


A Prototype for Ultimate Secure Transmission and Analysis of Smart Grid Data on the Wire



Combining data protection using quantum-secure keys with real-time computations on streaming data into a quantum/classical hybrid system

The project is a synergy of several state-of-the-art ideas: it combines quantum-secure data protection with real-time in-network processing to operationalize a quantum/classical hybrid system for secure transmission and analysis of power grid data. First, the project leverages the capabilities developed by Brookhaven National Laboratory (BNL) through the Analysis on the Wire (AoW) project to perform general-purpose, distributed, in-network computations on streaming data in transit. Second, Stony Brook University is applying a prototype to perform measurement-device-independent quantum key distribution (MDIQKD). Together, the project develops a prototype that will use MDIQKD to generate secure encryption keys and encryption channels for sharing these keys with AoW nodes so that they can access encrypted data.

KEY TAKEAWAYS

- Develops a prototype for a secure system in energy delivery
 - Combines real- or near real-time computations on streaming data in transit in the network together with quantum-protected key exchange
 - Provides hack-proof encryption to data flowing between different sources and destinations in the network
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OUTCOME

This project provides mechanisms for the secure transmission and analysis of power grid data flowing between different sources and destinations in the network, while allowing intermediate smart network nodes to perform a desired set of computations on the streaming data.

PARTICIPANTS

ROLE



Conducts classical network control design and implementation



Provides cryptographic quantum network design and implementation



Prepares theoretical analysis of MDI-QKD systems



Provides telecom qubits sources and polarization stabilization systems

CONTACT INFORMATION

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Cost Share: \$0

CYBERSECURITY FOR ENERGY DELIVERY SYSTEMS (CEDS)

CEDS projects are funded through DOE CESER, which aims to enhance the reliability and resilience of the nation's energy infrastructure by reducing the risk of energy disruptions due to cyberattacks.

Website: <https://www.energy.gov/ceser>

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