

Integrating scientific laboratories into the cloud

Conducting experiments is daily business of scientists, as well as documenting them in laboratory notebooks. Open documentation enables scientists to collaborate and to confirm results, therefore making studies more credible. Due to computerized research systems experimental data gets more elaborated. This increases the need for electronic notebooks with data storage and computational feature, as alternative to paper based notebooks. A new approach should simplify the scientists work, but needs to remain to have the same evidentially and credibility as before. The approach provided within this thesis is to enable a data management system to provide features needed to document the good laboratory practice within scientific studies. The data management system itself is open source, and based on a data store concept. The data store concept provides access to heterogeneous data storage systems, including cloud and grid structures. It also provides an interface to enable workflow management of the data, so it is possible to submit jobs into the cloud and the grid configured once before. Several of the customization features are used to implement the electronic laboratory notebook, as well as new features are added. These new features include the integration of a provenance functions and signing data digitally. The implementation provides the scientist with option to work with data, saved within different data storage system, such as grid and cloud infrastructures, but having only one interface to interact with. But even further the implementation can enable easy job management and computational features for the user. All in all it simplifies the usage of grid and cloud structures within daily live of a scientist and is a promising approach to make the technology more popular within the community. The presentation will show the possibilities of using grid and cloud functionality within a scientific environment and provide ideas of how to widen the application of provenance in data management within cloud and grid infrastructures.

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