DELIVERABLE D4.2

SETUP OF FIRST TESTBED ON SELECTED SITES

WORKPACKAGE 4

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CONTENTS

1. INTRODUCTION 4

1.1. OVERVIEW 4
1.2. DESCRIPTION OF WORK FOR SETUP OF FIRST TESTBED ON SELECTED SITES 4
1.3. DEFINITIONS, ACRONYMS, AND ABBREVIATIONS 5

2. INITIAL TESTBED SETUP 6

2.1. TESTBED COORDINATION AND MANAGEMENT AND INITIAL SETUP 6
2.2. INTEGRATION WITH DATAGRID 6
2.3. INFRAESTRUCTURE SUPPORT 7
2.3.1. User Support: Help Desk (J.Salt) 7
2.3.2. The CrossGrid software repository (M.Hardt) 9
2.4. VERIFICATION AND QUALITY CONTROL 10

3. APPENDIXES 11

3.1. APPENDIX A: TEST AND VALIDATION TESTBED ARCHITECTURE 11

1. INTRODUCTION

1.1. OVERVIEW

The work along the first six months of the project has followed the detailed planning for testbed setup described in our previous deliverable D4.1 (CG-4-D4.1-001-PLAN-1.1) with the objective to have a first testbed setup ready as soon as possible in selected sites, and joining the EDG testbed.

At the time of producing this deliverable, Month 6, this objective has been reached and several selected sites are running the EDG middleware testbed version 1.2, two of them (FZK and LIP) have in practice joined the EDG development testbed 1.2.0, and few others will do when, as agreed with EDG testbed responsibles, the version 1.3 intended for wider deployment is released. This achievement has required in particular the successful hardware and software installation at each site, the activity of the Integration team in coordination with EDG, the implementation of the Certification Authorities, the preparation of supporting tools like the Help Desk and the Software Repository.

Moreover, a very important step has been given with the establishment of the "test and validation" testbed for CrossGrid, managed by the LIP group, including the establishment of a Virtual Organization, and a Resource Broker. This essential work is described in detail in the appendix document "Test and Validation Testbed Architecture", that will be a reference document for the next three months where the aim is to "Experience with the first testbed on selected sites" that will be reported in our next deliverable D4.3 by Month 9.

Along this line, work has started in coordination with WP1 (applications) and with EDG, regarding the simple applications that will be tested in the next month. The EDG ATLAS and CMS MonteCarlo simulations have been selected for tests, that have started at FZK and CSIC, and two simple MPI prototypes from the CrossGrid task 1.3 (HEP interactive data mining) are also being prepared, and will be discussed in the coming CrossGrid Workshop at Linz (27-28 September). This workshop will be also the point for in-depth discussion with the WP2 and WP3 people on the testbed requirements, once the detailed description of the middleware in development has been provided in the corresponding deliverables for Month 6 of these two workpackages.

The structure of this document is as follows: Section 2.1 resumes the coordination task, the work of the Integration Team and of the CA group and the integration with EU DataGrid. Support issues, including Help Desk and Software Repository, are described in Section 2.2. Section 2.3 refers to the "Test and Validation Testbed Architecture", included separately in appendix A.

1.2. DESCRIPTION OF WORK FOR SETUP OF FIRST TESTBED ON SELECTED SITES

From Annex I: the product is Deliverable D4.2: Prototype, at the end of M6.

For selected sites: Testbed installation: hardware installation, manpower allocation, network monitoring, implementation of authentication and authorization procedures (CA & RA)

For Task 4.0 (Testbed coordination and management): Coordinate first testbed release with intensive Integration Team support.

For Task 4.1 (Testbed set-up and incremental evolution): First testbed project release, extending initial setup to selected nodes.

For Task 4.2 (Integration with DataGrid): Comparison with DataGrid testbed situation and study the possibility of test of a simple application.

For Task 4.3 (Infrastructure Support): Prepare Installation Kit and HelpDesk setup.

For Task 4.4: (Verification and Quality Control): Apply first verification procedures.

1.3. DEFINITIONS, ACRONYMS, AND ABBREVIATIONS

CrossGrid/X#	The EU CrossGrid Project IST-2001-32243
DataGrid/EDG	The EU DataGrid Project IST-2000-25182
GRID	Grid framework for sharing of distributed resources.
MPI	Message Passing Interface.
MPICH-G2	Grid-enabled implementation of MPI.
HTTP	Hypertext Transport Protocol.
WP	Work Package
VO	Virtual Organization
CE	Computing Element (EDG).
SE	Storage Element (EDG).
API	Application Programming Interface
MySQL	An Open Source Database following SQL92
RPM	Red Hat Package Manager
LCFG	Local Configuration Tool
OGSA	Open Grid Service Architecture

2. INITIAL TESTBED SETUP

2.1. TESTBED COORDINATION AND MANAGEMENT AND INITIAL SETUP

The deployment of the first testbed on selected sites has required a highly qualified technical work. The Integration Team, as the basic technical force to manage testbed releases, has provided this expertise. The team is integrated by Jorge Gomes from LIP, Marcus Hardt from FZK, Santiago Gonzalez and Javier Sanchez from CSIC (Valencia), Rafael Marco from CSIC (Santander), Christos Kanellopoulos from AuTH, and Pawel Wolniewicz from PSNC.

The CrossGrid Integration Team met at CERN along the first week of July. The objective was double: first the meeting put in contact, for discussion and learning, people from different sites, and second, they met with the EDG Integration Team working in the EDG testbed 1.2 .

For the initial testbed, the EDG standard installation procedure has been followed, as explained in detail in the description of the test and validation testbed (appendix A).

The first testbed setup has taken place with LIP (Lisbon, Portugal) leading the efforts and joining already by end of June to the EDG 1.2 beta development testbed, and soon followed by FZK (Karlsruhe, Germany). Also LIP has achieved the setup of the first CrossGrid Virtual Organization, for test issues. The list of sites now included in the test VO running EDG 1.2.0 includes also CSIC, and DEMO (Athens, Greece), and also USC (Santiago, Spain, with the testbed resources at CESGA), and AuTH(Thessaloniki, Greece) have installed this middleware and started the tests, and will be the next sites included in the VO.

In parallel the coordination between all CrossGrid sites has continued, tracking the installation situation both for hardware and software, with meetings via VRVS, and also using the WP4 e-mail list. The objective is to have the initial testbed installed before end of September of 2002. This information and the updated situation with respect to the D4.1 deliverable is described in detail through the WP4 webpages http://grid.ifca.unican.es/crossgrid/wp4 .

Implementation of Authentication and Authorisation Procedures

The work of the **Certification Authority** (CA) group has been centered on the extension of the CAs infrastructure already existing from the DataGrid project following the policy of having one CA per country. New CAs for Slovak Republic (II SAS in Bratislava), Greece (University of Thessaloniki) and Poland (PSNC in Poznan) have been deployed. The procedure has included the hardware installation of the CA machine, the CA software, and the elaboration of the Certification Policy Statement document. During the EDG CA meeting in Prague on 27th of June, the new CA sites were presented, and the plan for their integration was discussed. The CPS documents have been reviewed inside the CrossGrid CA group, and improved, so the new sites are ready for acceptance. Certificates have been already tested in the first CrossGrid testbed. All the updated information including the CPS documents, CA certificate files and revocation lists are available through the corresponding web page http://grid.ifca.unican.es/crossgrid/wp4/ca . All the CA issues have been discussed in WP4 VRVS meetings, and also CrossGrid has been present in the CA meetings inside EDG (last one in Prague, and next one coming in November).

2.2. INTEGRATION WITH DATAGRID

As indicated above, the initial testbed is using the EDG testbed software, version 1.2.

Two CrossGrid sites have joined the EDG development testbed: LIP and FZK. The initial plan for including more CrossGrid sites in a common testbed with EDG when version 1.2 was released by the end of July, has been modified to wait for the release of version 1.3 that will be more suited to be widely distributed, with the objective of reducing the support complexity.

The collaboration with EDG is progressing well, in particular for the work on the HelpDesk (task 4.3) and test procedures (task 4.4).

Other collaboration point will be the test of applications in the testbed. EDG HEP applications have been selected for test in the CrossGrid testbed: the ATLAS and CMS MonteCarlo Simulation are included in the EDG 1.2 release, and FZK and CSIC will run them in the CrossGrid testbed and report both to EDG and the Collaborations on problems and experience with them.

The status of the CrossGrid testbed was presented in the 5th EDG meeting in Budapest, in the corresponding EDG WP6 (Testbed) session by Marcus Hardt (FZK).

2.3. INFRAESTRUCTURE SUPPORT

Two main points have been addressed for the initial testbed: the Software Repository and the Help Desk. We start describing the main features and the present status of the CrossGrid HelpDesk.

2.3.1. **User Support: Help Desk (J.Salt)**

User Help Desk Goal

User Help Desk infrastructure should allow all CrossGrid testbed users to get support for encountered problems or questions and should allow access to the CrossGrid user documentation. Most of the guidelines written in this document have been agreed between the User Support representatives of DATAGRID and CROSSGRID in order to have similar Helpdesk utilities and to take profit of the experience coming from both projects. A user could be a scientist using the CrossGrid or a local system administrator of a CrossGrid Testbed site. Users can ask all kind of questions related to the CrossGrid Testbed; i.e. certificate, installation questions, network security, resource broker, etc.

The Help Desk Database administrator will take care of the utility and will control the efficiency of the method trying to improve it if possible.

Structural Organization

A single knowledge base contains the solutions to problems encountered during testbed operation. Users and the user support team will access this knowledge base by a WEB browser written in PHP. Ultimately this system will be extended to a self-help system (FAQ= Frequently Asked Questions) and will provide access to the Testbed documentation (Software use and installation, general use of the Testbed,...).

Levels of Services:

Three hierarchical levels of services will be provided: the User Level, the Expert Level and the Administrator Level. Let's see each one of them:

User level: the user can send the question and the service will acknowledge receipt of the problem. At this point the user may directly try to find the answer the his/her question by consulting the answers to previous questions which have been stored in the Data Base. The questions which can not be solved immediately using this procedure are reoriented to the relevant expert group.

Expert Level: is therefore composed of identified experts in several categories defined as: middleware groups, integration, Validation team, Site Administrators, etc, They will answer the questions issued by the users.

DB Administrator level: The HelpDesk Database will have one administrator who will control the whole procedure and will maintain the DB in good shape.

To launch the process, the support team will be composed of testbed users and site administrators who know and have used the testbed software. For a specific period (one week) one person of the team will be on duty and assigned to receive and manage the flow of questions.

The Question-Answer Mechanism

When a question is received, an acknowledgement ticket is sent to the user with the request number. A single member of the user support team will follow the question until its resolution.

All questions will be classified into one or more topic(s) and choose one or more key word(s) to the knowledge base by the user. The User Support team will check these actions done by the user in order to have an adequate checking of the proper handling of the DB.

These inputs will constitute the FAQ interface service which will allow to the user to consult the knowledge base before to send a given question. If the user found the adequate answer to his/her question , it will not be necessary to formulate the question.

In any case, the proposed solution will have to be tested by the user support team before being sent back to the user and updated in the knowledge base.

The Knowledge Base

Information is stored in the knowledge base according to the following tables:

For Questions:

Question table:

#request,#topic

Question-key-word table

#request, #key words

Question-forwarded table

#request, #owner of the forwarded request (expert)

For answers:

Answer table:

#request,#answer,answer text

Answer-owner table

#answer, #answerer (could be few lines for a an answer)

General Information:

Topic table

#topic, wording, #expert person

Key-word table

#key word, wording

Person table

#person, name, e-mail, phone,

Initial Choice

To launch the process it has been decided to implement a knowledge base on MySQL and a Graphical Client based on PHP.

Status of the implementation

The status of the implementation at IFIC (CSIC) –Valencia is the following:

a. 1 PC is devoted to the installation of the Helpdesk Data Base and the development of the different services provided by the Help Desk Utility;
b. Most of the actions to be covered by the levels 1 and 3 of section 2 have been implemented: send user questions to the Help Desk, close them, to consult the Data Base,etc;
c. The implementation of level 2 (Expert Level) described in section 2 is in progress;
d. Additional effort to assembly the different levels is needed.

2.3.2. The CrossGrid software repository (M.Hardt)

The Software Repository

The Software repository will be the central point of code exchange from the developers point of view. This is not so central, since there will be another Software Repository for WP3-developers in Posnan, but it will be the central Repository from a non WP3-member point of view. The basic function of a Central Software Repository is to keep track of changes to the source code made by developers. CVS is the state of the art method on which the cooperation agreed to use. (visit http://cvs.fzk.de to learn more about it). To improve its usability, a web frontend (see http://cvs.fzk.de/cgi-bin/viewcvs.cgi) has been installed. It provides an easy access to the sources and easy accessible information about who made which changes to it.

The Gridportal website

Communication is very important: to optimize communication a collaborative development platform -- GRIDPORTAL -- is currently being installed (visit http://gridportal.fzk.de to see it improving). This software is based on Savannah, the GNU branch from sourceforge, which had a very high recognized impact on the Open Source scene. The gridportal is a project oriented service. I.e. A task leader has to register a project. Note that a gridportal-project and the CrossGrid project are not to be mixed up. Every user can be a member of several gridportal-projects. He just needs to be given a membership by the respective owner of the projects.

A project offers the following features:

- General information page.
- New service: shows project news right after logging into the project.
- Discussion forums: similar to mailing lists but with more focus to online-communication.
- Mailing lists: similar to forums, both might be unified in the future.
- Download service: for file distribution. File collections can be dynamically created on a daily basis.
- Bugtracker: a bug tracking system similar to BugZilla.
- Trackers/Task Manager: a more generic, customizable Bugtracker. Can be used for feature requests and sub-task management.
- CVS: Direct link into the CVS repository of the task.

For a more detailed description there is a tutorial for the demo-system of the Central Software Repository, which was based on Sourceforge on http://gridportal.fzk.de/tutorial. It will be replaced by an up to date version soon.

Nightly Builds

The experience in Software development (e.g. from DataGrid) shows that nightly builds are essential for robust software. It is natural to run them at the Repository. The main reasons for nightly builds are:

- To have a coherent release build and early detect broken code.
- Compilation takes place frequently so that dependency problems are scotched.
- Compilation takes place on a reference platform. This avoids discussions about platform issues and concentrates them on few discussions only about that reference platform.
- Create packages for distribution.
- Check basic functionalities of packages.
- Create documentation (javadoc, doxygen, ...)

To accomplish this, we would like to use the Autobuild toolset developed within the DataGrid project. These tools provide a framework automatically performs a the following tasks:

- builds each package: configure, autotools, ant, make, ...
- generates documentation: make userdoc, make apidoc
- generates distribution files: make dist, make RPM
- runs specific checks: make check

Along these tasks it generates a set of webpages containing detailed output.

This involves the developers in the way that they have to follow the guidelines to enable the nightly builds: I.e. Developers must provide the make targets and a build method as mentioned above. This might not be easy for most existing software projects and will be discussed in detail in Integration Team meetings and in the appropriate mailing lists. However, when starting new projects from scratch we provide developers with an example project which might be quite interesting for existing projects as well. This example project is based on the edg-example project and will be found as cg-example in the cvs-repository as soon as it has been ported.

2.4. VERIFICATION AND QUALITY CONTROL

The Test and Validation testbed architecture, is described in detail in appendix A.

3. APPENDIXES

3.1. APPENDIX A: TEST AND VALIDATION TESTBED ARCHITECTURE

See attached document CG-4-D4.2-002-TEST.DOC

Abstract: This document provides an overview of the technologies that can be used in CrossGrid and describes the initial architecture for the test and validation testbed.