



Prototype of Meta Hosting Service (M2.2.2)

Version 2.0
Cluster 2
Responsible Partner JSC

DARIAH-DE **Construction of Research Infrastructures for the e-Humanities**

This research and development project is / was funded by the German Federal Ministry of Education and Research (BMBF), fund number 01UG1110A to N, and managed by the Project Management Agency of the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt, PT-DLR).

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Federal Ministry
of Education
and Research

Project: DARIAH-DE: Construction of Research Infrastructures for the e-Humanities

BMBF Fund number: 01UG1110A to N

Duration: March 2011 till February 2016

Document status: Final

Dissemination level: Public

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Revisions:

Date	Author	Comment
28/04/2015	Jedrzej Rybicki	Including comments, finalizing
30/03/2015	Jedrzej Rybicki	Paper attached
18/03/2015	Jedrzej Rybicki	Initial Version

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1. Introduction

Work package 2 in Cluster 2 is responsible for enabling and integrating services for digital humanities and arts. The enabling activity is covered by the provision of resources to run the services. JSC already offers resources to the DARIAH-DE researches through IaaS OpenStack-based Cloud. Also other partners have similar offerings in their portfolio. The problem with such VM offerings is that they offer very low-abstraction. In order to run a service on such a resource, the researcher has to log in, install all the required software, and run actual service. A lot of effort, even taking into account the assistance offered by the computer centers in this process.

Meta hosting should be built upon the available VM offerings and provide higher-level Software-as-a-Service-like abstraction to the users. The goal of the meta hosting is to provide running instances of selected services (like databases) „with just one click“.

In this document we provide the high-level overview of the work conducted. A more extensive description of the problem, and implemented solution will be published in the proceedings of the 38th IEEE International Convention of Information and Communication Technology, Electronics and Microelectronics. This has many advantages. First of all the peer review substantially increases the probability that the technical approach taken were sound. The publication is also an outreach activity of the project. The final version of the paper is attached to this document.

2. Implementation

Prerequisites for meta hosting service are twofold. First of all, resources (i.e. machines) to run the services must be available. The corner stone for efficient resource provision was set in the first phase of DARIAH-DE project. Most of the computer and data centers offer access to computational resources in forms of virtual machines or even infrastructure-as-a-service clouds.

The second prerequisite for meta hosting is the availability of service installation descriptions which could be used to create the instances of the required services on available resources. Old fashion documentation listing installation steps which has to be applied manually on a machine, is clearly not sufficient. First and foremost the software description should be infrastructure-independent, and automatically deployable. There are technologies available which can be leveraged to provide such deployable descriptions. Instead of developing a new standard for the descriptions, we reviewed the existing ones, and adopted the most promising one. The details of the review can be found in the attached paper. It should be stressed, however, that the meta hosting as a system is implemented in such a way that it would be possible to integrate alternative technologies easily.

2.1. Architecture

The implemented prototype of the meta hosting service comprises following main parts:

- Web-based user interface
- Workers responsible for managing instances of particular service type
- Messaging (connecting all the parts)

Through the web-based interface, the users can request new instances of available service types, view existing instances, and descriptions of service types. The remaining components of the system are not visible to the end users. Messaging is responsible for delivering the requests issued by the users to the respective workers. Workers wait for the incoming requests, create new instances of the services on the available resources using deployable software descriptions, and sent back messages acknowledging the creation and including coordinates required to access the instances (like IP addresses, ports, and credentials).

The far reaching decoupling of the components results in high degree of extensibility. In particular it is possible to change the system capabilities during the runtime e.g. to add new services.

2.2. State-of-the-art

As explained above we decided not to create own standard for creating deployable software installation descriptions, but rather re-use an existing technology. To this end we have reviewed a number of solutions, in particular:

- Puppet,
- Chef,
- Jujuh,
- Docker.

We decided to use Docker for the prototype. A more detailed discussion of the technologies and a justification of the choice.

2.3. Prototype

The prototype of the service is available to all DARIAH-DE users under:

<https://dariah.fz-juelich.de/metahosting>

3. Appendix

See “DARIAH Meta Hosting: Sharing Software in Distributed Infrastructure”.