A User Management Web System Based on Portlets for a Grid Environment Integrating Shibboleth, PURSe, PERMIS and Gridsphere

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Summary. We propose in this project the development of a distributed collaborative environment, which will constitute a virtual laboratory for multidisciplinary research projects related to oceanographic remote sensing. We will give an overview and the current state of this project, and concretely we will show the security access management module. We propose a well balanced solution between security and simplicity based on the integration of several technologies, where a user can either be registered through a web portal using a portlets system or access directly via Shibboleth. Grid access and job execution are controlled by a Role Base Access Control system (RBAC) that makes use of attribute certificates for the users and Public Key Infrastructure (PKI).

Keywords: Grid Computing, Shibboleth, PERMIS, Portlets, RBAC, PURSe, PKI.

1 Introduction

The increasing number of research projects for Earth Observation due to the launching of new missions every year, with higher spatial and radiometric resolution, makes the data analysis a very hard and tedious job, even unfeasible. Thus, it would be desirable that the research community had a simple and efficient access to the available datasets in order to get the best results.

GRID technology allows the research community to undertake collaborative computation, sharing heterogeneous resources such as hardware (clusters, PCs, sensors...), software (Operative Systems, scientific software,) and datasets, and all of them connected through a network, i.e. Internet.

RETELAB is being developed as a distributed collaborative working environment which will constitute a virtual laboratory for multidisciplinary research projects related to oceanographic remote sensing [2].

Once the web portal and the GRID infrastructure are completed, we will undertake the development of various testbed applications. These testbeds will enable on the one hand, to test the project and on the other hand, to get useful software that the oceanographers would be able to use.
2 Approach Overview

This paper is focused on the management and security control of RETELAB users. The aim of this phase was the development of a simple and secure access approach to the web portal and GRID system.

Current solutions have common problems such as the fact that they use a command line interface and it is neither comfortable nor attractive for users. A user friendly interface is basic to make users feel comfortable with a tool. Another problem is the computer science knowledge that the users are supposed to have. They usually need to spend a lot of time learning, installing and configuring tools instead of working on their projects.

The low security level in the final hosts is another issue to take into account. Security highly depends on the final users and their hosts and on the way they preserve their private keys and passwords.

3 Approach Description

We decided to develop an access system based on a web portal with a comfortable and user friendly interface, which does not demand computer skills from the users. As we cannot forget the security, the system will be based on a public key infrastructure (PKI). Moreover, we should find a solution to get and to store user credentials. Thus, we should develop a well balanced solution between security and simplicity. The access to the resources should be managed by roles which simplify user management and enable a more specific control of user rights. Hence, we decided to use the RBAC model [8]. Finally, it would be desirable to have a Single Sign-On (SSO) network where users would be able to use their credentials to access our system without the need to register. That is, a reliable partner network in which we can trust our partners and their access systems. Thus, the users of the partner organizations would be able to access our system through their own access systems.

4 System Architecture

Facing the problem, we came up with a web portal based on portlets technology [1]. We have used GridSphere [5] as the portlet container to develop our portal. The Globus Toolkit [4], specifically its version 4 (GT4), was used to develop the Grid System. In addition, we have also integrated some portlets developed by the Open Grid Computing Environment (OGCE). The register module is based on the PURSe [7] system that was improved to enable the management of user attribute certificates (ACs), and supports the role paradigm. Public Key Certificates (PKCs) got by PURSe are stored in the online credential repository MyProxy [6]. We have used PERMIS [3] software to develop the RBAC model. Finally, we have also integrated Shibboleth [9] to obtain a SSO network.

A typical scenario to register a user in RETELAB is shown in Fig[1]. First, the root user uses the Registration Portlet to register a new user. Next, the