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High Performance Data Distribution for Scientific Community

Juan M. Tirado (1), Daniel Higuero (2), and Jesus Carretero (3)

(1) University Carlos III, Leganes, Madrid, Spain (jtirado@inf.uc3m.es), (2) University Carlos III,Leganes, Madrid, Spain (dhiguero@inf.uc3m.es), (3) University Carlos III,Leganes, Madrid, Spain (jesus.carretero@uc3m.es)

Institutions such as NASA, ESA or JAXA find solutions to distribute data from their missions to the scientific community, and their long term archives. This is a complex problem, as it includes a vast amount of data, several geographically distributed archives, heterogeneous architectures with heterogeneous networks, and users spread around the world. We propose a novel architecture (HIDDRA) that solves this problem aiming to reduce user intervention in data acquisition and processing.

HIDDRA is a modular system that provides a highly efficient parallel multiprotocol download engine, using a publish/subscribe policy which helps the final user to obtain data of interest transparently. Our system can deal simultaneously with multiple protocols (HTTP,HTTPS, FTP, GridFTP among others) to obtain the maximum bandwidth, reducing the workload in data server and increasing flexibility. It can also provide high reliability and fault tolerance, as several sources of data can be used to perform one file download. HIDDRA architecture can be arranged into a data distribution network deployed on several sites that can cooperate to provide former features.

HIDDRA has been addressed by the 2009 e-IRG Report on Data Management as a promising initiative for data interoperability. Our first prototype has been evaluated in collaboration with the ESAC centre in Villafranca del Castillo (Spain) that shows a high scalability and performance, opening a wide spectrum of opportunities. Some preliminary results have been published in the Journal of Astrophysics and Space Science [1].

[1] D. Higuero, J.M. Tirado, J. Carretero, F. Félix, and A. de La Fuente. HIDDRA: a highly independent data distribution and retrieval architecture for space observation missions. Astrophysics and Space Science, 321(3):169–175, 2009