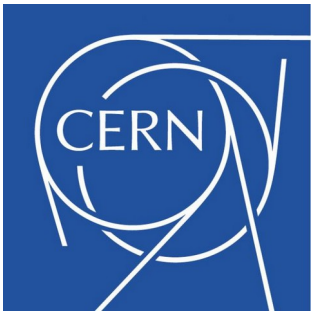

Title: Simulating CERN's Tape Library Infrastructure

Description: The High Energy Physics (HEP) experiments at CERN generate a deluge of data which must be efficiently archived for later retrieval and analysis. The custodial copy of the data is stored on magnetic tape in CERN's Data Centre, near Geneva. In October 2019, the total volume of archived data passed 340 Petabytes.

It is desirable to improve the efficiency of access to data stored in the tape archival system. However, due to the complexity of the system, analytical solutions are not always possible. Thus the only viable option is the the use of simulation.

A simulator will allow us to test different configuration scenarios and policies. Unfortunately, even though there are some Ad-Hoc simulators available, none has the desired features for the tape libraries that we currently use.

The project will consist of refactoring and extending an existing tape library simulator[1,2]. The simulator was written in Python 2, and simulates the operations of an Oracle SL8500 tape library. Your first task would be to convert the code to Python 3. Then add support for the IBM TS3500 and TS4500 tape libraries that we currently have at CERN.

Project content: 80% Computing, 20% Engineering.

Training value: You will learn how to refactor a legacy code-base and expand it with new features. You'll expand your Python programming knowledge and understand the principles of simulating systems in practice. Finally you will work closely with storage experts and discover CERN's tape storage infrastructure.

Skills and assets: Python programming and use of Linux OS. Ability to work in a team and participate in design discussions. Familiarity with object oriented programming are a plus.

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1 ,Mäsker, Markus, et al. "Simulation and performance analysis of the ECMWF tape library system." *Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis*. IEEE Press, 2016.

2 https://gitlab.rlp.net/maesker/TapeLibrarySimulator