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An HTTP Ecosystem for HEP Data Management

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In this contribution we present a vision for the use of the HTTP protocol for data management in the context of HEP, and we present demonstrations of the use of HTTP-based protocols for storage access & management, cataloguing, federation and transfer.

The support of HTTP/WebDAV, provided by frameworks for scientific data access like DPM, dCache, STORM, FTS3 and foreseen for XROOTD, can be seen as a coherent ensemble –an ecosystem –that is based on a single, standard protocol, where the HEP-related features are covered, and the door is open to standard solutions and tools provided by third parties, in the context of the Web and Cloud technologies.

The application domain for such an ecosystem of services goes from large scale Cloud and Grid-like computing to the data access from laptops, profiting from tools that are shared with the Web community, like browsers, clients libraries and others. Particular focus was put into emphasizing the flexibility of the frameworks, which can interface with a very broad range of components, data stores, catalogues and metadata stores, including the possibility of building high performance dynamic federations of endpoints that build on the fly the feeling of a unique, seamless and efficient system.

The overall goal is to leverage standards and standard practices, and use them to provide the higher level functionalities that are needed to fulfil the complex problem of Data Access in HEP. In this context we explain how the subset of SRM functionality relevant to disk system could be offered over HTTP. Other points of interest are about harmonizing the possibilities given by the HTTP/WebDAV protocols with existing frameworks like ROOT and already existing Storage Federations based on the XROOTD framework. We also provide quantitative evaluations of the performance that is achievable using HTTP for remote transfer and remote I/O in the context of HEP data, with reference to the recent implementation of HTTP support in FTS3.

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