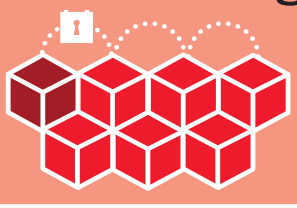
BLOSEM USE CASE 1: Supply Chain Security, Life Cycle Monitoring, and Real-Time Auditing

NATIONAL ENERGY TECHNOLOGY LABORATORY

GRID MODERNIZATION INITIATIVE
U.S. Department of Energy



BLOSEM
BLOCKCHAIN FOR OPTIMIZED SECURITY & ENERGY MANAGEMENT

Blockchain architecture for asset traceability and records of life cycle events that supports common responsibilities within operations including asset life cycle management, cyber incident response, and risk assessment of operations and remediation.

BLOSEM is an NETL-led project that is sponsored by the U.S. Department of Energy's Grid Modernization Initiative (GMI) and is co-funded by the Office of Fossil Energy and Carbon Management (lead), the Office of Nuclear Energy, and the Office of Electricity. BLOSEM is a multi-lab collaboration, established to develop energy-sector guidance, standardized metrics, and testing environments for technology maturation of novel blockchain-based concepts for device security, secure communications, and grid resilience.

PARTNERS

AMES LABORATORY
Creating Materials & Energy Solutions
U.S. DEPARTMENT OF ENERGY

NREL
Transforming ENERGY

Pacific Northwest
NATIONAL LABORATORY

SLAC NATIONAL ACCELERATOR LABORATORY

RESEARCH OBJECTIVES

Support the BLOSEM project goal of de-risking and accelerating blockchain concepts for energy systems:

- Enable the ability to rapidly connect blockchain solutions with grid emulation environments, including hardware-in-the-loop, cyber-physical systems, and co-simulation systems
- Decouple the dependencies of the specific blockchain under test to enable modularity, interoperability, and reusability to more rapidly connect and evaluate diverse blockchain solutions
- Develop core functionality to enable the flow of data and commands in a use case agnostic manner, easily extendible to new grid emulation system configurations

USE CASE OBJECTIVES

- Attestation of device or software deployed in operation (e.g., Is the device or software that shipped the same asset that was received? Is the device or software deployed in operations the same asset that continue to be installed and operating?)
- Assess risks that are introduced and the urgency of remediation when a vulnerability has been discovered or a cyber incident has occurred.
- Examine vulnerability and cyber incident information that is required to be shared broadly across organizations, and what must be kept to sharing within sub-groups of the network stakeholders.

BENEFITS OF BLOCKCHAIN

- Ensure asset information and lifecycle events are secure, digitized, trusted, and traceable
- Prevent tampering, cloning, and imposter devices
- Reduce asset vulnerabilities and cyber threats
- Automate the impact assessment of a cyber incident or vulnerability

OTHER BLOSEM ACTIVITIES

- **BLOSEM Unified Testing Platform**
  A multi-lab, unified testing platform that has interoperability to support a wide variety of blockchains.
- **Use Case 2: DER Coordination and Control -**
  Addressing tier-bypassing (FERC Order No. 2222)

Version 5, 06-02-2022