ENERGY & COMMERCE

June 5, 2023

TO: Members, Subcommittee on Innovation, Data, and Commerce
FROM: Committee Majority Staff
RE: Hearing Entitled "Building Blockchains: Exploring Web3 and Other Applications for Distributed Ledger Technologies."

I. INTRODUCTION

The Subcommittee on Innovation, Data, and Commerce will hold a hearing on June 7, 2023, at 10:00 a.m. in 2123 Rayburn House Office Building. The hearing is entitled "Building Blockchains: Exploring Web3 and Other Applications for Distributed Ledger Technologies."

II. WITNESSES

- Carla L. Reyes, Associate Professor of Law, SMU Dedman School of Law
- Hasshi Sudler, Professor and Chief Executive Officer, Villanova University College of Engineering and Internet Think Tank, Inc.
- Ryan Wyatt, President, Polygon Labs
- Ross Schulman, Senior Fellow, Decentralization, Electronic Frontier Foundation

III. BACKGROUND

Blockchain and distributed ledger technologies (DLT) are a new foundational technology providing individuals and businesses new ways to access, record, and validate digital activity online. Web3 is a term for a new iteration of the internet built on top of blockchains. While still in its infancy, it is marketed as having the potential to compete with Big Tech's online dominance. While cryptocurrencies represent one application of this technology, the underlying technology merits further attention of the other new opportunities and applications it facilitates.

Blockchains and DLT can provide new ways to secure personal information, increase transparency in the marketplace, and eliminate middlemen. Further, Congress must explore the importance of U.S. leadership in the deployment of emerging technologies like blockchain and distributed ledger technologies.

A. BLOCKCHAIN AND DISTRIBUTED LEDGER TECHNOLOGIES

A blockchain is a linked list of transactions stored on a network of computers. Blockchains are composed of groupings of data (blocks) linked together cryptographically (chain). Blockchains are decentralized, immutable, and open. Decentralized means that transactions or interactions are stored on a network of computers called nodes. Immutability means that once a transaction or interaction is logged on the blockchain, it cannot be changed. Open means that transactions or interactions can be viewed by anyone. These features, decentralization, immutability, and openness, mean that users can trust the cryptography of the blockchain even if they do not trust other users.

Blockchains are not a new, stand-alone technology. Rather, it is a creative interplay among four existing technologies.[1] When combined, these technologies create an encrypted secure log of transactions with no single point of failure.[2]

Blockchains are a subcategory of DLT. While many applications have been built on blockchains, alternative DLT architectures are popular in certain contexts such as large enterprises. Core to DLT is the ledger, or log of transactions, which is used to track inputs, outputs, and the movement of information. The various categories of DLT make different security, data structure, and record keeping decisions which lead to varying capabilities and strengths.

B. HISTORY OF BLOCKCHAIN

In 2008, an anonymous internet account known as Satoshi Nakamoto released a whitepaper titled "Bitcoin: A Peer-to-Peer Electronic Cash System."[3] The 9-page whitepaper laid out the author's vision of a new, decentralized way to conduct commerce using blockchain. Bitcoin, the first blockchain,[4] was developed in part as a response to the 2008 financial crisis and proponents argued the technology would create an alternative financial system.[5]

Following Bitcoin's invention, software engineers continued to experiment with new ways to use blockchains. In 2013, Vitalik Buterin, a Russian-Canadian computer programmer,

---

[1] Chris Jaikaran, *Blockchain: Background and Policy Issues,* Congressional Research Service (February 28, 2018), https://www.crs.gov/Reports/R45116

[2] Ibid.

[3] Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System,* Bitcoin, https://bitcoin.org/bitcoin.pdf.

[4] Vinay Gupta, *A Brief History of Blockchain,* Harvard Business Review (February 28, 2017), https://hbr.org/2017/02/a-brief-history-of-blockchain.

[5] Chris Williams, *Bitcoin's Birthday: Satoshi Nakamoto's Hidden Message Explained,* Crypto Briefing (January 3, 2021), https://cryptobriefing.com/bitcoin-birthday-satoshi-hidden-message-explained/; David Yaffe-Bellany, *Has bitcoin benefited from the banking crisis? Not in the way its fans hoped*, The Economic Times (April 1, 2023). https://economictimes.indiatimes.com/markets/cryptocurrency/has-bitcoin-benefited-from-the-banking-crisis-not-in-the-way-its-fans-hoped/articleshow/99166271.cms.

released the Ethereum whitepaper, which posited a new use case for blockchains.[6] Buterin wanted to create a more flexible, general-purpose platform which would allow programmers to "build much more than the financial applications of the future."[7] Unlike Bitcoin, Ethereum is a programmable platform which developers can build and deploy applications to, enabling a new wave of innovation.[8]

C. WHAT IS WEB3

The term web3 references a new, third internet-paradigm based on blockchain technology: Web 1.0 refers to the early internet (1991-2004) and was characterized by dial-up and AOL; Web 2.0 (2004-2020) was popularized in the mid 2000s and refers to the current internet paradigm which is characterized by social media, smartphones, and cloud computing; and Web3 is the emerging internet (2020-Present) built on top of blockchains and is characterized by increased user control, decentralization, and transparency.[9]

Importantly, while the shift from web 1.0 to web 2.0 required the development and deployment of physical broadband infrastructure, web3 is a software innovation which can be quickly deployed if allowed. Using a variety of blockchain-based technologies, web3 developers hope to make the internet more transparent and decentralized, while disrupting the dominance of Big Tech.[10]

D. ADOPTION AND AMERICAN LEADERSHIP

Venture capitalists have invested more than $188.7 Billion in blockchain related startups.[11] Today, there are more than 12,500 blockchain startups globally.[12] According to one Wells Fargo investment report, from invention to adoption, blockchain is growing at a similar pace to the internet in the 1990s.[13] According to a 2021 Morning Consult poll, 1 in 6 U.S. households own a token secured by a blockchain.[14] Further, the world's largest brands are exploring how they can integrate blockchain into their business. Starbucks integrated non-

---

[6] Kyle Torpey, *Vitalik Buterin on His Long-Term Goals for Ethereum,* Bitcoin Magazine (May 4, 2016), https://bitcoinmagazine.com/business/vitalik-buterin-on-his-long-term-goals-for-ethereum-1462381147; *Ethereum Whitepaper,* Ethereum (June 1, 2023), https://ethereum.org/en/whitepaper/.

[7] Ibid.

[8] *What is Ethereum: The Foundation of Our Digital Future*, Ethereum Foundation, https://ethereum.org/en/what-is-ethereum/.

[9] Chris Dixon, *Why Web3 Matters,* a16zcrypto (September 26, 2021), https://a16zcrypto.com/posts/article/why-web3-matters/; Andreessen Horowitz, *State of Crypto 2023,* a16zcrypto (2023), https://api.a16zcrypto.com/wp-content/uploads/2023/04/State-of-Crypto.pdf.

[10] *Web3 and the Future of Big Tech,* Manhattan Institute (March 7, 2022) https://manhattan.institute/event/web3-and-the-future-of-big-tech.

[11] PitchBook (n.d.) Companies in Blockchain and Cryptocurrency. PitchBook.

[12] Ibid.

[13] Wells Fargo Investment Institute, February 2022, *Cryptocurrencies - Too Early or Too Late?* https://saf.wellsfargoadvisors.com/emx/dctm/Research/wfii/wfii_reports/Investment_Strategy/cryptocurrency020722.pdf.

[14] *The Crypto Report: Our Analysts on the State of Cryptocurrency,* Morning Consult (July 2022), https://pro.morningconsult.com/analyst-reports/state-of-cryptocurrency.

fungible tokens (NFTs) into its loyalty program.[15] Nike launched an NFT platform, Swoosh, for digital sneakers.[16] Reddit minted 10.6 million collectible avatar NFTs.[17] From November 2021 to July 2022, the blockchain industry crashed more than $2 trillion, stabilizing at roughly a third of its peak valuation.[18]

Despite housing Silicon Valley and the best technical talent in the world, entrepreneurs are fleeing the U.S. for more friendly regulatory environments overseas. In 2023, American shares of blockchain developers are declining,[19] and less than 40 percent of all blockchain companies are headquartered in the United States.[20] In a March 2023 report titled "The New American Foreign Policy of Technology," the German Marshall Fund stated, "U.S. leadership is needed to ensure that nationalist and authoritarian forces do not fill the resulting structural vacuum in an increasingly digital world."[21]

Blockchains are a central component of the Chinese Communist Party's (CCP) strategy to undermine the U.S.-led global order. As we've seen with Huawei and other emerging technologies, the CCP will step in if we fail to lead. On May 27, a Beijing commission released a whitepaper titled "Web3 Innovation and Development White Paper (2023)."[22] This paper outlines plans to invest in the sector through 2025.[23] On June 1, a new set of regulations took effect in Hong Kong designed to draw web3 developers and create a leading blockchain ecosystem.[24]

In 2019, the CCP established the Blockchain-based Service Network (BSN).[25] BSN is a low-cost blockchain surveillance layer that sits at the bottom of a blockchain foundation enabling the Chinese government to compromise and exploit large pools of data that should otherwise be private. Should BSN become a global standard, the CCP would be able to monitor the identities

[15] *Starbucks Brewing Revolutionary Web3 Experience for its Starbucks Rewards Members,* Starbucks Stories & News (September 12, 2022), https://stories.starbucks.com/press/2022/starbucks-brewing-revolutionary-web3-experience-for-its-starbucks-rewards-members/.

[16] *Swoosh,* Nike (2023), https://www.swoosh.nike/.

[17] Tom Farren, *Reddit Just Dropped Thousands More NFTs on Polygon From Over 100 Artists,* Decrypt (April 11, 2023), https://decrypt.co/125975/reddit-nfts-polygon-gen3.

[18] Geoff Bennett & Andrew Chang, *After $2 Trillion Crypto Crash, What Happens Next?,* PBS (July 17, 2022), https://www.pbs.org/newshour/show/after-2-trillion-crypto-crash-what-happens-next.

[19] Andreessen Horowitz, *State of Crypto 2023,* a16zcrypto (2023), https://api.a16zcrypto.com/wp-content/uploads/2023/04/State-of-Crypto.pdf.

[20] PitchBook (n.d.) *Companies in Blockchain and Cryptocurrency.* PitchBook.

[21] Karen Kornbluh & Julia Trehu, *The New American Foreign Policy of Technology,* GMF U.S. (March 13, 2023), https://www.gmfus.org/news/new-american-foreign-policy-technology.

[22] Yogita Khatri, *Beijing releases white paper for web3 innovation and development,* The Block (May 27, 2023), https://www.theblock.co/post/232404/beijing-web3-white-paper.

[23] Yogita Khatri, *Beijing releases white paper for web3 innovation and development,* The Block (May 27, 2023), https://www.theblock.co/post/232404/beijing-web3-white-paper.

[24] Rita Liao, *As the US cracks down on crypto, Hong Kong extends a warm welcome,* TechCrunch (April 29, 2023), https://techcrunch.com/2023/04/29/hong-kong-china-crypto-east-rises/; Jesse Coghlan *Crypto firms jockey for Hong Kong licenses ahead of June 1 retail opening,* CoinTelegraph (May 30, 2023) https://cointelegraph.com/news/crypto-firms-hong-kong-licenses-june-retail-opening.

[25] Ledger Insights, *China's national blockchain infrastructure takes shape* (December 2, 2019) https://www.ledgerinsights.com/chinas-national-blockchain-infrastructure-bsn/.

and data of all global users.[26] Tan Min, BSN Secretary General, stated that BSN would build an internet where "China controls the rights to internet access."[27] BSN nodes are listed in multiple countries besides mainland China, and this fact becomes increasingly alarming as the CCP prepares to pair the technology with its digital Belt and Road Initiative.[28] In late 2021, BSN had partnered with more than 20 blockchains.[29]

IV.   COMMITTEE HISTORY

In March 2016, this subcommittee held one of the first hearings on the topic entitled, "Disruptor Series: Digital Currency and Blockchain Technology."[30] Other efforts followed over the years, which culminated in the inclusion of legislation championed by Reps, Brett Guthrie[31] and Darren Soto[32] in Chair Rodgers' bipartisan legislation with then-Rep. Bobby Rush, known as the American COMPETE Act.[33] That legislation became Title XV of the "Consolidated Appropriations Act, 2021,"[34] -- The COMPETES Act required the Department of Commerce to outline strategies and policies to promote blockchain technologies, amongst other technologies such as artificial intelligence, additive manufacturing, and quantum computing. The COMPETES Act reports are overdue.

IV.   ISSUES

- How can small and medium businesses take advantage of blockchain technologies?
- What will the impact be if the Chinese Communist Party is allowed to lead on the development of blockchain?
- What are the national and economic security threats of China leading in the deployment of blockchain technologies and web3?

---

[26] Yao Qian, *Technical Aspects of CBDC in a Two-Tiered System*, Institute of Digital Money, People's Bank of China (July 7, 2018) https://www.itu.int/en/ITU-T/Workshops-and-Seminars/20180718/Documents/Yao%20Qian.pdf.

[27] 24 minute mark, "How Blockchain Technology and BSN Support Fintech Development," *YouTube,* November 4, 2020. *https*://www.youtube.com/watch?v=k9Gtq-j__3U.

[28] Mikk Raud, *Knowledge Base: Blockchain-based Service Network*, DigiChina (July 2, 2021) https://digichina.stanford.edu/work/knowledge-base-blockchain-based-service-network-bsn-%E5%8C%BA%E5%9D%97%E9%93%BE%E6%9C%8D%E5%8A%A1%E7%BD%91%E7%BB%9C/.

[29] Timmy Shen, *China's state-backed blockchain network, U.S. firm team up to enhance CBDC efficiency,* Forkast News (October 14, 2021) https://forkast news/headlines/china-blockchain-network-bsn-cypherium-cbdc/.

[30] House Committee on Energy and Commerce, *Disrupter Series: Digital Currency and Blockchain Technology,* (March 16, 2016), https://docs.house.gov/Committee/Calendar/ByEvent.aspx?EventID=104677.

[31] H.R. 6938, Advancing Block Chain Act (116th Congress), https://www.congress.gov/bill/116th-congress/house-bill/6938?q=%7B%22search%22%3A%5B%22%22%5D%7D&s=1&r=5.

[32] H.R. 8153 Blockchain Innovation Act (116th Congress), https://www.congress.gov/bill/116th-congress/house-bill/8153/text?s=2&r=5&q=%7B%22search%22%3A%5B%22%22%5D%7D.

[33] H.R. 8132, American Competitiveness of a More Productive Emerging Tech Economy Act (116th Congress), https://www.congress.gov/bill/116th-congress/house-bill/8132?q=%7B%22search%22%3A%5B%22%22%5D%7D&s=3&r=3.

[34] Consolidated Appropriations Act, 2021, Public Law 116-260 (Dec. 27, 2020), https://www.congress.gov/116/plaws/publ260/PLAW-116publ260.pdf.

- What role can agencies like the Department of Commerce and Federal Trade Commission serve in the promotion of American leadership in emerging technologies like blockchain?
- What regulatory challenges exist at the federal, state, or local level to deploying blockchains and applications built on top of them?
- How would the adoption of blockchains impact the data privacy and security of Americans?

V.   STAFF CONTACTS
- Tim Kurth, Chief Counsel
- Teddy Tanzer, Senior Counsel
- Brannon Rains, Professional Staff Member
- Michael Cameron, Professional Staff Member
- Jessica Herron, Clerk