Integration, Processing, Analysis Methodologies and Tools for Ensuring High Data Quality and Rapid Data Access in TIM Monitoring System

Processing, storing and analysing large amounts of real-time data is a challenge for every monitoring system. The performance of the system strongly depends on high quality configuration data and the ability of the system to cope with data anomalies. The Technical Infrastructure Monitoring system (TIM) addresses data quality issues by enforcing a workflow of strict procedures to integrate or modify data tag configurations. TIM’s data acquisition layer architecture allows real-time analysis and rejection of irrelevant data. The discarded raw data (90’000’000 transactions/day) are stored in a database, then purged after gathering statistics. The remaining operational data (2’000’000 transactions/day) are transferred to a server running an in-memory database, ensuring its rapid processing. These data are currently stored for 30 days allowing ad hoc historical data analysis. In this paper we describe the methods and tools used to guarantee the quality of configuration data and highlight the advanced architecture that ensures optimal access to operational data as well as the tools used to perform off-line data analysis.

Technical Infrastructure (TI) operators manually check the input to ensure that requested data points are meaningful, and in the case of alarm points, that the specified instructions to be carried out are unambiguous and comprehensible.

Data are verified and comply with TIM system business rules. The request is then validated and associated with a tag configuration definition. Each point must successfully pass the test phase before obtaining operational status. Tests are an integral part of the procedure and ensure that all monitoring parameters are set with the optimal values.

The request document is submitted to an automatic workflow system which checks the validity of the document.

Almost 30% of requests are rejected in the initial stage, a series of check procedures are carried out. Data are ready for business rule verification. At this stage, a series of check procedures are carried out. Almost 30% of requests are rejected in the initial stage, as they contain errors. Equipment Specialists correct them and resubmit the request.

Tests are carried out from equipment to operator console. On one and the other side, the test is carried out and approved by the process responsible for the remote monitoring and operation of the installation.

Each point must successfully pass the test phase before obtaining operational status. Tests are an integral part of the procedure and ensure that all monitoring parameters are set with the optimal values.

Monitoring data are defined by “equipment groups”, responsible for the different parts of the technical infrastructure. They use the Monitoring Data Entry System of the Technical Infrastructure (NAIDESSTI) form for declaring their data to TIM. This form is then validated and associated with a tag configuration definition. Each point must successfully pass the test phase before obtaining operational status. Tests are an integral part of the procedure and ensure that all monitoring parameters are set with the optimal values.

Configuration

DATA DEFINITION AND INTEGRATION

Monitoring Data Entry System for Technical Infrastructure (NAIDESSTI) form

SUBMITTED

OPEN

READY FOR LOADING

READY TO CONFIGURE

READY FOR TEST

TESTED-ACCEPTED

The NAIDESSTI form is filled-in by Equipment Specialists. Basic checks are included in the form so that errors can be identified at the time of entry. The request document is submitted to an automatic workflow system which checks the validity of the document.

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ANALYSIS OF TIM DATA

TIM online data

TIM online data are multiple in the TIM synoptic display suite allowing real-time monitoring. These data are served directly by the C2MON server. The database is not accessed.

TIM history data

Detailed historical analysis of operational data is available through trend views and the history player. TIM History Player can replay all events from any moment within the last 30 days to animate visual applications for the chosen timeframe. It is also possible to zoom over a selected timeframe as a named set to replay at any time. Historical data are fetched from the SHORT-TERM-LOG database storage, while the data point additional information is provided by the C2MON server.

TIM statistics

Graphs derived from the analysis of filtered out data combined with operational data are available in the TIM Statistics module. Data are served exclusively from the database.

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