

**FISCAL NOTE**  
**Requested by Legislative Council**  
**12/21/2018**

Amendment to: HB 1048

- 1 A. **State fiscal effect:** *Identify the state fiscal effect and the fiscal effect on agency appropriations compared to funding levels and appropriations anticipated under current law.*

	2017-2019 Biennium		2019-2021 Biennium		2021-2023 Biennium	
	General Fund	Other Funds	General Fund	Other Funds	General Fund	Other Funds
<b>Revenues</b>	\$0	\$0	\$0	\$0	\$0	\$0
<b>Expenditures</b>	\$0	\$0	\$0	\$0	\$0	\$0
<b>Appropriations</b>	\$0	\$0	\$0	\$0	\$0	\$0

- 1 B. **County, city, school district and township fiscal effect:** *Identify the fiscal effect on the appropriate political subdivision.*

	2017-2019 Biennium	2019-2021 Biennium	2021-2023 Biennium
<b>Counties</b>	\$0	\$0	\$0
<b>Cities</b>	\$0	\$0	\$0
<b>School Districts</b>	\$0	\$0	\$0
<b>Townships</b>	\$0	\$0	\$0

- 2 A. **Bill and fiscal impact summary:** *Provide a brief summary of the measure, including description of the provisions having fiscal impact (limited to 300 characters).*

This bill asks ITD to research and report on distributed ledger technologies and their use within state government. This portion of the bill should have no fiscal impact. The implementation costs of these technologies would be included in the overall cost of projects using such technologies.

- B. **Fiscal impact sections:** *Identify and provide a brief description of the sections of the measure which have fiscal impact. Include any assumptions and comments relevant to the analysis.*

The sentence regarding developing and implementing the use of distributed-enabled platforms will carry a cost when potential use-cases are identified. However these costs would be a subset of a larger overall project cost to solve specific business needs for a single or multiple agencies. Distributed ledger technologies are typically developed and implemented as part of a larger IT solution. The fiscal impact would be identified as part of the overall agency project cost and the associated budget request for that project.

At this point no specific use-cases have been identified or requested for the 2019-2021 biennium so there is no current fiscal impact.

3. **State fiscal effect detail:** *For information shown under state fiscal effect in 1A, please:*

- A. **Revenues:** *Explain the revenue amounts. Provide detail, when appropriate, for each revenue type and fund affected and any amounts included in the executive budget.*

Not applicable

- B. **Expenditures:** *Explain the expenditure amounts. Provide detail, when appropriate, for each agency, line item, and fund affected and the number of FTE positions affected.*

Not applicable

- C. **Appropriations:** *Explain the appropriation amounts. Provide detail, when appropriate, for each agency and fund affected. Explain the relationship between the amounts shown for expenditures and appropriations. Indicate whether the appropriation or a part of the appropriation is included in the executive budget or relates to a continuing appropriation.*

Not applicable

**Name:** Dan Sipes

**Agency:** Information Technology Dept

**Telephone:** 701.328.4317

**Date Prepared:** 01/03/2019

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**12/21/2018**

Bill/Resolution No.: HB 1048

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**Name:** Dan Sipes

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**Date Prepared:** 01/03/2019

**2019 HOUSE INDUSTRY, BUSINESS AND LABOR**

**HB 1048**

# 2019 HOUSE STANDING COMMITTEE MINUTES

## Industry, Business and Labor Committee Peace Garden Room, State Capitol

HB1048  
1/8/2019  
30537

- Subcommittee  
 Conference Committee

Committee Clerk: Ellen LeTang by Kathleen Davis

### Explanation or reason for introduction of bill/resolution:

Exemption of open blockchain token from specified securities transactions & dealings. Use of distributed ledger technologies.

### Minutes:

Attachment 1

**Chairman Keiser:** Opens the hearing on HB 1048.

**Rep Toman-District 34, Mandan:** Introduces HB 1048. It allows government use of blockchain technology with the reporting portion. Essentially to allow ITD or other agency to request ITD find where blockchain can be useful in Secretary of State and Auditor's offices.

**0:55**

**Rep P Anderson:** Are they OK with this?

**Rep Toman:** They requested this.

**Chairman Keiser:** good question and if they are interested, they should be here.

**Rep Toman:** It's state government.

**Rep Bosch:** We have to differentiate the different between a utility token and a financial token in legislation? Can we just call it ledger enabled platform technologies?

**Rep Toman:** Technology is broad, but we don't want to limit.

**Rep M Nelson:** Will these only cover agencies under ITD? Would blockchain technology allow everyone to be in ITD and maintain confidentiality?

**Rep Toman:** I can't answer, but I think it would be a good fit for auditor's office as well.

**Rep M Nelson:** Does this cover all agencies?

**Rep Toman:** We probably need to add a section.

**Rep Ruby:** Line 9 states used by state agencies to protect against falsification. What is the significance for the report in even numbered year to be before June 1?

**Rep Toman:** I did not pick that date, so I don't know why they picked that date.

**Chairman Keiser:** The language is clear, and the way this is written, they don't have an option, they have to implement. Was that your intention?

**Rep Toman:** I see *shall* but we can change to *may*.

**Chairman Keiser:** Otherwise we don't have a choice.

**Rep Toman:** I would like shall to research.

**Chairman Keiser:** Anyone else here to testify in support of HB 1048?

**Shawn Riley~Chief Information Officer w/the Information Technology Dept. (ITD):** Attachment 1. He did a demonstration-11:55.

**Rep. Kasper:** how do you get everyone to agree there's 2 million people on the system?

**Riley:** The method of agreement is a mathematical formula.

**Chairman Keiser:** when you say verify, you're not talking about an individual literally verifying, you talking about an algorithm established for that account.

**Riley:** that's correct. Verifying the integrity of the data.

**Rep M Nelson:** I'm hearing one transaction is recorded in a multitude of places. How much storage or information highway do we need?

**Riley:** The networks are built to be exceeding efficient. We're not using vastly more storage. It's the methodology using that same bandwidth and storage is different.

**Rep Adams:** Who writes the algorithm for each node?

**Riley:** Algorithms are part of the network and agreement. If we look at blockchains modeled today, they're agreed to by the entire groups.

**Rep. Kasper:** If you agree to something, how do you know they are legit, honest, verifiable?

**Riley:** It's all on the network and public algorithms reviewed by multiple organizations. Agreed to and reviewed by those organizations and made public for anyone to review the actual math.

**Rep Kasper:** You're saying some outside expert entity is verifying and I'm trusting they verified correctly.

**Riley:** Trust aspect is true, but it's like using a credit card. You trust.

**Rep Louser:** With this language the Secretary of State's office wants to use this technology for voting. What happens?

**Riley:** This is intended to be a study to determine viability and feasibility. We would require a project that would be funded and asked for, from our customer base before we'd implement blockchain.

**Rep Louser:** Basically this is a study and then you will report.

**Riley:** Yes.

**Rep C Johnson:** This is basically a software program?

**Riley:** Yes.

**Rep C Johnson:** Is this an evolution of technology?

**Riley:** Yes.

**Rep Ruby:** It seems more than a study based on the last sentence.

**Riley:** That would be part of the amendment. We can have a conversation about the report.

29:35

**Chairman Keiser:** further questions? Further testimony in support? Opposition? Neutral?  
Closed the hearing.

# 2019 HOUSE STANDING COMMITTEE MINUTES

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1/8/2019  
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Committee Clerk: Ellen LeTang

### Explanation or reason for introduction of bill/resolution:

Exemption of open blockchain token from specified securities transactions & dealings. Use of distributed ledger technologies.

### Minutes:

Attachment 1

**Chairman Keiser:** Reopens the hearing on HB 1048.

**Rep Toman~District 34, Mandan:** Attachment 1. Goes over the amendment.

**Chairman Keiser:** Rereads the attached amendment. Is this correct?

**Rep Toman:** That's correct. There is still zero fiscal note.

**Rep Ruby:** The department shall select a state agency, upon the request of the state agency. Is it select or request?

**Chairman Keiser:** I think what it's trying to say is, if five state agencies request, the department shall select one.

**Rep Toman:** That's what we are trying to accomplish.

**Chairman Keiser:** Discussion on the amendment?

**Rep P Anderson:** Can they have more than one in the pilot program?

**Chairman Keiser:** No, one for the pilot program. Further questions? What are the wishes of the committee?

**Rep Ruby:** Adopt amendment 19.0323.01001.

**Rep Laning:** Second.

**Voice vote taken, amendment passed.**

**Chairman Keiser:** We have HB 1048 as amended, what are the wishes of the committee?

**Rep Laning:** Makes a motion of a Do Pass as Amended.

**Rep Schauer:** Second.

**Chairman Keiser:** Further discussion?

**Roll call was taken on HB 1048 for a Do Pass as Amended with 12 yes, 0 no, 2 absent & Rep C Johnson is the carrier.**

DA 1/9/19

19.0323.01001  
Title.02000

Prepared by the Legislative Council staff for  
Representative Toman  
January 9, 2019

PROPOSED AMENDMENTS TO HOUSE BILL NO. 1048

Page 1, line 2, after "technologies" insert "and a pilot program"

Page 1, line 6, after the second underscored boldfaced hyphen insert "**Pilot program** -"

Page 1, line 7, replace the first underscored comma with "and"

Page 1, line 7, remove ", and implement"

Page 1, line 9, remove "used by state agencies"

Page 1, line 12, after the underscored period insert "The department shall select a state agency, upon the request of the state agency, to serve as a pilot program for the implementation and use of distributed ledger-enabled platform technologies."

Renumber accordingly

Date: Jan 8, 2019

Roll Call Vote #: 1

2019 HOUSE STANDING COMMITTEE  
ROLL CALL VOTES

BILL/RESOLUTION NO. 1048

House \_\_\_\_\_ Industry, Business and Labor \_\_\_\_\_ Committee

Subcommittee

Amendment LC# or Description: 19.0323.01001

Recommendation

- Adopt Amendment
- Do Pass     Do Not Pass     Without Committee Recommendation
- As Amended     Rerefer to Appropriations
- Place on Consent Calendar

Other Actions     Reconsider     \_\_\_\_\_

Motion Made by Rep Ruby    Seconded By Rep Laning

Representatives	Yes	No	Representatives	Yes	No
Chairman Keiser			Rep O'Brien		
Vice Chairman Lefor			Rep Richter		
Rep Bosch			Rep Ruby		
Rep C Johnson			Rep Schauer		
Rep Kasper			Rep Adams		
Rep Laning			Rep P Anderson		
Rep Louser			Rep M Nelson		

Total (Yes) \_\_\_\_\_ No \_\_\_\_\_

Absent \_\_\_\_\_

Floor Assignment \_\_\_\_\_

voice vote - motion passed

Date: Jan 8, 2019

Roll Call Vote #: 2

2019 HOUSE STANDING COMMITTEE  
ROLL CALL VOTES

BILL/RESOLUTION NO. 1048

House \_\_\_\_\_ Industry, Business and Labor \_\_\_\_\_ Committee

Subcommittee

Amendment LC# or Description: 19.0323.01001

Recommendation

- Adopt Amendment
- Do Pass     Do Not Pass     Without Committee Recommendation
- As Amended     Rerefer to Appropriations
- Place on Consent Calendar

Other Actions     Reconsider     \_\_\_\_\_

Motion Made by Rep Lanning    Seconded By Rep Schauer

Representatives	Yes	No	Representatives	Yes	No
Chairman Keiser	X		Rep O'Brien	X	
Vice Chairman Lefor	X		Rep Richter	X	
Rep Bosch	Ab		Rep Ruby	X	
Rep C Johnson	X		Rep Schauer	X	
Rep Kasper	X		Rep Adams	X	
Rep Lanning	X		Rep P Anderson	X	
Rep Louser	Ab		Rep M Nelson	X	

Total (Yes) 12    No 0

Absent 2

Floor Assignment Rep Johnson

**REPORT OF STANDING COMMITTEE**

**HB 1048: Industry, Business and Labor Committee (Rep. Keiser, Chairman)** recommends **AMENDMENTS AS FOLLOWS** and when so amended, recommends **DO PASS** (12 YEAS, 0 NAYS, 2 ABSENT AND NOT VOTING). HB 1048 was placed on the Sixth order on the calendar.

Page 1, line 2, after "technologies" insert "and a pilot program"

Page 1, line 6, after the second underscored boldfaced hyphen insert "**Pilot program** -"

Page 1, line 7, replace the first underscored comma with "and"

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Renumber accordingly

**2019 SENATE GOVERNMENT AND VETERANS AFFAIRS**

**HB 1048**

# 2019 SENATE STANDING COMMITTEE MINUTES

## Government and Veterans Affairs Committee Sheyenne River Room, State Capitol

HB1048  
3/7/2019  
#33367

- Subcommittee  
 Conference Committee

Committee Clerk: Pam Dever

### Explanation or reason for introduction of bill/resolution:

Relating to the use of distributed ledger technologies and a pilot program.

### Minutes:

Att # 1 – Rep Toman

**Chairman Davison:** Let's open the hearing on HB1048.

**Rep. Nathan Toman, Dist. 34, Mandan:** I am here to introduce this bill. (see att#1) Sen. Vedaa heard all about this yesterday. We want implement a block chain technology for state agency at their request. It would come out of the agency's budget who requested this technology.

**Chairman Davison:** Any questions? Any more in support?

**Dorman Bassell, Chief ITD for N.D.:** I am here in support of block chain. Any questions?

**Chairman Davison:** Any questions? More in support? Agency? Against? Close hearing. What are the committee wishes?

**Sen. Shawn Vedaa:** I heard this in IBL yesterday. It is very interesting and amazing technology. I move a DO PASS. **Vice Chair Meyer:** I second.

**Chairman Davison:** Any discussion? Call roll: **YES -- 7 NO -- 0 -0-absent**  
**Bill PASSED. Sen. Shawn Vedaa will carry the bill.** Sen. Oban voted yes a minute later when she came into room.

Done (4.07)

3-7-19

Date:  
Roll Call Vote #: 1

2019 SENATE STANDING COMMITTEE  
ROLL CALL VOTES  
BILL/RESOLUTION NO. HB 1048

Senate Government and Veterans Affairs Committee

Subcommittee

Amendment LC# or Description: \_\_\_\_\_

- Recommendation:  Adopt Amendment  
 Do Pass     Do Not Pass     Without Committee Recommendation  
 As Amended     Rerefer to Appropriations  
 Place on Consent Calendar  
Other Actions:  Reconsider     \_\_\_\_\_

Motion Made By Sen. Vedaa    Seconded By Sen. Meyer

Senators	Yes	No	Senators	Yes	No
Chair Davison	/		Sen. Oban	/	
Vice Chair Meyer	/		Sen. Marcellais	/	
Sen. Elkin	/				
Sen. K. Roers	/				
Sen. Vedaa	/				

Total (Yes) 7    No 0

Absent 0

Floor Assignment Sen. Vedaa

If the vote is on an amendment, briefly indicate intent:

**REPORT OF STANDING COMMITTEE**

**HB 1048, as engrossed: Government and Veterans Affairs Committee (Sen. Davison, Chairman)** recommends **DO PASS** (7 YEAS, 0 NAYS, 0 ABSENT AND NOT VOTING). Engrossed HB 1048 was placed on the Fourteenth order on the calendar.

**2019 TESTIMONY**

**HB 1048**

Jan 8, 2019  
Attachment 1

***HB 1048 TESTIMONY***

***HOUSE INDUSTRY, BUSINESS LABOR COMMITTEE***

***BY: SHAWN RILEY, CIO, INFORMATION TECHNOLOGY***

***INFORMATION TECHNOLOGY DEPARTMENT (ITD)***

***JANUARY 8, 2019***

Mr. Chairman and members of the committee, my name is Shawn Riley. I am the Chief Information Officer with the Information Technology Department (ITD). I am here to indicate support of House Bill 1048.

The Information Technology Department supports distributed ledger technology. This technology will be key to future projects. Distributed ledger technology can improve security and ensure very high degrees of accuracy for citizen data.

Initially we were concerned that the language within House Bill 1048 would require the technology implementation without a project. That type of direction would be incredibly difficult to implement as distributed ledger is a foundational technology. As a comparable example, this would be akin to trying to create electricity with just the coal, but no generators. Distributed ledger is essential component of a product, but not a product that can stand alone.

We have discussed these concerns with Rep Toman. We jointly understand that House Bill 1048 is intended to be a study and not a mandate for implementation. This is the reason we have placed \$0 on the fiscal note, as the Information Technology Department is resourced to complete a study without additional funds.

This concludes my remarks. I would be happy to answer any questions.

Shawn Riley

Chief Information Officer

Information Technology Department

(701) 328-1001

[Sriley@nd.gov](mailto:Sriley@nd.gov)

19.0323.01001  
Title.

Prepared by the Legislative Council staff for  
Representative Toman  
January 8, 2019

PROPOSED AMENDMENTS TO HOUSE BILL NO. 1048

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Renumber accordingly

# MAKING SENSE OUT OF BLOCKCHAIN TECHNOLOGIES



NB 1048 3-2-19 att #1 pgl

## WHAT IS BLOCKCHAIN?

**Blockchain** is a decentralized digital ledger (a continuously growing list of electronic records) of transactions kept over time and secured using **cryptography** (a kind of algorithmic code). Blockchain ledger data is distributed across a network of computers. Its users can directly interact with stored data in real-time without the need for an intermediary (a “middle-man” or distributor) to authenticate transactions. The technology provides an independent, tamper-resistant, and transparent platform for parties within the blockchain to securely store, transmit, and process sensitive information.

### Blockchain Summary:

- **Decentralized**
- **Peer-to-peer**
- **Tamper-resistant**
- **Synchronized through consensus**
- **Eliminates the need for a third-party verifier**
- **All transactions are visible to all parties involved in the specific blockchain**

## SMART JARGON: UNDERSTANDING BLOCKCHAIN

- **Blockchain:** A shared digital ledger that provides a reliable means to record business transactions comprised of a sequence of linked data compartments (or “blocks”) among a distributed network of members.
- **Cryptography:** Secure information and communication techniques, which is used in blockchain to send and/or store data so that only intended recipients can access the data.
- **Hash:** A type of cryptography—in blockchain, it is a coded string of letters and numbers that is permanently unique to each individual block in the chained sequence; also sometimes called the “digital fingerprint.”
- **Block:** A sealed data compartment that contains 1) its own identifying block hash, 2) the hash from the previous block in the chain sequence, and 3) a set of time-stamped transactions.
- **Blockchain Transaction:** A member-verified data record that provides nearly immutable proof of business dealings—such as financial or contractual agreements.

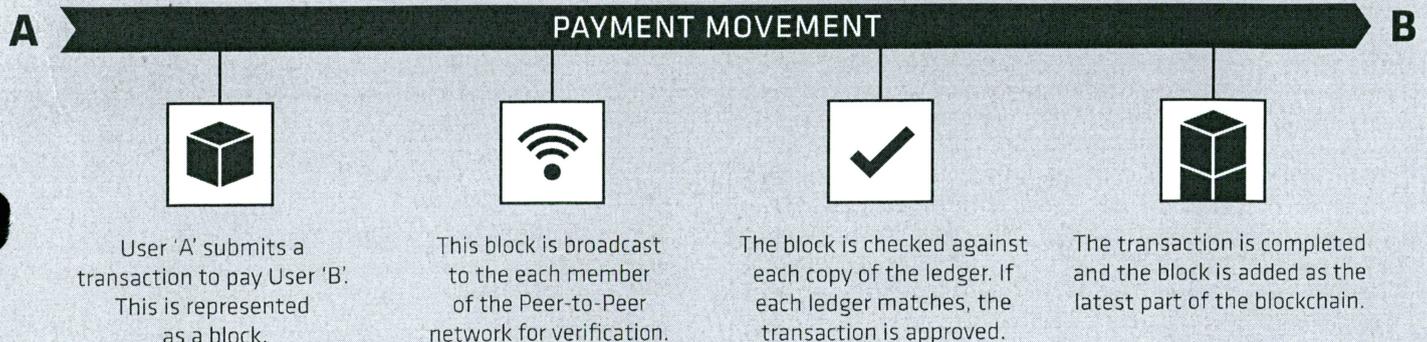
## HOW BLOCKCHAIN WORKS

A blockchain is a record-keeping system where multiple sources validate an entry before it gets added to the chain of data. Once data has been added, it cannot be changed and the record is distributed to multiple places within the network. Adding a new record (known as a block) to the blockchain sequence requires verification by multiple members connected to the blockchain network. These blocks of data are all linked to one another forming the chain. All transactions are public to those in the blockchain, but all individual identities are hidden.

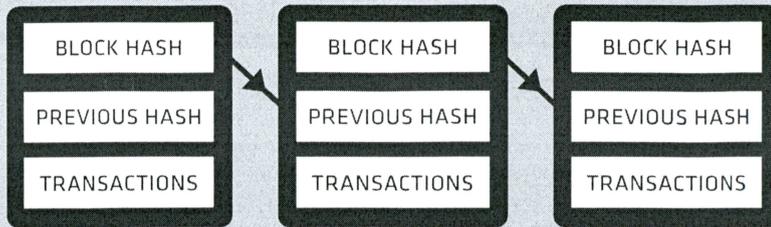
Blockchain technology uses an algorithm to assign a cryptographic hash (a unique string of letters and numbers—also sometimes called the “digital fingerprint”) to each block. In addition to the hash, each block contains timestamped sets of prior transactions, plus the hash of the previous block—which is what creates the immutable link between sequential blocks in the chain.

The combination of cryptography and timestamps allows blockchain technology to automatically verify that this progressive hash sequence never changes. This action restricts new blocks from being inserted out of order—thereby preventing transaction data from being altered or falsified after the fact.

## PROCESS OF A BLOCKCHAIN TRANSACTION



## WHAT IS A BLOCK?



### BLOCK HASH

A coded string of letters and numbers that is permanently unique to each individual block in the chained sequence.

### PREVIOUS BLOCK HASH

The identification hash from the previous block, which prevents a block from being added to the middle of the chain.

### SET OF TRANSACTIONS

Data records that provide member-verified proof of business dealings.

## EMERGING USE CASES

A wide variety of applications can use a blockchain transaction database. Existing barriers to wide acceptance of blockchain (e.g., culture, complexity, energy use), will likely be addressed over time. While blockchain's well-publicized roots come from currency and finance, it is already making an impact in many industries, including:

- **Supply Chain Management:** When combined with properly validated business practices, blockchain provides an auditable method to document supply chains. For example, it has been used to ensure conflict-free diamonds,<sup>1</sup> protect against counterfeiting manufacturing in IoT,<sup>2</sup> and reliably track a product's materials and manufacturing from source to delivery to promote ethical practices.<sup>3</sup>
- **Smart Contracts:** Smart contracts offer speed, efficiency, and security by building the terms of the agreement into blockchain transactions. Within the blockchain application, all terms and conditions of a contract for goods or services can be efficiently listed, amended, and agreed upon without the need for physical documents and signatures or for using potentially insecure methods of communication. Smart contracts can also eliminate complex and expensive services of a third-party intermediary for major transactions—such as real estate purchases or new auto loans.
- **Health/Medical Records:** Blockchain has the potential to standardize secure electronic medical record sharing across providers in a less burdensome way than previous approaches.<sup>4</sup> It offers the ability to create a decentralized record management system that reduces the need for another organization between the patient and the records to manage access. Blockchain-enabled healthcare applications offer potential benefits such as instantly verifying the authenticity of prescriptions or automatically identifying potential adverse drug interactions.
- **Governmental Services:** National identity management systems, taxes/internal revenue monitoring, voting, and land management are just a few examples in which a blockchain ecosystem could be leveraged by public authorities. The State of Illinois, for example, recently launched a birth registry and identification system trial.<sup>5</sup> The African nation of Ghana has also enabled land registration based on blockchain technology.<sup>6</sup>

## PROCESSING PERFORMANCE, EFFICIENCY & SECURITY

While the promises of blockchain are great, its algorithms can require significant amounts of compute performance and power from both central processing units (CPUs) and graphics processing units (GPUs)—both in terms of processing bandwidth and the energy consumed to perform operations. Therefore, implementing blockchain applications on a mass scale using current technologies is challenging.

To unleash the potential of blockchain, AMD is developing new processing solutions—designs that can simultaneously deliver more compute performance while consuming less energy. For instance, AMD brings the industry's first high-performance 7nm computing and graphics processors.<sup>7</sup>

## THE POWER AND FREEDOM TO GO FURTHER

Blockchain's impact is rapidly expanding across a wide swath of industries and applications. While it is still at a formative stage, the technology's enormous potential shows substantial and unique value.

AMD is currently working with ecosystem partners to bring the transformative potential of blockchain to consumers, new markets, governments and others in a variety of applications.

FOR MORE INFORMATION, PLEASE VISIT [WWW.AMD.COM/BLOCKCHAIN](http://WWW.AMD.COM/BLOCKCHAIN)

FOR MORE INFORMATION ON OUR PRODUCTS OR SERVICES, PLEASE VISIT [WWW.AMD.COM](http://WWW.AMD.COM)

1. "The Diamond Industry Is Obsessed With the Blockchain," *Fortune*, September 12, 2017.

2. "Blockchain and the Internet of Things will be used to combat with the counterfeiting of brands," *Bit News*, August 24, 2018.

3. "From Farm To Finished Garment: Blockchain Is Aiding This Fashion Collection With Transparency," *Forbes*, May 10, 2017.

4. "Exploring the Use of Blockchain for EHRs, Healthcare Big Data," *Health IT Analytics*, Feb 5, 2018.

5. "Illinois Launches Blockchain Pilot to Digitize Birth Certificates," *Coindesk*, September 1, 2017

6. "Ghana Looks To IBM For Blockchain-Based Land Administration," *ETHNews*, July 11, 2018

7. "AMD CTO: 'We Went All In' On 7nm CPUs," *CRN*, August 23, 2018.