as an operating system for marketplaces, data-sharing networks, micro-currencies, and decentralized digital communities. It has the potential to vastly reduce the cost and complexity of getting things done in the real world."[1]

Why Blockchain? - Blockchain provides many benefits to the public and private sectors, including the speed, trust, security, and accuracy of business process.[2] Across the country, Chief Information Officers (CIOs) are considering blockchain technologies because it provides an unhackable record of government transactions in a world where cybersecurity and data integrity is critical.[3] In a blockchain, information security is supported in three ways.

1. Records placed on the blockchain remain in their original form, with changes to the information added to (not replacing) the original record. This makes it possible to view the history of any record in its unaltered form.

2. Information on the blockchain is replicated on multiple nodes (any device connected to the blockchain) along a connected network thereby making the record immutable (unchangeable). A full node (or all of the decentralized devices), stores all of the blockchain information and transaction history.

3. Information on the blockchain is encrypted. Cryptography ensures that blockchain ledger access is secure and no single individual can modify the ledger. Only those invited to participate in the blockchain have access to the encryption key required to transact business on the blockchain.

Additions to the blockchain can also be near real-time, allowing government solutions to be timely and efficient. In addition, new blockchain solutions often eliminate entities no longer needed in the business process allowing streamlining to occur.

Blockchain's Potential Impact - Many experts believe that the characteristics of blockchain technology are creating the backbone of a new type of Internet and thus new ways of performing work. Technologists cite that blockchain will revolutionize how business is conducted—in many ways similar to how the Internet changed our lives over the last thirty years. Because of the nature of blockchain, business solutions can be reimagined and business entities that don't add value to the process can be removed.

For example, blockchain solutions are being reimagined in the area of professional credentials whereby the professional license and the person's credentialing history are maintained digitally on the blockchain. These new solutions allow medical professionals to work in multiple locations without the need for duplicative credential validation at each medical facility. Access to the medical license, credentials, and even educational history would be provided in a mobile "digital wallet" connected to and authenticated by the blockchain. Each professional could grant permissions to his/her data on a selective and secured basis using a digital "token." To this end, the Department of Homeland Security has launched an innovation project to assess how blockchain can be used for credentialing documents in order to limit counterfeiting.[4]

We would be remiss, however, not to acknowledge blockchain criticisms. Naysayers of the technology cite concerns about scalability, response time, among others. What is clear from our expert technologist panel is that blockchain will continue to evolve as innovators overcome potential challenges. As Rosa Shores (BlockSpaces, LLC) shared, "We can't even imagine today how blockchain will change business and government. Like the Internet, blockchain technologies will continue to evolve and people will continue to innovate new solutions." Joseph Huchel and Pete Teigen (IBM) further elaborated that, "Blockchain will evolve in ways similar to that of mobile computing and the Internet. As new technological innovations evolve, blockchain technology will adapt and leverage those new capabilities. Blockchain innovators are already working to embrace future technologies such as Quantum computing. Post Quantum Computing cryptography solutions that secure blockchain, such as lattice based cryptography, are already being developed and tested."[5]

Is Blockchain the Solution for Everything? - Equally important to understanding the concept of blockchain is realizing that blockchain is not the solution for all business situations. Blockchain is appropriate when there needs to be a single record of truth (or information) that is repeatable and best preserved in its original form. Blockchain is not currently appropriate for high volume, low value, or high speed transactional systems when only a few entities are involved and the preservation of the original record (and subsequent changes) is unimportant. For example, a transit system's rider pass, though easily digitizable, may not be a good candidate for a blockchain solution. Similarly, a small record keeping system at a state agency used by one person would be an inefficient use of blockchain

Companies, such as IBM and Deloitte, have invested in creating and perfecting selection methodologies to evaluate appropriate uses of blockchain.[6,7] Large private firms are using these methodologies to

select how to invest in blockchain, while public entities are leveraging this expertise to assist with state government budgeting and decision-making.

Is Blockchain a Passing Fad? - When asked if blockchain is a passing fad, our blockchain experts shared multiple solutions in use today that are yielding tangible Return On Investment (ROI) data and lessons to perfect the technology. These early adopters are developing fact-based case studies to justify blockchain solutions to decision makers and to mitigate implementation risks. For example, some analysts project that blockchain will save $15 to $20 billion annually to the financial services sector alone by 2022.[8] This early ROI data is difficult for business investors to ignore.

As with all new technologies, time will tell when and how blockchain will become mainstream and revolutionary. Our expert panel all agreed that blockchain is here to stay, but also acknowledged that it is unlikely that blockchain will exist in its current form ten years from now. As with any new technology, blockchain will continue to evolve over time, similar to the how the Internet moved from a text-based solution to a complex network supporting data exchange that is integral to our everyday lives.

Existing Blockchain Business Solutions - One way to determine if a new technology has long-term merit is to examine actual business applications in use or ones that are being developed through private investments.

- **Commercial Solutions** – At the December, 2018, Florida State University Collegiate Blockchain Conference, IBM presented blockchain solutions developed in collaboration with its industry partners.[9] For example, Walmart and IBM have implemented a blockchain food supply chain management system that has resulted in tangible cost savings and increased consumer food safety protection. This solution has reduced the time it takes to trace food sourcing from a week down to 2.2 seconds. It is now possible for Walmart to pinpoint where and when a tainted food has entered the supply chain, thereby saving millions of dollars in wasted food and medical care. Because of this success, the Federal Drug Administration is seeking to implement a similar blockchain solution. Other global commercial examples exist in the transportation, banking, finance, legal, and healthcare industries.

- **Government Solutions** - Government solutions built on blockchain are also starting to become ready for production. For example, Prashant Mehta and Louis Smith (Kyra Solutions) shared their firm's development of patented blockchain applications for transportation and land records. Tom Bossi (Deloitte) cited the State of Illinois and its legislative funding for multiple pilot projects that are contributing to the evolution of blockchain in the government sector. IBM provided examples from the State of Delaware's business registration and Uniform Commercial Code (UCC) lien tracking systems that are providing a streamlined and frictionless experience for citizens. In addition, last week Anthem, Health Care Service Corporation, PNC Bank, and IBM announced a new collaboration to create a network using blockchain technology to improve transparency and interoperability in the healthcare industry—a move that addresses a significant inhibitor to blockchain adoption in the healthcare space. [10]

- **Worldwide Blockchain Efforts** – Internationally, import/export blockchain solutions are in use today that were developed to address fraud and shipping errors caused by so many entities previously involved in the process (e.g., customs agents, shipping lines, shippers, consignees, brokers, booking agents, etc.). Thanks to the distributed ledger provided by blockchain, unneeded steps and business

entities were removed from the import/export process, and resulting improvements were made in security, record keeping, inspection rates, and information transparency.[8]

Other countries are further ahead of the United States in their blockchain efforts, partially because of fewer laws that regulate business transactions. As shared by IBM, "Dubai is the most progressive city implementing blockchain with a stated goal to have all key services migrated to use Blockchain by 2020." Other international initiatives were cited, including efforts in more than a dozen countries as a new way to provide government services. For example, in Estonia the government is piloting projects for voting, identity management, and healthcare. [8]

What is the Timeline for Implementing Blockchain Solutions? –The government sector has traditionally lagged in the technological evolution process thereby allowing the commercial marketplace to absorb the innovation cost and risk. Only when a new technology is mature does the public sector often begin its implementation efforts. Blockchain solutions will be no different. There will be trailblazers, mass adopters, and followers.[11]

According to Government Technology magazine (*2018 Hindsight)*, private ventures will continue to develop revolutionary blockchain solutions throughout 2019 for governmental business cases such as smart contracts, the food supply chain, electronic voting, land records, prescriptions, among others.[3] Global industry leaders will also continue to advise their public sector clients on blockchain technologies through entities such as Deloitte's Center for Digital Government and IBM's Center for The Business of Government.

As new blockchain solutions are created by the private sector, government entities will need to consider how to select and implement them. State governments will soon be faced with evaluating commercial blockchain solutions to integrate with or replace antiquated systems that are nearing end-of-life. Government entities can be prepared for this change by:

- Becoming informed about appropriate uses of blockchain technologies
- Identifying how these solutions will impact their infrastructure and technology staffing
- Determining how their agencies' daily work will change
- Participating in pilot endeavors in cooperation with the private sector to become better informed and ready for the change management essential to blockchain implementations
- Understanding how to budget and plan for blockchain initiatives

The challenges of implementing blockchain solutions in the public sector, however, may prove to be ultimately less about the technology and more about how *government procedures, policies, and statutory language will need to evolve*. For example, how a person's prescription is fulfilled in a blockchain environment will be vastly different than how current laws regulate this process. Similarly, smart contracts will revolutionize the contracting process in a way that no longer requires a notary or other non-essential entities. (A blockchain-based smart contract is an agreement between two entities formalized in the form of computer code that executes when the conditions of the contract are met and all members of the blockchain agree. Speed and trust are enhanced and unneeded entities are removed.)

The decentralized nature of blockchain also offers a fundamentally different way to interact with citizens. Blockchain technologies can enable decentralized, citizen-centric services where an individual serves as the manager of their own data and determines how it is shared with government. For

example, the Swiss city of Zug launched a pilot program to register residents' IDs on the blockchain to unlock access to government eServices such as online voting and proof of residency.[12]

In summary, implementing government blockchain solutions should be treated no different than implementing other new technology solutions—they will just be more complex from a regulatory and change management perspective since blockchain involves a network of participants and the removal of those no longer contributing to the process.

What is the Cost of Implementing Blockchain? - Government officials often ask how much blockchain will cost to implement. The answer is simple since blockchain solutions will become part of the normal evolution of technology. It will be no different than how Internet-based systems eventually replaced mainframe applications and revolutionized business transactions. Private industry will create government blockchain solutions and subsequently offer new software packages to government entities for a price that can be planned for and budgeted during the legislative process. An important point to remember is that governments *can get started* on their blockchain educational journey at a relatively low start-up cost using cloud-based software and platform-as-a service starter kits.[13]

Next Steps - Technology businesses and government entities that have remained successful over time are those accustomed to adapting to technological changes and employing proven methodologies for implementing innovation. As Kyra Solutions shared, new technology exploration from a vendor's perspective requires several key steps:

- Selecting an appropriate business application
- Prototyping the potential solution to understand limitations and strengths
- Conducting a pilot project to learn from technical and business users
- Developing Version 1.0 (commercially available)
- Developing progressive feature-rich versions of the solution

In government, blockchain implementations should also follow standard methodologies with steps including:

- Blockchain education
- Evaluating where blockchain technology can transform and enhance government services
- Developing a sandbox for technological experimentation
- Creating a proof of concept
- Identifying and resolving legal and legislative impacts of the solution
- Developing a sound business case to justify a funding request
- Obtaining legislative funding
- Procuring services using standard procurement processes
- Iterative implementations to deploy progressively rich feature sets

Thus, Florida state agencies should start educating themselves on blockchain, learning how other states are innovating in this space, and selecting appropriate use cases. As Thomas Hardjono writes in *The Impact of Blockchain for Government: Insights on Identity, Payments, and Supply Chain*:

> "Strong industry consensus exists around the belief that blockchain technologies will be the leading edge of "next Internet" economy. It is imperative that government and industry work together to continue and strength technological and market leadership in this new area, and

to address potential policy and regulatory incompatibility that may constrain growth of the emerging digital-blockchain economy."[14]

As part of the educational process, Florida would benefit from establishing a centralized working group or task force to explore blockchain technologies and its impact on Florida government. In addition, Florida would benefit by creating a technology sandbox for experimentation (similar to the regulatory sandbox established by the State of Arizona in 2017)[15] and selecting an appropriate pilot project. Failure to take these initial steps could result in three possible scenarios: agencies could inadvertently select a vendor's blockchain solution that is not mature, Florida could continue to fall behind on innovation, or several agencies could independently implement a blockchain solution without sharing knowledge and expertise thereby wasting taxpayer dollars.

Is Blockchain Where Florida Should Spend Its Technology Dollars? – FTC would be remiss if we didn't address where blockchain fits in the overall strategic technology requirements of Florida government. Florida, like many other state governments, has a vast backlog of technology needs as a result of inadequate focus and funding. Our state's needs are extensive, ranging from improving technology-based citizen services, increasing data security, migrating technology solutions to cloud technologies, and using state data assets for governmental decision-making. However, "Blockchain should not be put on the backburner," stated Louis Smith (Kyra Solutions). "Instead blockchain should become part of the overall digital transformation that is needed in Florida state government since it can assist with data governance, transparency, and security." These underlying changes to government business processes are necessary to address the growing expectations for digital services demanded by our citizens and the changing needs of government.

From FTC's perspective, the cost of initial planning and investigation activities is small in comparison to the cost of a poorly understood, underdeveloped, or disjointed blockchain projects implemented as one-offs by multiple siloed agencies. FTC recommends starting with an initial task force effort, initial use of a "sandbox" for learning, and the selection of a pilot project following proven successes in other states. This incremental approach will help ensure effective use of Florida's technology funding and resources, as well as manage the necessary learning curve involved.

How to Learn More – FTC is holding Florida's first government blockchain symposium on May 23. For more information contact Cyndy Loomis (cyndy@fltechcouncil.org).

About FTC - The Florida Technology Council (FTC), a 501(c) 6 educational non-profit association, is playing a pivotal role in defining Florida's technology future. Our vision is to grow Florida's technology economy by building a sustainable technology professional organization with a powerful statewide voice.

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Endnotes

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