Applying Blockchain to Energy Delivery Systems

Anthony Cosimo, Dakota Moore, Katie Ringgenberg, Keegan Bloedel, Steven Rein, and Jacob Dawson

Problem and Solution

Energy Delivery Systems fail to:

- Provide performance data in an immutable way
- Reliably authenticate sources to maintain the integrity of control commands and data in Energy operations.
- Maintain operations when a single machine fails.

Implement a blockchain network:

- Immutable block nodes
- Distributed network
- Overall increased security

Functional Requirements

- **We shall deploy a blockchain network that is easily maintainable.**
- **We shall use the HyperLedger Fabric software for our permissioned distributed ledger framework for the use of maintaining restricted access.**
- **We shall have a user interface that display metrics and measurements and allows users (human and devices) to request specific information or give specific commands, if they have the proper authority to.**
- **We shall deploy a blockchain system to be ran on PowerCyber resources, the Iowa State cyber security lab for electric infrastructure.**

Non-Functional Requirements

- **We shall implement a Continuous Integration/Continuous Development pipeline for building, testing, and deploying changes to the blockchain network.**
- **We shall deploy at least two nodes for our blockchain network.**
- **Queries and commands should take no longer than 15 seconds to execute.**

Engineering Standards

- Agile - 2 week sprints

- Test Driven Development

- Continuous Integration & Continuous Development

- Code Reviews

Development Standards

- GitLab
- HyperLedger Fabric
- JavaScript: Google JavaScript Style Guide
- Trello
- Swagger & Swagger CodeGen