

A Generic Main Control Software Structure in a Distributed Data Acquisition Platform: D-Matrix

Monday 9 October 2023 14:50 (10 minutes)

In addition to data acquisition, DAQ systems often incorporate monitoring and controlling tasks. In contrast to developing custom control software for individual experiments, a unified control software architecture abstraction is expected. The core of the generic control software is developed using Python and primarily comprises core function groups and executors. The core functional group encompasses various functionalities required for system control, including user management, subsystem configuration, system operational control, and so on. The functional group related to system configuration interacts with the database. Due to the predominant use of C++ in the development of the D-Matrix system software, the system operational control of the main controller requires interaction with C++. We have encapsulated and abstracted the interaction interfaces, primarily utilizing ZeroMQ and boost.python. The core functional group ensures functionality extensibility by scanning and adding Python files in specific working directories. The core executors consist of three types: terminal console, script executor, and web server. All three executors actually utilize the same command format to invoke various functionalities: 'group name + command name [+ parameters]'. The terminal console supports interactive command-line sessions or single-command execution. The script executor can execute pre-written script files. The web server is developed using Flask and interacts with the front-end web pages. The front-end pages also use the same command format to perform various operations and retrieve response data. The diversity of executors within the architecture enables the control software to have a wide range of application scenarios.

Authors: YANG, Junfeng; SUN, Zhengyang (University of Science and Technology of China)

Presenter: SUN, Zhengyang (University of Science and Technology of China)

Session Classification: Plenary Session Monday