BLOSEM UNIFIED TESTING PLATFORM (UTP)

NATIONAL ENERGY TECHNOLOGY LABORATORY

GRID MODERNIZATION INITIATIVE U.S. Department of Energy
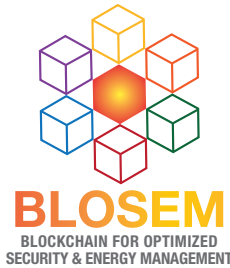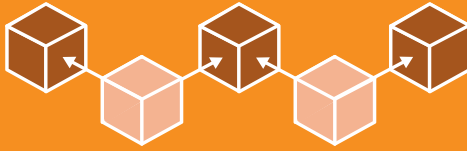
BLOSEM seeks to create a multi-lab, unified testing platform (UTP) that has interoperability to support a wide variety of blockchains. This testing environment will be representative of the modern grid of the future by encompassing generation, transmission, distribution, and end user (edge) for the electric grid.

BLOSEM
BLOCKCHAIN FOR OPTIMIZED SECURITY & ENERGY MANAGEMENT

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

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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

CORE FUNCTIONAL RESPONSIBILITIES

Connectivity
- Communication interfaces for providing the incoming/outgoing requests and events

Control and Data Flow
- Platform for enabling the flow of information and extending interfaces to process and route from source to destination

Time Synchronization and Management
- Enable the coordination of time within asynchronous, concurrent environments that may need to synchronize for shared data and operations

Testing Infrastructure
- Platform for hosting, recording, and analyzing the testing metrics for the blockchain and the use case

System Automation and Data Orchestration
- Enabling configurability and automation of defining resources and connections within the BLOSEM environment

USE CASE DEMONSTRATIONS

- **Use Case 1: Supply Chain Security, Life Cycle Monitoring, and Real-Time Auditing -** Asset traceability and records of life cycle events

- **Use Case 2: DER Coordination and Control -** Addressing tier-bypassing (FERC Order No. 2222)

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