



CONTRACT NUMBER 508830

DEISA
DISTRIBUTED EUROPEAN INFRASTRUCTURE FOR
SUPERCOMPUTING APPLICATIONS

European Community Sixth Framework Programme
RESEARCH INFRASTRUCTURES
Integrated Infrastructure Initiative

HSM layer v1.0

Deliverable ID: DEISA-DJRA7-3.5

Due date : January 31st, 2005
Actual delivery date: February 22, 2005
Lead contractor for this deliverable: EPCC, UK

Project start date: May 1st, 2004
Duration: 5 years

Project co-funded by the European Commission within the Sixth Framework Programme (2002-2006)		
Dissemination Level		
PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission	
CO	Confidential, only for members of the consortium (including the Commission Services)	

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1. Introduction

This document reports on the deliverable DEISA-DJRA7-3.5 'HSM layer v1.0' Task 3.3 'Design & implementation of HSM layer release 1.0' in Work Package 3 of the DEISA JRA7 activity [1]. This is a public deliverable classified as 'other' in [1].

Please note that the acronym, HSM, is more commonly used to refer to Hierarchical Storage Management. To avoid possible confusion within this document, the acronym DESHL rather than HSM is used for the Heterogeneous Service Management layer. DESHL is derived from the term **DEISA Services for the Heterogeneous management Layer**. This term more accurately describes the purposes of this layer in the DEISA infrastructure. The acronym HSM is as far as is possible only used in the titles of deliverables previously named in the DEISA Description of Work [1].

The objectives of DEISA JRA7 are to develop a means for coordinating and integrating OGSA (Open Grid Services Architecture)-based services [2] for distributed resource management (DRM) in a heterogeneous environment, the Heterogeneous Service Management layer (DESHL), and to use this to integrate a variety of existing user-level tools to provide the necessary high-level services in:

- ? authentication, authorisation and accounting;
- ? job preparation, submission and monitoring;
- ? data movement for job input and output;
- ? other areas to be determined by DEISA user requirements.

This document uses UML 1.0 notation for the UML [3] diagrams.

1.1 *Executive Summary*

This document reports on the initial release of the DEISA JRA7 DESHL software. This release contains the Web service interface for job submission to the DEISA heterogeneous environment. This is defined in WSDL (Web Services Description Language).

1.2 *References and Applicable Documents*

- [1] DEISA Annex I – “Description of Work”, November 5th 2003.
- [2] OGSA, <http://forge.gridforum.org/projects/ogsa-wg>.
- [3] UML, <http://www.uml.org/>
- [4] DEISA JRA7 “Quality Plan”, D-JRA7-1.1 v1.0.
- [5] SAGA GGF, <https://forge.gridforum.org/projects/saga-rg/>
- [6] Functional scope for HSM v1.0, DEISA-JRA7-3.1 v1.0

- [7] Final Design for HSM v1.0, DEISA-JRA7-3.4 v1.0
- [8] Web Services Resource Framework, http://www.oasis-open.org/committees/tc_home.php?wg_abbrev=wsrf
- [9] UNICORE, <http://unicore.sourceforge.net>
- [10] OpenMolGRID, <http://openmolgrid.org/>

1.3 Document Amendment Procedure

The document procedure is covered in the Quality Plan [4] (Section 5.6).

1.4 List of Acronyms and Abbreviations

API	Application Programming Interface
CLI	Command Line Interface
CLT	Command Line Tool
DEISA	Distributed European Infrastructure for Supercomputing Applications
DESHL	DEISA Services for Heterogeneous Management Layer
DRM	Distributed Resource Management
HPC	High Performance Computing
HSM	<i>Heterogeneous Service Management layer (deprecated)</i>
JRA7	Seventh Joint Research Activity
NJS	Network Job Supervisor
OGSA	Open Grid Services Architecture [2]
OpenMolGRID	Open Computing GRID for Molecular Science and Engineering [10]
SAGA	Simple API for Grid Applications [5]
SOAP	Originally Simple Object Access Protocol, now XML-based protocol for exchanging information
UML	Unified Modelling Language
UNICORE	Uniform Interface to Computing Resources [9]
WS	Web service
WSDL	Web Services Description Language
WSRF	Web Services Resource Framework
XML	eXtensible Markup Language

2. Background

The DESHL functional scope and background can be found in the 'Functional scope for HSM v1.0' document [6]. The design is presented in 'Final Design for HSM v1.0' [7].

3. Contents of DESHL v1.0

DESHL aims to provide service-based access to DEISA resources. An instance of DESHL will be hosted within a Web services container at a DEISA site. In the extended heterogeneous DEISA infrastructure, sites have different HPC resources but all sites will provide access to those resources via UNICORE [9]. A DESHL at one site will provide access to the UNICORE services at that site and other sites.

This initial DESHL release contains the Web service interface for job submission to the DEISA heterogeneous environment. This is defined in WSDL by all partners. Those sites participating in the DEISA heterogeneous environment can present this Web service interface. This Web service can then be accessed by user tools at client sites. This initial DESHL release forms the fundamental layer necessary for integrating user-level functionality with the DEISA job submission service.

As shown in Figure 1, the DESHL v1.0 comprises the DESHLManager and DESHLJob port types as originally described in [7]. DESHLManager provides the functionality for creating and submitting a job with DESHLJob providing the functionality for monitoring a job and destroying it.

It should be noted that DESHL v1.0 is based on editors' drafts of WSRF [8]. At the time of writing these drafts were considered to be in a relatively stable state.

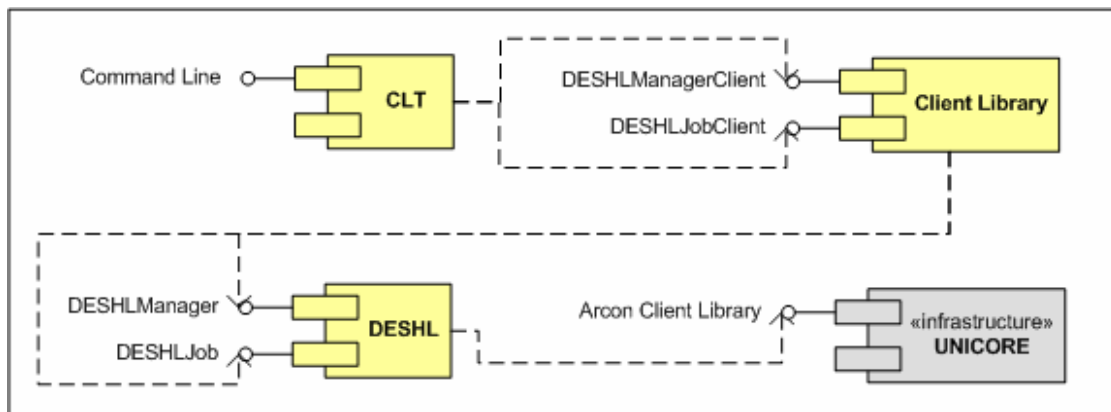


Figure 1: UML Component diagram of DESHL 1.0 from [7]

4. Use of DESHL v1.0

DESHL v1.0 is currently being used by developers at EPCC to build the user tools for OGSA-based batch job management in the DEISA heterogeneous environment. This involves building a user command line tool (CLT) and Client Library as shown in Figure 1. The CLT interacts with the Client Library which in turn provides access to the DESHL and hence the DEISA HPC resources.

Developers at FZJ are building the server-side implementation of the Web services interface (as expressed by the WSDL in DESHL v1.0). This implementation is based

upon UNICORE[9] and a higher level UNICORE API from the OpenMolGRID [10] project.

The architectural diagram in Figure 2 illustrates the relationship between the DESHL Web Services and the UNICORE Helper classes and where these sit in the overall DEISA heterogeneous environment stack.

As part of the development of the CLT, Client Library and UNICORE Helper classes, the DESHL is constantly being tested and if necessary updated.

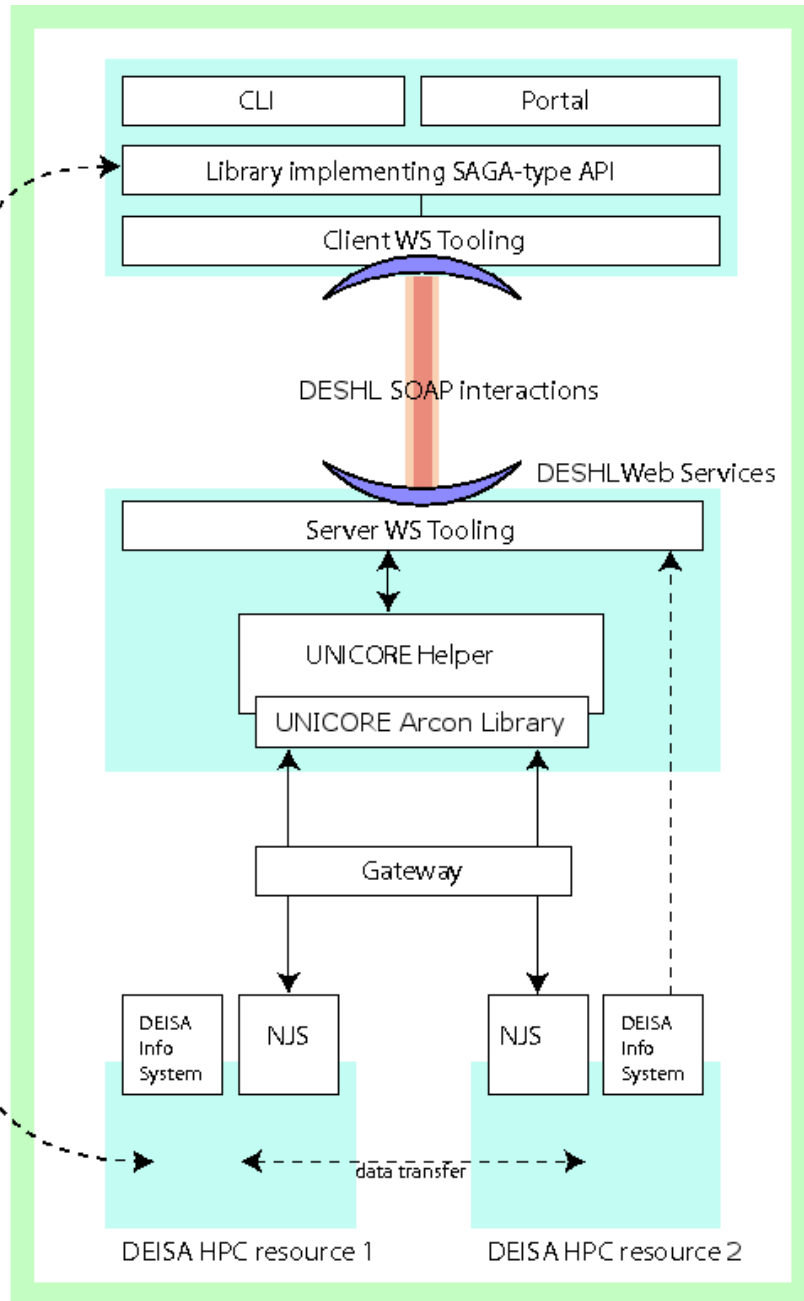


Figure 2: Architectural Layers from [7]

The DESHL along with the CLT, Client Library and UNICORE helper classes will be demonstrated as part of the deliverable D-JRA7-4.1 'Demo of core user management tools on HSM' due in April 2005 (project month 12).

5. Availability of DESHL v1.0

DESHL v1.0 is a public release and at the time of writing can be obtained from the DEISA JRA7 NeSCForge development site at <http://forge.nesc.ac.uk/projects/deisa-jra7/>.

The release is contained in a zip archive that contains the following files:

- ? `deshl.xsd` – this file contains the XML schema for the types used in the DESHL
- ? `deshljob.wsdl` – the WSDL for the DESHLJob port type
- ? `deshlmanager.wsdl` – the WSDL for the DESHLManager port type
- ? `D-JRA7-3.4-Final-Design.doc` – DEISA JRA7 deliverable, DEISA-JRA7-3.4 v1.0 'Final Design for HSM v1.0' [7]
- ? `D-JRA7-3.5-HSM-Layer-V1.doc` – a copy of this document, that is the DEISA JRA7 deliverable DEISA-JRA7-3.5 'HSM layer v1.0'