

**Final report for the  
CENTER FOR ENABLING DISTRIBUTED SCIENCE (CEDS) project**

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The CENTER FOR ENABLING DISTRIBUTED SCIENCE (CEDS) project was led by Argonne National Laboratory (ANL)/University of Chicago (UC) team. Annual and final reports that cover the activities and contributions of all participating institutions were submitted by the ANL/UC team.

The work of the University of Wisconsin – Madison (UW) was guided and driven by the research and development program of work developed by the ANL/UC team in consultation with the other institutions. The focus of the research and development agenda of CEDS changed after the mid-term review. During the first phase of the project the UW team developed and implemented technologies for managing the allocation of storage resources. Globus on-line and logging were the main areas of work for the UW team during the second phase of the project.

When a file transfer via GridFTP is initiated it is not guaranteed that the destination can accommodate the file on the local storage system. In other words, the transfer may fail at any time due to insufficient storage. The UW-team developed and implemented utilities that can be invoked “on the fly” by the GridFTP server to allocate (reserve) the storage space needed to accommodate the file. If the required storage is not available the server will reject the transfer request. Supporting this functionality required changes in the control flow of the GridFTP server and innovative algorithms that provide the desired ease of use, reliability and recoverability. These algorithms were used to support similar functionality for services provided by the Condor system.

After the mid-term review, the focus of the UW-team shifted to enabling Condor jobs to move the job output sandboxes via Globus inline services. This capability is currently part of the Condor system. Supporting third-party protocol to move the sandboxes of Condor jobs required structural changes in the Condor code. These changes – through file transfer plugins – enables Condor to support a variety of file transfer protocols which has been of great value to the growing community of Condor users.

This work also laid the foundations for supporting asynchronous transfers of sandboxes. Such transfers improve CPU utilization as they allow the overlap of compute and data transfer activities. The work on asynchronous transferred was in collaboration with the Fermi team. While the original prototype developed in the context of this project this functionality did not transition to the production (stable) release of Condor, it played a critical role in recent development work to make this feature an integral part of Condor.

The UW-Madison team also prototyped a capability to forward events logged by Condor to a NetLogger server located at LBL. This capability used some of the algorithms developed during the first phase of the project.