

**Master-Thesis:**

**Implementation of Blockchain-based Virtual Redundancy as a Novel Distribution Power System Protection concept**

Due to financial constraints, common application of protection systems in distribution networks implement a single Intelligent Electrical Device (IED), leaving aside the redundancy to fit within the economic margins. This thesis proposal explores the implementation of a novel protection concept, based on virtual redundant protection service for distribution networks in order to bring resiliency into the system in case of failure in any of the IEDs. The idea behind is to reroute the connections protection system into any machine with enough idle resources to run its own service as well as the migrated container. This machine will be selected from the TOPSIS algorithm and deployed, making use of the Last-Resource Letter (LRL) application.

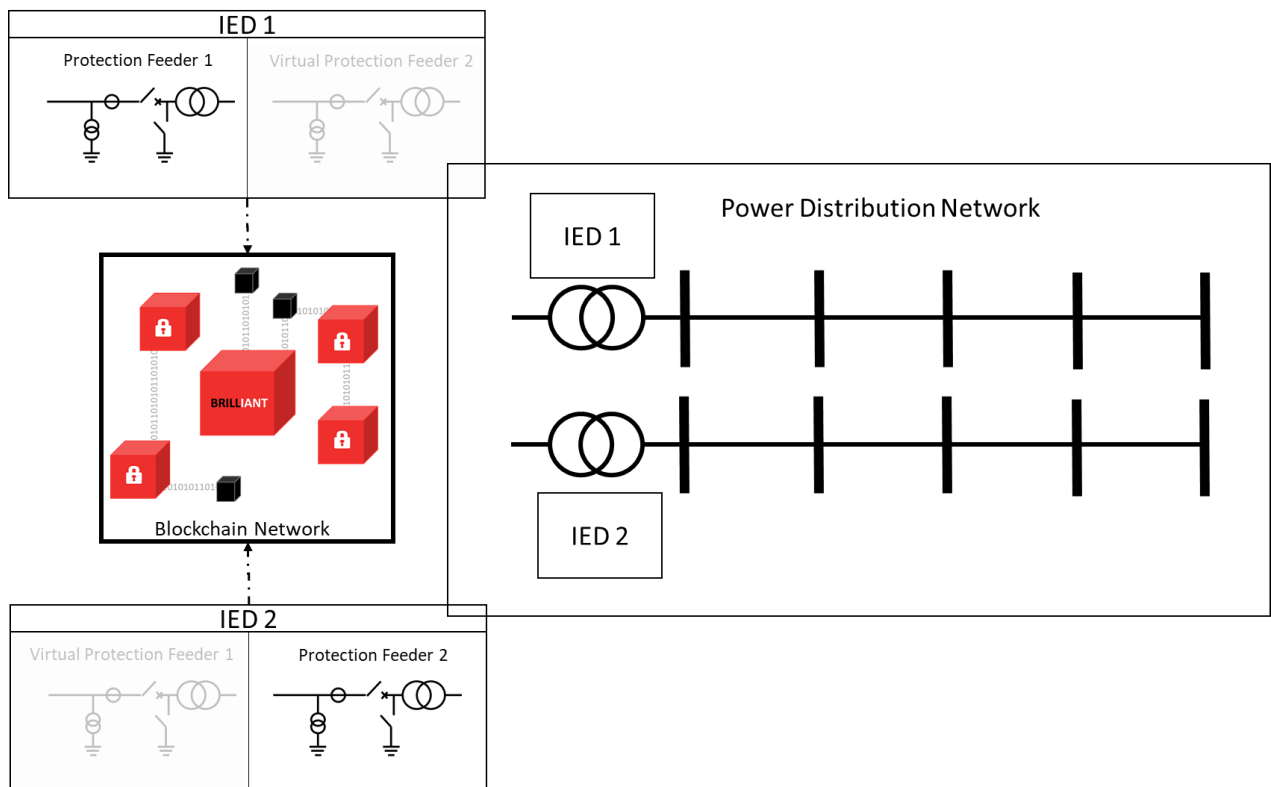


Figure 1: Blockchain-based Virtual Redundancy applied as a novel distribution network protection concept.

**Your tasks:**

The student is expected to work on a Virtual Box Linux environment where a distributed network should be deployed, where a Virtual Redundancy Blockchain service will run, as well as different protection algorithms with values simulated from Matlab.

Finally, the development has to be tested and its performance measured in a simulated environment, under different predefined conditions. A new protection concept and the study of its implications represent the expected outcome of the thesis.

**On this project, you expect to find:**

- Blockchain technology in new contexts
- Cryptographic algorithms
- Docker containers
- C, C++
- MATLAB
- Distributed Computing
- Consensus Algorithms
- Python
- JavaScript
- Programming and Automation concepts

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