Contribution ID: **346** Contribution code: **WEMG019** Type: **Poster Presentation with Mini Oral**

Implementation and scalability analysis of TSPP for Vacuum Framework

Wednesday 24 September 2025 15:51 (3 minutes)

SCADA (Supervisory Control and Data Acquisition) systems traditionally acquire data from PLCs through polling. The Time Stamped Push Protocol (TSPP), on the other hand, enables a PLC to timestamp and push data to the SCADA at its own discretion. The Vacuum Control Systems for CERN accelerators are primarily built on a dedicated Vacuum Framework, which relies on polling and is therefore subject to its limitations. Implementing TSPP would thus be an important improvement.
TSPP needs software on the PLC –a Data Manager - to determine what data to push, when to push it, and how to package it into the correct format. Due to its particular data model, implementing TSPP for the Vacuum Framework required the development of a dedicated Data Manager. Additionally, while most current systems with TSPP have a single PLC per SCADA instance, Vacuum Framework applications often involve hundreds. Given that no data was available on the impact that large numbers of PLCs pushing data to a SCADA system might have, extensive testing was required. In particular, the relationship between server load and the effective rate of received values was studied to assess performance at scale.
This paper details the implementation of TSPP for the Vacuum Framework, its Data Manager design, and the testing carried out to validate the protocol and assess its performance limits in order to ensure a smooth deployment.

Footnotes

Funding Agency

Author: FERREIRA, Rodrigo (European Organization for Nuclear Research)

Co-authors: GIANNOULAS, Alexandros (European Organization for Nuclear Research); ROCHA, Andre (European Organization for Nuclear Research); CANTU, Liam (European Organization for Nuclear Research)

Presenter: FERREIRA, Rodrigo (European Organization for Nuclear Research)

Session Classification: WEMG Mini-Orals (MC01, MC05, MC10)

Track Classification: MC10: Software Architecture & Technology Evolution