

**Calendar No. 373**

116TH CONGRESS }  
*1st Session* }

SENATE

{ REPORT  
116-177

BLOCKCHAIN PROMOTION ACT OF 2019

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R E P O R T

OF THE

COMMITTEE ON COMMERCE, SCIENCE, AND  
TRANSPORTATION

ON

S. 553



DECEMBER 17, 2019.—Ordered to be printed

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SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

ONE HUNDRED SIXTEENTH CONGRESS

FIRST SESSION

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### BLOCKCHAIN PROMOTION ACT OF 2019

DECEMBER 17, 2019.—Ordered to be printed

Mr. WICKER, from the Committee on Commerce, Science, and  
Transportation, submitted the following

### R E P O R T

[To accompany S. 553]

[Including cost estimate of the Congressional Budget Office]

The Committee on Commerce, Science, and Transportation, to which was referred the bill (S. 553) to direct the Secretary of Commerce to establish a working group to recommend to Congress a definition of blockchain technology, and for other purposes, having considered the same, reports favorably thereon with amendments and recommends that the bill (as amended) do pass.

#### PURPOSE OF THE BILL

The purpose of S. 553, the Blockchain Promotion Act of 2019, is to direct the Secretary of Commerce to establish an interagency working group to recommend to Congress a definition of blockchain technology and to make recommendations for additional interagency studies related to blockchain technology.

#### BACKGROUND AND NEEDS

Blockchain is a publicly accessible online record-keeping database that stores digital information—blocks—in multiple, decentralized locations.<sup>1</sup> Blockchain is the technology underlying Bitcoin and applications tracking transactions and assets in cryptocurrency.<sup>2</sup> Blockchain technology emerged in the late 1980s and

<sup>1</sup>See, e.g., Merriam-Webster, definition of blockchain ([www.merriam-webster.com/dictionary/blockchain](http://www.merriam-webster.com/dictionary/blockchain)).

<sup>2</sup>See Lexico, definition of blockchain ([www.lexico.com/en/definition/blockchain](http://www.lexico.com/en/definition/blockchain)).

early 1990s.<sup>3</sup> The core ideas for the technology were derived from a combination of research focused on the following: (1) creating a consensus model so that a network of computers could reach an agreement on a given result even if the computers or the network itself were unreliable, and (2) creating an electronic ledger of digitally signed information that could easily show that no data in the ledger had been altered.<sup>4</sup> In 2008, these core ideas were combined and applied to electronic cash in the paper Bitcoin: A Peer to Peer Electronic Cash System.<sup>5</sup> This led to the creation of Bitcoin, the world's first cryptocurrency. Many people today conflate blockchain technology and Bitcoin, but in reality blockchain technology is the underlying platform upon which Bitcoin was built. Furthermore, blockchain technology has potential applications beyond just cryptocurrency.

Blockchain technology uses transparency, security, and shared user access to create a trusted system where entities that are not familiar with one another can engage in transactions without a trusted third-party intermediary. Blockchain technology creates that trusted system through four key characteristics: (1) the technology uses ledgers that only allow data to be added, not overwritten, so that the ledger can provide a full transactional history; (2) blockchains are cryptographically secure such that the information therein is immune to tampering and the ledger is attestable; (3) the ledger is shared among multiple participants; and (4) the blockchain itself can be distributed throughout the network nodes, protecting against tampering.<sup>6</sup>

Despite the many variations of blockchain networks and the rapid development of new blockchain related technologies, most blockchain networks use common core concepts. Blockchains are a distributed ledger comprised of blocks. Each block is comprised of a block header containing metadata about the block, and block data containing a set of transactions and other related data. Every block header (except for the very first block of the blockchain) contains a cryptographic link to the previous block's header. Each transaction involves one or more blockchain network users and a recording of what happened, and it is digitally signed by the user who submitted the transaction.<sup>7</sup>

Blockchain technology has been forecasted to have a business-value-add impact of \$176 billion by 2025, which is projected to increase to \$3.1 trillion by 2030.<sup>8</sup> Blockchain technology's ability to cut out the middleman in a transaction is driving innovation throughout many industry sectors. In 2016, Barclays processed an international transaction in 4 hours using blockchain technology, far shorter than the 10 days it would have taken without

<sup>3</sup>Dylan Yaga, Peter Mell, Nik Roby, Karen Scarfone, Blockchain Technology Overview, National Institute of Standards and Technology (October 2018) (<https://nvlpubs.nist.gov/nistpubs/ir/2018/NIST.IR.8202.pdf>) (NIST Blockchain Technology Overview) p. 2.

<sup>4</sup>See, generally, NIST Blockchain Technology Overview, p. 2 (<https://nvlpubs.nist.gov/nistpubs/ir/2018/NIST.IR.8202.pdf>).

<sup>5</sup>Satoshi Nakamoto, Bitcoin: A Peer-to-Peer Cash System, (October 31, 2018) (<https://bitcoin.org/bitcoin.pdf>).

<sup>6</sup>NIST Blockchain Technology Overview, p. 2-3.

<sup>7</sup>Id. at v.

<sup>8</sup>Katie Costello, "Gartner Predicts 90% of Current Enterprise Blockchain Platform Implementations Will Require Replacement by 2021", (June 3, 2019) (<https://www.gartner.com/en/newsroom/press-releases/2019-07-03-gartner-predicts-90-of-current-enterprise-blockchain>).

blockchain technology.<sup>9</sup> During a test of new blockchain technology in 2018, Walmart realized a decrease in the time spent tracing a package of produce back to its source from 7 days to 2.2 seconds.<sup>10</sup> Blockchain's ability to trace the source of food could help prevent some 48 million foodborne illnesses every year that affect Americans.<sup>11</sup> Walmart has required its leafy green vegetable suppliers to upload their data to a blockchain platform created by IBM to digitize its food supply chain by September 2019.<sup>12</sup>

Blockchain technologies may provide similar benefits for Federal and State agencies. According to the National Conference of State Legislatures (NCSL), 28 States have introduced legislation related to blockchain in 2019.<sup>13</sup> Twenty-seven bills and one resolution have been enacted or adopted. NCSL noted the following:

Digital currencies are only one way to use blockchain. Other evolving applications can include online voting, medical records, insurance policies, property and real estate records, copyrights and licenses and supply chain tracking. They can also include smart contracts, where payouts between the contracted parties are embedded in the blockchain and automatically execute when contractual conditions have been met.

Some observers are concerned, however, that the Federal Government may lag behind the private sector in its adoption of blockchain because there is no one accepted legal definition of blockchain (even though the technological elements of blockchain are well known, as described above), and because there has not been a systematic examination of how Federal agencies could use blockchain technologies and networks. S. 553 is intended to address these concerns by helping Congress better understand the capabilities of blockchain technology and further informing decisions by the Federal Government to efficiently leverage the capabilities of blockchain technology.

#### LEGISLATIVE HISTORY

S. 553, the Blockchain Promotion Act of 2019, was introduced on February 26, 2019, by Senator Young (for himself and Senator Markey) and was referred to the Committee on Commerce, Science, and Transportation of the Senate. On July 10, 2019, the Committee met in open Executive Session and, by voice vote, ordered S. 553 reported favorably with amendments offered by Senator Lee to improve the bill by clarifying that members of the Blockchain Working Group serve without pay and that the working group itself terminates when it submits the report required by the bill.

Similar legislation, H.R. 1361, the Blockchain Promotion Act of 2019, was introduced on February 26, 2019, by Representative Matsui [D-HI] (for herself and Representative Guthrie [R-KY-2])

<sup>9</sup>Jemima Kelly, "Barclays Says Conducts First Blockchain-Based Trade-Finance Deal" (September 7, 2016) (<https://www.reuters.com/article/us-banks-barclays-blockchain/barclays-says-conducts-first-blockchain-based-trade-finance-deal-idUSKCN11D23B>).

<sup>10</sup>Jenna Dobkin, "9 Blockchains Transforming the Way We Pay, Play, and Work", ReadWriteWeb (Aug. 15 2019) (<https://readwrite.com/2019/08/14/9-blockchains-transforming-the-way-we-pay-play-and-work/>).

<sup>11</sup>Id.

<sup>12</sup>Id.

<sup>13</sup>Heather Morton, Blockchain 2019 Legislation (<http://www.ncsl.org/research/financial-services-and-commerce/blockchain-2019-legislation.aspx>).

and was referred to the Committee on Energy and Commerce of the House of Representatives. On February 27, 2019, that bill was referred to that Committee's Subcommittee on Communications and Technology.

#### ESTIMATED COSTS

In accordance with paragraph 11(a) of rule XXVI of the Standing Rules of the Senate and section 403 of the Congressional Budget Act of 1974, the Committee provides the following cost estimate, prepared by the Congressional Budget Office:

<b>S. 553, Blockchain Promotion Act of 2019</b>			
As ordered reported by the Senate Committee on Commerce, Science, and Transportation on July 10, 2019			
By Fiscal Year, Millions of Dollars	2019	2019-2024	2019-2029
Direct Spending (Outlays)	0	0	0
Revenues	0	0	0
Deficit Effect	0	0	0
Spending Subject to Appropriation (Outlays)	0	*	*
Statutory pay-as-you-go procedures apply?	No	<b>Mandate Effects</b>	
Increases on-budget deficits in any of the four consecutive 10-year periods beginning in 2030?	No	Contains intergovernmental mandate?	No
		Contains private-sector mandate?	No
* = between zero and \$500,000.			

S. 553 would require the Department of Commerce to establish a blockchain working group with governmental and nongovernmental members. Within one year of enactment, the bill would require the group to recommend a working definition of blockchain technology, research topics, and opportunities for federal agencies to use blockchain.

Because there is already a blockchain working group with the department, and based on information from the National Institute of Standards and Technology (NIST), CBO estimates that implementing S. 553 would cost less than \$500,000 in fiscal year 2020; any spending would be subject to the availability of appropriated funds. CBO expects that the group would primarily rely on a report that NIST published in October 2018.<sup>1</sup>

The CBO staff contact for this estimate is David Hughes. The estimate was reviewed by H. Samuel Papenfuss, Deputy Assistant Director for Budget Analysis.

<sup>1</sup> According to NIST, "blockchains are tamper evident and tamper resistant digital ledgers implemented in a distributed fashion (i.e., without a central repository) and usually without a central authority (i.e., a bank, company, or government). At their basic level, they enable a community of users to record transactions in a shared ledger within that community, such that under normal operation of the blockchain network no transaction can be changed once published." See Dylan Yaga and others, *Blockchain Technology Overview*, NISTIR 8202 (National Institute of Standards and Technology, October 2018), p. ii, <https://doi.org/10.6028/NIST.IR.8202> (PDF, 755 KB).

## REGULATORY IMPACT STATEMENT

In accordance with paragraph 11(b) of rule XXVI of the Standing Rules of the Senate, the Committee provides the following evaluation of the regulatory impact of the legislation, as reported:

## NUMBER OF PERSONS COVERED

S. 553, as reported, would have no effect on the number or types of individuals and businesses regulated.

## ECONOMIC IMPACT

S. 553, as reported, would have no economic impact.

## PRIVACY

S. 553, as reported, would have no effect on the personal privacy of affected individuals.

## PAPERWORK

S. 553, as reported, would direct a Department of Commerce working group to prepare and submit a report to Congress on its work within 1 year of enactment of the bill.

## CONGRESSIONALLY DIRECTED SPENDING

In compliance with paragraph 4(b) of rule XLIV of the Standing Rules of the Senate, the Committee provides that no provisions contained in the bill, as reported, meet the definition of congressionally directed spending items under the rule.

## SECTION-BY-SECTION ANALYSIS

*Section 1. Short title*

This section would provide that the bill may be cited as the “Blockchain Promotion Act of 2019”.

*Section 2. Working group to recommend definition of blockchain technology*

Subsection (a) of this section would establish definitions for two terms used throughout the bill.

Subsection (b) of this section would require the Secretary of Commerce, within 90 days of enactment, to establish within the Department of Commerce a working group referred to as the “Blockchain Working Group”.

Subsection (c) of this section would establish the membership of the Blockchain Working Group. The Secretary of Commerce would designate a cross-section of Federal agencies that could use, or benefit from, blockchain technology to be represented on the Blockchain Working Group. The head of each Federal agency so designated would then be required to appoint an officer or employee to serve as a member of the Blockchain Working Group. In addition, the Secretary of Commerce would appoint nongovernmental stakeholders with respect to blockchain technology to serve on the Blockchain Working Group. Subsection (c) further identifies certain nongovernmental stakeholder groups that must be represented, including: (1) information and communications technology

manufacturers, suppliers, software providers, service providers, and vendors; (2) subject matter experts representing industrial sectors, other than the technology sector, that the Secretary determines could use, or benefit from blockchain technology; (3) small, medium, and large businesses; (4) individuals and institutions engaged in academic research relating to blockchain technology; (5) nonprofit organizations and consumer advocacy groups engaged in activities relating to blockchain technology; and (6) rural and urban stakeholders. Finally, subsection (c) would provide that members of the Blockchain Working Group shall serve without pay.

Subsection (d) of this section would require the Blockchain Working Group to provide a report to Congress within 1 year of the bill's enactment. This report would need to include the following:

- A recommended definition of blockchain technology;
- Recommendations for a study to be conducted by the Assistant Secretary of Commerce for Communications and Information, in coordination with the Federal Communications Commission, on the impact of blockchain technology on electromagnetic spectrum policy;
- Recommendations for a study to examine a range of potential applications, including nonfinancial applications, for blockchain technology; and
- Recommendations for opportunities for Federal agencies to use blockchain technology.

Subsection (d) also would permit the Blockchain Working Group to consider any recommendations contained in the National Institute of Standards and Technology Internal Report 8202 entitled, "Blockchain Technology Overview," in preparing the report under section 2(d).

The Committee is aware that various States have adopted or are working to adopt their own definition for blockchain technology. The Committee also understands that various other public and private sector groups are working to craft a common, standard definition of blockchain technology. The Committee intends for the Blockchain Working Group to fully consider these ongoing efforts to create a standard definition for blockchain technology, for it to consult with stakeholders that have worked on these efforts, and for it to recommend a definition that is consistent with such efforts. In addition, the Committee does not intend for the work of the Blockchain Working Group to supplant definitions adopted at the State level.

Subsection (e) of this section would provide that the Blockchain Working Group shall terminate on the date on which it submits the report to Congress under section 2(d).

#### CHANGES IN EXISTING LAW

In compliance with paragraph 12 of rule XXVI of the Standing Rules of the Senate, the Committee states that the bill as reported would make no change to existing law.