U.S. DEPARTMENT OF ENERGY | NATIONAL ENERGY TECHNOLOGY LABORATORY

Distributed Secure Anonymous Ledger (DSEAL) System

POC PHYSICAL OPTICS CORPORATION — Technology that makes a difference.®

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Problem:

The operation of energy systems and components is dependent on data from sensor networks (e.g., temperature, pressure, mass flows, chemical composition, strain, etc.) and corresponding command signals to actuators. Currently, there is no reliable cybersecurity technology capable of detecting and mitigating false command signals (e.g., from hackers) and other cyber threats (e.g., malware) to protect energy systems.

Solution:

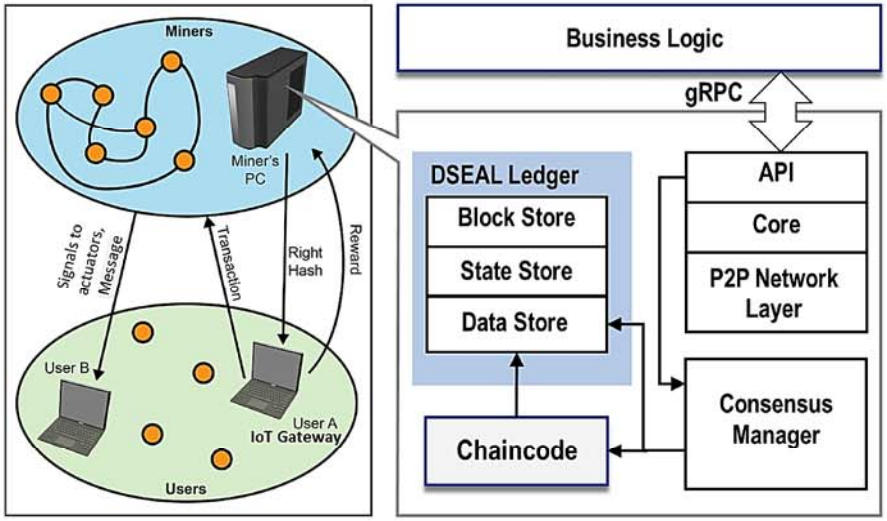
DSEAL - decentralized messaging and transaction platform installed in an energy control system and accessible via DSEAL user application software.

It is based on innovatively customized Blockchain protocol that provides anonymity and end-to-end security via verification of control commands and a sensors' data in energy generation system.

DSEAL uses a decentralized network backbone, consisting of "miners" to provide to any registered user/computer anywhere the ability to send a secure transactions, across multiple channels traceable in a decentralized ledger

Results:

Developed and successfully tested DSEAL that is capable of providing a secure, near real time, verification of control commands and sensor data in enery system with a low (<1%) computational overhead.



POC's DSEAL secure decentralized messaging and transaction platform allows detecting and mitigating false command, false sensor data, and other cyber threats for the achievement of a robust, reliable energy system

Applications:

Industrial Control Systems (ICSs) including energy systems, financial and healthcare services, Internet of Things (IoT) , enterprise networks and databases, and secure messaging systems.

Protection of DoD's systems and networks against cyber-attacks, intrusion, and exploitation.

Safeguarding critical cyberspace infrastructure, Homeland Security operations, federally controlled information systems, and transportation.

Impacts / Benefits:

DSEAL enables energy systems and industrial IoT systems to:

- Create a new distributed ledger for secure verification, tracking, and management of transactions including signals to actuators and real-time sensor data, thus protecting energy systems against cyberattacks.
- Verify control commands and sensor data with high speed and a low (<1%) computational overhead.
- Detect and mitigate of false command signals, false sensor data, and other cyber threats including malware.

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