

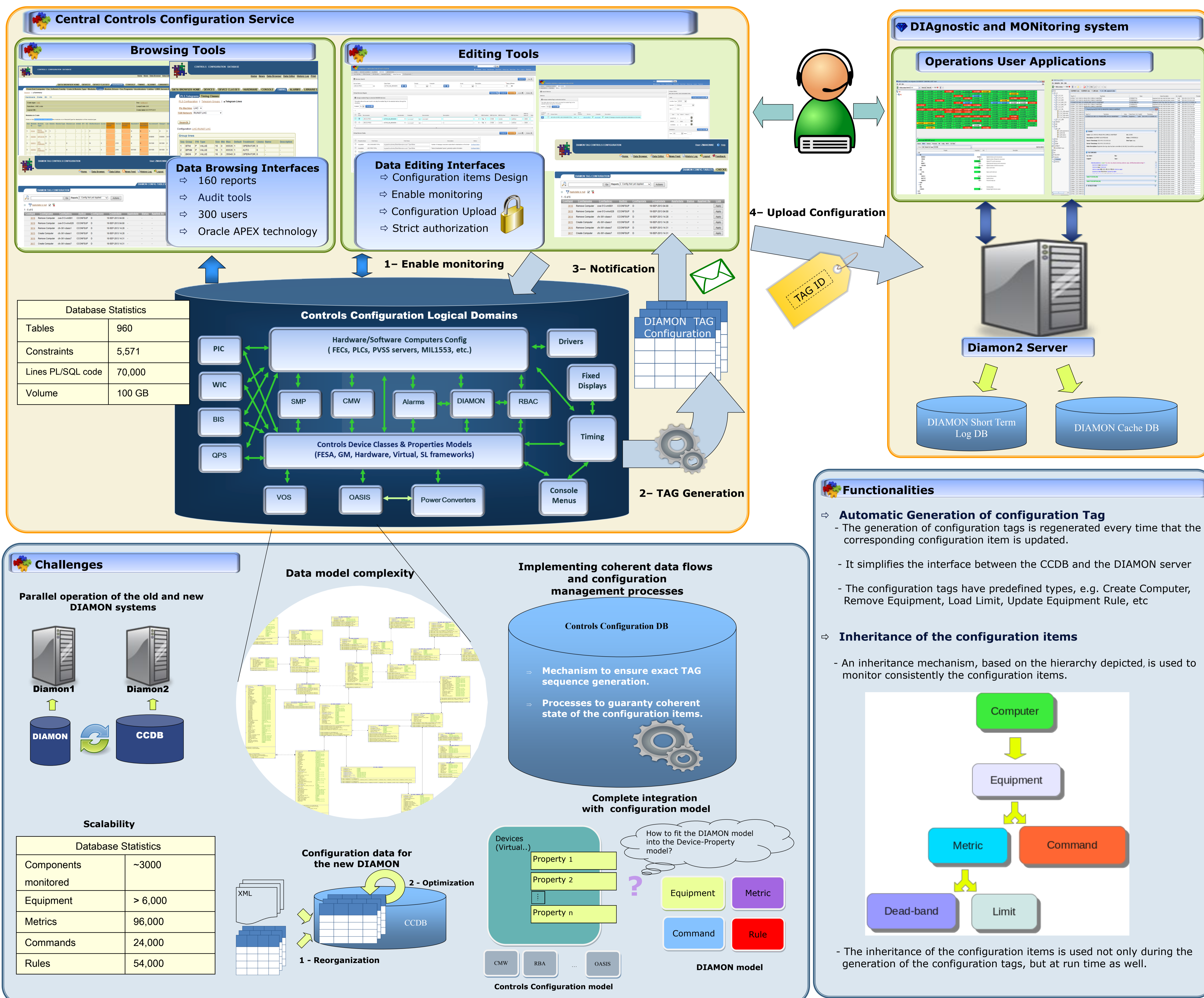


Challenge to providing a successful Central Configuration Service to support CERN's new Controls Diagnostic and Monitoring System

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Abstract

The Controls Configuration Service (CCS) provides the Configuration Management facilities for the Controls System for all CERN accelerators. It complies with Configuration Management standards, tracking the life of configuration items and their relationships by allowing identification and triggering change management processes. Data stored in the CCS is extracted and propagated to the controls hardware for remote configuration. The article will present the ability of the CCS to audit items and verify conformance to specification with the implementation of on-line feedback focusing on Front-End Computers (FEC) configurations. Long-standing problems existed in this area such as discrepancies between the actual state of the FEC and the configuration sent to it at reboot. This resulted in difficult-to-diagnose behavior and disturbance for the Operations team. The article will discuss the solution architecture (tailored processes and tools), the development and implementation challenges, as well as the advantages of this approach and the benefits to the user groups – from equipment specialists and controls systems experts to the operators in the Accelerators Controls Centre.



Conclusion

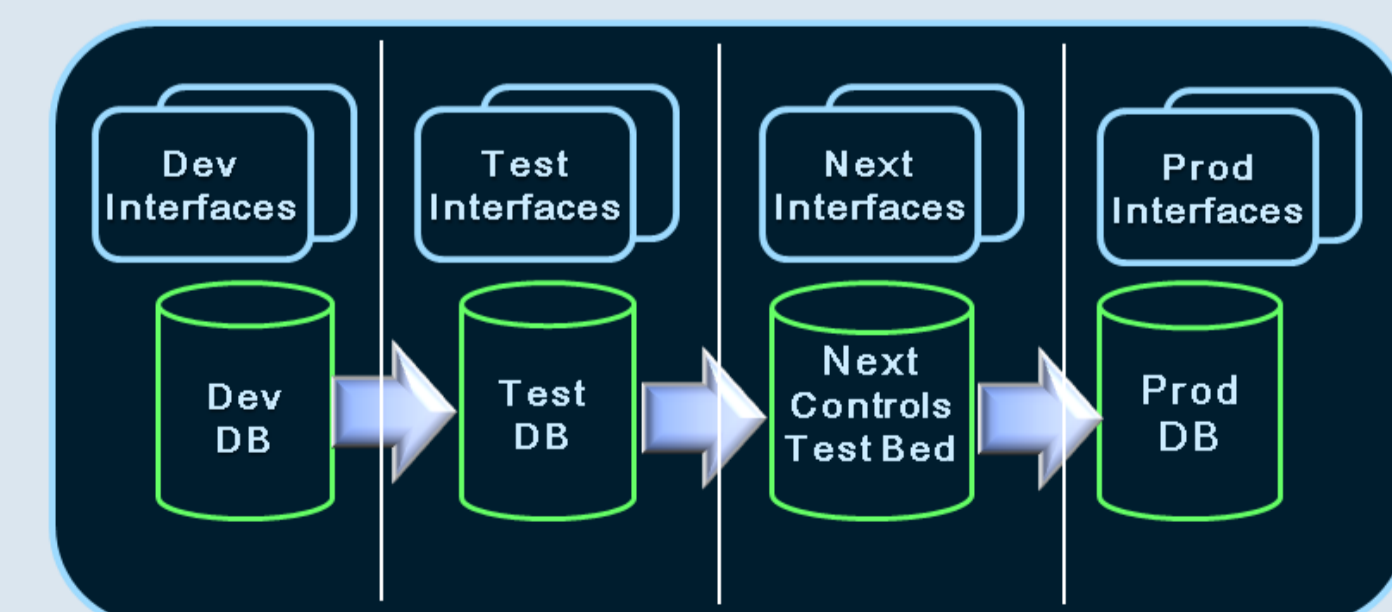
The Controls Configuration Service provides the complete set of configuration management functionalities needed for the new Diagnostics and Monitoring System despite the important constraints that needed to be respected while transitioning from the old to the new DIAMON System.

The main goals, to centralize the DIAMON configurations, to improve the scalability and the robustness of the configuration processes as well as the responsiveness to changes as configuration data can be loaded into the DIAMON server in real-time have been achieved. Other important advantages are the possibility to integrate the DIAMON data with the configuration data for other systems (e.g. FECs configurations, CMW, RBAC, etc.) in order to obtain a global and consistent configuration across the entire Controls System, to eliminate the redundancy of the data between the old DIAMON DB schema and the CCDB and thus improve the quality of the data thereby minimizing the errors and down time due to erroneous configurations.

From the users perspective new and improved tools have been made available to provide the configuration data, a notification system has been put in place, processes, auditing and reporting capabilities have been set up in order to ensure a coherent data flow from the CCS to the DIAMON system and to check the quality of the data and its consistency.

Quality Assurance

- Development Environments to run unit
- Testing Environments to run functional test
- NEXT Controls Configuration Environment part of the Controls Test Bed since 2010 to run continuous integration test.



References

- [1] W. Buczak et al., "DIAMON2-Improved monitoring of CERN's Accelerator control infrastructure", ICALEPCS'13, San Francisco, USA, Oct-2013
- [2] Z. Zaharieva et al., "Database Foundation for the configuration management of the CERN Accelerator Control System", ICALEPCS'11, Grenoble, France, Oct-2011.
- [3] M. Buttner et al., "Diagnostic and Monitoring CERN Accelerator infrastructure", ICALEPCS'09, Kobe, Japan, Oct-2009.
- [4] ITIL: www.itil-officialsite.com
- [5] IEEE Std. 828-2012: standards.ieee.org
- [6] COBIT: www.isaca.org/COBIT
- [7] Z. Zaharieva, R. Billen, "Rapid Development of Database Interfaces with Oracle APEX, used for the Controls Systems at CERN", ICALEPCS'09, Kobe, Japan, Oct-2009
- [8] J. Nguyen Xuan, V. Baggolini, "A Testbed for validating the LHC controls system core before deployment", ICALEPCS'11, Grenoble, France, Oct-2011