DEVELOPING A GRID PORTAL FOR LARGE-SCALE RESERVOIR STUDIES \(^1\), John Lewis\(^a,b\), Gabrielle Allen\(^a,b\), Promita Chakraborty\(^a,b\), Dayong Huang\(^a,b\), Zhou Lei\(^a\), Xin Li\(^a,c\), Chris White\(^a,c\), Chongjie Zhang\(^a,b\), Louisiana State University, Center for Computation & Technology\(^a\), Department of Computer Science\(^b\), Department of Petroleum Engineering\(^c\), Baton Rouge, LA 70803, gallen@ect.lsu.edu.

Oil and gas reservoir studies are crucial for obtaining accurate assessments and predictions of reservoir performance. Such studies are computationally challenging because they involve massive (terabyte or even petabyte sized) geographically distributed datasets and require performing hundreds or thousands of simulations. The lack of a secure and easy-to-use user interface also hinders the ability of engineers to perform advanced reservoir studies. At LSU the UCoMS project is using Grid computing to address data and computation need, for example providing a system called ResGrid which can be used for Grid-enabled uncertainty analysis. As part of the UCoMS project we have also developed a Grid portal for large-scale reservoir studies, which provides a Web-based user-friendly interface with security management.

The UCoMS portal acts as a single entry point to conduct advanced reservoir studies. First of all, the portal deals with security. A Grid Security Infrastructure credential is retrieved from a proxy to provide authentication to access Grid resources. Secondly, the portal provides Web pages to specify the parameters and the problem scales (e.g., the grid block size of a reservoir). Then, a user can submit the job and monitor the execution status via this Grid portal.

The portal is built on the GridSphere framework (contained in the Tomcat container). GridSphere is a free, open-source portal framework developed by the European GridLab project, which focuses on developing Grid application tools and middleware. GridSphere provides a well documented set of functionality, including portlet management, user management, layout management, and role-based access control. Its portlet-based architecture offers flexibility and extensibility for portal development, and facilitates software component sharing and code reuse. We used GridSphere and the associated GridPortlets package to develop our own customized portlets and used Hibernate as the database interface. Our portal integrates customized Grid-enabled portlet components to ensure robust data management, job submission, user credential management and resource management for large-scale reservoir studies.

The talk will briefly describe the UCoMS project, and present the UCoMS portal detailing the design of the portlets. We will use a series of portlets interfaces to illustrate a walkthrough of the system.

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\(^1\)This work is a part of Ubiquitous Computing and Monitoring System (UCoMS) for Discovery and Management of Energy Resources project (DOE grant No.DE-FG02-04ER46136). John Lewis is also supported by LSU Office of Strategic Initiatives REU Program.