On Distributed Collaboration for Biomedical Analyses

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Abstract:
Cooperation of research groups is nowadays common for the development and execution of biomedical analyses. Multiple partners contribute data in this context, data that is often centralized for processing at some cluster-based or supercomputer-based infrastructure. In contrast, real distributed collaboration that involves processing of data from several partners at different sites is rare. However, such distributed analyses are often very interesting, in particular, for scalability, security and privacy reasons. In this article, we motivate the need for real distributed biomedical analyses in the context of several ongoing projects, including the ICAN project that involves 34 French hospitals and affiliated research groups. We present a set of distributed architectures for such analyses that we have derived from discussions with different medical research groups and a study of related work. These architectures allow for scalability, security/privacy and reproducibility issues to be taken into account. Finally, we illustrate that these architectures can serve as the basis of a development method for biomedical distributed analyses.

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