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HDF5WS – Web Service for Remote Access of Simulation Data¹

SVETLANA SHASHARINA, CHUANG LI, ROOPARANI PUNDALEEKA, NANBOR WANG, DAVID WADE-STEIN, Tech-X Corporation, DAVID SCHISSEL, QIAN PENG, General Atomics — Data produced by modern plasma physics and fusion simulations is growing in size and typically resides on a remote site: a supercomputer or a cluster. In order to analyze and visualize the data, one needs to query and extract subsets of interest rather transfer the bulk of it. In this paper, we introduce our solution to this problem. It is a Web Service based on Globus Toolkit. The service client's API is written in C++ and has a set of methods commonly used to query and access HDF5 data, which is the most popular data format used in plasma physics and fusion simulations. Through this API, users can query attributes of remote datasets, extract particular datasets and hyperslabs into the client memory as if HDF5 files were local. The data transfer mechanism used in the service is gridFTP. In addition to describing the service, we provide multiple benchmarking results, comparing various data formats, types of middleware and data transfer mechanisms. These results determined the design of the service.

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