The complexity and extreme parameters of LHC, such as the stored energy, the collision frequency, the high risk of adverse background conditions and damaging beam losses has demanded an unprecedented connectivity between the operation of the accelerator and the experiments at both hardware and software level.

LHCb has been at the forefront of developing a software framework and hardware which connects to all of the LHC communication interfaces for timing and control of the machine, monitoring of the machine and beam parameters, and the beam interlock system, in addition to its own local systems for beam and background monitoring. It is integrated into the readout control and drives the global operation of the detector, providing the shifters with the tools needed to take fast and well-guided decisions to run the LHCb experiment safely and efficiently. It has allowed the detector to be operated with only two shifters already at the LHC pilot run. The requirements are reliability and clarity for the shifters, and the possibility to retrieve the past conditions for offline analysis. All essential parameters are archived and an interactive analysis tool has been developed which provides overviews of the experimental performance and which allows post-analyzing any anomaly in the operation.

This paper describes the architecture and the many functions, including the control automation of the sub-detector voltages as well as the VELO detector motion system, the handling of beam dumps and injection interlocks, the LHCb event identification, and the shifter and expert tools for monitoring the experimental conditions.

**Primary authors**: Dr. JACOBSSON, Richard (CERN) ; Mr. ALESSIO, Federico (CERN) ; Mr. SCHLEICH, Sebastian (University of Dortmund)

**Co-authors** :

**Presenter**: Mr. ALESSIO, Federico (CERN)
Track classification: Online Computing
Type: Oral Presentation