



Distributed Ledger Cybersecurity Resilience Framework in a Post Quantum Cryptography Era

Robert Campbell

Sr., Capitol Technology University, Laurel, Maryland, 20708, USA

Abstract:

Mission-critical infrastructures and systems are increasingly adopting enterprise blockchain and distributed ledger technologies without fully understanding the vulnerability, threat and risk environment that exists in today's environment. Further, organizations are less prepared for the coming ominous threat from Quantum Computers (QC). In 2018, Gartner revealed that Quantum Computing (QC) is a digital disruption that organizations may not be prepared for and CIOs may not see coming. Cyber-attacks on enterprise distributed ledgers can adversely impact intellectual property, healthcare information, personally-identifying information, human safety, and the reputation and trust of organizations. Enterprise Distributed Ledgers are complex systems that incorporate cryptography, fault-tolerance, and distributed consensus and its cybersecurity is not well understood in a systematic and thorough way. Standard network defenses and threat detection are not enough thwarted adversaries from exploiting vulnerable distributed ledgers in a PQC environment. This threat environment requires a new Cyber Resilient approach that is built-in and accounts for the arrival of large-scale, fault-tolerant QCs to be immediately implemented into enterprise blockchain deployments. To date there are no known public plans or strategies to incorporate Cyber-Resilience into enterprise distributed ledgers in the Post Quantum Cryptography (PQC) era. This research proposes an enterprise distributed ledger Cyber Resilient framework that can be used to analyzing the security and risk of enterprise distributed ledger systems. Specifically, the author proposes metrics, analysis methodologies and performance parameters to be included in an enterprise distributed ledger framework that is measurable, testable, and affordable in the PQC era.

Biography:

Rob Campbell the President of Med Cyber-Security, Adjunct Professor, Independent Distributed Ledger researcher, and Ph.D. student. Med Cyber-Security conducts independent research and consulting services that include; Quantum Resistant Cybersecurity Technologies (QRCT), Blockchain, and Distributed Ledger Technologies (DLT). Other services include Digital forensics, eDiscovery, Data Recovery and Security and Penetration testing. He is an international speaker, and an ex-



pert on security, encryption, networking, forensics, and Internet technologies. (International Peer-Reviewed Blockchain research which was originally published as a working paper at the Blockchain International Scientific Conference hashtag#ISC2019 in London on 12 March 2019). The JBBA: <https://lnkd.in/gNujUjR>. The second peer-reviewed distributed ledger paper 'Transitioning to a Hyperledger Fabric Quantum-Resistant Classical Hybrid Public Key Infrastructure:' <https://lnkd.in/gzyWupW> was placed in Hyperledger Fabric's research library as a reference. Robert received his MS in Computer Science with a concentration in software engineering and space systems engineering from the Naval Post Graduate School. He is a senior cryptologist, cyber-security specialist, and healthcare certified information technologist. Additionally, Rob holds the following degrees and certifications: Bachelor's Degree in Electronic Engineering Technology, Space Systems Engineering Professional Code. He is a former Naval Cryptologist, with over 30 years of experience in the Department of Defense and the Intelligence Community. Passions: Quantum Physics, DLT, Cosmology, Ancient Technology, and Wisdom, Human Consciousness, and Truth.

Publication of speakers:

1. T. M. Fernández-Caramès and P. Fraga-Lamas, "Towards Post-Quantum Blockchain: A Review on Blockchain Cryptography Resistant to Quantum Computing Attacks," in *IEEE Access*, vol. 8, pp. 21091-21116, 2020, doi: 10.1109/ACCESS.2020.2968985.
2. R. Campbell, "Evaluation of Post-Quantum Distributed Ledger Cryptography," *The Journal of the British Blockchain Association*, vol. 2, no. 1, pp. 17-24, 2019.

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