



USER MANUAL
FLOOD APPLICATION

WP 1.2

Document Filename:	CG1.2-v1.0-IISAS-FloodUserManual.doc
Work package:	WP 1.2
Partner(s):	II SAS
Lead Partner:	II SAS
Config ID:	CG1.2-v1.0-IISAS-FloodUserManual
Document classification:	PUBLIC

Document Log

Version	Date	Summary of changes	Author
1.0	2004-12-06	First draft	Branislav Šimo
	26/01/2005	Verified by the QE	Robert Pajak

CONTENTS

COPYRIGHT NOTICE	4
1. INTRODUCTION.....	5
1.1. ABBREVIATIONS AND ACRONYMS	6
1.2. REFERENCES AND SOURCE CODE	6
2. PRODUCT USAGE	8
2.1. RUNNING THE PRODUCT	8
2.1.1. <i>Operating Requirements</i>	8
2.2. USING APPLICATION PORTAL.....	10
2.2.1. <i>Retrieving user credential</i>	10
2.2.2. <i>Working with jobs and workflows</i>	12
2.2.3. <i>Viewing results</i>	13
2.2.4. <i>Registering output file</i>	13
2.2.5. <i>Browsing file metadata</i>	14
2.3. USING MIGRATING DESKTOP.....	16
2.3.1. <i>Starting flood application plug-in</i>	16
2.3.2. <i>Workflow management</i>	16
2.3.3. <i>Viewing results</i>	18
2.3.4. <i>Metadata browsing</i>	18
3. TROUBLESHOOTING Q&A	21
4. CONTACT INFORMATION AND CREDITS.....	22
5. THE EDG LICENSE AGREEMENT	23

COPYRIGHT NOTICE

Copyright (c) 2005 by Institute of Informatics, Slovak Academy of Sciences. All rights reserved.

Use of this product is subject to the terms and licenses stated in the EDG license agreement. Please refer to Section 6 for details.

This research is partly funded by the European Commission IST-2001-32243 Project “CrossGrid”.

1. INTRODUCTION

This user guide describes the components of the flood forecasting application developed by II SAS in the context of the CrossGrid project. The application consists of several simulation models (meteorological, hydrological and hydraulics) and appropriate post-processing tools connected together, so constituting a workflow.

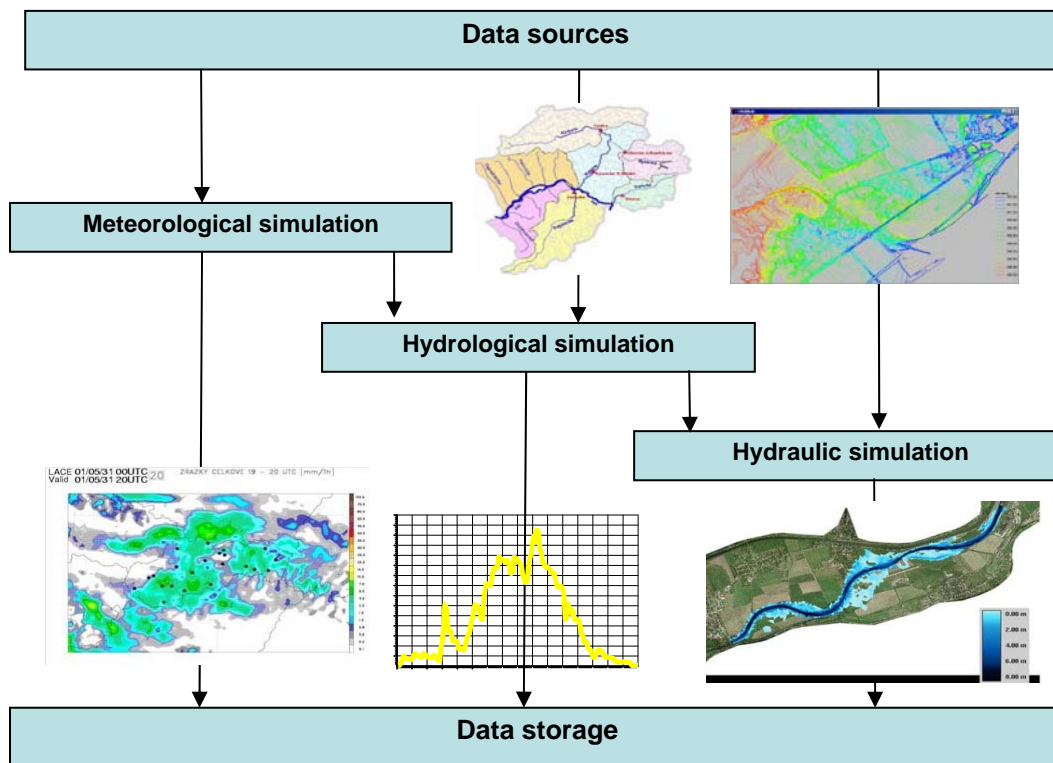


Fig. 1-1: Basic schema of flood application

Meteorological model is used to forecast precipitation, which is used by hydrological model for computation of discharge of the river. That is used in the final step for the actual computation of possible flood by the hydraulics model. All the models generate binary output data, which are then used by post-processing tools to generate pictures visualizing the situation. These pictures are then used by respective experts for situation evaluation.

Note: This user guide does not describe the simulation models themselves, their parameters or conditions of their usage as such description is beyond its scope. It focuses solely on the user interface part and supporting services.

The flood forecasting application framework with appropriate simulation models enable users to easily run desired sequence of simulations and respective post-processing tools, browse the results of simulations, register results into the replica management service and applicable metadata into the metadata catalog for later search and retrieval.

We have created two user interfaces to enable users to interact with the application in a more user-friendly way. One interface is implemented as a web portal accessible with standard web browser. It consists of a set of portlets – reusable web components – that are placed in the portlet portal framework.

Another user interface is implemented as plug-in for Migrating Desktop (MD) – a desktop user environment for working with grids developed in the CrossGrid. More information about MD can be found in the MD user guide.

While the portal interface focuses mainly on the flood application, MD is general tool that enables a user to work with grid in a flexible way. It also integrates other applications via its plug-in system.

In the following chapters we describe each element of the user interface and how is the user interface used.

1.1. ABBREVIATIONS AND ACRONYMS

ALADIN	Meteorological model
ALADIN/LACE	ALADIN model for Central Europe
CAVE	Cave Automatic Virtual Environment
CE	Computing element (EDG)
CHAGAL	Graphical tool designed for visualization of 2D meteorological fields
CrossGrid/CG	The EU CrossGrid Project IST-2001-32243
DataGrid/EDG	The EU DataGrid Project IST-2000-25182
DaveF	Hydraulic model
DBMS	Database Management System
Flood-VO	Flood Virtual Organization
GRID	Grid framework for sharing of distributed resources
GUI	Graphical User Interface
GUID	Globally Unique Identifier
GVK	Grid Visualization Kernel
HSPF	Hydrological model
JDL	Job Description Language
LCG	
MARMOT	MPI verification tool
MD	Migrating Desktop
MM5	Meteorological simulation model
MPI	Message Passing Interface
MPICH-G2	Grid-enabled implementation of MPI
MPI-G2	Message Passing Interface with the globus2 device
NLC	Rainfall-runoff hydrological simulation model
O/R DBMS	Object/Relational DBMS
OCM-G	Grid OMIS (On-line Monitoring Interface Specification) compliant monitor
OGCE	Open Grid Computing Environments Collaboratory
OGSI	Open Grid Services Infrastructure
PSE	Problem Solving Environment
RAS	Roaming Access Server
RB	Resource Broker
SE	Storage Element (EDG)
SHMI	Slovak HydroMeteorological Institute (Subcontractor of II SAS)
UI	User interface
WMO	World Meteorological Organization
WN	Working Node
WS	Web services
XML	Extended Markup Language

1.2. REFERENCES AND SOURCE CODE

Source code of the application is accessible on the public project CVS server and can be browsed via following https://savannah.fzk.de/cgi-bin/viewcvs.cgi/crossgrid/crossgrid/wp1/wp1_2-flood/.

2. PRODUCT USAGE

The flood forecasting application framework can be accessed either by a web browser which displays the content produced by the application portal or by a tool plug-in run in the Migrating Desktop (MD) environment (see Fig. 2-1).

Note: Portal has to be installed according to the flood application install guide, while the MD has to be installed according to the MD install guide.

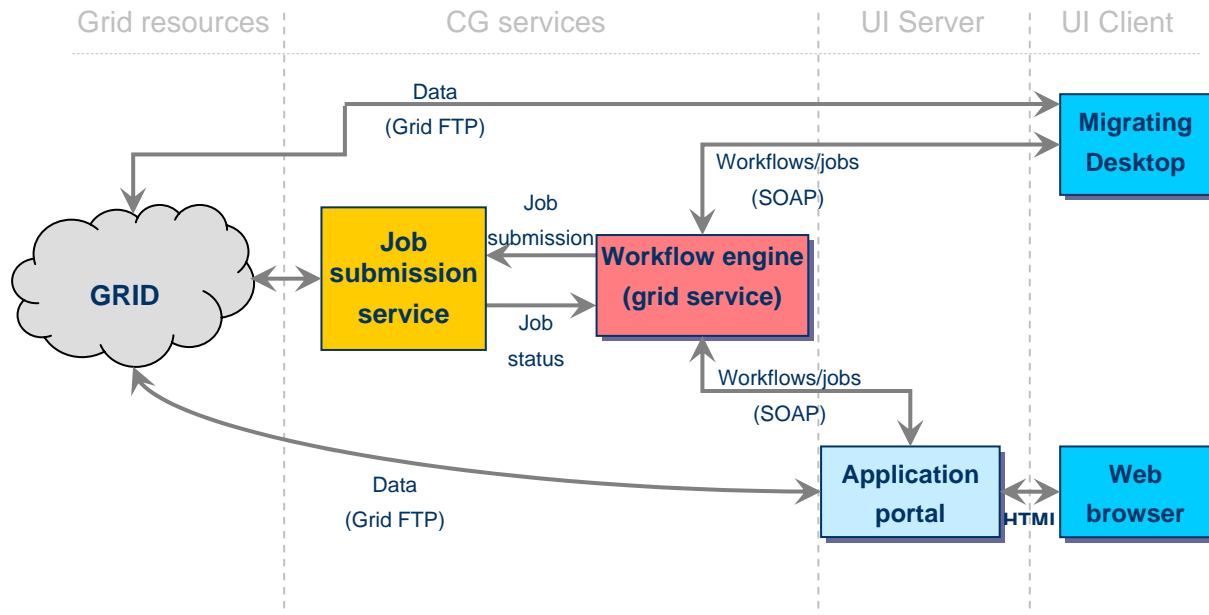


Fig. 2-1: Schema of the whole system with two user interfaces connecting to the workflow service

Both these user interfaces connect to the:

- workflow service that contains preconfigured jobs and workflows, makes it possible to change default parameters of jobs and manages the execution of workflows,
- Metadata service containing the description of datasets registered to the grid replica service.

Workflow service and user interfaces make use of the term “workflow template”. It determines the predefined workflow, i.e. the predefined chaining of the jobs, with parameters of each of the jobs in the workflow set to some default value. User has to select one of the workflow templates and instantiate it (by pressing a button on UI). Only after instantiation of the workflow it is possible to change the default parameters of the jobs contained within. Currently, neither the workflow service nor the user interfaces support creation of user defined workflows.

A list of workflow templates is shown in separate part of user interface. Upon instantiation, new workflow item is created in the workflow list

2.1. RUNNING THE PRODUCT

2.1.1. Operating Requirements

2.1.1.1. Local hardware requirements

The parameters of local hardware are determined by its ability to run the software described in the following chapter “Local software requirements”.

2.1.1.2. Local software requirements

- For accessing web interface – graphical web browser with JavaScript support
- For running Migrating Desktop – Java Virtual Machine. For details see the Migrating Desktop’s user guide.

2.1.1.3. Grid infrastructure requirements

Properly configured grid environment based on the CrossGrid software:

- i.e. running storage element with GridFTP access (at least one),
- computing element (at least one) capable of running mpich-p4 jobs with at least 8 nodes,
- resource broker,
- myproxy server for temporary storage and retrieval of user credentials.

There is a specific requirement when using the application portal – shared file system between the portal and a grid Storage Element (SE) to which the output of the jobs is to be directed in order for the portal to be able to browse the results of the jobs (see install guide for details).

2.2. USING APPLICATION PORTAL

First step in using the application portal is to start a web browser and to go to the location of the portal installation. The link has following format: `https://<server name>:<port number>/flood`.

The welcome page of the portal will appear containing some general information. In order to use the portal, user has to log in, so he has to fill his portal user name and password into edit boxes located in the upper right corner. In case of failed login portal administrator should be contacted.



Fig. 2-2: Portal welcome page

After successful login a menu is presented in the form of “tabs” in the upper part of the page. Tabs are divided into following subjects: Security, Jobs, Files, Edit and Metadata. Each tab represents an area containing one or more modules or sub-windows called portlets.

2.2.1. Retrieving user credential

The security tab contains a proxy manager portlet. This portlet is very important and must be used before any other portlets that access the grid.

Proxy manager portlet is used to retrieve the user credential in the form of a proxy certificate from the Myproxy server. User has to delegate his proxy certificate to Myproxy server some time before. Such delegation is usually made by invoking the `myproxy-init` command on the machine where his certificate is stored and this command installed. Such machine connected to the grid is usually called user interface (UI) element (not to be confused with e.g. portal user interface). For

To retrieve proxy certificate the *Get new proxy* button in the Proxy manager portlet has to be pressed. Then user have to be fill in the fields shown in Fig. 2-4 and then press the *Get proxy* button.

The successful proxy retrieval is shown in Fig. 2-5. After the proxy certificate has been retrieved other tabs can be used.

Note: User name and password that have to be entered into the proxy manager portlet are those specified during proxy certificate delegation to the Myproxy server. The portlet uses this information to authenticate to Myproxy server and to retrieve the stored proxy certificate.

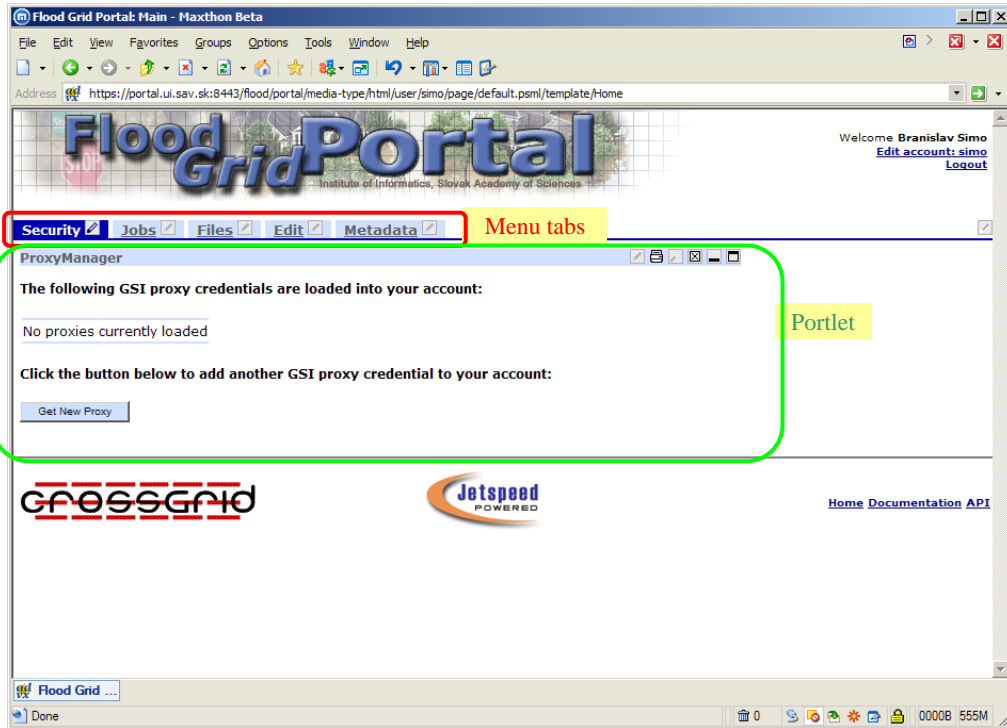


Fig. 2-3: Portal after successful login; showing Proxy manager portlet

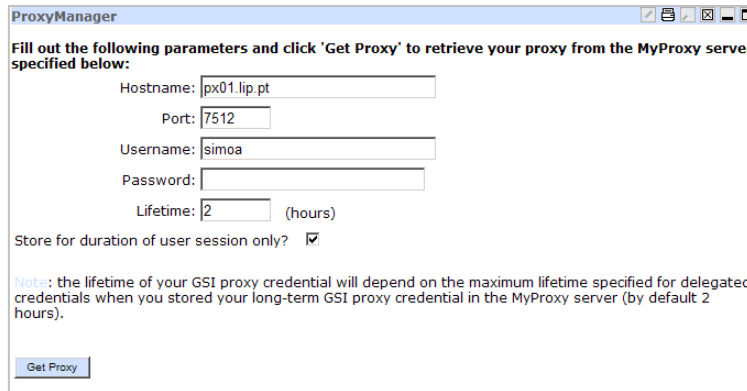


Fig. 2-4: Fields of the Myproxy portlet

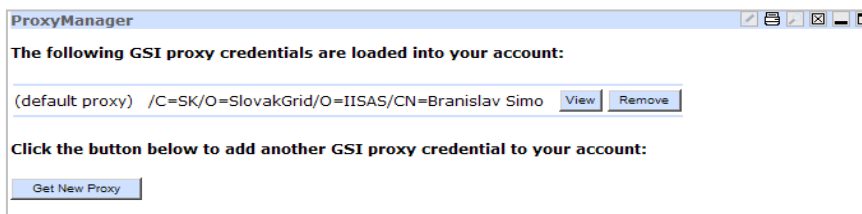


Fig. 2-5: Successful retrieval of user proxy certificate

2.2.2. Working with jobs and workflows

Fig. 2-6 shows the *Jobs* section of the portal. The section contains two main portlets:

- Workflow template portlet,
- Workflow portlet

The workflow template portlet contains a list of names of predefined workflows. User can view the content of the workflow by pressing the small picture of down-pointing arrow next to the workflow template name. That unfolds the content of the template and also shows the *Select* button together with an edit field. These are to be used to create the instance of a workflow template – a workflow. Edit field specifies the name of to-be-created workflow instance.

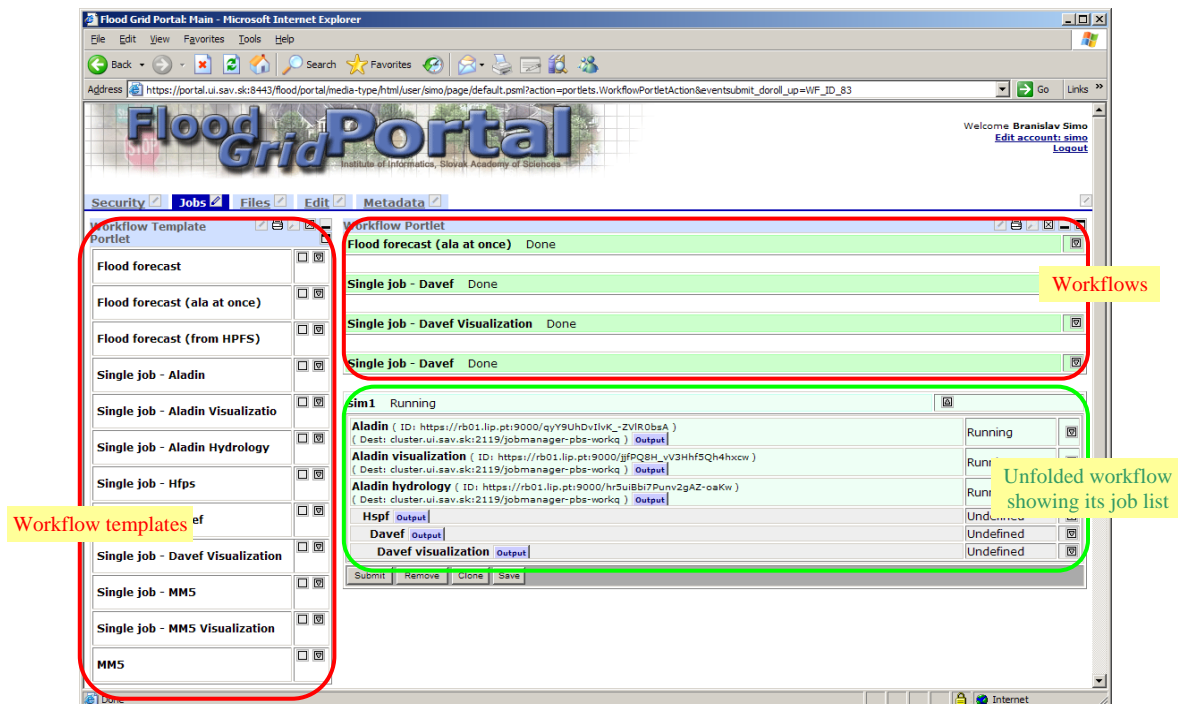


Fig. 2-6: “Jobs” section of the portal

After instantiation, the new workflow will appear at the bottom of the workflow list in the workflow portlet. The gray color and *undefined* state signify that the execution of the workflow has not started yet. The small icon of down-pointing arrow next to the workflow name is used to unfold the content of a workflow. The list of jobs comprising a workflow is indented, each indent implying dependence on the previous job with smaller indent. The jobs of the workflow instance can be unfolded like workflows in order to show the job parameters. Their names, meaning and count vary and depend on the type of the job.

The JDL parameter is a special one. It is not passed to the job, but instead is used to construct the JDL job specification, which controls how the job is handled by the grid infrastructure. JDL is passed upon job submission to the grid resource broker.

Unfolded workflow record contains four buttons:

- Submit – submits the workflow for processing by the workflow service. The workflow will immediately enter *running* state. However, it takes several seconds for the workflow’s job(s) to start running.
- Remove – removes the workflow from the list. Cancels its execution if it is running.

- Clone – creates an exact copy of selected workflow. (not implemented yet)
- Save – saves the modified values of the parameters of the job(s).

2.2.3. Viewing results

When the job has finished or even during its run a user can click on the *Output* button located next to the workflow name in the workflow portlet. Doing so will transfer him to the Visualization portlet on the Files tab. Visualization portlet will be open in the output directory of selected job. This directory contains all the output files of the job. The content of a file can be shown by clicking on the name of the file. Visualization portlet can show text files and pictures. Other binary files will be shown as meaningless characters.

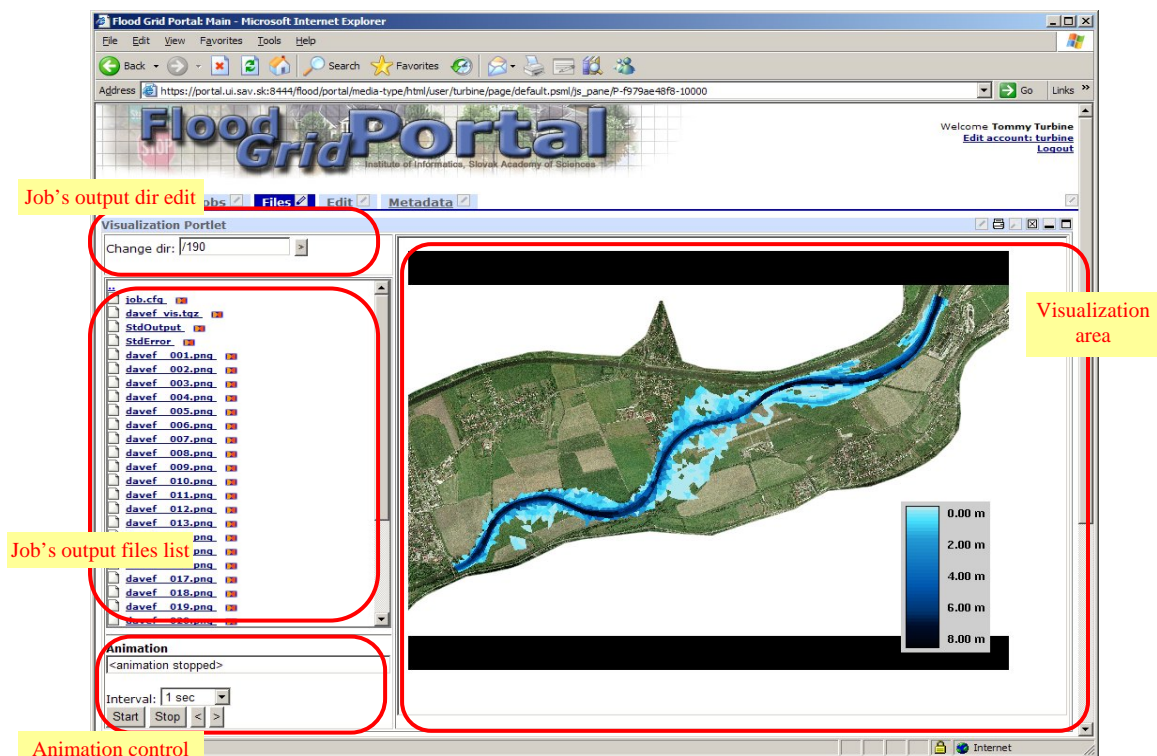


Fig. 2-7: Jobs section of the portal

2.2.4. Registering output file

It is possible to register an output file by clicking the small icon next to the file name. User will be presented with the metadata form (see Fig. 2-8), which has to be filled in and submitted by pressing the *Submit* button. Red colored fields are obligatory.

This action will register the file into Replica Manager and all the metadata into the Metadata Service. The file can be located later on by searching the metadata database.

Fig. 2-8: Metadata registration form

2.2.5. Browsing file metadata

Metadata can be searched by clicking the *Metadata* tab on the portal followed by the click on the *Query* button. A form as on Fig. 2-9 will be shown. User can combine several search conditions to find the desired file. Each condition consists of:

- Name of the metadata item – combo box on the left
- Condition type – equal, not equal, more, less, etc
- Searched value

New conditions can be added using the *Add condition* button or they can be removed using the *Remove condition* button.

Pressing the *Find* button will find all registered replicas with metadata matching the search condition(s). Clicking on the presented records will show all metadata entries for given record.

Selecting some of the check boxes next to the names of the found records and pressing the *Add selected* button will add those records to the working list of replica records shown in Fig. 2-10. Replicas in this list can be downloaded, deleted or just removed from the metadata database. Clicking one of the record names will show all metadata entries for given record and registered replicas for given GUID.

CG1.2-v1.0-IISAS-FloodUserManual

PUBLIC

14 / 24

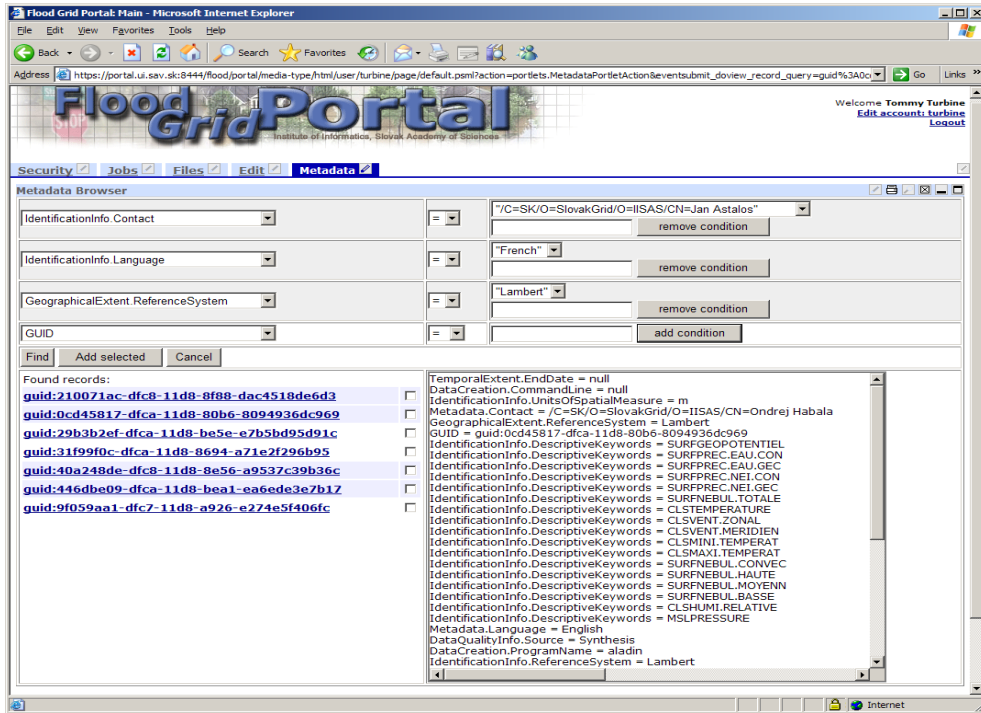


Fig. 2-9: Metadata search form

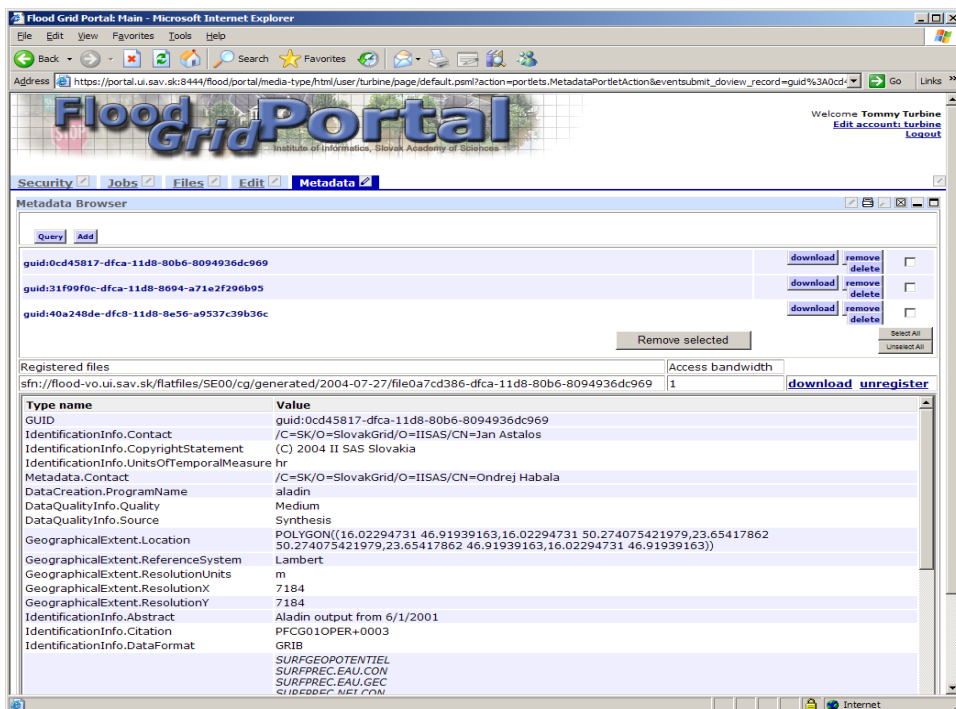


Fig. 2-10: Working list of replica records

2.3. USING MIGRATING DESKTOP

This chapter describes the usage of the Migrating Desktop (MD) environment for working with the flood application. It focuses on the MD flood plug-in. For information about starting, basic usage and usage of other parts of MD, please refer to the MD user guide.

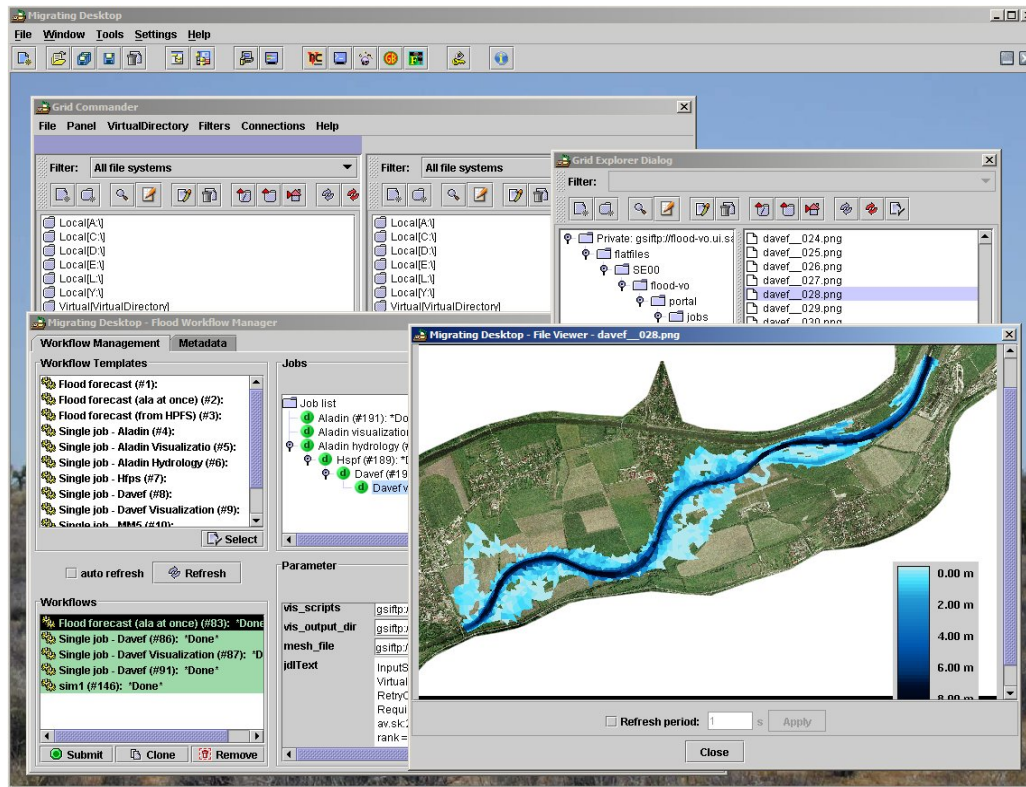


Fig. 2-11: Snapshot of Migrating Desktop during results browsing

2.3.1. Starting flood application plug-in

After the MD has been started the flood application plug-in can be activated by pressing the starting button shown in Fig. 2-12.

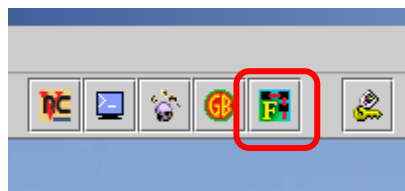


Fig. 2-12: Flood application plug-in starting button

A plug-in window will appear as on Fig. 2-13. It contains two tabs titled *Workflow management* and *Metadata*.

2.3.2. Workflow management

Workflow management window consists of following areas:

- Workflow templates – contains the list of workflow templates

- Workflows – contains the list of user’s workflows. Global state of the workflow is indicated just after its name and also by line color.
- Jobs – shows the jobs comprising a workflow in a tree structure. A job that is a leaf of another job depends on it and will not run before the first job finishes. The jobs panel shows workflow structure when a workflow has been selected in either *workflow templates* panel or in *workflows* panel. When showing a structure of a workflow instance (selected from *workflows* panel) the job is preceded by an icon indicating its state. States use the same names as used by other grid tools and middleware.
- Info – shows details about any item selected: workflow template, workflow or job.
- Parameters – displays the parameters of a job. Parameters are displayed only for jobs of a workflow instance and not for jobs of workflow templates. After a user modifies parameters they have to be saved by pressing the *Save* button.

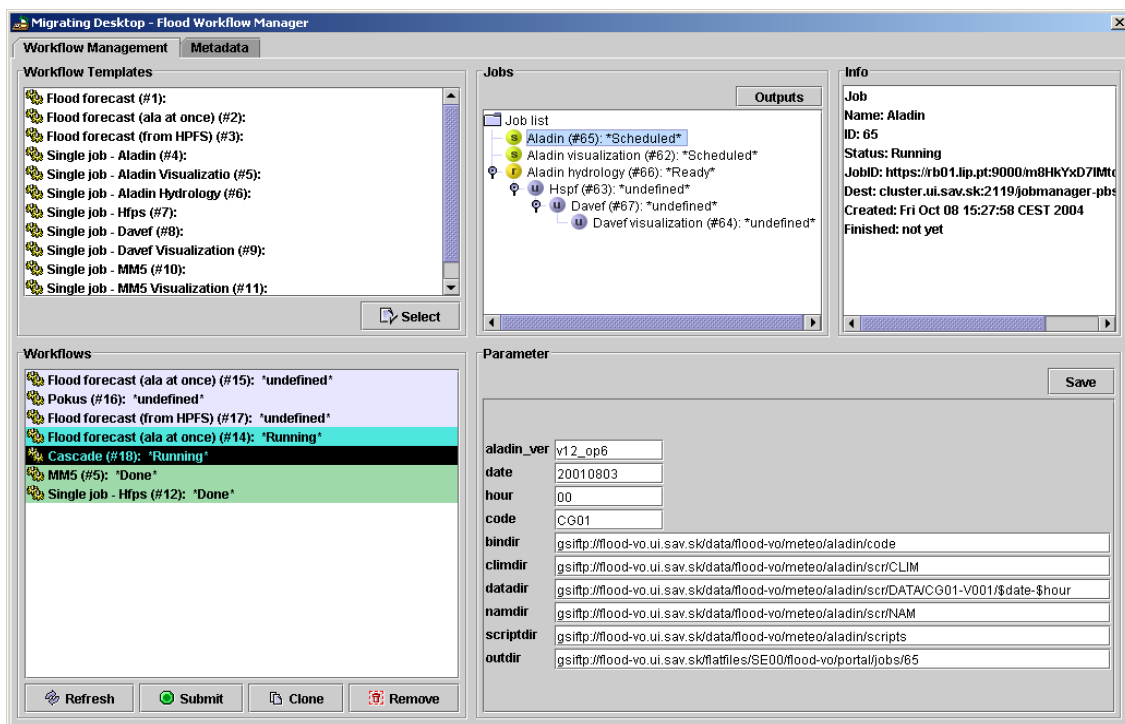


Fig. 2-13: Flood application plug-in – workflow management

To run a computation user has to choose one of the workflow templates in the *Workflow templates* panel and press the *Select* button. A dialog will appear asking for the name of new workflow instance. User can change the default and will press the *OK* button. The workflow instance will be created and shown in the *Workflows* panel.

User then clicks on the created instance and jobs will be displayed in the *Jobs* panel. Clicking on the jobs will show their parameters in the *Parameters* panel. Those can be modified and saved by pressing the *Save* button. When everything is prepared, a click on *Submit* button will submit the workflow for execution and change the workflow state to running.

By pressing the *Refresh* button a user can refresh the states of the workflows shown in the window. The jobs will be processed in defined order and if everything will go fine the user will end up with successfully finished workflow.

2.3.3. Viewing results

When running or finished jobs is selected user can press the *Outputs* button to start the *Grid Explorer* dialog. It will open in the output directory of the selected job. User can select one of the files and press the view or edit icon to perform respective action. A new dialog will appear either just showing the content of the file or another one with the text editor.

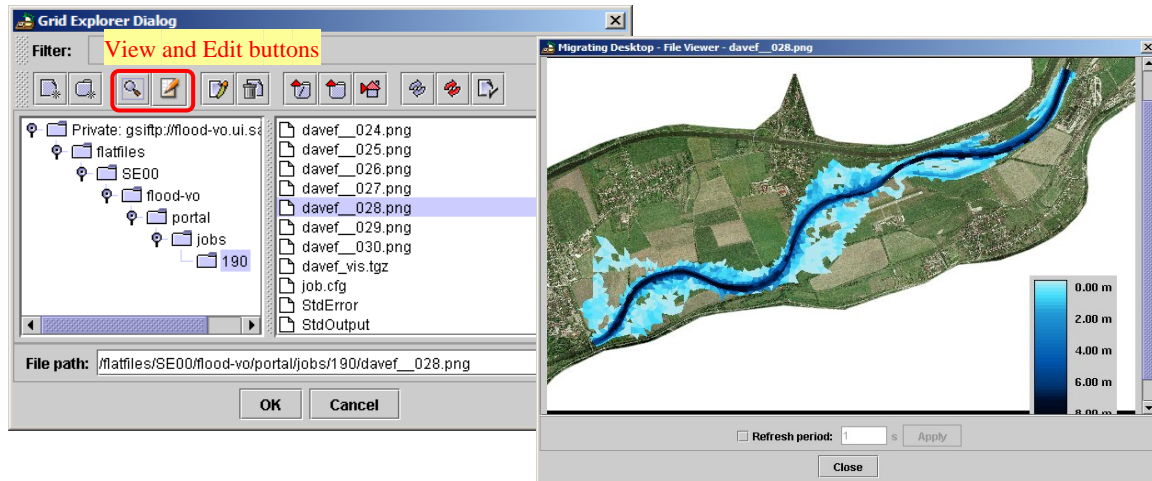


Fig. 2-14: Browsing results using Grid Explorer

2.3.4. Metadata browsing

Metadata window (see Fig. 2-15) enables a user to search for the registered files by specifying constraints on the metadata describing them.

Query dialog will be displayed after pressing the *Query* button. Conditions can be specified in the upper part of the window. Additional condition row can be added using the *Add row* button and a row can be removed using the *Remove* button.

Pressing the *Preview* button will show the resulting set of GUIDs in the panel below buttons. Clicking on the results will show all metadata items defined for given GUID.

Several entries can be selected from the preview panel and transferred to the main window by pressing the *Select* button. In the main windows these selections are grouped as *Dirs*. Selecting the GUID in main window will show its metadata. Right click will show a context menu with items for download of replica representing the GUID or deletion of the GUID from and respective replicas from storage.

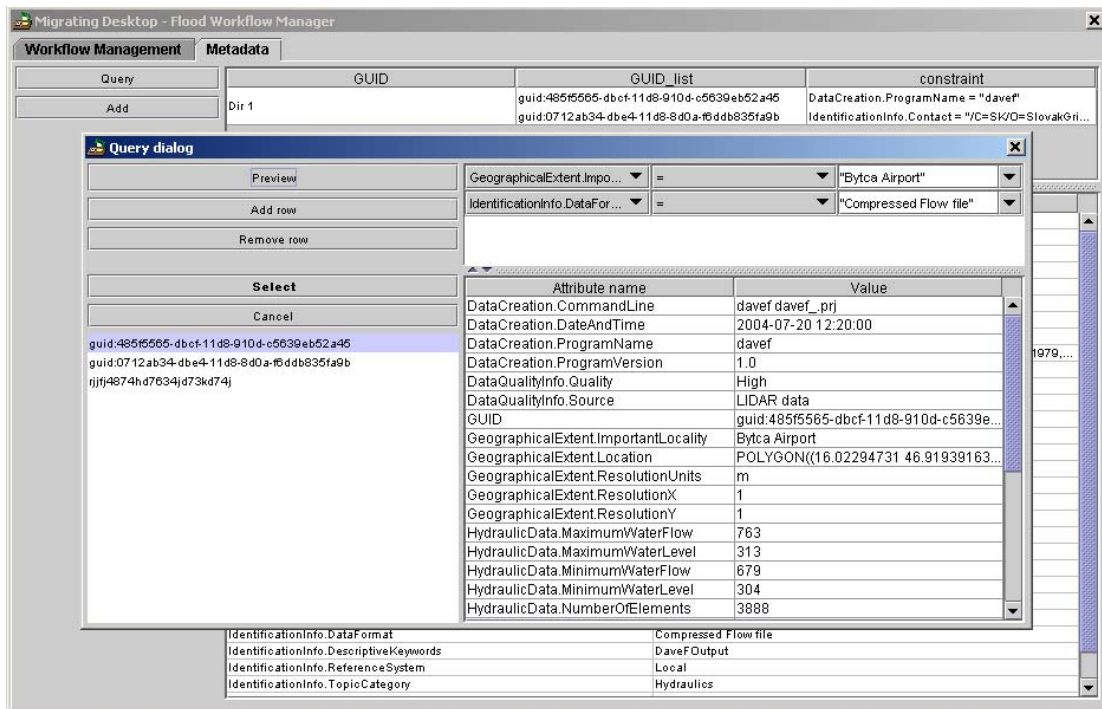


Fig. 2-15: Flood application plug-in – metadata panel with query dialog in the front

Known Problems

- Connection between application portal and workflow service occasionally crashes when using Maxthon browser extension for Internet Explorer. The reason for this behavior is unclear and it does not occur when using Internet Explorer alone or other browsers.

3. TROUBLESHOOTING Q&A

Q: A workflow has been submitted, but jobs do not start running.

A: It takes several second for a job to start running, because it has to traverse the services managing job submission – resource broker, local queue manager – and then report its state back. If, however, the job stays too long in undefined state, have a look to the log file of the workflow service to see the source of the problem.

4. CONTACT INFORMATION AND CREDITS

In case of any questions, please contact the developers:

- Branislav Simo, branislav.simo@savba.sk, (portal, MD plug-in, web services)
- Martin Maliska, martin.maliska@savba.sk (portal, MD plug-in, web services)
- Emil Gatial, emil.gatial@savba.sk (portal, MD plug-in, web services)
- Dr. Ladislav Hluchy, hluchy.ui.@savba.sk (task leader, director of II SAS)
- Jan Astalos, astalos.ui@savba.sk (testbed administration, ALADIN model)
- Miroslav Dobrucky, miroslav.dobrucky@savba.sk (HSPF, NLC models)
- Viet Tran, viet.ui@savba.sk (DaveF model)

5. THE EDG LICENSE AGREEMENT

Copyright (c) 2005 CrossGrid. All rights reserved.

This software includes voluntary contributions made to the CrossGrid Project. For more information on CrossGrid, please see <http://www.eu-crossgrid.org>.

Installation, use, reproduction, display, modification and redistribution of this software, with or without modification, in source and binary forms, are permitted. Any exercise of rights under this license by you or your sub-licensees is subject to the following conditions:

1. Redistributions of this software, with or without modification, must reproduce the above copyright notice and the above license statement as well as this list of conditions, in the software, the user documentation and any other materials provided with the software.
2. The user documentation, if any, included with a redistribution, must include the following notice:
“This product includes software developed by the CrossGrid Project (<http://www.eu-crossgrid.org>).”

Alternatively, if that is where third-party acknowledgments normally appear, this acknowledgment must be reproduced in the software itself.

3. The names “CrossGrid” and “CG” may not be used to endorse or promote software, or products derived therefrom, except with prior written permission by cgooffice@cyfronet.krakow.pl.
4. You are under no obligation to provide anyone with any bug fixes, patches, upgrades or other modifications, enhancements or derivatives of the features, functionality or performance of this software that you may develop. However, if you publish or distribute your modifications, enhancements or derivative works without contemporaneously requiring users to enter into a separate written license agreement, then you are deemed to have granted participants in the CrossGrid Project a worldwide, non-exclusive, royalty-free, perpetual license to install, use, reproduce, display, modify, redistribute and sub-license your modifications, enhancements or derivative works, whether in binary or source code form, under the license conditions stated in this list of conditions.

5. DISCLAIMER

THIS SOFTWARE IS PROVIDED BY THE CROSSGRID PROJECT AND CONTRIBUTORS “AS IS” AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, OF SATISFACTORY QUALITY, AND FITNESS FOR A PARTICULAR PURPOSE OR USE ARE DISCLAIMED. THE CROSSGRID PROJECT AND CONTRIBUTORS MAKE NO REPRESENTATION THAT THE SOFTWARE, MODIFICATIONS, ENHANCEMENTS OR DERIVATIVE WORKS THEREOF, WILL NOT INFRINGE ANY PATENT, COPYRIGHT, TRADE SECRET OR OTHER PROPRIETARY RIGHT.

6. LIMITATION OF LIABILITY

THE CROSSGRID PROJECT AND CONTRIBUTORS SHALL HAVE NO LIABILITY TO LICENSEE OR OTHER PERSONS FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL, EXEMPLARY, OR PUNITIVE DAMAGES OF ANY CHARACTER INCLUDING, WITHOUT LIMITATION, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES, LOSS OF USE, DATA OR PROFITS, OR BUSINESS INTERRUPTION, HOWEVER CAUSED AND ON ANY THEORY OF CONTRACT, WARRANTY, TORT (INCLUDING NEGLIGENCE), PRODUCT LIABILITY OR OTHERWISE, ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.