

The Prospect of Blockchain for Strengthening Nuclear Security

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In the last few years, distributed ledger technology (widely recognized in the form of blockchain) has demonstrated practical benefits beyond the development and exchange of cryptocurrencies. Blockchain solutions are being implemented in the fields of international development, healthcare, and education, predominantly as an information-sharing platform that enable parties to interact in a trusted environment. The strength of blockchain stems from its cryptographically-secure properties: when data is recorded onto the blockchain by any user, it is automatically copied onto other connected nodes (or participants) on the chain, as opposed to storing it directly into a centralized database. Consequently, the information has “no single point of failure” in a blockchain; any changes to the information –an attempt to extract or manipulate sensitive data, for instance –will be logged.

Thus, blockchain’s ability to preserve the integrity of data could potentially help enhance security measures across businesses, including the nuclear sector. For instance, blockchain technology could make it difficult for a malevolent actor to reconfigure files or install code that could linger in a computer network undetected, among other applications. This paper outlines the exploratory research the Stimson Center conducted in the Fall of 2019 –including expert interviews with blockchain developers and nuclear facility operators –to better understand the possible applications for nuclear security. The paper examines use cases that could potentially prevent or mitigate security vulnerabilities in nuclear facilities that could be exploited by cyber and insider threats. Moreover, the paper discusses potential difficulties in applying blockchain for nuclear security, and the ways in which the use of this technology could alter security considerations – for better or worse –at the national and operational level.

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