First Report on ACGT Portal usage, online training modules development and evaluation

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ABSTRACT:

The present deliverable is the second report on the ACGT Portal. The ACGT Portal is currently in the phase of integration of different heterogeneous services, while the development of training materials and the evaluation of the portal are prepared and ready to be launched.

Part 1 of this document presents the current status of the development of the ACGT Portal. **Part 2** of this document presents the integration of services in the ACGT Portal.

KEYWORD LIST: Web Portal, Grid Portal, Biomedical Portal, Online Training, Usability

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Executive Summary

ACGT is an Integrated Project (IP) funded in the 6th Framework Program of the European Commission under the Action Line "*Integrated biomedical information for better health*". The high level objective of the Action Line is the development of methods and systems for improved medical knowledge discovery and understanding through integration of biomedical information (e.g. using modelling, visualization, data mining and grid technologies). Biomedical data and information to be considered include not only clinical information relating to tissues, organs or personal health-related information but also information at the level of molecules and cells, such as that acquired from genomics and proteomics research.

The ultimate objective of the ACGT project is the development of European Knowledge Grid infrastructure offering high-level tools and techniques for the distributed mining and extraction of knowledge from data repositories available on the Grid, leveraging semantic descriptions of components and data and offering knowledge discovery services in the domain of Cancer research.

In the architecture of the ACGT Grid infrastructure, the portal is the gate to the services. Structured on several layers of access rights, the ACGT Portal is offering information to all the actors playing in the ACGT project and more general in the domain of Cancer research.

The present deliverable is the second report on the ACGT Portal. The first report on the ACGT Portal was presented in the deliverable *D14.2 Visual prototype and report of the ACGT portal*.

The ACGT Portal is currently in the phase of integration of different heterogeneous services, while the development of training materials and the evaluation of the portal are prepared and ready to be launched.

The present document is structured in two parts.

Part 1 of this document presents the current status of the development of the ACGT Portal. The development of the ACGT Portal is planed to undergo in spiral, based on several prototypes. From this perspective, the ACGT Portal moved from the first prototype, presented in D14.2 to a second prototype that we present in this document.

The current status of the ACGT Portal is characterised by:

- Integration of different ACGT services by different methods and levels of integration
- Move-up from a bottom-up service oriented approach to a top-down user oriented approach
- Plan for the development of training materials
- Plan for the user evaluation of the ACGT portal.

Part 2 of this document presents the integration of services and the new front-end of the ACGT Portal.

The portlets currently in different phases of implementation in the ACGT Portal are:

- Login portlet

- Homepage
- Role request portlet
- Change password portlet
- Layout manager portlet
- Profile manager portlet
- Credential manager portlet
- Administration page
- Group manager portlet
- Role manager portlet
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- Obtima portlet **
- Oncosimulator portlet **
- Query Tool and Mapping Tool Portlets **

All the portlets marked with * are totally new or completely replace portlets from the first prototype of the portal. The portlets marked with ** are still under development.

PART 1

Status of the ACGT portal

1 Short description

The ACGT Portal is the interface of the ACGT environment, which attempts to provide an integrated easy-to-use and up-to-date gateway to the ACGT tools and services.

The main roles of the ACGT Portal are:

- It provides a unique access point for the ACGT Grid
- It provides a customizable client for ACGT services
- It integrates the usage of ACGT internal and external services
- It provides the main ACGT channel for training
- It provides a channel for ACGT dissemination and exploitation.

In many respects the ACGT Portal gives access to the services of the Business Process Layer and it is the main point of entry in the ACGT environment

The ACGT Portal is built on the Gridsphere portal framework. GridSphere is an open-source JSR-168 compliant portal framework that is ready to run with a suite of tutorial and example modular web components, called portlets. A portlet is a module of a dynamic web page created using Java. For creating dynamic web pages, JSP (Java Servlet Pages) was developed, which combines html with java - a JSP web server to run such applications is needed. As only some parts of the dynamic page actually needs to be modified while doing a set of actions, web page content was redesigned as a set of integrated dynamic JSP modules and a static html content.

JSR (Java Portlet Specification) 168 is one of the main standards in portal development. JSR 168 is a standard API for integrating portlets in portlet containers. JSR-168 defines a contract between the portlet container and portlets and provides a convenient programming model for portlet developers. The Java Portlet Specification V1.0 was developed under the Java Community Process (having as members experts from leading industry companies) as JSR 168, and released in October 2003. The second version of the standard, Java Portlet Specification V2.0 or JSR286 was released in July 2008 and is in the process of adoption.

The Gridsphere portal framework provides a standard based platform for the easy development of portlets. Portlets are defined by a standard API and provide a model for developing new portal components that can be shared and exchanged by various portlet containers. Gridsphere provides a portlet container, a collection of core portlets and an advanced user interface library that makes developing new portlets easier for application developers.

Currently, there are two versions of the ACGT Portal that are maintained:

- Stable version, which contains portlets providing the access to services that are in a stable form. This portal is used for demonstrations and user evaluations. The address of this portal is:

  http://rd.siveco.ro/acgt/

- Development version, which contains portlets, which are under development or portlets for services that are still under development. This portal is used for internal tests only. The address of this portal is:

  http://rd.siveco.ro:8080/acgt/

2 Development methodology

The development of the ACGT Portal is planed to undergo in spiral, based on several prototypes.

A prototype is an initial version of a system, which may be used for experimentation. Prototypes are valuable for requirements elicitation because users can experiment with the system and point out its strengths and weaknesses. The prototype allows users to experiment and discover what they really need to support their work, but more importantly forces a detailed study of the requirements, which reveals inconsistencies and omissions.

Rapid development of prototypes is essential so that they are available early in the elicitation process. Establishes feasibility and usefulness before high development costs are incurred.

Prototypes are also essential for developing the 'look and feel' of a user interface and they can be used for system testing and the development of documentation.

A prototype of a proposed system is presented to workers for critical comments. Revisions are made to the original prototype, producing a second version that is again presented to users for critical analysis. The process of revising and submitting to users continues until some criterion for acceptability is reached.

For further details on the requirements engineering within the ACGT project see *D2.1 - User requirements and specification of the ACGT internal clinical trial*.

The ACGT Portal is on the top layer of the ACGT architecture. Even if the development of the portal is independent from the rest of the system, the ACGT portal is highly influenced by the evolution of the rest of the components. For further details on the integration of ACGT Portal in the general ACGT architecture see *D3.1 – The ACGT Initial Architecture*.

There is a need for an early deployment of the portal, but the portal is not developed in one step, based only on the initial analysis. Instead of that, several prototypes of the portal are going to be developed. At each stage more complexity will be added to the portal both in terms of functionalities and technical integration.

The highest risk of the portal development is a reduced rate of usage. In order to eliminate this risk, all the specific features are integrated in the portal along with the development of the ACGT infrastructure. Thus, not all features of the portal are implemented from the first prototype.

The gradual implementation of the portal functionalities will keep the complexity of the portal in reasonable limits and will allow users to get familiar with the portal while this is growing in complexity.

In the same time, the gradual implementation of the technical features of the portal into the grid system will allow the early testing of the ACGT tools and services, even before their complete integration in the system. At the moment of the implementation in the portal prototype, some functionalities belonging to the grid layer may not be in a stable and mature state. For this reason some of the portal features may be implemented in a transitory form at the portal level, rather than at the grid level.

3 Service integration

For service integration, the ACGT Portal represents the Business Process Layer, in which services should be primarily described from the user/usage point of view.

Different types of services will be possible accommodated in the ACGT Portal, reflecting different stages in the integration of these services in the ACGT system. Basically, we might refer to:

- ACGT integrated services
- ACGT external services
- Third-party services.

The goal is to have as many of the services integrated in the ACGT Grid. However, it is presumable that not all the useful/necessary services will be easily and immediately

Service registry is a component responsible for storing information about services available in ACGT environment. It should provide enough information for enabling the execution of at least the following operations: registering, unregistering, updating, search and discovery, availability, access and monitoring.

From the integration point of view, the leading idea is that as much as possible from these service tools should be defined under the grid. However, in some cases, some of these tools might be defined in the ACGT Portal, as described below.

ACGT integrated services are those services accessible through the ACGT Portal that are fully compliant with the ACGT standards and quality requirements.

ACGT external services are those services, provided by ACGT partners that are in a transitory phase, in the sense that they do not fulfil all the requirements (technical, regarding security, etc) for being fully integrated in the ACGT infrastructure. Normally, for these services all the tools will be available, but some of them might be defined in the portal. Once these services are fully integrated, they become ACGT integrated services.

Third-party services are those services registered by providers that are not ACGT partners. These services will not interfere with the core of the ACGT infrastructure, services and data. These services will be published under the responsibility of each provider and used under the responsibility of each ACGT user. Third-party services may become in time ACGT external or even integrated services, after the fulfilment of all necessary conditions.

In the current phase of the portal, most of the ACGT services are integrated as external providing different degrees of compatibility with ACGT architecture. More details on service integration in the ACGT Portal are given in the deliverable *D14.5bis Methodology for ACGT service integration in the ACGT Portal on the Business Process Layer*.

4 Online training

4.1.1 Embedded Support

For the most critical usability problems, primarily those that are associated with conceptual issues, the help embedded into the user interface itself. Embedded support explains:

- How to begin interacting: On the first screen that is displayed when opening the system for the first time, the user is told what they can do and how to proceed.

- What the buttons mean: Instead of a one-word definition of each icon, we used tool tips to provide meaningful explanations of what each button would do or mean if pressed.

Most thoughtful usability experts are of two minds when it comes to embedded help systems. On the one hand, it is good to add helpful information about the task at hand right on the page, sometimes in the form of a patch on the screen that reveals the helpful text upon mouse-over.

However, there is something in the soul of the usability professional that believes that if the interface were properly designed, no help would be necessary. But if you cannot build the perfect system, you should at least provide necessary help information without forcing the user to search for it.

Design principles

- Make the information task-oriented and highly structured, because the purpose of online help is to get the user back on task as fast as possible

- Separate information into distinct information types and include only one information type in each online help topic. Information types can be by content type (task, concept, reference) of user models (beginner, intermediate, advanced).

- Follow minimalist principles in designing online help topics. Many online help designers misconstrue minimalism to simply mean brevity; however, minimalist design hinges on being able to make good decisions on what to do, say, or show, and on what not to include.

- Keep the length of topics short, perhaps to no more than two screens long. However, there is no infailible length prescription: online help topics need to be "as long as necessary and as short as possible".

4.1.2 Help documents

Help documents will be available both for the non-registered users, accessible form the front-page of the ACGT Portal and for the registered users in the *How to* section of the portal.

4.1.3 Video and multimedia tutorials

A third category of support materials and most related to the notion of online training are video and multimedia tutorials.

Tutorials will be also of two types:

- Public tutorials aimed to explain what is ACGT about and what one should do to access the facilities provided by ACGT.

- Private tutorials explaining how to use different ACGT tools and services and therefore targeting those groups of users, which are entitled to access the corresponding tools and services.

More details on the development of the training materials can be found in the deliverable *D14.3 Demonstration and Report of training modules*.

5 Online evaluation

The evaluation of the software tools that will be carried on through the portal covers both the evaluation of ACGT services and the evalution of the portal itself.

Usability reporting templates (see below questionnaires) are built to evaluate the usability and functionality of the developed tools and software and the whole platform in a standardised way. The use of standardised templates will allow an automatic analysis of the platform.

The evaluation of software and tools is an optional task to the end-user when he uses the platform:

- The system should ask the user to evaluate the tool, when the user has performed a defined number of applications, tools and software. This has to be defined after the first trainings of the ACGT platform
- The system should ask the user to evaluate the portal when he logs out
- The evaluation form is freely accessible after the user logged in to the portal via a button in the task line

To attract the user to fill in the form, it must be as simple as possible. The amount of questions will be kept to a minimum that still allows a sufficient evaluation.

The header should provide a selection list, where

- the E-mail address, (via log in), date, the software name and version number is automatically filled in, if the end-user fills in the evaluation form after leaving a tool
- the name is automatically filled in and a selection list is provided with the available software of ACGT
- after the user clicks on the chosen software the actual version and the name of the software is filled in

A casket below the header gives the user the option to evaluate (in exceptions that can be done anonymous) and the entries in the header are deleted.

The target groups will receive different usability evaluation forms. The user group clinicians and researcher will evaluate the system regarding usability of the interfaces and the workflow performance while the software developer is interested in the interactions between his system and the architecture and standards of the ACGT platform. While the first user groups receive the evaluation forms through the portal, the software developer should receive it directly after implementation of the software. To integrate the forms into the ACGT platform, the online reporting forms needs to be formatted in XML Format.

More details on the user evalution can be found in *D2.3 User requirements for the evaluation of developed software and tools regarding usability criteria*.

5.1 Web Questionnaires

5.1.1 Usability questionnaire for clinicians and researchers

Question	Answer	Comment
Was it easy to access the tool?	O yes O no O not known	
Is the software well documented?	O yes O no O not known	
Is the GUI sufficient?	O yes O no O not known	
Is a user manual provided?	O yes O no O not known	
Is the software well documented?	O yes O no O not known	
Is the user interface self-descriptive/ Self-documenting?	O yes O no O not known	
Are meaningful error messages provided?	O yes O no O not known	
Is the user interface intuitive?	O yes O no O not known	
Is it easy to perform simple operations?	O yes O no O not known	
Is it feasible to perform difficult operations?	O yes	

	O no O not known	
Do widgets behave as expected?	O yes O no O not known	
Is the user interface responsive and fast enough?	O yes O no O not known	
Are relevant data formats supported?	O yes O no O not known	
Is the design of the user interface sufficient?	O yes O no O not known	

5.1.2 Usability questionnaire for software developers

Question	Answer	Comment
Was it easy to integrate a new software component into the ACGT system?	O yes O no O not known	
Was there an adequate documentation or user guide provided on how to integrate the new software component into the ACGT system?	O yes O no O not known	
Is the design cohesive, i.e., each module has recognisable functionality?	O yes O no O not known	
Are the security mechanisms provided by the ACGT systems adequate?	O yes O no O not known	
Does the software interact with the credentials of the ACGT environment without problems?	O yes O no	

	O not known	
Is it possible to enforce security policies?	O yes O no O not known	
Can the software withstand attacks that must be expected in its intended environment?	O yes O no O not known	
Is the software free of errors that would make it possible to circumvent its security mechanisms?	O yes O no O not known	
Does the architecture limit the impact of yet unknown errors?	O yes O no O not known	
Have the tools and services of the ACGT system that are used by the new component been optimized for speed?	O yes O no O not known	
Is input data checked for the correct format?	O yes O no O not known	
Is exception handling provided?	O yes O no O not known	
Does the system allow for a change in data structures?	O yes O no O not known	
Using an API for integration, are variable names descriptive of the physical or functional property represented?	O yes O no O not known	
Using an API for integration, do uniquely recognisable functions contain adequate comments so that their purpose is clear?	O yes O no O not known	

PART 2

Portal development

6 Scenario-driven approach

In developing the ACGT portal prototype, several user scenarios have been taken into account.

These scenarios have been developed by other partners for demonstrating different components of the ACGT.

Scenarios are stories, which explain how a system might be used. Telling stories about systems helps to ensure that project stakeholders share a sufficiently wide view to avoid missing vital aspects of problems. Scenarios vary from brief stories to richly structured analyses, but are almost always based on the idea of a sequence of actions carried out by intelligent agents.

Using a scenario-driven approach for the development of the ACGT portal we avoid a massive development of the portal in a wrong direction. New features are added to the portal only when specific user scenarios require them.

Currently, the list of the scenarios used for the development of the ACGT portal:

- pseudo-TOP scenario

  This scenario aims at testing a real current-day clinical trial with all the complexity of database.

- ObTiMA/SIOP scenario

  This scenario illustrates the management of a clinical trial with ObTiMA.

- Data mining of public data

  Creation of GridR-based service by an independent bioinformatician

- Data mining of real data

  Creation of GridR-based service by a bioinformatician attached to a clinical trial

- MCMP pseudo-multicentric-multiplatform trial (Affy/Illumina comparison)

  This scenario tests a study with large compute/storage requirements.

Other scenarios are under work, as the implementation of different user scenarios in the ACGT portal will be done on a continuous base.

7 ACGT Front-end

The top-down approach to the ACGT Portal development aims the make a friendlier ACGT in order to facilitate the adoption of first-time users.

The initial design of the ACGT Portal (first prototype) was more oriented through the integration of the ACGT services (bottom-up approach), thus the initial front page was too simple and unattractive, especially for new users.

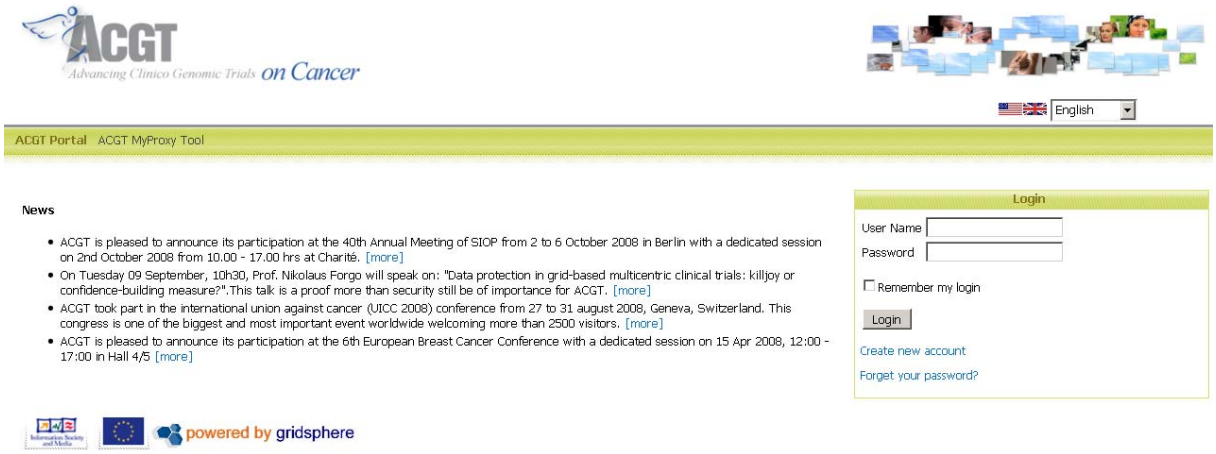

Figure 1: Current ACGT Portal Front-end

The new ACGT front-page comes with a user-oriented perspective, while keeping the simplicity and usefulness of the design that the user may find in the private sections of the portal.

Front page goal

Provide an attractive, simple entry point that invites folks who have never heard of ACGT but somehow stumbled or were referred to this page to browse and use the applications and available ACGT infrastructure.

Subgoal

Make browsing and understanding the operation of the portal very easy.

Layout: 3 vertical panels

The central panel offers a quick browse capability of available applications.

- Top part: show a current/featured app in a bit more detail and provide a browsable list of available applications. Later on if we want to organize these we may create 2 columns where the left column will have the group of applications and the right column the apps within that group.

- Central part. Display and give access to short video tutorials we may choose to create. These can be the 'professional' videos we discussed in Crete but also

simple YouTube style and quality videos shot by the developers themselves (or doctors) on any subject of interest.

- Lower part: a directory of help files arranged in the 4 categories shown: general, docs, bio-researchers and IT folks. Each title will be a link to a tutorial, manual etc. Suggested help file titles are shown.

Right pane is dedicated to news we may have including a new tool, an ACGT event etc.

First Time Users

First-time users are drived by a link prominently displayed in the right-upper part of the home page. This will lead to a help document that will cover the very bare essentials of the portal. IT might be the exact same document under the 'about this portal' title in the help files suggested at the bottom part of the central pane.

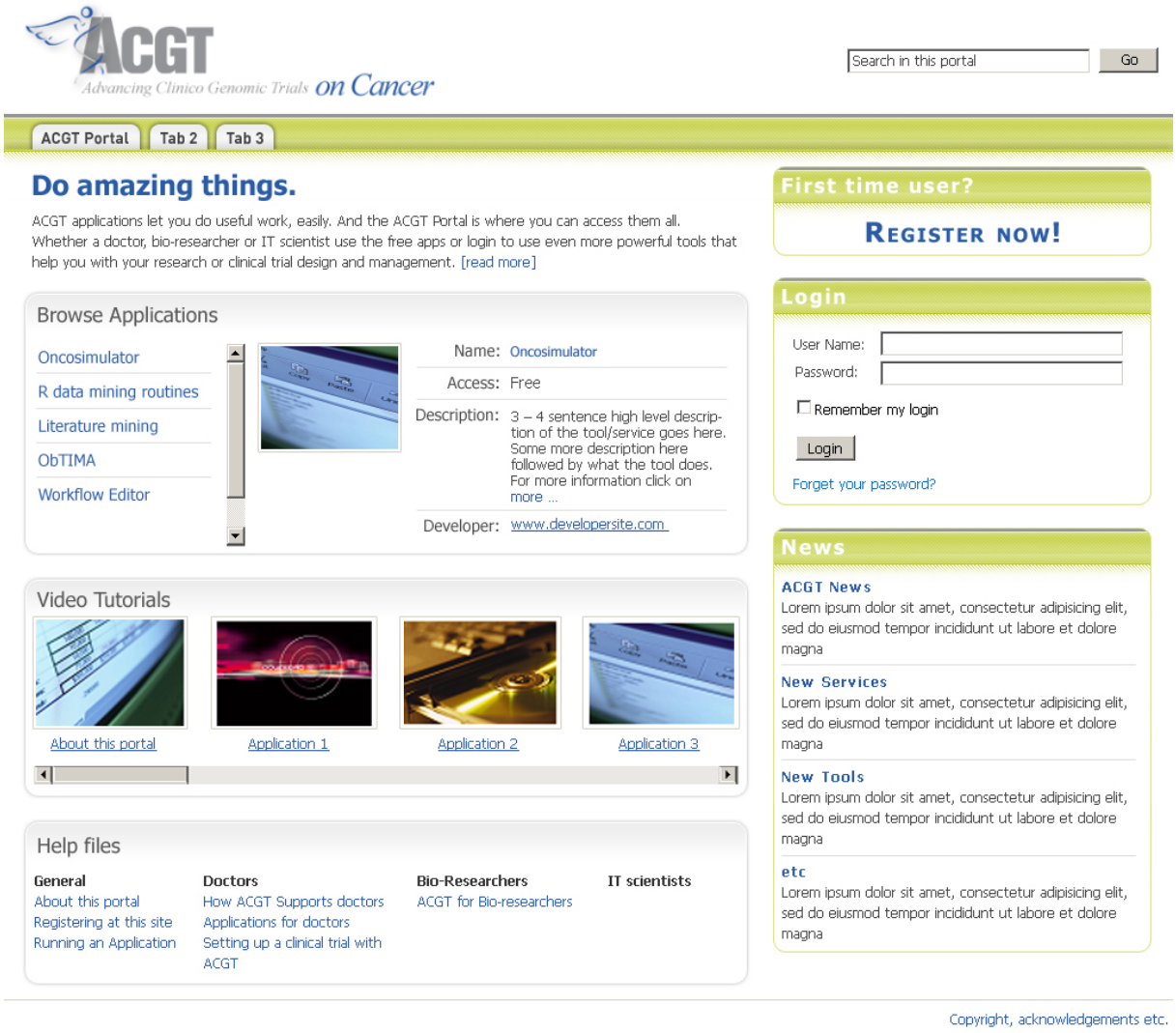

Figure 2: New ACGT Portal Front-end

8 ACGT Portlets

The portlets currently in different phases of implementation in the ACGT Portal are:

- Login portlet
- Homepage
- Role request portlet
- Change password portlet
- Layout manager portlet
- Profile manager portlet
- Credential manager portlet
- Administration page
- Group manager portlet
- Role manager portlet
- Messaging portlet
- GAS portlet *
- GRMS portlet *
- DMS portlet *
- GridR Session portlet *
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- Metadata registration v2.0 portlets *
- Service monitoring portlet *
- Workflow editor portlet *
- VO Management Portlet **
- Obtima portlet **
- Oncosimulator portlet **
- Query Tool and Mapping Tool Portlets **

The unmarked portlets were also present in the first prototype of the ACGT portal and described in the deliverable *D14.2 Visual prototype and report of the ACGT portal*. Therefore, in the sequel, we will mainly describe the new portlets, marked with *. The portlets marked with ** are still under development and will be only shortly described here.

8.1 GAS Portlet

Gridge Authorization Service (GAS) is an authorization system, which can be the standard decision point for all components of a system. Security policies for all system components are stored in GAS. Using this policies GAS can return an authorization decision upon the client request. GAS has been designed such a way that it is easy to perform integration with

external components and it is easy to manage security policies for complex systems. Possibility to integrate with many Globus Toolkit and operating system components makes GAS an attractive solution for grid applications.

The main goal of GAS is to provide functionality that would be able to fulfil most authorization requirements of grid computing environments. GAS is designed as a trusted single logical point for defining security policy for complex grid infrastructures. As the flexibility is a key requirement, it is to be able to implement various security scenarios, based on push or pull models, simultaneously.

Secondly, GAS is considered as independent of specific technologies used at lower layers, and it should be fully useable in environments based on grid toolkits as well as other toolkits. The high level of flexibility is achieved mainly through the modular design of GAS and usage of the complex data structure, which can model many scenarios and objects from the real world.

The GAS portlet is an administration portlet application for GAS developed by PSNC and deployed into the ACGT Portal by SIVECO.

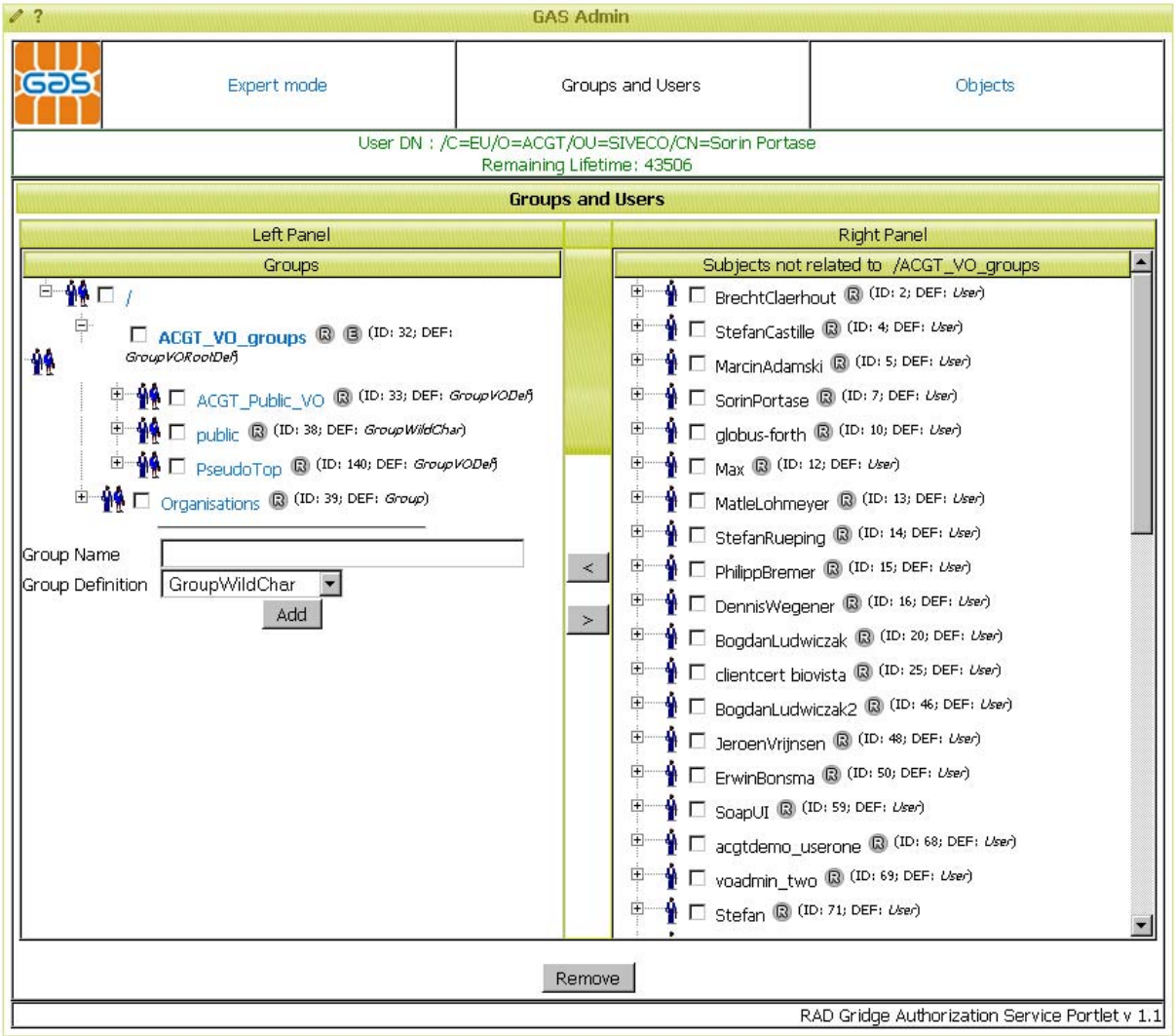

Figure 3: GAS Portlet

8.2 GRMS Portlet

The Gridge Resource Management System (GRMS) is an open source meta-scheduling system, which allows developers to build and deploy resource management systems for large scale distributed computing infrastructures. The GRMS, based on dynamic resource selection, mapping and advanced scheduling methodology, combined with feedback control architecture, deals with dynamic Grid environment and resource management challenges, e.g. load-balancing among clusters, remote job control or file staging support. Therefore, the main goal of the GRMS is to manage the whole process of remote job submission to various batch queuing systems, clusters or resources. It has been designed as an independent core component for resource management processes, which can take advantage of various low-level Core Services and existing technologies. Finally, the GRMS can be considered as a robust system, which provides abstraction of the complex grid infrastructure as well as a toolbox, which helps to form and adapts to distributing computing environments.

Special features of GRMS include:

- Dynamic resource discovery using different information sources to get static and dynamic parameters of machines, queues or jobs in Grid environment.
- Powerfull job description providing wide variety of means to express application and user requirements.
- Framework approach to support different Data Management Systems.
- Complex but flexible workflow job support – precedense constraints based on job status changes.

The GRMS Portlet is a graphical user interface client to the GRMS System. The GRMS Portlet was developed by PSNC and deployed into the ACGT Portal.

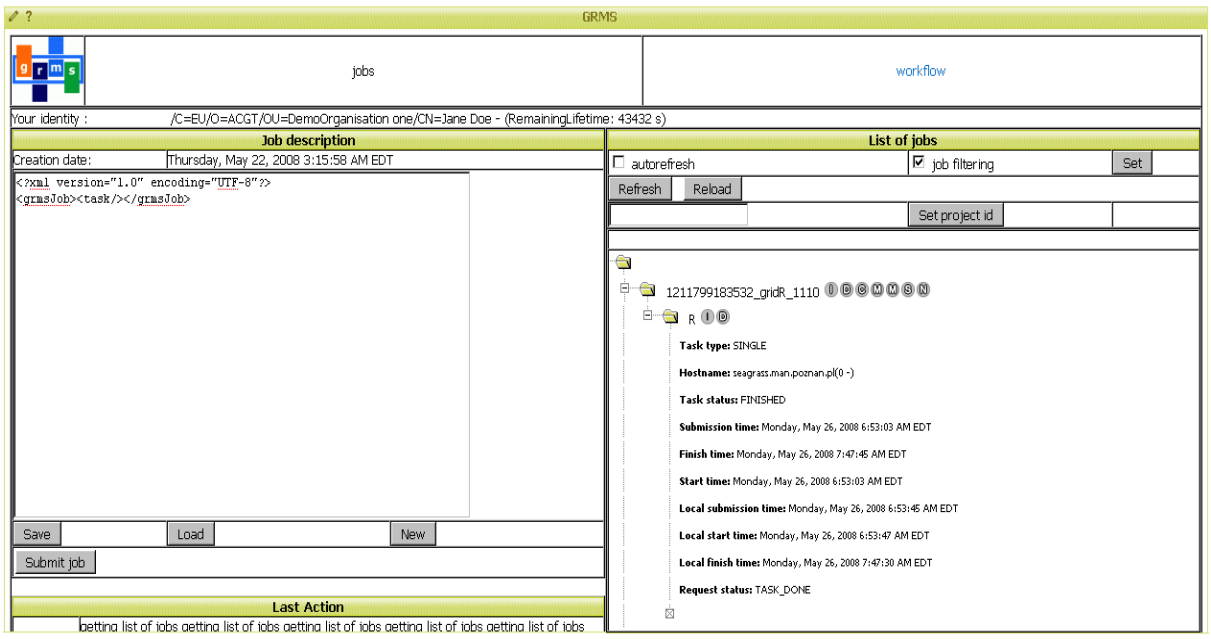

Figure 4: GRMS Portlet

8.3 DMS Portlet

Gridge Data Management System is one of the main components of Gridge Data Management Suite (GDMSuite) - a middleware platform providing a uniform interface for connecting heterogeneous data sources over a network. GDMSuite stands for the backbone of the Gridge environment, on which computational services would perform its operations. Gridge Data Management Suite constitutes a bundle of packages, designed for the creation of a complete and robust data management environment. It is intended to fulfill even the enterprise requirements of grid environments in terms of reliability, security and performance.

Data Management System (DMS) is a middleware application, based on SOA model that determines a loose coupling between reusable components, which are platform-, language-, and operating system-independent. Similar to computing and network resources, DMS provides services to manage and retrieve data files in order to support grid jobs. The computational resources managed by DMS can be described by metadata scheme, which allows create an abstract, semantic and explorable layer of resources.

Originally, DMS was provided with a stand-alone Web interface called DMS Portal.

The DMS Portlet was developed by SIVECO by emulating all the features available in the DMS Portal. Also the web service layer used by the DMS Portal to access the backend applications was ported into the DMS Portlet.

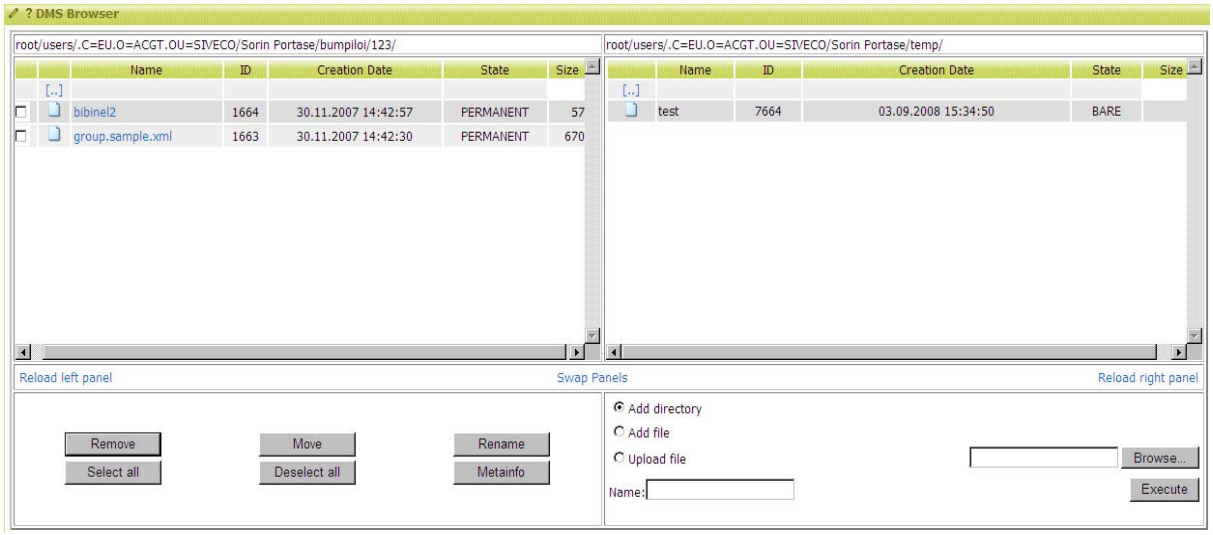

Figure 5: DMS Portlet

8.4 GridR Session Portlet

In ACGT the R environment, namely GridR, is used as a tool for the remote execution of R code in the grid. More specifically, the task of the execution of the R code is submitted as a grid job to a remote grid machine. The current implementation of the server side GridR components that are related to the grid environment is based on several external software components, namely the GT4 grid middleware, an installation of the R environment on the

grid machines which will execute the functions remotely and a GRMS-Server installation from the Gridge toolkit on a central machine in the grid environment that is responsible, for instance, for resource management.

On the client side, GridR consists of a set of R functions and involves the Cogkit, which is responsible for proxy generation and data transfer, and a GRMS-Client. The client side part is structured around the components “RemoteExecution” (JobSubmission and JobDescription Generator) and “Locking”. The RemoteExecution component is responsible for the execution of R code as a job in the grid environment by transforming the R code to execute into a set of files, creating a job description file in the respective job description language, and submitting the job to the resource management system by the GRMS-client. During this process, the locking component takes care of the consistency of files/variables.

An R programming language interface that supports the access to the ACGT services is provided in the ACGT environment. This means that R users and developers will have access to distributed resources in a transparent fashion, as if those resources were local. The complexity of the grid is thus hidden from the user.

Again, accessing the ACGT grid environment requires no changes in the core R implementation. In practice grid access is performed through the call of predefined R functions loaded from a package. R users can make use of the grid technology in a transparent way by passing the functions to be executed in the grid as input to one of those predefined functions (grid.apply) in their local code.

TheGridR Session is an applet developed by FhG as a GridR web-based client. The applet was wrapped inside a portlet and made available in the private area of the portal.

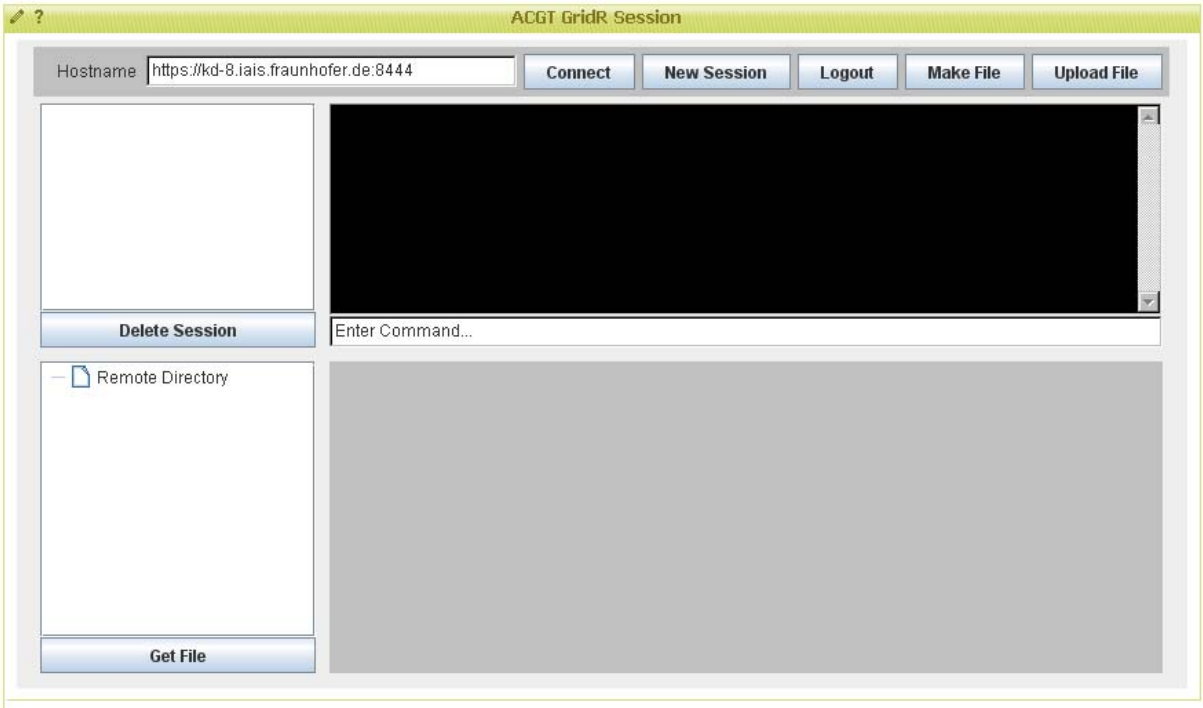

Figure 6: GridR Session Portlet

8.5 MyProxyTool Portlet

MyProxy is open source software for managing X.509 Public Key Infrastructure (PKI) security credentials (certificates and private keys). MyProxy combines an online credential repository with an online certificate authority to allow users to securely obtain credentials when and where needed. Users run myproxy-logon to authenticate and obtain credentials, including trusted CA certificates and Certificate Revocation Lists (CRLs).

Storing credentials in a MyProxy repository allows users to easily obtain RFC 3820 proxy credentials, without worrying about managing private key and certificate files. They can use MyProxy to delegate credentials to services acting on their behalf (like a grid portal) by storing credentials in the MyProxy repository and sending the MyProxy passphrase to the service. They can also use MyProxy to renew their credentials, so, for example, long-running jobs don't fail because of expired credentials. A professionally managed MyProxy server can provide a more secure storage location for private keys than typical end-user systems. MyProxy can be configured to encrypt all private keys in the repository with user-chosen passphrases, with server-enforced policies for passphrase quality. By using a proxy credential delegation protocol, MyProxy allows users to obtain proxy credentials when needed without ever transferring private keys over the network.

MyProxy provides a set of flexible authentication and authorization mechanisms for controlling access to credentials. Server-wide policies allow the MyProxy administrator to control how credentials may be used. Per-credential policies provide additional controls for credential owners. MyProxy supports multiple authentication mechanisms, including passphrase, certificate, Kerberos, Pubcookie, VOMS, PAM, LDAP, SASL and OTP.

In the ACGT Portal, MyProxyTool is an applet developed by Custodix designed for storing user's grid credentials into MyProxy. The applet was wrapped inside a portlet and made available in the public area of the portal.

Figure 7: MyProxy Tool Portlet

8.6 Metadata Registration Portlets v2.0

The user interface to the Metadata Repository are a JSR 168 compliant portlet application that allows a user to browse and edit the Services and Data types stored into the Metadata Repository. It also allows the user to start (enact) a service.

The Metadata Registration Portlets v2.0 were developed using the available Gridsphere tools and relay on plain JSP and minimal JavaScript for rendering. These portlets replace the Metadata Registration Portlets designed for the first prototype of the ACGT Portal and presented in D14.2.

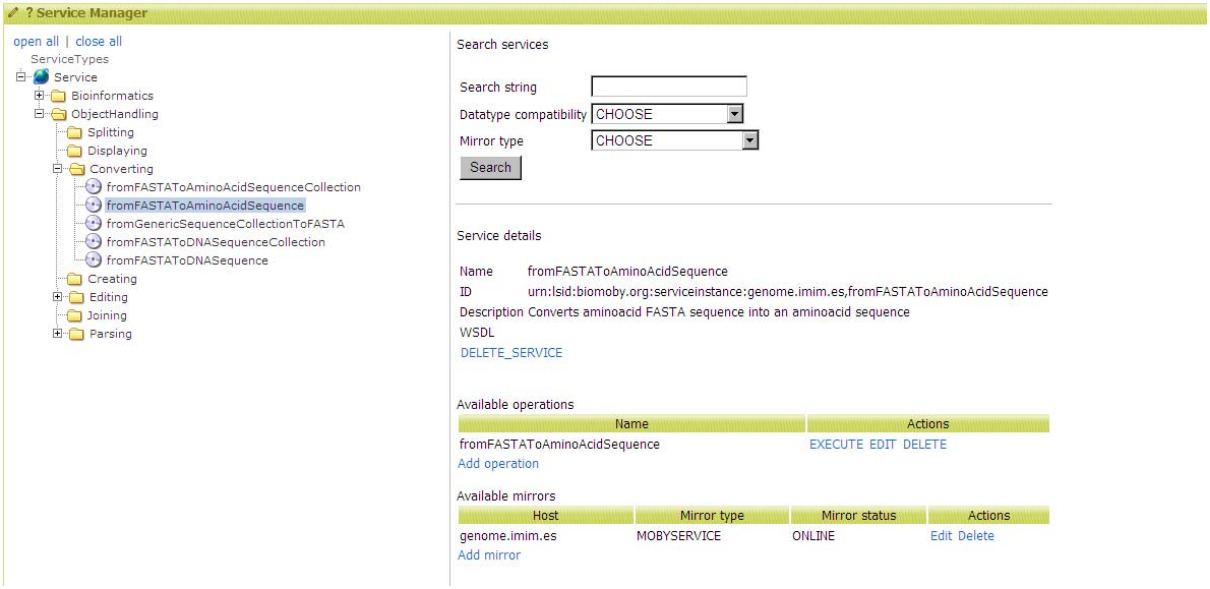

Figure 8: Metadata Registration Portlets v2.0

8.7 Service Monitoring Portlet

This portlet was designed to offer monitoring capabilities for services started by users using the Service Manager portlet. Its simple design also relies on plain JSP for rendering which gives it robustness. On the other hand the simple approach limits the solutions available for making the user interface dynamic and appealing. This is a common trade-off that has to be addressed when implementing the JSR 168 specifications.

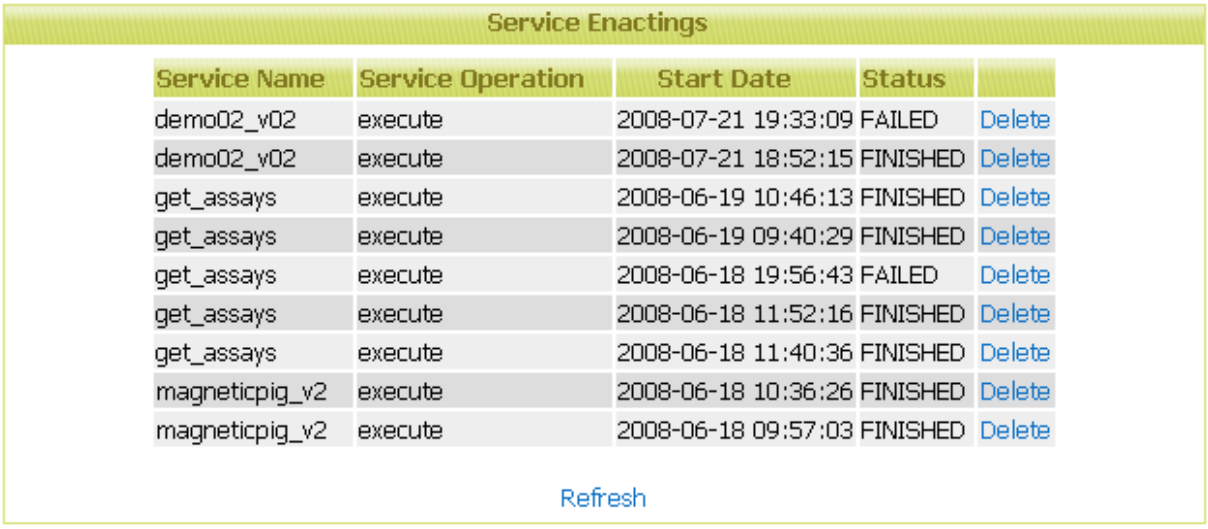

Figure 9: Service Monitoring Portlet

8.8 Workflow Editor Portlet

The ACGT Workflow Editor is a graphical tool that allows a user to combine different ACGT services into complex workflows. This tool has a web based graphical user interface developed by FORTH. It supports the searching and the browsing of the available services and data sources and their composition through some intuitive and user-friendly interface. The workflows created can be stored in a user's specific area and later retrieved and edited so new versions of them can be produced. The publication and sharing of the workflows are also supported so that the user community can exchange information and users benefit from each other's research.

Sometimes when a service is accessible via a standalone application whose user interface is rather hard to duplicate inside a JSR 168 portlet or when the integration time is short. The quick solution is to wrap that application inside a portlet using an IFrame. This is the case for the ACGT Workflow Editor Portlet that was loosely integrated in the ACGT Portal through an IFrame.

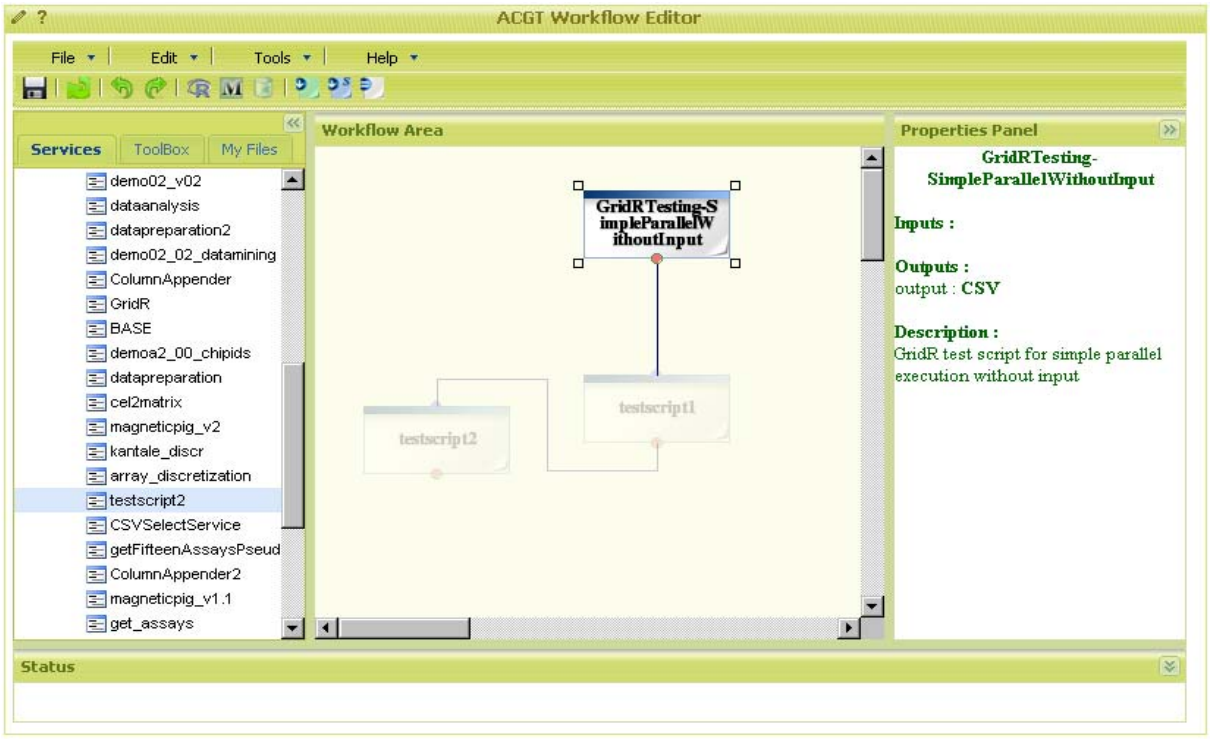

Figure 10: Workflow Editor Portlet

8.9 VO Management Portlet

The VO Management Portlet is a variation of the GAS Portlet, designed for an easier management of Virtual Organizations (VOs).

The VO Management Portlet provides a better approach to a VO approach to roles and rights, while keeping a good control of the resource access.

The current version of the VO Management Portlet is under tests in the ACGT development portal.

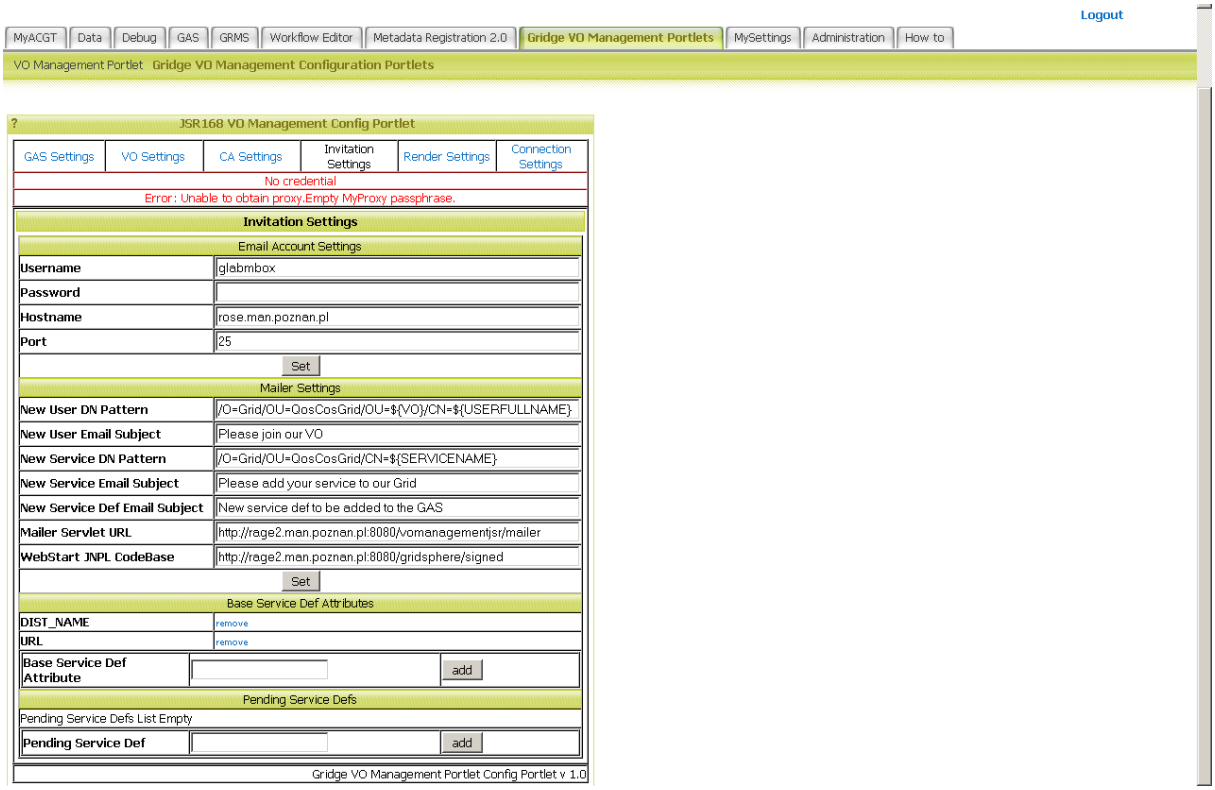

Figure 11: VO Management Portlet

8.10 Obtima Portlet

The ontology based clinical trial management system for ACGT (ObTiMA) plays a crucial role within ACGT. ObTiMA will support the design phase of a clinical trial and will be a tool allowing an end-user to manage a patient within a clinical trial, to capture data, to report data and to query and analyze databases used in the trial in a standardized way.

ObTiMA can be used in different levels:

- create and set up a new clinical trial according to the legal and ethical directives
- data entry via remote data entry (RDE) for managing patients in a clinical trial
- analysis of data in a single trial and across trials.

In the first stage, Obtima Portlet will be developed using Iframes, as for the Workflow Editor Portlet.

8.11 Oncosimulator Portlet

The Oncosimulator Portlet was developed by PSNC as a variation of the GRMS Portlet with the goal of launching and monitoring Oncosimulator jobs over the grid.

The Oncosimulator Portlet has to be intregrated in the ACGT Portal.

8.12 Query Tool and Mapping Tool Portlets

These portlets will bring in the portal the functionalities of the data query and mapping tools. These tools have been developed by UPM and currently exist as stand-alone Web applications.