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Concept for Preservation and Reuse of Genome and Biomedical Imaging Research Data

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Abstract

The German Research Foundation (DFG) recommends preserving research data for at least ten years. The DFG funded project LABIMI/F establishes an infrastructure for preservation, retrieval and reuse of biomedical research data based on grid/cloud computing technology for two applications a) genome and b) imaging data. The requirements for this infrastructure were determined during workshops with relevant stakeholders. Afterwards product evaluations were conducted and the relevant products were integrated into the infrastructure concept. In this paper, we address the suitability of our solution concerning the fulfillment of the requirements. It is shown that the solution satisfies five of the eight requirement categories completely and the other three categories partly. Furthermore, in order to prove the adherence to the widely accepted Open Archival Information System (OAIS) standard, we successfully performed a mapping of our technical components to the functional entities of the OAIS.

Keywords:

Research data management, XtreemFS, DSpace, OAIS

Materials and Methods

Requirements for the preservation and reuse of biomedical genome and imaging research data were determined during workshops with experts and stakeholders [1]. Further requirements were extracted from literature. Product evaluations were conducted [2]. The relevant products were integrated into the infrastructure concept and the result was evaluated against the obtained requirements. Afterwards, we proved the conformity of our concept with the widely accepted Open Archival Information System (OAIS) standard [3] by mapping the technical components to the functional entities of the OAIS.

Results

We developed a technical concept for the LABIMI/F infrastructure incorporating the results of the product evaluations (e.g. DSpace and XtreemFS) (see figure 1). The analysis of the concept revealed the following: The five requirement categories a) external references, b) Content Sharing, c) Reliability, d) Metadata Schemas and e) Workflow Integration were fulfilled completely, whereas the three categories f) Data Sovereignty, g) Audit Trail and h) Data Migration could only be partly fulfilled.

A mapping of the technical components of the LABIMI/F infrastructure concept to the OAIS functional entities proved the conformity with the OAIS, since all of its aspects are addressed by our concept.

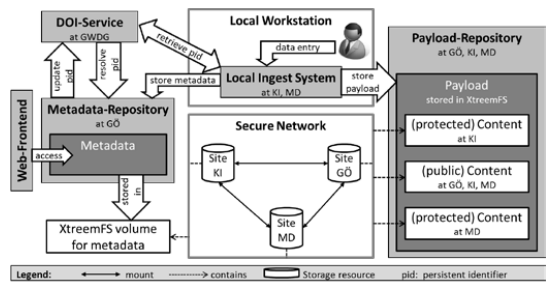

Figure 1 - The LABIMI/F infrastructure concept consisting of a local entry system and repositories for metadata and payload connected to each other via a secure network.

Conclusion

The analysis of the concept requirements revealed that the planned infrastructure is suitable for our applications with minor limitations concerning f) Data Sovereignty, g) Audit Trail and h) Data Migration. However these limitations mainly affect the administration of the system and thus do not severely impact the system's applicability or usability. The conformity with the OAIS proves the completeness of the concept concerning the requirements for long-term preservation.

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