

PDQ Tracker – High Level Requirements

Purpose

The purpose of PDQ Tracker is (1) to measure phasor data quality, (2) to disseminate data quality information to assure data quality awareness and facilitate data quality problem resolution, and (3) to provide a platform that can be extended to provide comprehensive data quality analytics including phasor data correction.

Approach

PDQ Tracker will include three dimensions of profiling synchrophasor data quality.

Definition / Metadata – This static or configuration data provides the definition of what is being measured. An error in configuration can have significantly more adverse impact than other data quality errors.

Accuracy / Correctness - The extent to which the data are free of identifiable errors. This includes both time and data accuracy.

Availability / Completeness – A measure at multiple levels (point, device, PDC) as a percent of total data expected regardless of data accuracy. Often this measurement is adjusted based on planned gaps in availability. Given that some PDC vendors discard data that is “late,” this measure can count data that is delayed beyond a threshold latency as unavailable.

Features

- Will work with any PDC and synchrophasor data architecture.
- Will be self-configuring using C37.118 header information and will consume phasor data in multiple formats and protocols.
- Will be capable of being up and running and reporting on phasor data quality (at least to a limited degree) following a quick installation process. The default configuration will provide basic DQ monitoring and reporting functionality.
- Will be highly customizable and configurable by engineering staff to perform sophisticated data quality checks.
- Will include periodic reports that support a DQM process to improve phasor data quality.
- Will allow IT professionals to create new metrics and reports which can be shared and implemented by other users.
- Will send emails to provide alerts of significant DQ issues.
- Will raise alarms that can be integrated with real-time phasor data streams, phasor data archives, and analytics. These alarms will be configurable through external spreadsheets and well as through the PDQ Tracker Manager.

Outputs / Points of Interface

- A web application will be provided – the Phasor DQ dashboard – that enables users to easily see current real-time alarms and view the library of reports on data quality metrics.
- Real-time output data stream will be provided in any of the many standard forms supported by the Grid Solutions Framework, including IEEE C37.118 as well as COMTRADE. Real-time data quality alarms are also made available through an Application Programming Interface (API).
- Data quality reports will be automatically recreated periodically and disseminated via email on a daily or monthly basis.
- A collection of web data services will be available to provide request-reply alarm data to the Phasor PQ Dashboard and other applications
- A relational data base will house alarm status and alarm and metrics history which can be queried for alarm information.

Initial Data Availability Tests / Reports

- Device (PMU) availability (per unit time)
- Devices added / not reporting

Initial Data Correctness Tests / Reports

- Time Errors / Stream Latency – Based on an internal GPS clock
- Value Sanity Check – to verify that data is within engineering limits.
- Latched Value Detection – a common mode of phasor value failure
- Signal DQ Flag Set by PMU.
- Data outside tolerance with a comparison value (e.g., from SCADA).