Monitoring System Based on Phasor Measurement Units with Variable Reporting Rates

by Paolo Castello, Carlo Muscas, Paolo Attilio Pegoraro and Sara Sulis

Summary of changes

This paper is the extended version of the paper "New Approach for Measurement Data Handling in Cloud-Based Synchrophasor Systems for Smart Grids" by Paolo Castello, Carlo Muscas, Paolo Attilio Pegoraro and Sara Sulis presented at "22nd IMEKO TC4 International Symposium & 20th International Workshop on ADC Modelling and Testing".

The entire paper has been deeply revised with respect to the 22nd IMEKO TC4 version to investigate the feasibility of the proposed approach in a real measurement system. The proposed approach, driven by the good results obtained in the simulation context, was moved to a real PMU prototype able to interface with other devices of the synchrophasor architecture, following the principle of interoperability.

In particular, for this extended version:

- The introduction has been deeply revised and expanded.
- Section II has been rewritten and expanded to better contextualize the proposed architecture, which is based on data handling with variable reporting rate based on the state of the monitored electrical quantities. The following contributions have been added in the section:
    - A detailed discussion about the different measurement reporting policies.
    - A description of the proposed data handling strategy from the PMU and PDC points of view.
    - A detailed discussion about the PMU prototype with the hardware components and the solution adopted to integrate the new features.
- Section III has been complemented with a real test scenario used to verify the feasibility of the proposed approach in a real context.
- The section IV introduces the results obtained from the real scenario with a deep analysis of the data handling from the PDC point of view.

Thank you very much for your attention,

Your faithfully,

Paolo Castello

On behalf of my co-authors
Carlo Muscas
Paolo Attilio Pegoraro
Sara Sulis