CERN Alarms Data Management: State and Improvements

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Abstract

The CERN Alarms System - LASER is a centralized safety system ensuring the capturing, storing, and notification of anomalies for the whole accelerator chain, including the technical infrastructure at CERN. The underlying database holds the pre-defined configuration data for the alarm definitions, for the Operators alarms consoles as well as the time-stamped, run-time alarm events, propagated through the Alarms Systems.

The article will discuss the current state of the Alarms database and recent improvements that have been introduced. It will look into the data management challenges related to the alarms configuration data that is taken from numerous sources. Specially developed Extract-Transform-Load (ETL) processes must be applied to this data in order to transform it into an appropriate format and load it into the Alarms database.

The recorded alarms events together with some additional data, necessary for providing events statistics to users, are transferred to the Alarms data federation and development of new functionality at the database and interfaces level. Data federation and development of new functionality at the database and interfaces level plays a pivotal role and has proven to be a stable approach.

A significant challenge in the future of the Alarms data management will be the smooth streamlining of data providers. Successful development of Services/Components together with some additional data, necessary for providing events statistics to users, are transferred to the Alarms data federation and development of new functionality at the database and interfaces level.

The article will cover as well the data management challenges related to the recently developed suite of data management interfaces in respect of keeping data consistency between the alarms data configuration coming from external data sources and the data modifications introduced by the end-users.

Conclusion

The Alarms Service is a critical element, which is indispensable to the Operation of CERN’s accelerators complex. The data base plays a pivotal role and has proven to be a stable and reliable solution. Continuous effort is put into its improvement through reorganization, data federation and development of new functionality at the database and interfaces level.

A new LASER Core database model is in the process of being developed catering for additional data elements for the alarms quality management and a workflow for the operators to approve the alarms configuration data.

A significant challenge in the future of the Alarms data management will be the smooth transition between the existing database model and ETL processes and the new ones to support the renovated LASER service.

References