

Hubdrive: Supporting Seamlessly Peer-to-Peer Data Sharing

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HUBzero® has been developed to support the whole research lifecycle for creating data, sharing data, running simulations and workflows and publication of the research results with DOIs (Digital Object Identifiers). The framework belongs to the family of virtual research environments and/or science gateways and instances are so-called hubs under HUBzero®. The HUBzero® team is conducting research into the viability of collaborative systems built on peer-to-peer (p2p) network infrastructure for the development and sharing of scientific research online. P2p is communication between client computers (desktops, mobiles, laptops) without the need of a server. Decentralized/p2p systems simultaneously offer both resilience and pruning (expiration of no longer relevant information) over traditional client-server architecture.

This research is manifesting as a prototype client application: Hubdrive. Hubdrive is a standalone application with a user experience similar to network-based file and folder management like Google Drive, Dropbox, iCloud and others, with additional collaborative file sharing features. There is no size limit to file sharing in the p2p world, so files can be papers or documents, but also very large datasets.

Hubdrive is novel over traditional file sharing solutions in that it is leveraging a decentralized data sharing network and protocol called “hypercore protocol” (formerly dat protocol⁴). Therefore, data is peer or user owned and managed and simply pinned on centralized servers to assist with availability offline and redundancy.

The feature set most beneficial to the end user include:

1. Offline managing of data and files, which syncs to collaborators and peer researchers when connectivity is re-established
2. Redundancy via leveraging peer devices if centralized systems (e.g. HUBzero®)

are unavailable

3. Out-of-the-box version control

The demonstration will show how this prototype seamlessly integrates with HUBzero®’s CMS making the user experience around collaboration on projects and publications (two components which have long since been included in the HUBzero® offering) as easy as managing a folder on one’s desktop. Simply drag, drop, move, rename as one would any normal file. The demo will present 3 features:

1. Adding a folder and containing files and directory structure to Hubdrive
2. How Hubdrive integrates with HUBzero® projects
3. How the files in Hubdrive are available to be attached to HUBzero® project-based publications

Attendees of the demonstration will learn how to create a folder on a user’s local computer, which is discoverable both by peer collaborators and the HUBzero® infrastructure. The folders are accessible from within the HUBzero® CMS. The HUBzero® CMS uses a project-based approach to organize collaboration, these folders exist in this online group. Within this project context, users can create publications and submissions which ultimately result in DOIs after adding authors, abstracts, a title, and selecting relevant attachments from the project in the form of files representing datasets, images, PDFs, etc.. The demonstration will show modifying that the connected folders’ content, automatically syncs to the project without the time consuming need to go to a website and manually upload files. Thus, Hubdrive enables to effectively and seamlessly for p2p data sharing.

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