Portals for Life Sciences—a Brief Introduction

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ABSTRACT

The topic '"Portals for Life Sciences"' includes various research fields, on the one hand many different topics out of life sciences, e.g. mass spectrometry, on the other hand portal technologies and different aspects of computer science, such as usability of user interfaces and security of systems. The main aspect about portals is to simplify the user's interaction with computational resources which are concerted to a supported application domain.

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INTRODUCTION

Life sciences cover a broad range of different disciplines including biology and medicine. In all these fields computational tools have become indispensable in research and development. Computational methods often require specific computational resources and highly advanced computing skills for installation, administration, and daily use. Scientists want to focus on their specific research combining all kinds of approaches, but they do not want to deal with the details of software installation, usability, and hardware configuration. Hence, there is a need for self-explanatory and intuitive user interfaces for computational tools in the life sciences.

Currently, three important basic types of interfaces to applications exist: desktop applications, portals, and script interfaces. The installation of scientific software on the user side is often awkward and difficult. It also requires users to take the responsibility of keeping their software up-to-date. Portals offer an alternative interface that avoids most of these drawbacks. In general, a portal can be defined as a framework for integrating information, applications, and processes across organisational boundaries and as a single entry point for a community. Users are in the position to customise their tools and views and are provided with a repository of personal information. Most users are familiar to using portals such as Amazon or Google.

However, like every technology the use of portal frameworks has advantages and disadvantages. The advantages are mostly on the user's side and the disadvantages are more on the developer's and administrator's side. Users are not burdened by software rollouts, firewall issues, and platform issues. Additionally, they are able to access a portal from everywhere they have access to the Internet. This advantage directly implies an important disadvantage of portals: they rely on the availability of the portal server and a fast Internet connection. Another disadvantage is that users are not able to access local data in a portal unless the developer of a portlet offers the possibility to upload data. Developers have to deal with portal technology, which is often still in an early stage of development and not as robust as other technologies. Since the advantages outweigh the disadvantages, portals are an important state-of-the-art technology to meet users' needs.

There are various aspects to consider in the context of portals. The main aspect is the user in the supported domain and his role as end-user, developer or administrator. Irrespective of the underlying infrastructure and whether the integrated tools rely on internet technologies, on grid computing or cloud computing, the user should be empowered with intuitive tools. Besides the usability, the monitoring of jobs is an important aspect. Monitoring enables users to control the status of their jobs. The access to tools and data is granted on the basis of an authentication and authorisation concept. Especially, the access to data and large data set sizes is a sensitive topic in the field of life sciences, which emphasises the important role of security in portals and the need for a sophisticated distributed data management.

In the context of portals, there is still the need to simplify human-computer interaction. The kind of simplification that is chosen depends on the specific domain the portal is developed for and which elements of the researchers' work the portal supports. Accordingly, there are many different kinds of portals and the following ones are only an extract: a portal that purely consists of a collection of links; a workflow-enabled portal that offers the possibility to orchestrate and submit workflows; a semantic portal that supports the development of an ontology; a data portal that provides tools for sophisticated data management. Even though these portals are quite diverse from an user's point of view, developers of portals can base the involved technologies on similar concepts and infrastructures. The exchange of experience, ideas and needs between users and developers is highly beneficial for achieving technological and functional advances on portals for life sciences.

Speakers at IWPLS'09 discussed various kinds of portals with focus on different aspects, tools, technologies, and application domains. The nine papers accepted for oral presentation at IWPLS'09 are collected in this volume. They were selected based on their quality and suitability to the workshop.

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