C++ Declarative API & pyxrootd within Xrootd

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*Abstract*—A brief description of the Xrootd architecture and its purpose within the WLCG group, together with an overview of the server- and client- sides of the Xrootd framework are provided within the present work. The client side of Xrootd has a relatively new implementation called Declarative API. Its main purpose is to provide the user an asynchronous interface that is more in line with the modern C++ paradigm. A focus on the development workflow for this API is given. Moreover, the pyxrootd package, which provides a python interface with the Xrootd client, is also discussed and tested in a usual file-operation use case.

Keywords—Xrootd, pyxrootd, asynchronous programming, declarative API, pipeline, server, client.

# Introduction

Started as a protocol which granted remote access to root format specific files, with a primary use case focused on data analysis (rather than data transfer), Xrootd became widely used within then scientific community at CERN (European Organization for Nuclear Research) and other large-scale facilities (e.g., SLAC-Stanford Linear Accelerator Center). Over the last years, the framework evolved a lot, and it now supports data analysis, data transfers, data management plus features like staging data from tape.

In terms of storage capacity, only the ATLAS and CMS collaborations alone produce a total of around 150 Petabytes of data which needs to be accessed by thousands of physicists within the Worldwide Large Hadron Collider Compute Grid - WLCG community [7]. As a result, a key objective of the WLCG is to assure both the process of moving the data between sites and deliver the data to any end-user application. Even though LHC has proven to be able moving data at the necessary throughput [2], only by adopting a so-called federated regional storage using Xrootd

# Xrootd framework

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##### Acknowledgments

Thank you all.

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