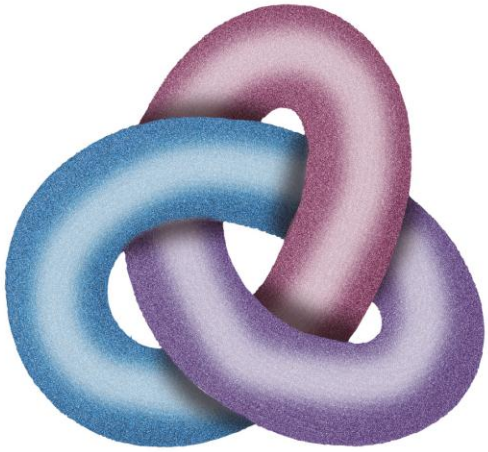

DRIHM

DISTRIBUTED RESEARCH INFRASTRUCTURE FOR HYDRO-METEOROLOGY

D5.3: Report on Best Practices

Abstract: This document describes best practices for using the DRIHM e-infrastructure. We comment on the status of the DRIHM services and infrastructure and outline the progress achieved with respect to collaborations with other European infrastructure projects

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DISTRIBUTED RESEARCH INFRASTRUCTURE FOR HYDRO-METEOROLOGY

Table of Contents

1 Executive Summary

The aim of this deliverable is to report on best practices experienced and adopted during the course of the DRIHM project. We comment on the status of the DRIHM services and infrastructure and outline the progress achieved with respect to collaborations with other European infrastructure projects, including EGI, and PRACE. As the topics covered by this deliverable are expected to evolve over time, this document is considered to be a living document that will be regularly updated to reflect the latest state of the DRIHM services and infrastructures.

This deliverable reports on best practices in regard to the organisation of the DRIHM service activities, deployment and operation of DRIHM services. Although the DRIHM project neither does deploy any services during its first year nor will there be any test bed released, the report already describes some of the envisioned components as they are perceived now. Further extensions to this report will go into details. These components are necessary for implementing DRIHM Experiment Suites 1, 2 and 3.

This report is a living document the initial version of which is due in month 12. Subsequent versions will be published as addenda to this report in months 30 and 42.

2 Introduction

One of the main goals of the DRIHM project is the implementation and operation of a distributed and inter-organisational e-Infrastructure for Hydro-Meteorology Research (HMR) capable of supporting the execution of complex HMR workflows as described in [1] and exemplified in Experiment Suites 1, 2, and 3. In order to successfully fulfil the objectives, DRIHM partners not only need to comply with procedures and policies as defined by European e-infrastructures. Rather, they also need to efficiently leverage application execution environments using best practices experienced during the course of the DRIHM project. The focus of DRIHM WP5 (Infrastructure Operation and Management, Data and Resource Management) is therefore twofold: Firstly, to assess the existing procedures; and secondly, to define adequate operational procedures and best practices.

This document describes standardised best practices that were adopted by DRIHM as well as methods that were formalised and implemented by partners during the course of the DRIHM project. The practices of interest in the context of the DRIHM service activities cover the areas of documentation, support, service development, integration and deployment as well as operational practices of the research infrastructure. To facilitate the collaboration with European e-Infrastructures DRIHM pays close attention to the practices established by EGI [2], PRACE [3], and the National Grid Initiatives (NGI). For an assessment of these practices DRIHM strongly relies on the experience of its partners and public deliverables published by the European e-infrastructure projects. We also refer to [4] and [5] for a more detailed description of the DRIHM operational model and the corresponding DRIHM support concept.

This document will be regularly updated to reflect changes in the internal organisation of the project and developments of the infrastructure operated by DRIHM. Updated versions will also reflect experiences and suggestions communicated via the DRIHM User Forum (DUF, http://www.drihm.eu/index.php/forum).

3 DRIHM Test Bed

DRIHM services and applications have to pass a thorough testing and validation process before being installed on the DRIHM e-Infrastructure (or on European e-infrastructure resources respectively). The tests have to confirm that the software to be deployed fulfils functional and system requirements and is able to interact with other services and the environment the particular software is deployed into. Such interactions include, for instance, runtime characteristics of the service processes, communication with the operating system, drivers and low-level libraries, interoperability with DRIHM services. Figure 1 depicts the interdependencies between the DRIHM service activities as required to fulfil this task (extracted from [1]).

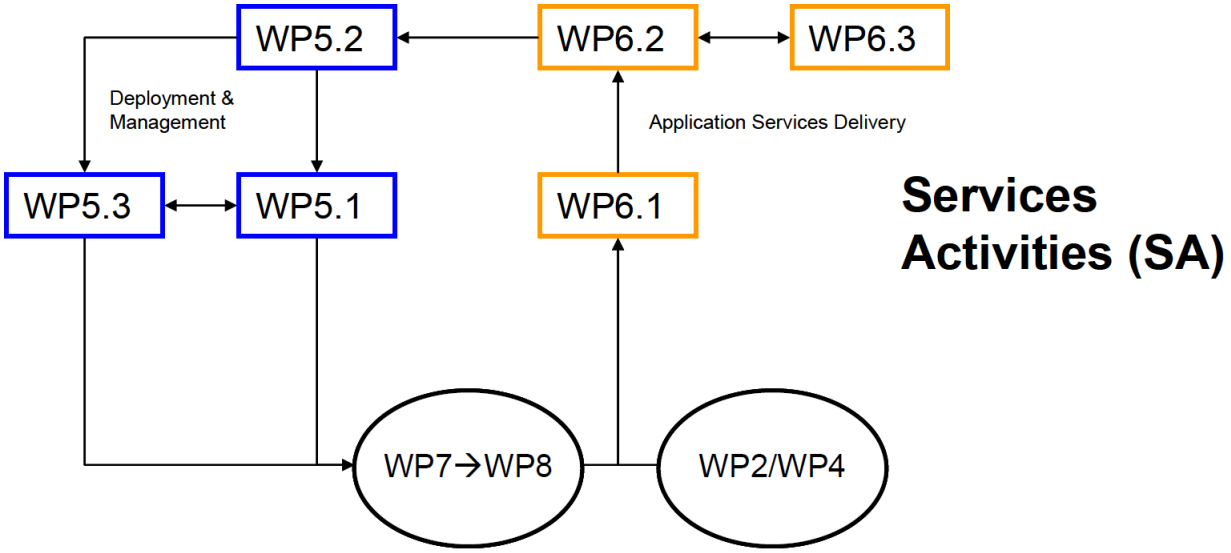

Figure 1: Interdependencies between service activity tasks [1]

To support the service validation process a DRIHM test bed is being established. The test bed is designed to act as a platform supporting pre-production DRIHM service validation and benchmarking activities. The test bed comprises computing and storage resources provided by

several National Grid Initiatives (NGI) with support from the EU funded project "Initiative for Globus in Europe (IGE)"[1]. In particular, resources are available from (see Figure 2):

- the German Leibniz Supercomputing Centre (LRZ), Germany
- the University of Southampton (SOTON), United Kingdom
- the Technical University Dortmund (TUDO), Germany
- Universitatea Tehnica Cluj-Napoca (UTCN), Romania
- Universidad Complutense de Madrid (UCM), Spain
- Poznan Supercomputing and Networking Center (PSNC), Poland
- the Uppsala Universitet (UU), Sweden
- the University of Edinburgh – Edinburgh
- Parallel Computing Centre (UEDIN-EPCC), United Kingdom
- the Stichting voor Fundamenteel Onderzoek der Materie – Institute for Subatomic Physics (FOM-NIKHEF), The Netherlands

In addition, this test bed is being extended for DRIHM purposes by French resources provided in Toulouse and Italian resources from CIMA and IMATI. The intention is to have the DRIHM test bed represent a variety of architectures and platforms, which allows DRIHM partners to prepare services and applications for a final production deployment in the PRACE and EGI environments. As such, the test bed serves all DRIHM work packages for testing HMR scientific applications.

Results of the service validation and benchmarking procedures are recorded and can be shared with collaborating institutions and projects upon request (like, e.g., the MAPPER project, http://www.mapper-project.eu).

While the full DRIHM architecture stack is shown in Figure 3, Figure 4 depicts (in non-black) the components relevant for the DRIHM test bed. In particular, the test bed is Globus[2]-based with a SCI-BUS[3] portal and the SHIWA[4] workflow system.

[1] http://www.ige-project.eu/home

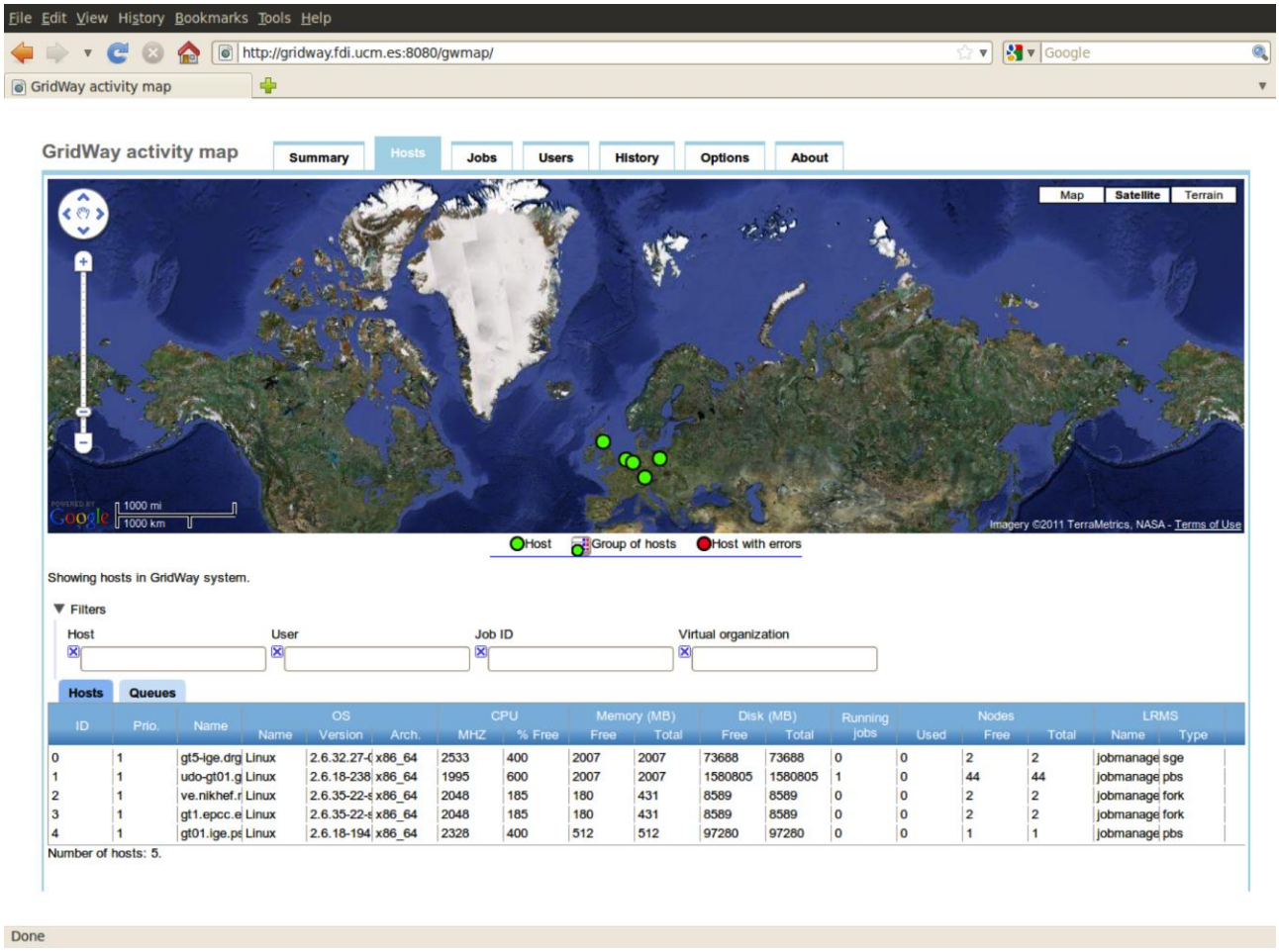

Figure 2: IGE test bed

Using the test bed requires a membership to the DRIHM Virtual Organisation (DRIHMVO), managed by LMU.

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[2] http://www.globus.org/toolkit/

[3] http://www.sci-bus.eu/introduction1

[4] http://www.shiwa-workflow.eu/

The full details of the DRIHM test bed will be published as a separate report in February 2013 which will specify how to extend the test bed, how to access it, and how to use it.

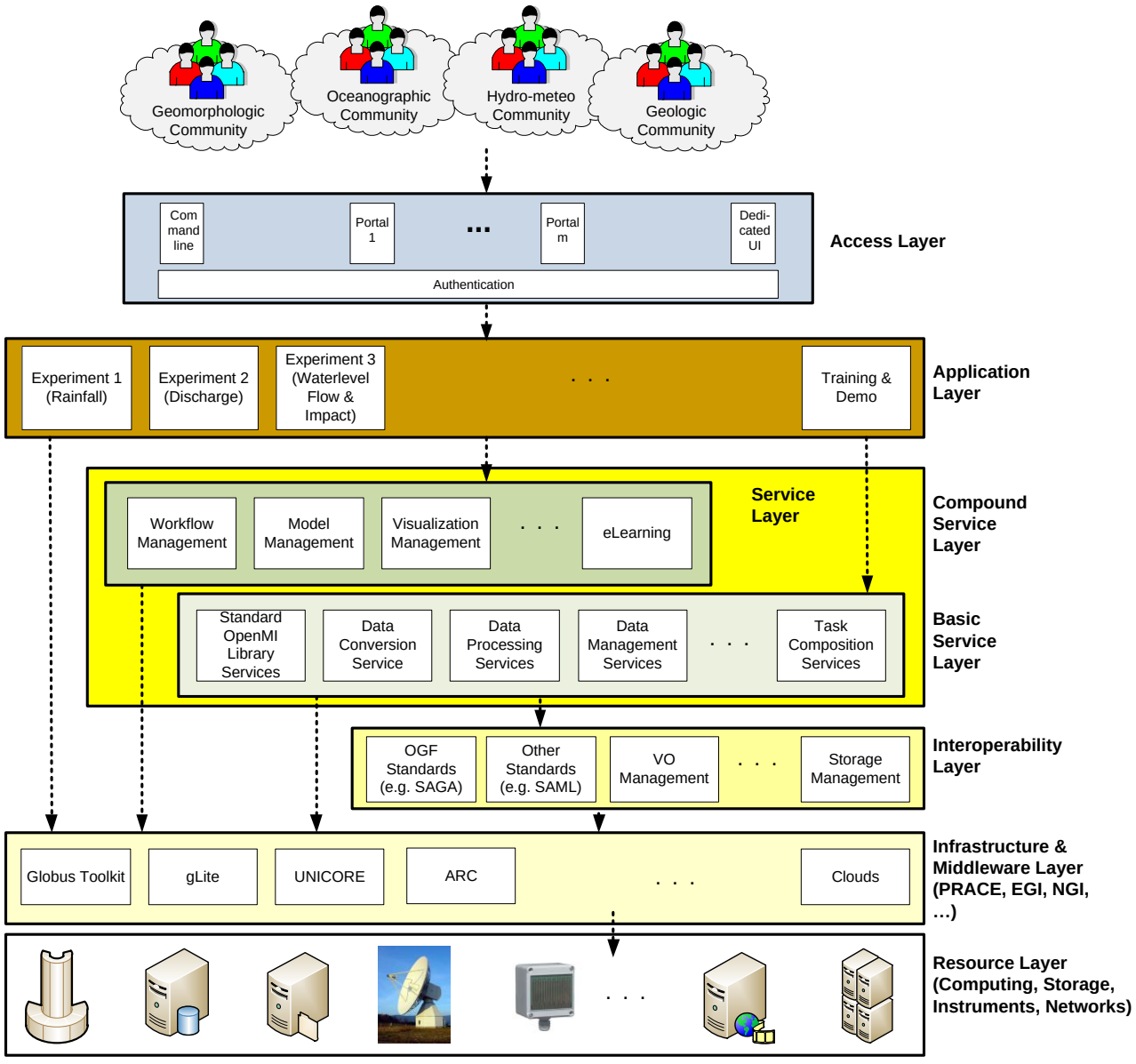

Figure 3: DRIHM architecture stack [1]

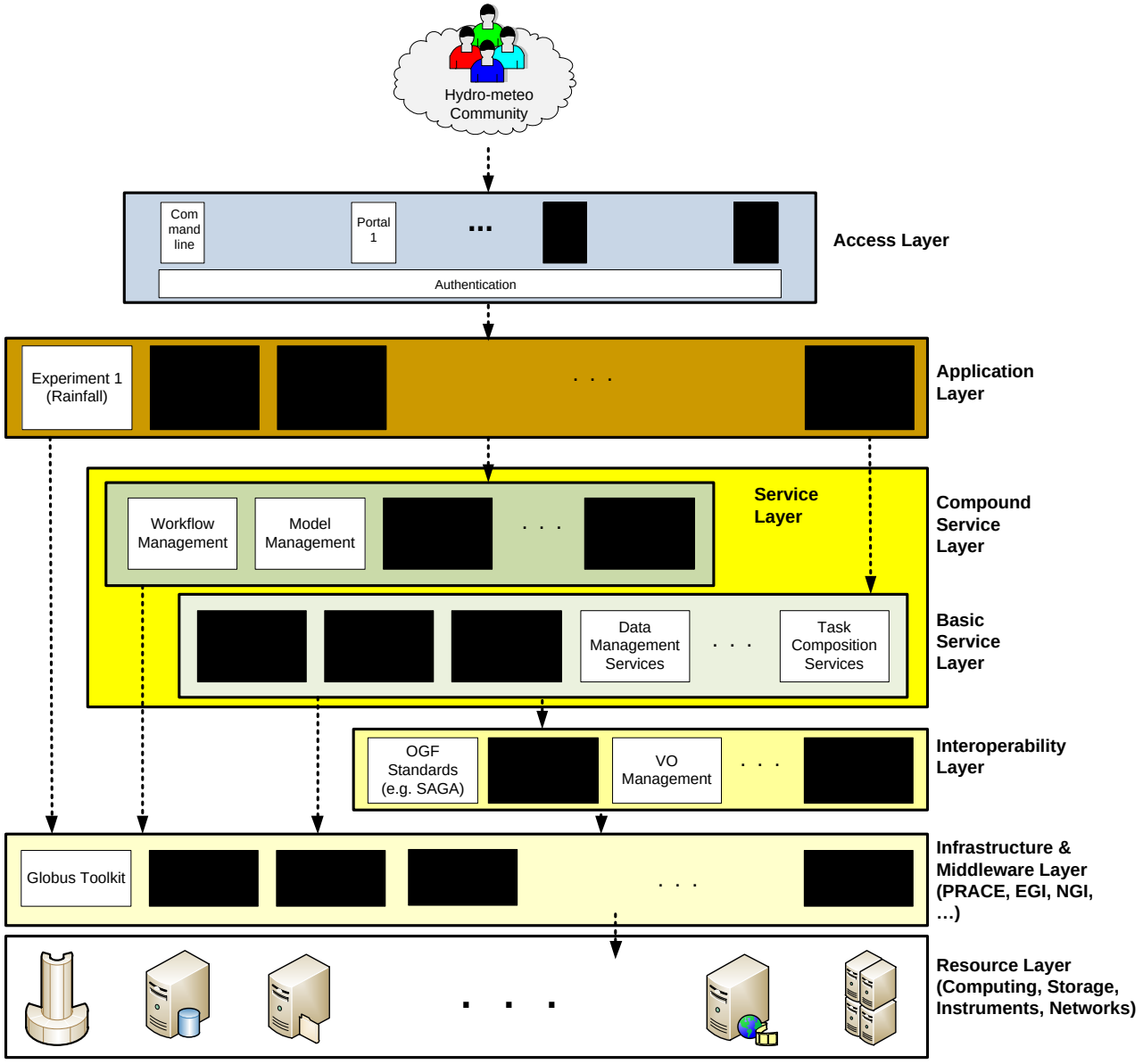

Figure 4: DRIHM test bed components

4 DRIHM Service Activities

The task of the DRIHM service activity work packages, WP5 and WP6, is to evaluate, test, deploy, operate and verify the mutual integration of DRIHM services. These work packages have to ensure that DRIHM services are in line with the project requirements and that they are able to facilitate the execution of HMR applications upon distributed European e-infrastructures. The two work packages are thus central to DRIHM's success. Figure 1, Figure 5, and Figure 6 (all from [1]) depict the interrelationships between the work packages.

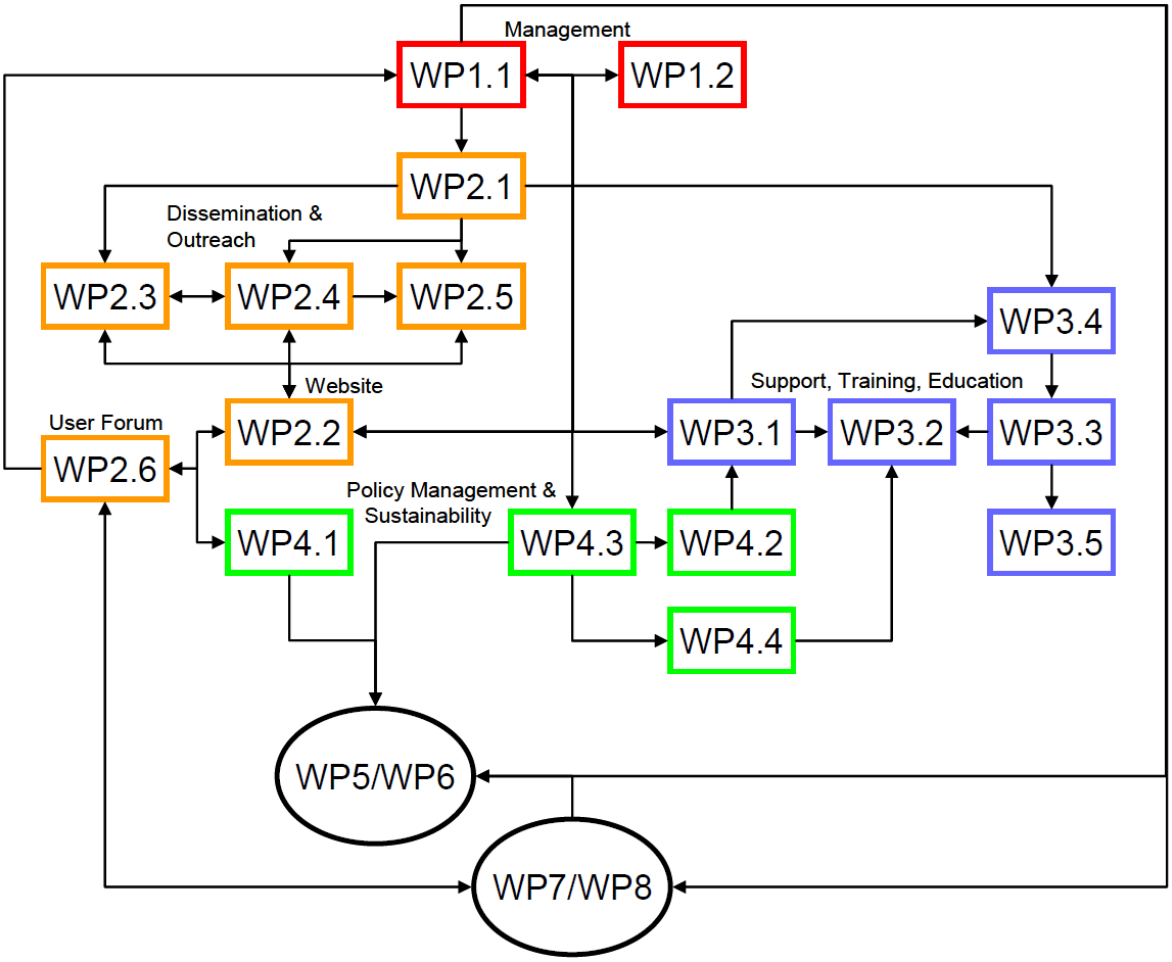

Figure 5: Interdependencies between networking activities and service activities

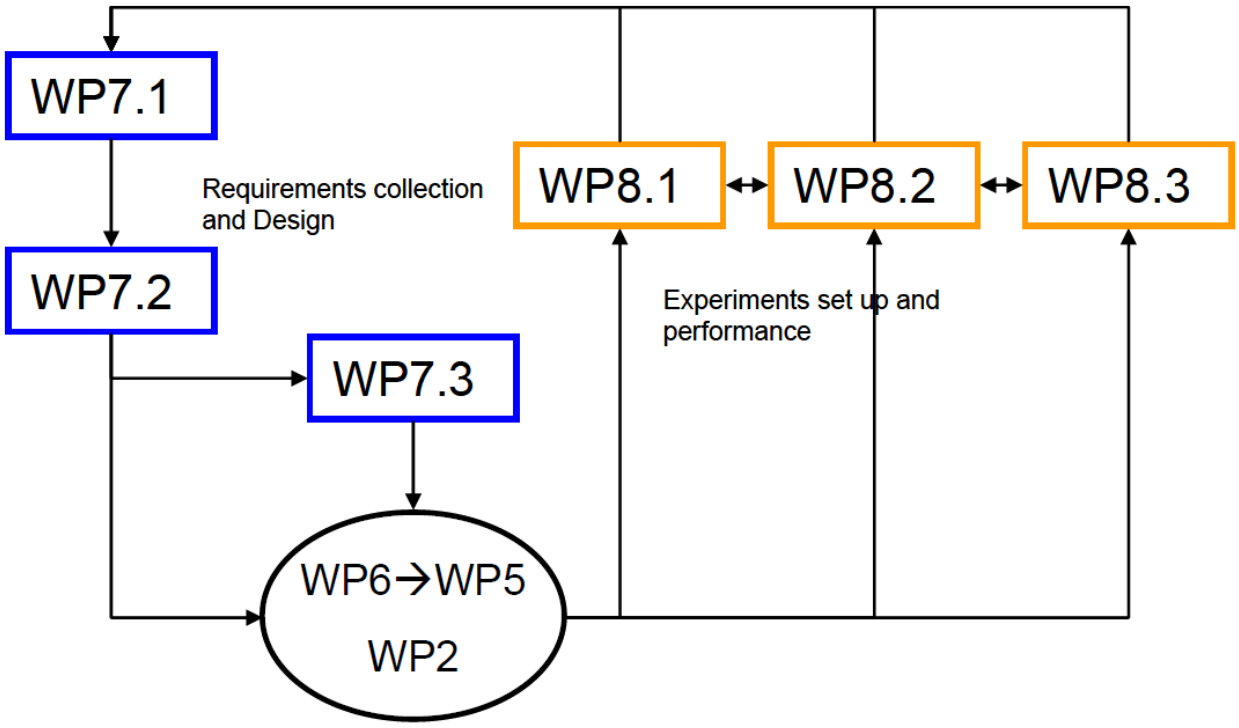

Figure 6: Interdependencies between service activities and joint research activities

In order to improve the internal communication among the service activities themselves and among service activities and network/joint research activities, a number of best practices were adopted. Monthly[5] teleconferences are held involving project partners responsible for the service activity work packages. This mechanism not only accelerates planning and coordination of work, it also improves communication and information exchange among project partners. When possible, face-to-face meeting are organised to coordinate the work in the large. Additionally, DRIHM established a cross-work package technical workgroup to address technical issues related to the DRIHM infrastructure.

As a result, this cooperation model is working quite well yielding substantial achievements in preparing both the DRIHM research infrastructure and its pre-production test bed.

[5] The period may change to "weekly" as the project progresses.

Based on the experience of other projects, DRIHM has adopted a wiki-type solution for internal documentation, planning and information exchange via a restricted area on the project's home page (http://www.drihm.eu/index.php/restricted-area) and a private area in the DUF (http://www.drihm.eu/index.php/forum).

In addition, the service activity work packages have adopted best practices in the area of service delivery, service monitoring, service quality assurance, and service repair. In particular, DRIHM complies with the incident and problem management standards as exhibited by the respective ISO/IEC 20000 processes. For more details we refer to [4].

4.1 Service Deployment

Best practices for service deployment are not yet applicable for the first year report.

4.2 Monitoring and Quality Assurance

Best practices for monitoring and quality assurance are not yet applicable for the first year report.

4.3 Documentation and Support

Comprehensive documentation for services and applications is crucial for successfully coordinating the DRIHM work packages, especially the service activities and the joint research activities. Therefore an environment able to support collaborative work of multiple activities was necessary. A wiki-type solution was chosen by the project partners to address this need. The document repository is divided (see also [1]) into a public area (http://www.drihm.eu/index.php/documents) and a restricted area (http://www.drihm.eu/index.php/restricted-area).

While the restricted area acts as a central place for all work packages to publish project relevant documents that should be available to all project partners, the public area collects all documents that cover DRIHM infrastructure components, including application and service installation and administration manuals, user guides and tutorials for DRIHM users who are

willing to run complex HMR applications, and for e-infrastructure operators charged with the installation and configuration of DRIHM components on production e-infrastructures. The documentation of DRIHM services is regularly revised and extended, for instance, to address platform specific requirements. The repository thus plays an important role in achieving the sustainability goals of the DRIHM project.

To facilitate the deployment process of all successfully validated software components, a DRIHM service description form is being designed. The form describes DRIHM applications, models, and services and provides their essential characteristics including system and security requirements. The form is filled out prior to the deployment of each service in the DRIHM e-infrastructure and is provided as a part of the service documentation package. The service description form proves to be a very successful addition to the publicly available service guides. The form greatly improves the communication between DRIHM and representatives of the EGI and PRACE e-Infrastructures responsible for deploying DRIHM services in production environments. The respective forms will be made available for each service and will be included in the respective installation and configuration manuals as part of the project sustainability efforts.

In order to support the HMR scientific community, DRIHM will operate a help desk and provide VOs and user communities with comprehensive technical assistance. Reported problems will be handled by the service activities according to the ISO/IEC 20000 practices (see [4]). Issues beyond the expertise of DRIHM will be escalated to external entities, such as application developers or service providers. A respective Memorandum of Understanding (MoU) has already been signed with EGI, others are awaiting approval (e.g., with the IGE project and with the MAPPER project).

5 Summary & Conclusions

This document is the initial version of deliverable D5.3 of task WP5.2 of the DRIHM work package 5. It outlines best practices defined and adopted by the DRIHM project. Functional areas covered in this document include the DRIHM test bed, deployment and operation of DRIHM services, monitoring, quality assurance, documentation and user support.

New best practices will be assessed and adopted over the course of the project to satisfy the evolving requirements of the DRIHM e-infrastructure. Changes and developments in this area will be reflected in the future issues of this deliverable.

This report is a living document the initial version of which is due in month 12. Subsequent versions will be published as addenda to this report in months 30 and 42.

6 Acronyms and References

6.1 Acronyms

DUF	DRIHM User Forum
EGI	European Grid Initiative
HMR	Hydro-Meteorologic Research
HPC	High Performance Computing
IGE	Initiative for Globus in Europe
MoU	Memorandum of Understanding
NGI	National Grid Initiative
PRACE	Partnership for Advanced Computing in Europe
VO	Virtual Organisation

6.2 References

[1] DRIHM Description of Work, Part B

[2] EGI: http://www.egi.eu/

[3] PRACE: http://www.prace-project.eu/

[4] DRIHM Deliverable D5.4: *Report on Support Process Definition*, 2012

[5] DRIHM Deliverable D5.1: *Report on the Assessment of Operational Procedures and Definition of the DRIHM Operational Model*