



EGI-Engage

Design of the EGI Service Registry and Marketplace

D3.2

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Abstract

This document details the features of the “EGI Service Registry and Marketplace” and analyses existing solutions, tools and required extensions to implement the EGI marketplace demonstrator. It is based on the concept of the EGI marketplace, defined in the EGI-Engage deliverable D2.3, and on the requirements defined there. These were collected through an ample consultation process, involving large resource providers, projects and research communities and also other e-Infrastructures.

The EGI marketplace has the ambition of becoming the platform where an ecosystem of EGI-related services can be promoted, discovered and shared, including EGI offered services as well as discipline and community-specific solutions enabled by EGI and/or provided by third parties under defined agreements with EGI. Purpose of the marketplace is to improve the discoverability and accessibility of the EGI solutions, generic and/or others thematic, while leveraging existing Virtual Research Community efforts and EC funding of Virtual Research Environments.



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DELIVERY SLIP

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TERMINOLOGY

A complete project glossary is provided at the following page: <http://www.egi.eu/about/glossary/>

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1 Executive summary

This document details the envisaged features of the “EGI Service Registry and Marketplace” and analyses existing solutions, open-source tools and extensions to implement the EGI marketplace demonstrator. This analysis is based on the concept of the EGI marketplace, as defined in the D2.3, to address the collected requirements.

The EGI marketplace has the ambition of becoming the platform where an ecosystem of EGI-related services can be promoted, discovered and shared, including EGI offered services as well as discipline and community specific tools and services enabled by EGI and/or provided by third parties under defined agreements.

The core of this deliverable is the assessment of the technologies to implement the EGI marketplace. A first analysis has been performed to identify the most promising solutions to satisfy the identified requirements. Various solutions were considered: AppDB, GOCDB, FIWARE Marketplace Generic Enabler, Open IRIS, PrestaShop and WooCommerce. The list of evaluated technologies includes: (1) EGI tools that can be extended to become a marketplace (namely, GOCDB and AppDB), (2) technologies supported by other initiatives (OpenIRIS and FIWARE), and (3) generic web tools with features suitable to the implementation of marketplaces (WooCommerce, WordPress). The amount of effort needed to implement a prototype of the EGI marketplace can vary considerably depending on the choice.

Experts in development, design and operations of user-facing tools and/or a marketplace from various academic organizations, were appointed. The following metrics were taken into consideration by the evaluators: (1) adequacy of the solution against requirements, (2) possible costs in terms of licenses and support and (3) solution supportable in terms of expertise within the EGI collaboration.

As a result of this consultation and analysis, Open IRIS and AppDB were shortlisted. The evaluation will continue in the coming months to compare different operational and maintenance models, terms of use, compliance to policies and regulations and costs of ownership, operations, development and maintenance.

This document presents the envisaged EGI marketplace technical architecture and the short-term development roadmap necessary for the release of the demonstrator in August 2016.

The business case of the EGI marketplace, including the terms of use, the operational agreements, costs and the long-term sustainability plan will be discussed in collaboration with the technology provider and SaaS provider of choice, and with the involvement of the EGI Services and Solutions Board, who is responsible of the management of the EGI service portfolio, the EGI Executive Board and Council.

2 Introduction

The primary goal of the EGI Service Registry and Marketplace is to ensure the discoverability of the EGI services (generic and thematic ones) delivered by EGI for different customer groups.

- Facilitate service discovery and reuse at the institutional and inter-institutional level across different stakeholders (see Figure 1) and hence increase the visibility of providers and access to existing expertise.
- Provide accounting and billing, to support both free-at-point of use and pay-for-use access.
- Increase competitiveness by providing a low cost of entry to expensive technologies for small academic institutions and businesses.
- Facilitate inter-disciplinary research by providing access to products and services typically considered outside of a particular field.
- Provide opportunities for collaborative improvements of products and services.
- Provide the grounds for machine actionability of services and for the possibility to compose them in workflows.

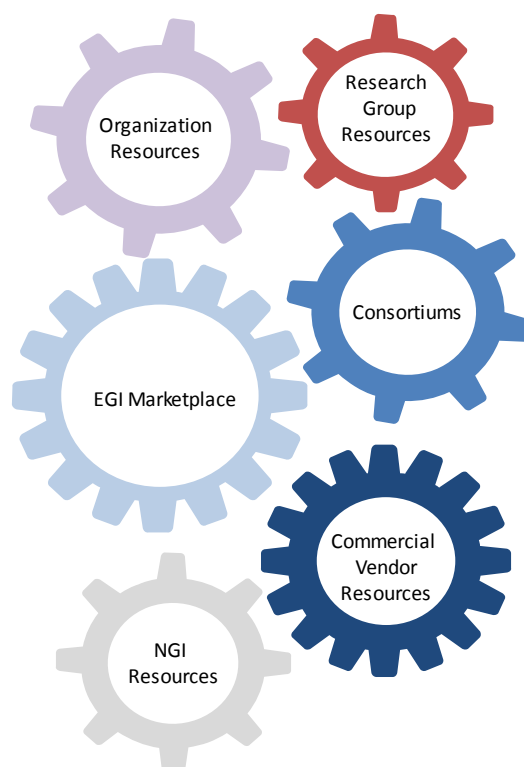


Figure 1 The EGI marketplace - Actors

The EGI Marketplace should provide functionalities necessary for bringing together offering and demand for making research.

These functions include basic services for registering business entities, publishing and retrieving offerings and demands, searching and discovering offerings according to specific research communities' requirements as well as lateral functions like reviewing, rating and recommending.

The Marketplace would provide researchers with a uniform interface to discover and match application and service offerings from providers and sources (e.g. published by different stores) with demand of consumers.

The definition of the EGI Marketplace terms of use and business model will follow the successfully implementation of the first marketplace prototype. One of the options that will be considered is the possibility for EGI to offer a "marketplace as a service" to complement the EGI marketplace business functions where needed. This approach allows resource providers (groups, facilities, organizations, etc.) to have a self-service platform to register and manage their resources creating virtual pools of resources spanning groups, organizations, consortiums, collaborations, and the research community in general. Various options and their related business cases will be considered.

In the following Sections the document examines requirements, compares tools, provides a description of the envisaged technical architecture and of the development roadmap and describes the future work.

3 Requirements

This section shows, via example screens, how the marketplace requirements identified in D2.3¹, can be addressed. This representation has been done to facilitate the work of the experts involved in the evaluation of different solutions. Please, refer to section 3.5 of the D2.3 for a full list and description of the requirements mentioned in this chapter. The actors mentioned in this section, including Service Providers and Users are derived from the marketplace roles defined in D2.3.

3.1 Service Management

This section covers the functions needed for provisioning of services to the marketplace and service management requirements. The system should support the registration of any type of service and product.

3.1.1 Service Provider

This section deals with the service provider’s perspective of service management.

3.1.1.1 Service Registration

- Service providers are responsible of adding and maintaining service descriptions (metadata) in the marketplace
- The service provider is able to register a service in the service catalogue and can specify detailed information and display options for the service including:
 - o name
 - o Service description
 - o Service instructions
 - o Service visibility
 - o Assigned pricing
 - o Usage policy
 - o Picture
 - o Highlight/Hide service
 - o Check order status
- Check order/request status:
 - o Submission of order/request
 - o User view
 - o Admin view



¹ <https://documents.egi.eu/document/2535>

Create Provider ✕

Name:

Url:

Description:

Location:

Timezone: (UTC+01:00) Belgrade, Bratislava, Budapest, ... ▼

Marketing and Outreach Support Request ✕

Title:

Request for: bob.smith@bsse.ethz.ch

Description:

Interest:
 social media
 conference
 EU project
 other

Personal Overview **Inbox** Memberships (4) Providers Resources

Date	Type	Title	Resource	Provider	Request status	Role
2015-12-30 10:04	Service	support for EU project	Marketing and Outreach Support Request	EGI	Pending	Submitter

Inbox Providers Resources Resource types Charges Invoices

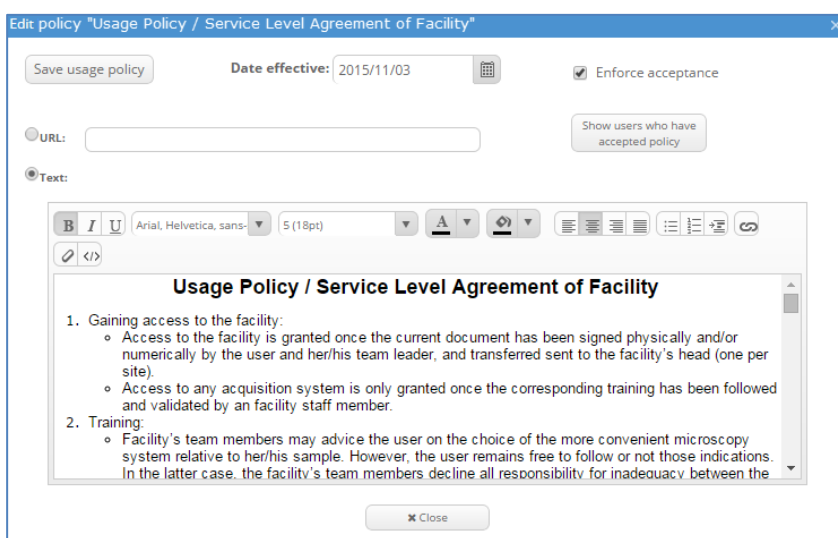
Any group ▼ Any contact ▼ Any status ▼ From: To:

Date	Type	Item	Title	Provider	User	Status
2015-12-30 10:04	Service	Marketing and Outreach Support Request	support for EU project	EGI	iris@science-it.ch	Pending

3.1.1.2 Usage policies and SLAs

Resource providers may define specific usage policies or service level agreements.

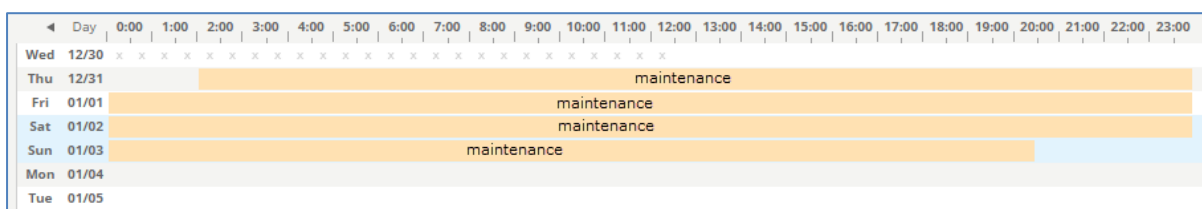
- The service provider is able to manage service level agreements and usage policies for/her services:
 - o Create service level agreements
 - o Modify service level agreements
 - o Assign service level agreements to services
 - o Modify terms of usage and policies



3.1.1.3 Availability

The service provider can define a time window for when the offered services are unavailable:

- Define unavailability (Time and Day, e.g. 2015-07-03 8:00 AM to 5:00 PM)
- Inform users



Distribution list for resource 'Two-photon Rig1 4.10'

From: 12/30/2014 To: 12/30/2015 Delimiter: ;

Email distribution list: 10 user(s)

georg.keller@fmi.ch; pawel.zmarz@fmi.ch; marcus.leinweber@fmi.ch; david.mahringer@fmi.ch; alexander.attinger@fmi.ch; matthias.heindorf@fmi.ch; bo.wang@fmi.ch; hassana.oyibo@fmi.ch; Elisabeth.meyer@fmi.ch; felix.widmer@fmi.ch

Close

3.1.1.4 Accounting

The service provider is able to view usage reports for users, groups and communities that are using a service instance. The usage report shows data about:

- Number of users
- Services used
- Service consumption

Resource Details for 'Two-photon Rig1 4.10'

Description Contacts Usage QR code Subscriptions Issues

Usage by: Users From: 30.12.2014 To: 30.12.2015 Distribution list

Filter by: Any group

Chart Table Misuse

User	Usage	Duration
david mahringer	Usage: 22.88%	Duration: 613 hour(s)
Marcus Leinweber	Usage: 22.83%	Duration: 604 hour(s)
alexander attinger	Usage: 17.05%	Duration: 681 hour(s)
georg keller	Usage: 11.27%	Duration: 450 hour(s)
bo wang	Usage: 10.99%	Duration: 439 hour(s)
matthias heindorf	Usage: 9.11%	Duration: 363.5 hour(s)
Elisabeth Meyer	Usage: 4.51%	Duration: 180 hour(s)
Hassana Oyibo	Usage: 0.68%	Duration: 38.5 hour(s)
pawel zmarz	Usage: 0.43%	Duration: 17 hour(s)

Close

3.1.1.5 Service request and incident management

Tickets: The service provider is contacted for service requests and incident management; an interface integrated with GGUS, the EGI helpdesk system, will be considered. The service provider will be able to reply and manage tickets.

Date	Type	Item	Title	Provider	User	Status
2015-12-30 13:54	Issue	Virtual appliance marketplace	cannot launch VMs	EGI	bob.smith@bsse.ethz.ch	Active
2015-12-30 13:54	Service request	Virtual appliance marketplace	cannot launch VMs	EGI	bob.smith@bsse.ethz.ch	Pending
2015-12-30 13:50	Service request	Virtual appliance marketplace	cannot launch VMs	EGI	bob.smith@bsse.ethz.ch	Active
2015-12-30 13:50	Service request	Virtual appliance marketplace	cannot launch VMs	EGI	bob.smith@bsse.ethz.ch	Active
2015-12-30 13:48	Service request	Virtual appliance marketplace	cannot launch VMs	EGI	bob.smith@bsse.ethz.ch	Closed

Edit issue submitted by 'bob.smith@bsse.ethz.ch' for 'Virtual appliance marketplace'

Requester: **Bob Smith (bob.smith@bsse.ethz.ch)**
 Resource: **Virtual appliance marketplace**
 Provider: **EGI**
 Date of submission: **2015-12-30 13:54**

Status: **Active**

Title: cannot launch VMs

Text: I have a problem launching VMs.

Urgent:

3.1.2 User

This section develops the user perspective of service management.

3.1.2.1 Service request and incident management

The user is able to open support tickets for service request and incident management, and to interact with the support channel to provide information as required.

3.1.2.2 Publications

Users can link research publications to services that supported their research process:

- Ability for users to submit publications and link them to a provider(s) and service(s) used.
- Optional features: show publications linked to services/providers and search services/providers via references to publications

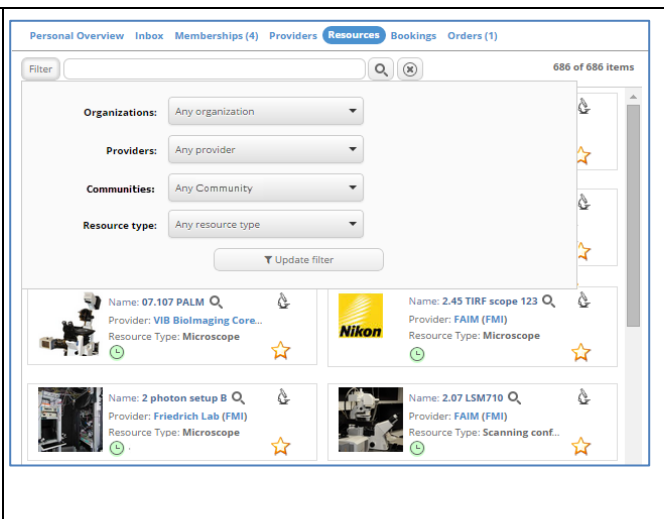
3.1.2.3 List

The user can list all services they have access to see details (pricing, how to access, SLAs, associated information, creation date, last update, etc.), regardless of the type of service.

3.1.2.4 Search and status

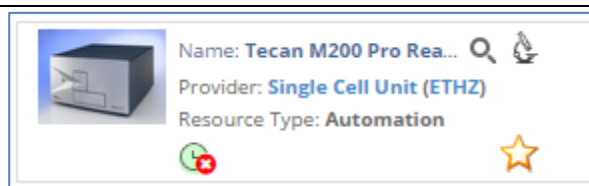
The user is able to search and filter for resources on the basis of:

- characteristics
- search term
- virtual organization



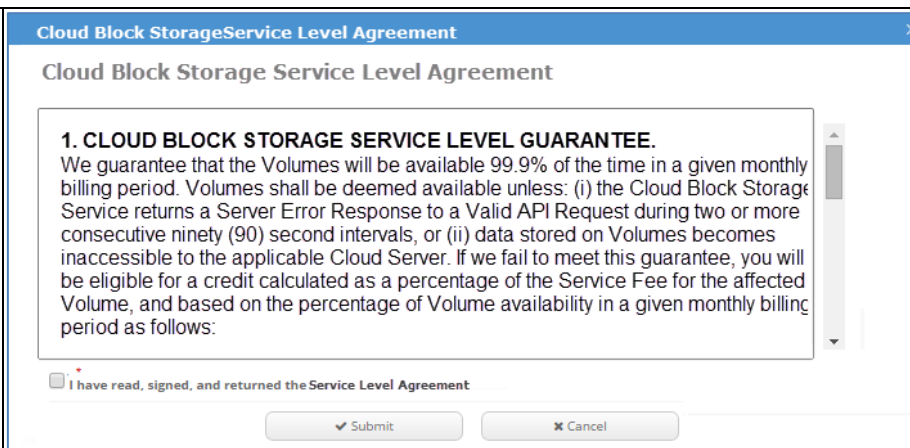
3.1.2.5 Status

Availability (available, unavailable, service outage, maintenance, etc.)



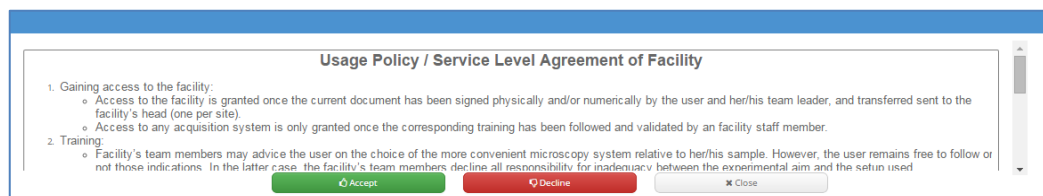
3.1.2.6 Negotiation

Policies: Negotiate the SLA through a broker or accept the pre-defined SLA associated to the service



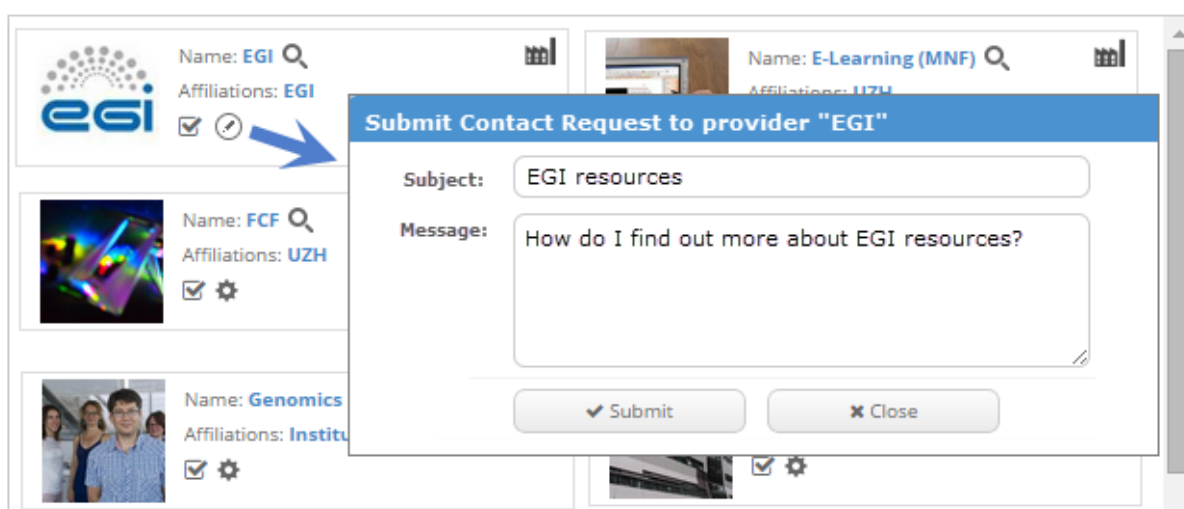
3.1.2.7 Policies

Policies: The user can accept or decline usage policies.



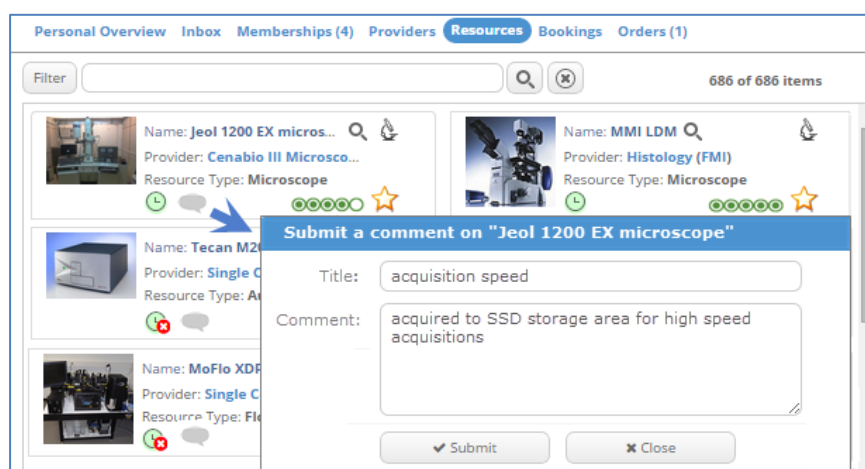
3.1.2.8 Contact

The user is able to contact the service provider via messages.



3.1.2.9 Rating

The user is able to review and rate services and service providers:



3.1.2.10 Usage

The user is able to view own usage information including services used.

Personal Overview [Inbox](#) [Memberships](#) [Providers](#) [Resources](#) **Bookings**

Show iCal Feed

Booked on	Start	End	Duration	Charge	Resource	Provider	Status	
2015-12-25 11:49	2015-12-28 10:30	2015-12-28 12:30	2 hours	100.00 EUR	2.07 LSM710	FAIM	Elapsed	⚙
2015-12-25 11:49	2015-12-28 10:30	2015-12-28 12:30	2 hours	225.00 EUR	4.66 Zeiss longrun	FAIM	Elapsed	⚙
2015-12-25 11:49	2015-12-28 10:30	2015-12-28 12:30	2 hours	225.00 EUR	4.43 Fluoview	FAIM	Elapsed	⚙
2015-12-25 11:49	2015-12-28 10:30	2015-12-28 12:30	2 hours	225.00 EUR	4.66 Leica MacroFluo	FAIM	Elapsed	⚙
2015-12-25 06:17	2015-12-25 09:30	2015-12-25 11:00	1 hour 30 mins	150.00 EUR	2.45 LSM700_Euler	FAIM	Elapsed	⚙

Navigation: 1 2 3 ... 5 items per page 1 - 5 of 447 items

3.1.2.11 Documentation

Access documentation sources and knowledge base if available.

Resource Details for '2.07 LSM710'

Description **Contacts** Usage **Articles/Documents**

Instrument Control
macros to control the hardware functions of your ZEISS microscope

Image Acquisition
acquisition-related macros

Image Handling
general handling of images and the CZI file format

Close

3.1.2.12 Finance

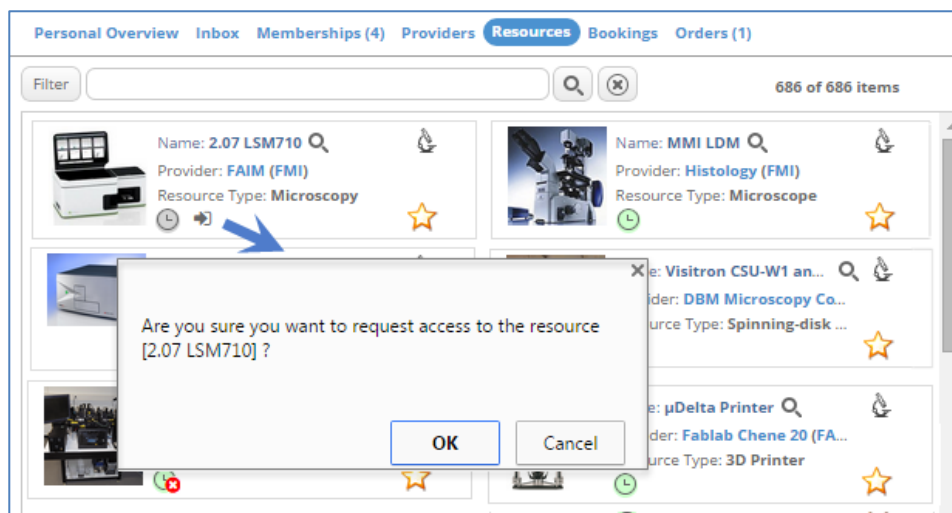
Finance: The user is able to review incurred expenses and pay for a service.

Charge Date	Status	Description	Provider	User	Price	Charge	
2014-11-02 12:01	Assigned (ID: 12, Draft)	2014-11-04 17:30 to 2014-11-04 20:30 2.45 LSM700_Euler	FAIM	dean.flanders@fmi.ch	FAIM (LSFU) (3 x 50.00 CHF [off-hours]) FAIM Discount Package (FDP) (50.00 %, -75.00 CHF)	75.00 CHF	✎
2014-11-02 11:59	Assigned (ID: 12, Draft)	2014-11-02 18:30 to 2014-11-02 20:00 2.45 LSM700_Euler	FAIM	dean.flanders@fmi.ch	FAIM (LSFU) (1.5 x 50.00 CHF [off-hours]) FAIM Discount Package (FDP) (50.00 %, -37.50 CHF)	37.50 CHF	✎
2014-11-02 11:50	Assigned (ID: 12, Draft)	2014-11-02 07:30 to 2014-11-02 16:00 2.45 LSM700_Euler	FAIM	dean.flanders@fmi.ch	FAIM (LSFU) (8.5 x 100.00 CHF) FAIM Discount Package (FDP) (50.00 %, -425.00 CHF)	425.00 CHF	✎

Navigation: 1 5 items per page 1 - 3 of 3 items

3.1.2.13 Resource access

Request authorization to access one or more services.

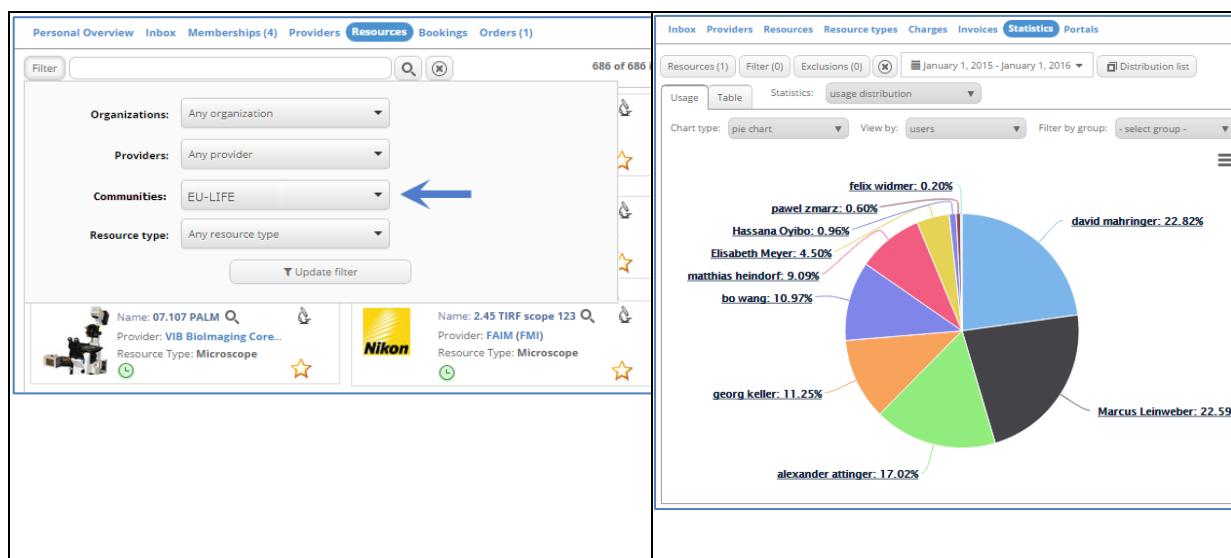


3.1.3 Directory Manager

This section provides guidelines on service management functions from the directory manager perspective.

3.1.3.1 Accounting

Resources available to/booked and used by a virtual organization / users should be viewable.



Inbox Providers Resources Resource types Charges Invoices **Statistics** Portals

Resources (7) Filter (0) Exclusions (0) [X] January 1, 2015 - January 1, 2016

Statistics: heat map

	2015-01 (Total: 552.5 hrs)	2015-02 (Total: 717 hrs)	2015-03 (Total: 403.5 hrs)	2015-04 (Total: 560.5 hrs)	2015-05 (Total: 387 hrs)	2015-06 (Total: 523 hrs)
Two-photon Rig1 4.10	324	355.5	188.5	232	248	340
Two-photon Rig2	0	218	68.5	159.5	12	0
Surgery setup 4.10	228.5	143.5	146.5	169	127	183

People Groups Departments/Institutes Organizations Providers Projects Communities Social Media Attributes

Select users on the page / Select all users from the grid

Created	Email	Name	Organization	Last login date	Social Media
2015-09-02 14:54	maximilian.bahls@bsse.ethz.ch (ETHZ)	Maximilian Bahls	ETHZ	2015-12-31 15:26	
2015-06-13 17:59	hocine.rekaik@college-de-france.fr (College de France)	hocine rekaik	College de France	2015-12-31 14:58	
2015-03-05 08:17	v.hurst@stud.unibas.ch (Unibas)	Verena Hurst	Unibas	2015-12-31 12:42	
2015-03-05 08:17	beat.erne@unibas.ch (Unibas)	Beat Erne	Unibas	2015-12-31 16:24	
2014-08-31 11:23	bob.smith@bsse.ethz.ch (ETHZ)	Bob Smith	ETHZ	2015-12-31 16:38	

1 2 5 items per page 1 - 5 of 2037 items

3.1.3.1.1 Number of users

Inbox Providers Resources Resource types Charges Invoices **Statistics** Portals

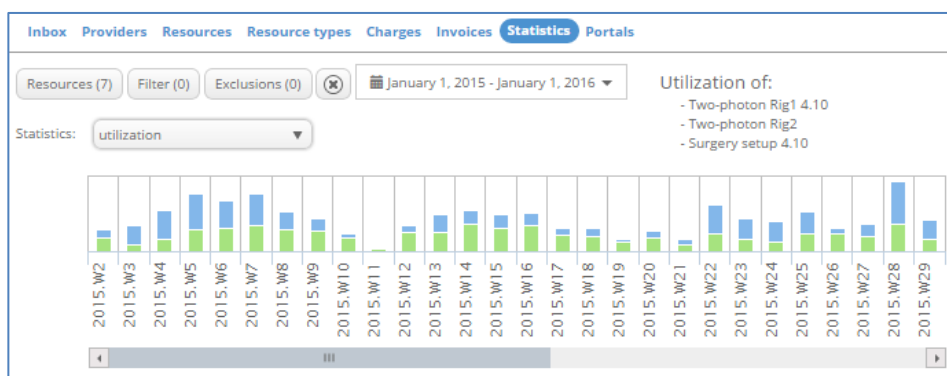
Resources (7) Filter (0) Exclusions (0) [X] January 1, 2015 - January 1, 2016

Statistics: totals Group by: None

Display by: User Indicate time periods: None

EU-LIFE	2015, 01	2015, 02	2015, 03	2015, 04	2015, 05
Helpdesk support	4	5	1	1	4
Marketing and Outreach	2	5	0	2	4
Project management	0	1	0	1	0
Total (all)	6	10	1	4	8

3.1.3.1.2 Consumption / usage



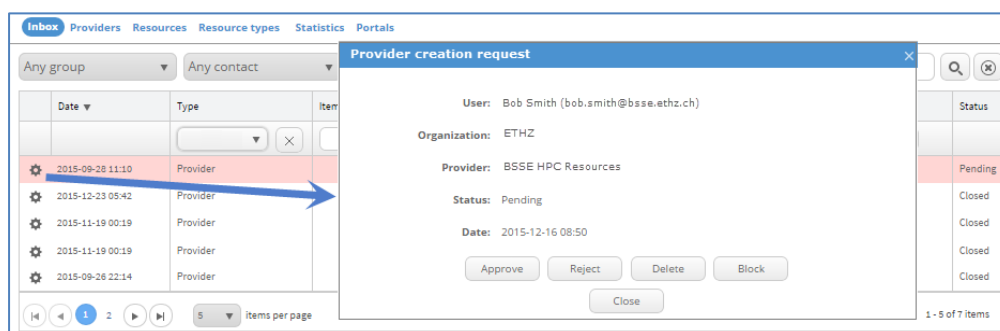
3.1.4 Main Administrator

This section provides view of possible service management functions from the perspective of the main systems administrator.

3.1.4.1 Manage provider requests

The functions envisaged should allow administrators to:

- Accept resource provider request
- Decline resource provider request (with reason)
- Disable a provider (with reason)



3.2 Requirements: Access Management

This section covers access management requirements. The system should support access management of services in terms of visibility and actual access to the services where applicable.

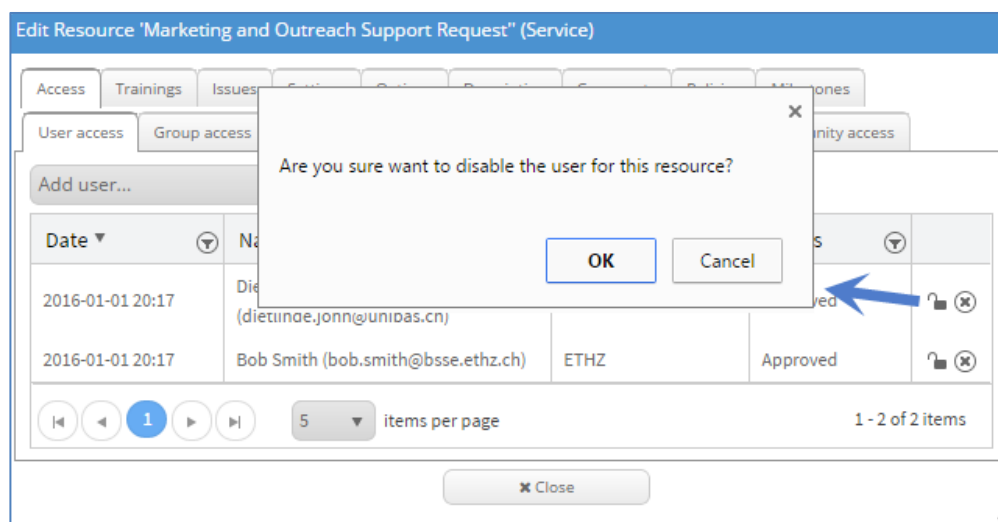
The access management requirements are based on those specified in D2.3, which were based on the original EGI use case examples before the project was initiated (Appendix II). In order to demonstrate the requirements example screens were created with example service providers and services that could be within the system. The access management features provided by the marketplace will have to be compliant with the general AAI architecture of the EGI technical platforms. This will be part of a second phase assessment that will take place in the first months of PY2.

3.2.1 Service Provider

This section defines the service provider's access management views.

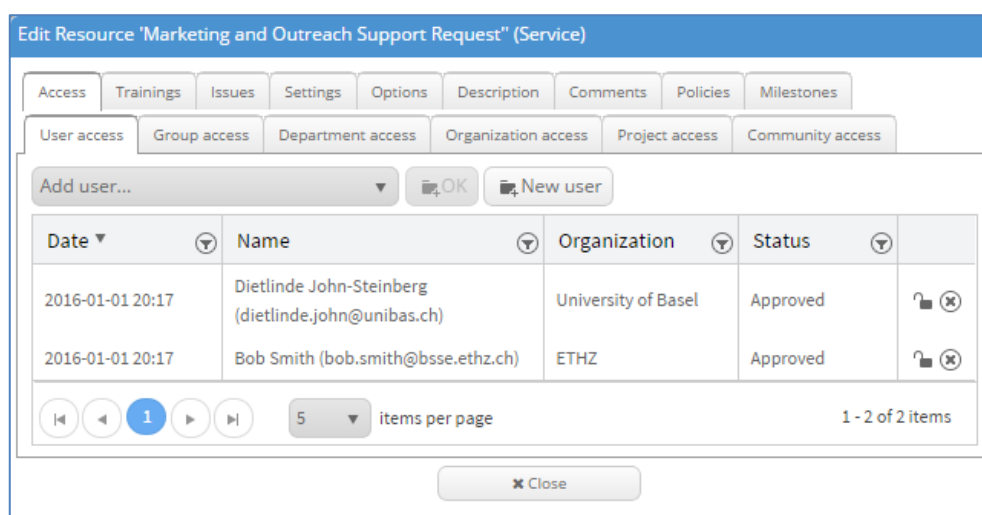
3.2.1.1 Service access request

The service provider can manage service access requests for an individual user, group or community to: Allow/Decline access with reason.



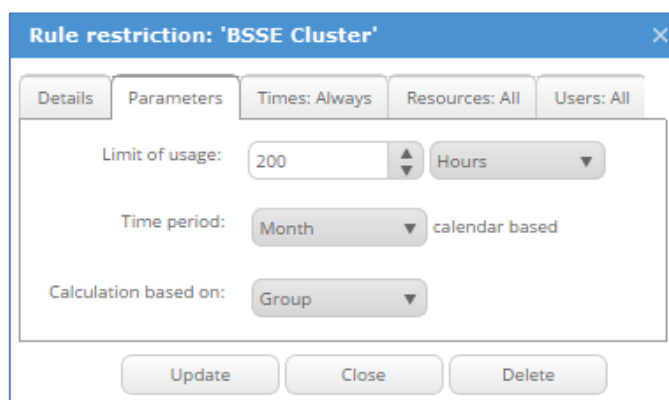
3.2.1.2 Directory Management

The service provider can manage all users, groups and communities that have access to his/her service: list of all members, Remove members, invite members.



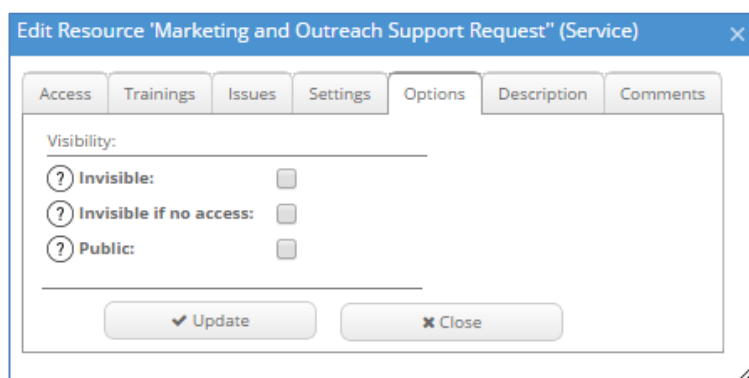
3.2.1.3 Usage limits

The service provider can manage usage quotas – where applicable – for his/her resources and assign them to users, groups and communities:



3.2.1.4 Service access

The service provider is able to publish his/her services in the service catalogue and can manage to whom these services are visible as well as hide services to Users, Groups, Virtual Organizations, Everyone.



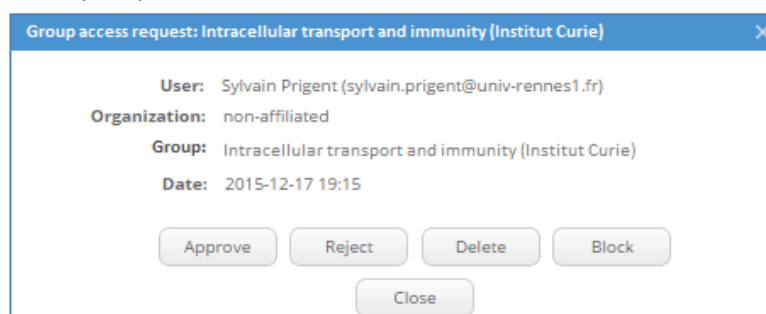
3.2.2 Directory Manager

This section provides views for management of access to organizations, groups, departments, projects, and communities.

3.2.2.1 Manage directory requests

A directory manager can manage membership requests for users:

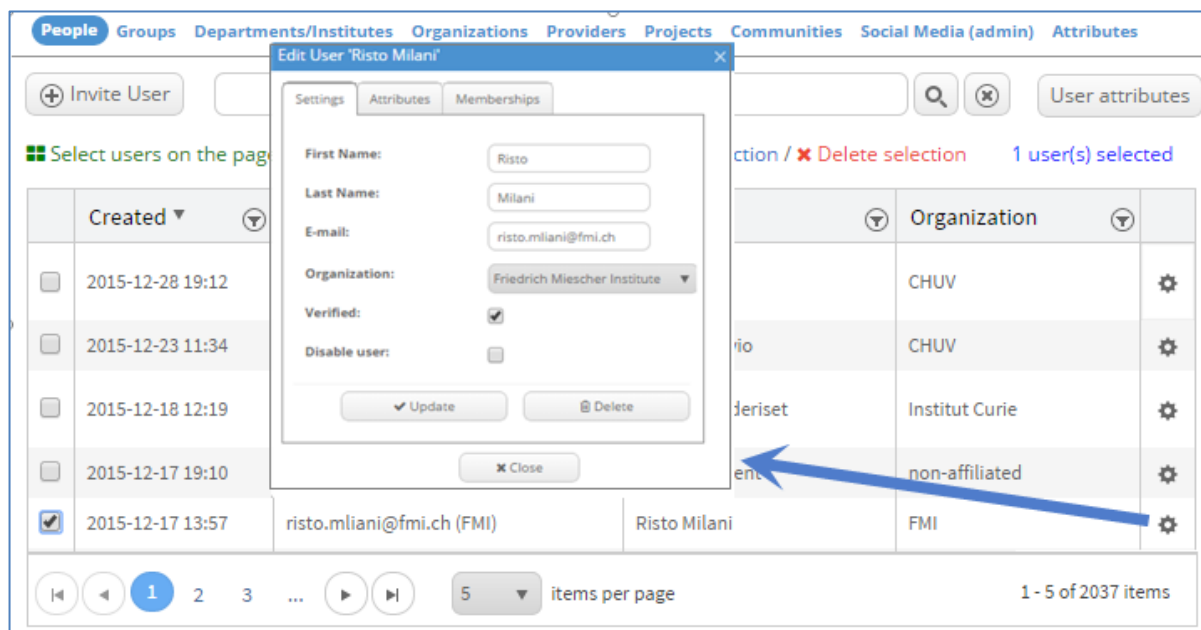
- Accept membership request
- Decline membership request (with reason)



3.2.2.2 Manage memberships

The directory manager is able to manage the memberships:

- List of all members
- Remove members
- Invite members
- Promote member to administrator

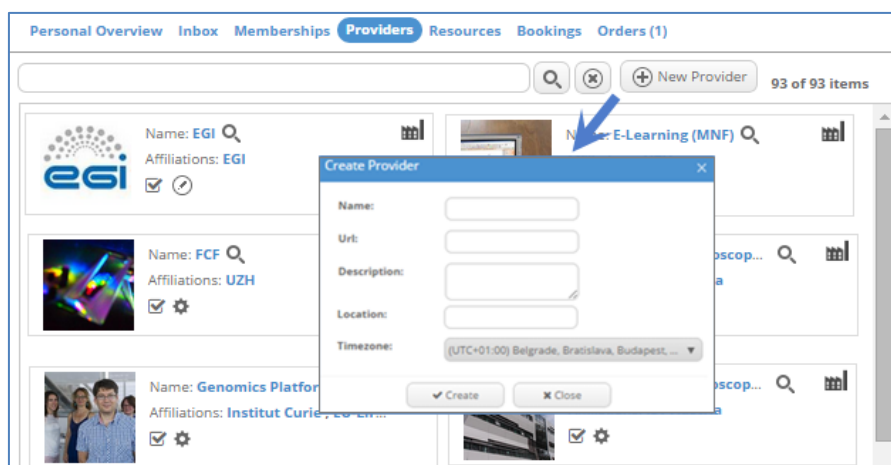


3.2.3 User

This section provides with examples for user access management functions.

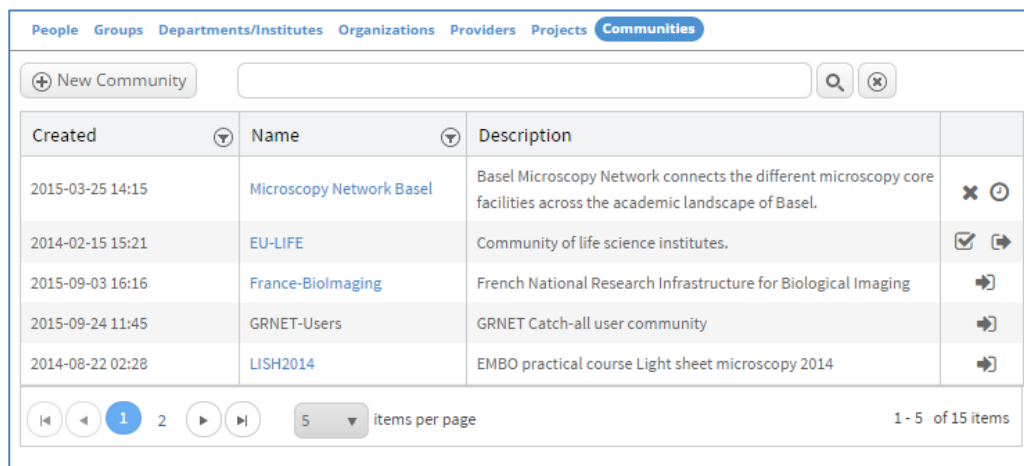
3.2.3.1 Create a provider

Users can request to become a resource provider.



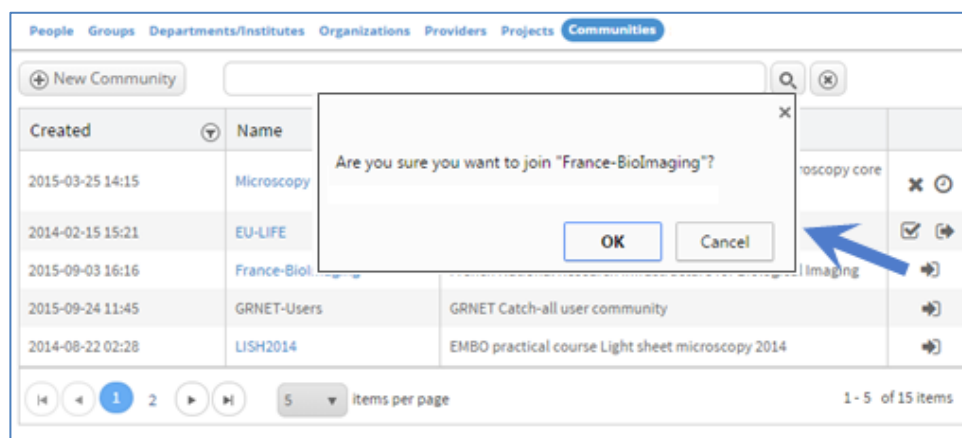
3.2.3.2 Directory search

Search for suitable community



3.2.3.3 Directory requests

The user is able to request access to: Services, Communities / Virtual Organizations, and Groups.



3.2.4 Directory Administrator

Directory administrator access management overview.

3.2.4.1 Manage Directory

Able to manage all aspects of the directory to support directory managers and users.

Peoples Groups Departments/Institutes Organizations Providers Projects Communities Social Media (admin) Attributes

Invite User User attributes

Select users on the page / Select all users from the grid / Cancel selection / Delete selection 1 user(s) selected

Created	Email	Name	Organization	Last login date	
<input type="checkbox"/> 2015-12-28 19:12	benjamin.boury-jamot@chuv.ch (CHUV)	Ben BJ	CHUV	(no data)	<input type="button" value="gear"/>
<input type="checkbox"/> 2015-12-23 11:34	Fulvio.Magara@chuv.ch (CHUV)	Magara Fulvio	CHUV	2015-12-28 15:03	<input type="button" value="gear"/>
<input checked="" type="checkbox"/> 2015-12-18 12:19	mylene.perderiset@curie.fr (Institut Curie)	mylene perderiset	Institut Curie	(no data)	<input type="button" value="gear"/>
<input type="checkbox"/> 2015-12-17 19:10	sylvain.prigent@univ-rennes1.fr	Sylvain Prigent	non-affiliated	2015-12-17 19:11	<input type="button" value="gear"/>
<input type="checkbox"/> 2015-12-17 13:57	risto.milani@fmi.ch (FMI)	Risto Milani	FMI	(no data)	<input type="button" value="gear"/>

1 2 3 ... 5 items per page 1 - 5 of 2037 items

4 Assessment

Several open source projects and solutions offered as SaaS were selected for closer examination in order to prepare for the running of a marketplace demonstrator.

A first analysis was performed to identify the most promising solutions that could be used. These have been assessed against the following requirements:

- Adequacy of the solution against the functional requirements identified in D2.3;
- Possible costs in terms of licenses and support;
- Solution supportable in terms of expertise within the EGI collaboration.

The evaluation has been done both within the TJRA1.2 and through the consultation of experts on developing, designing or operating user-facing tools and/or a marketplace. This work has been carried out by accessing live instances of the solutions (this was not possible in all cases) and available documentation on features, costs and licences. After shortlisting solutions, an additional evaluation will follow to consider aspects such as conformance to EGI policies, EU regulations and directives, terms of use and deployment models (internally operated services versus outsourced service), cost of maintenance and ownership. The EGI-Engage marketplace solution proof of concept (POC) is planned for delivery in 2016 (D 3.7, August 31 2016).

4.1 Examples of existing platforms

Below is a list of existing platforms that are being used for similar purposes.

Comparable Services	Description
GEANT Cloud Catalogue ²	Catalogue of cloud services being developed by GEANT
UberCloud Marketplace ³	HPC cloud marketplace
Science Exchange ⁴	Various research services
Internet2 Net+ ⁵	Internet2 list of cloud service providers
Helix Nebula Marketplace ⁶	Hybrid IaaS cloud marketplace
UK Gov ⁷	UK government list of cloud services
Microsoft Azure Marketplace ⁸	Microsoft cloud solution
Fortissimo marketplace ⁹	It is a list of "Experiments" that give examples of how services can be used (use cases) with links to these services.

² <https://catalogue.clouds.geant.net/>

³ <https://www.theubercloud.com>

⁴ <https://www.scienceexchange.com/>

⁵ <http://www.internet2.edu/vision-initiatives/initiatives/internet2-netplus/>

⁶ <http://hnx.helix-nebula.eu/>

⁷ <https://www.digitalmarketplace.service.gov.uk/>

⁸ <https://azure.microsoft.com/en-us/marketplace/>

⁹ <https://www.fortissimo-marketplace.com>

Strategic Service Store ¹⁰	The main goal of the STRATEGIC project is to facilitate organizations and notably public bodies to leverage the benefits of public cloud services.
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Unfortunately, in most of these cases, the solutions adopted are not available for use by other providers' groups, with the exception of UberCloud, which is based on a WordPress plugin.

4.2 Tools evaluated

Based on the above considerations and on a study of the solutions currently available in the IT scenario, the following products were selected: AppDB, GOCDB, FIWARE Marketplace Generic Enabler, Open IRIS, PrestaShop, WooCommerce.

The tools selected for the evaluation represent well-known solutions for three different categories:

- EGI tools that could be adapted/extended to become a marketplace: GOCDB, AppDB
- Technologies to implement marketplace from other research activities: OpenIRIS, FIWARE
- Generic web tools with feature to implement marketplaces: WooCommerce, WordPress

4.3 TJRA1.2 High Level Evaluation

This section summarise the outcome of the evaluation of the identified technologies done internally by the TJRA1.2.

- **AppDB**
 - **Pros:**
 - It is an established tool for VMs (69 registered) and software (512 registered).
 - It is well integrated into the EGI ecosystem.
 - **Cons:**
 - Effort is needed to complement it with additional functionality.
 - It has a focus on software and VM registration, and would require extensions in other areas.
 - **Notes:**
 - AppDB is funded by grants and in part by EGI. Development is coordinated by IASA. Usage is free of charge; support and operations could be covered through the EGI Core Services funding mechanism.
- **GOCDB**
 - **Pros:**
 - It is an already established tool for registration of resource providers and the resources they manage.
 - It is well integrated into the EGI ecosystem as well as into the EUDAT production infrastructure.
 - **Cons:**

¹⁰ <http://strategic-project.eu/>

- It would require modification in order to meet the requirements specified in the EGI Engage marketplace requirements.
- Currently has a focus on service configuration management for internal use by service administrators.
- **Notes:**
 - GOCDDB developments are funded primarily by EC grants and by EGI. Development is coordinated by STFC; usage is free of charge; operations are supported by the EGI Core Services funding mechanism.
- **FIWARE Marketplace Generic Enabler (WMarket)**
 - **Pros:**
 - It is designed for the purpose of a marketplace and contains much of the required business logic.
 - It is well established in supporting VMs and software.
 - **Cons:**
 - Currently focus is on software and VMs it would require extension (e.g. to support use cases for core facilities and instruments).
 - It would require effort to modify, and it is unclear if this effort would be successful and if a solution could be delivered in time.
 - **Notes:**
 - WMarket is one of the generic enablers developed as part of the FIWARE project. It works collectively with several other FIWARE generic enablers to deliver solutions. Development is led by the Faculty of Informatics at the Universidad Politécnica de Madrid. Usage is free of charge.
- **Open IRIS**
 - **Pros:**
 - It already meets many of the requirements defined for the EGI marketplace and extension for missing requirements would be minimal.
 - **Cons:**
 - Currently the front facing portion does not give the impression of a marketplace as a user has to login first to see resources, but this is scheduled for release.
 - It will require some enhancements in order to better support software and VM use cases.
 - It is provided as Software as a Service, meaning that EGI has no possibility to change provider or to operate it; software installation by third parties is not supported.
 - It doesn't have an open license that allows reuse and extension.
 - Support of use is provided via an annual fee; the system is only provided as SaaS, for this reason compliance to the EGI security policies and EU data regulations needs to be evaluated.
 - **Notes:**
 - Open IRIS is funded by grants and Open IRIS consortium members. Development efforts are led by the Swiss eScience Coordination team, the Swiss NGI, and by an EGI work group. Usage is free.

- **PrestaShop**
 - **Pros:**
 - It has a wide user base and is well established.
 - Many features of the store concept and pricing exist.
 - **Cons:**
 - It is unlikely that the required level of integration into AAI for each individual marketplace participant can be met.
 - The use cases and types of items envisioned in the marketplace are generally outside the current scope of the solution.
 - **Notes:**
 - PrestaShop is an open source solution. Usage is free and extensions can be programmed or bought.

- **WooCommerce**
 - **Pros:**
 - It is developed with a multi-vendor marketplace focus, though is targeted towards commodity services of small business.
 - The primary advantage of using a solution such is that is based on WordPress and is a commonly used platform with many options available.
 - **Cons:**
 - It possibility and costs of integrating the system into the EGI AAI for each individual marketplace participant should be evaluated technically.
 - The costs related to integrating the systems with the priority requirements of EGI needs more in depth evaluation.
 - **Notes:**
 - WooCommerce is an open source solution based on WordPress. Usage is free and extensions can be programmed or bought.

4.4 Comparison requirements

The developers for AppDB, GOCDDB, and Open IRIS were asked to evaluate their tool and indicate what features their tool have in common with the marketplace or would not require substantial effort to modify to add their capabilities (Appendix III). The table below summarizes the matches in each category.

This analysis has been performed only against a sub-set of the solutions considered in this document. For this reason, it will be used only for a direct comparison between two of the tools analysed.

Table 1. How GOCDDB, AppDB and Open IRIS matches EGI marketplace requirements. Tools are listed in decreasing order according to the number of existing capabilities that they already deliver by category.

Requirement Area	Application Match		
	GOCDDB	AppDB	Open IRIS
Service Provider	20	29	50

Directory	20	12	42
Total	40	41	92

4.5 Evaluation

An evaluation was performed of the above tools by eight experts on developing, designing or operating user-facing tools and/or a marketplace, representing different academic organizations. The experts were asked to rate the solutions in the following areas:

- Adequacy of the solution against requirements: to understand how each technology under evaluation fits with the EGI marketplace requirements;
- Possible costs in terms of licenses and support: the cost of the solution is another parameter that has to be taken into account in the final choice;
- Is the solution supportable in terms of expertise within EGI: the availability of expertise related to a technology within the EGI collaboration would allow developing a marketplace that could be more easily maintained in case of new future requirements?

The following sections report on the outcomes of the evaluation.

4.5.1 Adequacy of the solution against functional requirements

In this first area, Open IRIS and AppDB obtained a consensus from all the evaluators as the solutions that are more complete in terms of features. Open IRIS has been recognized as the tools that provides the largest amount of features being already organised as a service catalogue. Although the AppDB was not designed as a marketplace, its existing features could be extended with some effort to satisfy the identified requirements.

The FIWARE MP Generic Enabler has been also well evaluated by a certain number of experts but the changes it requires to implement the requirements seem greater.

Evaluators assessed in very different ways PrestaShop and WooCommerce. For someone, they are excellent solutions to implement the marketplace, for others, they are structured to serve commercial companies with objectives very far from the EGI ones.

Table 2. Adequacy of the solution against requirements, 1 (poor) – 5 (complete)

Solution	Score
Open IRIS	33
AppDB	30
FIWARE MP GE	27
PrestaShop	24
WooCommerce	24
GOCDDB	13

4.5.2 Possible costs in terms of licenses and support

All the solutions under evaluation offer free use and access for service providers and users, for this reason the assessment in this categories mainly focussed on understanding the cost EGI may incur when adopting one of these solutions. Costs of operations and ownership may vary considerably considering these solutions support different deployment models: in some cases EGI.eu can be the service operators (e.g. AppDB), while in other cases the solution is only accessible as SaaS (e.g. Open IRIS).

EGI-based software, AppDB and GOCDDB, are already co-funded by EGI and additional cost to support their extension to provide the capabilities of a marketplace as outlined in D2.3 should be low due to the existing integration with other EGI platforms like AAI.

Another important factor that has been identified to assess the sustainability and costs in terms of licenses and support is the size of the user base of each tool. Tools with extensive list of user groups and broad adoption across different sectors have larger chances of receiving community support compared to specific technologies adopted by few communities. On the other hand, in these cases integrating ad-hoc features and maintaining them over time may be expensive if these capabilities are not adopted for upstream release and software is not open source.

In relation to this, Open IRIS, with its increasing user base and the Swiss Federation support, PrestaShop and WooCommerce, with the large communities behind them, seem to meet requirement. FIWARE MP Generic Enabler seems to not give enough guarantees about its sustainability and the support that may be needed.

For some evaluators, adopting commercial tools (like PrestaShop and WooCommerce) could increase the cost of support since EGI should rely on negotiations and agreements with external organizations to achieve this.

Finally, one expert raised the point that none of the non-commercial solutions (AppDB, GOCDDB, FIWARE MP Generator and Open IRIS) may be capable of guaranteeing the support of thousands or hundreds of thousands of users via high-availability (HA) configurations. Scalability of the short listed solutions will be evaluated in the coming months.

To conclude with, with regards to this metric, there is an agreement to give a slight preference to community open source projects. Commercial tools (PrestaShop and WooCommerce) received the lower evaluations since consultancy could be needed to extend some of their features and the licenses cost will need negotiation involving external organizations. Further investigations will be conducted for the shortlisted tools, to understand the applicable terms of use and service level agreements.

Table 3. Overall ranking of tools according to the envisaged costs in terms of licenses and support, 1 (high cost for EGI) – 5 (low cost for EGI)

Solution	Score
AppDB	32
GOCDDB	29

Open IRIS	26
FIWARE MP GE	23
WooCommerce	22
PrestaShop	21

4.5.3 Is the solution supportable in terms of expertise within EGI

Purpose of this assessment was to establish how easily EGI could support the prospective users of a marketplace in their usage of the service. In this category, the EGI tools (AppDB and GOCDDB) received the best score as expected as the technical experts are from the EGI community. However, Open IRIS and FIWARE MP General Enabler were considered supportable in term of expertise within EGI by the evaluators. For the commercial tools, opinions among the experts varied greatly: some experts believe that they can be easily adopted as well-known solutions with a large user base, while others considered them far from the current level of expertise in the EGI Community.

Table 4. Is the solution supportable in terms of expertise within EGI, 1 (poor) – 5 (good)

Solution	Score
AppDB	37
GOCDDB	31
Open IRIS	25
FIWARE MP GE	24
WooCommerce	20
PrestaShop	19

4.5.4 Conclusions

Considering the three metrics defined and the evaluations of the experts, the solutions that better fits the EGI needs to implement a marketplace are AppDB (99) and Open IRIS (84).

According to their self-assessment, Open IRIS has a better match with the EGI marketplace requirements and currently offers many of the marketplace features envisaged.

AppDB needs extensions to become a marketplace and an allocation of resources to cover these costs, however the cost of ownership in this case would be lower as AppDB is already a production platform that will be supported through the EGI Core Activities funding mechanism as of May 2016, and no costs for providing an additional tool would be incurred in this case. Furthermore, AppDB is an in-house tool and negotiation and integration of new capabilities would be easy.

FIWARE MP Generic Enabler has to be extended too to meet the requirements but the knowledge of this solution in EGI is minor with respect to AppDB.

With regards to GOCDDB, there is a consensus between evaluators about the fact that the extensions would be major; however, GOCDDB is acknowledged to be an important source of information to be consumed by the future EGI marketplace.

Finally, experts have very different opinions on adopting PrestaShop or WooCommerce as tools to implement the marketplace. For some the capability of commercial platforms to be adapted to the needs of EGI requires negotiation; on the other hand, some reviewers believe that their large base would assure a low support cost and a long-term sustainability.

Taking into considerations all the points of the above analysis Open IRIS and AppDB seem the most promising solutions to implement the EGI marketplace demonstrator from a functional point of view. The first for its best match of the requirements, the second as well-known EGI tool (low entry-level for EGI) that could be extended to become a marketplace and would not generate additional operational and support costs.

Additional evaluations will be carried out for the shortlisted group of solutions taking into account the following aspects:

- Completeness of solutions and adequacy of the current features based on the evaluation of a live service instance in those cases where just documentation was used for the assessment.
- Compliance to the project open source policies and with the EGI security policies.
- Compliance with the AAI architecture of EGI.eu.
- Costs of development incurred to support a set of priority requirements.
- Costs of maintenance.
- Compliance with Data Protection Regulation (EC) No 45/2001 for the processing of personal data, for the protection of personal data and confidentiality, specifically in the case of SaaS solutions, EGI will have to be the sole controller of any processing of personal data performed on its behalf. In accordance with article 23 of Regulation (EC) No 45/2001, organizations contracted would be processors and shall only act on instructions of EGI with regard to the processing of personal data. The operators of the marketplace shall have measures and system tools in place to ensure that the data subjects can exercise their right of access, rectification, blocking and erasure in an easy manner.
- Compliance to data quality principles, meaning that personal data can be processed for a specified, explicit and legitimate purpose. The data processed must be adequate, relevant and not excessive in relation to the purpose for which they are collected and further processed. They also must be accurate, kept up to date in a form that permits for the identification of the data subjects for no longer than necessary for the purpose for which the data were collected and further processed.
- In the capacity of controller, EGI must be informed, and agree, in advance of any sub-processor that the contractor and its subcontractors wishes to use for the provision of its services and whether the sub-processing would be carried out within or outside the EEA. The sub-processor must commit to respect the same level of data protection, including security measures, as defined in the contract between the controller and the Cloud Service Provider. The contractor remains fully liable to the controller for the performance of the sub-processor's obligations under a sub-processing agreement.
- EGI shall be allowed to carry out audits or let these be carried out by a third party to ascertain that the operator has the necessary technical and organisational measures in

place, has the necessary competences and the efficiency of the control measures including vulnerability and penetration testing based on a commonly agreed audit plan.

- The operator shall at any time be able to promptly provide EGI with a comprehensive list of measures on back-ups as well as lists of logs and audit trails on the cloud system operations and management which the EU Agency in its capacity of Controller, should be empowered to monitor and audit without any restrictions.
- In the case of SaaS solution, the contractor shall be ISO/IEC 27001:2013 certified or, at least, have a clear and sound Information Security system in place.

The remainder of the document presents the envisaged technical architecture of the marketplace.

5 Technical Architecture

This section describes the high-level architecture of the EGI marketplace and it provides examples of how it would map into Open IRIS and its key components.

5.1 High Level Architecture

Below is the proposed high-level architecture of the EGI marketplace.

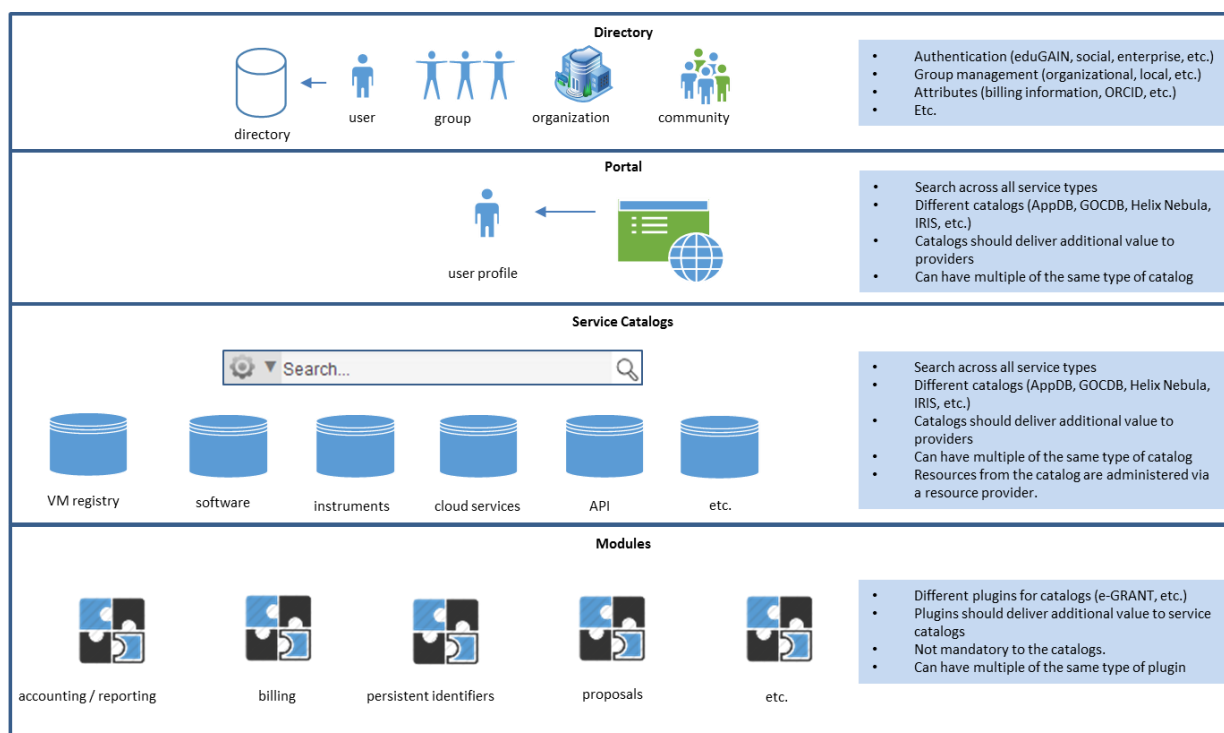


Figure 2. The EGI marketplace - High-level architecture

5.2 Key components

- **Directory:** the directory contains information in terms of user authentication (local, federated, social), groups, departments, organizations, projects, or communities.
- **Portal:** the portal is the environment in which the user logs into the system and presents a view according to their access, and allows for personalization.
- **Service Catalogues:** it is a list of services based on the EGI service catalogue. These are managed by service providers that define the visibility and access levels based on user, groups, departments, organizations, projects, or communities.
- **Modules:** The modules are either internal or external to the system and allow for various functions (accounting/reporting, billing, service request management, monitoring, service management etc.).

5.2.1 Directory

The directory contains information specifically on users and groupings of users within an organization in terms of group or department, or across organizations via projects or communities. It should be possible to populate it with information from existing attribute authorities of EGI. The groupings have administrators assigned to them. The directory is largely self-service allowing for the creation and management of each type without the intervention of the main administrator, with the exception of the organization, which requires the main administrator of the system to nominate a person to be responsible for organization and manage future administrators for the organizations.








	audience	description	requirements	trust
	users	Anyone (academic, commercial, private, etc.)	Support for multiple affiliations and discover resources.	
	groups	A group of people affiliated with one institution.	Track usage and billing information of resources used by their group.	
	departments	A group of groups in an organization or across organizations.	Can be used to provide access at levels of multiple groups in a department.	
	organizations	Any legal entity (commercial, academic, NGO, association, etc.).	A legal entity that can control users and groups, and handle billing.	
	projects	A group of people affiliated with one or more organizations.	Useful for providing access to data.	
	communities	Like an organization but with people and groups affiliated with one or more organizations.	Useful for large collaborations across multiple institutions.	
	providers	Can be a lab, core facility, commercial, etc.	Publish into a service catalog, authentication services, billing, etc.	

Figure 3. How users are grouped in the EGI marketplace

5.2.2 Portal

There may be one or more portals defined by resource providers with independent URLs. Resource providers can control their visibility within individual portals. These are aggregations of resource providers as defined by the portal administrator. Within each of these portals, the users can define their preferences and browse resources.

5.2.3 Service Catalogues

This is a collection of services imported and managed via service providers. Providers can be affiliated to one or more organizations as well as one or more communities. Different service catalogues will be managed for different user groups of EGI. Creation and management of providers are fully self-service and can manage access to the resource provider and its individual resources on the level of user, group, department, organization, project, or community. The authorization framework will be designed to comply to the business model and terms of reference of the marketplace, which will be defined in consultation with the service providers of EGI and Services and Solutions Board.

5.2.4 Modules

These are modules available to the service providers to manage their services. The use of the modules will depend on their applicability to services. For example, modules like billing depend on the access policies applicable to services. Providers may choose only to use the base functionality to manage their provider and resources. However, they have also available to them additional modules like accounting/reporting, incident management and service request management, reservation, billing, scheduling, project management, etc.

5.3 Marketplace integration with the EGI tools eco-system

The marketplace will be integrated with various ancillary services (e.g. databases, application catalogues etc.).

Population of the marketplace with service instances and their metadata. The marketplace will integrate with AppDB, GOCDDB, and e-grant to create one location to facilitate the discovery of a wide variety of services. The marketplace will allow the composition of services into catalogues providing different views depending on the user group; it will allow the addition of new service instances via the portal, as well as the automated population via component services via APIs, thus avoiding duplication.

AppDB is a registry for software, virtual appliances and other research objects like data sets. A service provider will be able to define a service to automatically pull information from AppDB via defined APIs. It is planned for software and virtual machine resources registered in AppDB to have their title, image, category, text description, item ID, and permalink extracted and loaded into the marketplace. These resources will be tagged as “public” and primarily be a link to a URL to forward users to AppDB. Users will be able to mark these items as favourites so they can define a virtual pool of services relevant for their research.

GOCDDB is a registry of resource providers for any type of service, including community-specific tools like portal and computational and storage resources. The integration with a marketplace can allow the publishing of status information and other metadata. The specific publication policies and the level of granularity of information provided by GOCDDB need to be further investigated.

Service Level Agreement management. Integration of e-grant would allow automating the establishment of service level agreements and of the underpinning agreements binding EGI.eu and the service providers.

e-Grant is a tool for submitted requests for research resources and establish SLAs and OLAs from EGI affiliated organizations. It can be offered as a service within the marketplace, in the form of a section of the marketplace or link associated to a service instance.

6 Development Roadmap

This section describes a short-term roadmap (March – August 2016) to implement the first release of the EGI Marketplace demonstrator foreseen for month 18 (August 2016).

Table 5. Roadmap to release the first version of the EGI marketplace demonstrator

Task Number	Task Name	Start Date (MM/YY)	Completion Date (MM/YY)	Status	Dependencies From other tasks
1	Evaluation of terms of use, legal requirements, costs of ownership, development and support	03/2016	05/2016	Started	None
2	Design and mockup of public facing marketplace.	03/2016	04/2016	Started	None
3	Development of public facing marketplace.	04/2016	05/2016	Planned	2
4	Define technical integration of AppDB, GOCDB, and eGrant.	03/2016	06/2016	Started	
5	Integration work for of AppDB, GOCDB, and eGrant	04/2016	07/2016	Planned	4
6	Define EGI catalogues for demonstration purposes and populate service catalogue with EGI services.	05/2016	06/2016	Planned	
7	Test release of first version of public facing marketplace for EGI.	07/2016	07/2016	Planned	3, 5, 6
8	First release of the EGI Service Registry and Prototype	08/2016	08/2016	Planned	3, 5, 6

The following sections provide further information about the needed activities if Open IRIS will be confirmed to be the tool of choice for the demonstration following the evaluation stage defined at Step 1 in the table above.

6.1 Design and mock-up of public facing marketplace

Open IRIS currently requires a login in order to know what types of resources the person has access to seeing. However, resources can be registered that are also classified as “public”, so these will be allowed to be visible by all users without requiring a login. The design of the public facing portal is currently being done with feedback from the Open Access Research Infrastructure (OARI) from the University of Leiden¹¹. As well as with input from “equipment.data” web site¹² ran by

¹¹ <http://www.oari.science.leidenuniv.nl/>

JISC¹³ in the UK. EGI requirements will be also taken into account; a lot of knowledge can be gained from the AppDB project¹⁴.

6.2 Development of public facing marketplace

The mockups are being designed for one central portal and customizable for individual portals as desired. The public portals are expected to use adaptive design principles for running on standard web browsers as well as mobile devices.

6.3 Define technical integration of AppDB, GOCDDB, and e-Grant

Currently, Open IRIS is designed that resource providers can register resources directly into the system and control access. In this project, it will also be extended to retrieve data and integrate with remote data sources. The first candidates for these are the existing EGI services AppDB, GOCDDB, and e-Grant. However, it will be designed to be extended to other services (e.g. <http://equipment.data.ac.uk>).

6.4 Integration work for of AppDB, GOCDDB, and e-Grant

Based on the analysis to define the details of the technical integration of AppDB, GOCDDB, and e-grant, the technical integration work will proceed. There will be collaborations formed with the responsible person from each of these applications to perform the implementation. As AppDB is already extracting similar information from GOCDDB, it is assumed that Open IRIS can use a similar mechanism for this extraction. AppDB itself already has an extensive REST API for extracting information, so this can be leveraged to import information into Open IRIS. In terms of e-grant, the existing functionality of Open IRIS will be used, and attempts will be made to make e-grant a more prominent part of Open IRIS. In this way, resource providers can select to use it for their services to provide SLAs or make offers.

6.5 Populate service catalogue with EGI services

EGI already has a well-defined service catalogue¹⁵. So this will be used as the basis for the services imported. Computational and storage resources (e.g. grid, cloud, cluster) will be defined as applications, whereas services (e.g. consulting, support) will be defined using dynamic forms for request submissions and subsequent tracking.

6.6 Test release of first version of public facing marketplace for EGI

As Open IRIS has close match to many of the original requirements (Appendix III), extensive modification will not be required if Open IRIS is selected at the reference platform. Therefore, no major obstacles are foreseen for the launch. The majority of the effort will centre on the extension of the public interface and integration into the EGI tools. This test release will allow these changes

¹² <http://equipment.data.ac.uk>

¹³ <http://www.jisc.ac.uk>

¹⁴ <http://appdb.egi.eu>

¹⁵ <https://www.egi.eu/services/catalogue>

to be exposed to a wide audience of users to get feedback that can be incorporated before the final release.

6.7 First release of the EGI Service Registry and Prototype

As the prototype is to be used productively, service agreements will need to be put into place, support process, and ticket workflows will be clarified in preparation for the release. Links to the system will be placed into the EGI web site to direct users to search the service catalogue for EGI services and resources.

7 Next steps and conclusions

The goal of this deliverable was to establish the design of the EGI service registry and marketplace. This has been extensively done by examining the defined requirements from D2.3 (Appendix III) and conceptualized in screen mock-ups. These are based on the original use cases gathered before the project started (Appendix II). These can serve as the basis for the POC and have elements prioritized based on feedback on essential features from a survey performed (Appendix I).

In addition, an extensive analysis on existing solutions to implement the EGI marketplace demonstrator has been done taking into account the requirements based on the original EGI use cases and specified in D2.3. The outcome of this assessment of the technologies has been that the Open IRIS solution comes to the closest to meeting those functional requirements in its current state. AppDB is second in the shortlist, and is already a production platform that has the advantage of reducing costs of service operations for EGI. The two solutions offer different deployment models: the former can be offered as SaaS and is hence externally operated; the latter already conforms to the EGI security framework, the AAI infrastructure of EGI and is maintained by the EGI community.

A second phase evaluation will follow to consider: the terms of use, compliance to EGI and EU policies and regulations, the trial of a live instance of Open IRIS and the evaluations of costs of ownership, development, operations and support.

The EGI marketplace will be modular and will integrate with existing platforms of EGI as needed. A short-term roadmap is defined to deliver the demonstrator by August 2016.

In parallel with the technical implementation of the demonstrator, the analysis and development of a legal, policy and business framework for a marketplace capability will continue within the task NA2.2. In this context, the activity to define the term of reference to publish service into the tool has to be considered of great importance. Indeed, EGI has to guarantee that services advertised via its marketplace guarantee an adequate quality of service satisfying the defined requirements.

Appendix I. Essential features

A survey and several interviews were performed with sixteen large resource providers, projects and research communities (EGI.eu, Barcelona Supercomputing Center, SURFSara, EMBL-EBI, VENUS-C, France Grilles, DARIAH, STFC, MTA SZTAKI, Cyfronet, GRNET, CSC, the Lifescience Grid Community, Neugrid, iMarine, WeNMR). The survey feedback and interviews helped determine if there is interest in a marketplace solution from each perspective, and the requirements for such a solution.

In order to determine the important or essential features of the marketplace, the participants indicated which features of a marketplace would be essential/important and those that were not important. The responses are indicated here:

Rate the following functionalities:	ESSENTIAL / IMPORTANT	NOT IMPORTANT
service description	100%	0%
direct link to the service	100%	0%
filter by...	87%	13%
status of the service: up & running, down, etc..	87%	13%
visibility/access rules by user, group, organization, department, community, project	75%	25%
categorization of EGI affiliation (e.g. integrated, endorsed, external)	56%	44%
user rating	50%	50%
visibility/access rules by VO	44%	56%
prices	37%	63%
negotiation phase	31%	69%
visitors of this service have also viewed	25%	75%

Rating of Importance of Features in a Research Marketplace

Based on a threshold of 50% we have assigned in order of priority:

1. Service description
2. Direct link to service
3. Filter by
4. Status of the service
5. Visibility/access rules by user, group, organization, department, community, project
6. Categorization of affiliation
7. User rating

Appendix II. Usage scenarios

In the course of the EGI-Engage project, different marketplace usage scenarios were developed based on the experience of EGI working with research resource users and providers. Different scenarios were developed from the perspective of the end user, resource provider, and platform administrator. These usage scenarios were then used to elucidate needed features and formulate detailed requirements for the system.

The scenarios of use that individual resource providers use to fund their activities are extremely diverse (pay for use, free at point of delivery, academic, commercial, co-financed, etc.). The solution developed will need to have the ability to allow for all the different usage models, and the resource provider will need to decide which tools to use based on how they finance the provisioning of their services. In addition, many times resource providers use a mixture of scenarios to fund their activities.

The following marketplace user stories have been assembled by EGI based on the requirements from the e-Infrastructure space. These have been analysed and the detailed requirements summarised in Appendix III.

Scenario 1

- The service provider publishes a service
 - The service provider (SP) registers a new service in the service catalogue
 - The SP can assign a service level agreement (SLA) to the new service
 - The SP assigns a price to the new service (can be zero for free services or different prices for different user segments like SMEs, internal users, external academic users, etc.)
 - The SP can define a policy to access the service
 - The new service is available in the service catalogue
- The customer discovers the existing services
 - The customer accesses the service catalogue and gets the list of offered services
 - The customer can look for a service with specific characteristics/requirements (search engine) and compare
 - The customer can read the details of a service: description, how to accept SLA and penalties for underperformance of SLA, price, SPs list, creation date, last update, etc.

Scenario 2

- The customer directly selects and buys a service
 - The customer accesses the service catalogue and looks for a service
 - The customer chooses the service to buy
 - The customer may negotiate the SLA through a broker or accept a pre-defined SLA associated to the service
 - The customer buys the service
- The customer selects a service through a broker

- The customer lists the requirements that should be satisfied by the service they are looking for
- The broker identifies the best service according to the customer's requirements
- The broker offers the selected service to the customer
- The customer evaluates the offered service, may negotiate the SLA through a broker or accept the pre-defined SLA
- The customer buys the service

Scenario 3

- The customer reviews and rates a service and/or a SP
 - The customer selects a service from the list of bought services
 - The customer reviews and rates the service and/or the SP
- The customer wants to check the status of orders
- The customer consults the consumption/usage
- The customer manages the service
- A SP manages the published services
 - A SP registers into the service catalogue
 - Hides previously published services / changes the conditions associated / highlights the services / announces a maintenance break

Scenario 4

- A SP checks the information associated to services
 - The SP controls the accounting information related to their services (usage, number of users, average consumption) and they can control either by service published or total

Appendix III. Requirements mapping

A “y” for application indicates a fit or that minor effort would be required to extend feature to match requirements based on input from the developers of the solution.

Application Match			Section	Topic	Requirement
GOCDDB	AppDB	Open IRIS	2	Service Management	
			2.1	Service Provider	Provisioning of services and service management
y	y	y	2.1.1.1	Service Registration	Provider registration: Users can register a resource provider.
y	y	y	2.1.1.2	Service Registration	Service registration: The service provider is able to register a service in the service catalogue and can specify detailed information and display options for the service including:
y	y	y	2.1.1.3	Service Registration	Service name
y	y	y	2.1.1.4	Service Registration	Service description
y	y	y	2.1.1.5	Service Registration	Service instructions
y	y	y	2.1.1.6	Service Registration	Service visibility
y		y	2.1.1.7	Service Registration	Assign pricing
y	y	y	2.1.1.8	Service Registration	Usage policy
y	y	y	2.1.1.9	Service Registration	Picture
			2.1.1.10	Service Registration	Highlight service
y	y	y	2.1.1.11	Service Registration	Hide a service
		y	2.1.1.12	Service Registration	Check order status
		y	2.1.2.1	Usage policies and SLAs	The service provider is able to manage service level agreements and usage policies for his/her services:
		y	2.1.2.2	Usage policies and SLAs	Usage policies and SLAs: The service provider is able to manage service level agreements and usage policies for the services
		y	2.1.2.3	Usage policies and SLAs	Create service level agreements
		y	2.1.2.4	Usage policies and SLAs	Modify service level agreements
			2.1.2.5	Usage policies and SLAs	Assign service level agreements to services
		y	2.1.2.6	Usage policies and SLAs	Modify terms of usage and policies

y		y	2.1.3.1	Availability	Availability: The service provider can define a time window for when his/her services are unavailable:
y		y	2.1.3.2	Availability	Define unavailability (Time and Day, e.g. 2015-07-03 8:00 AM to 5:00 PM)
		y	2.1.3.3	Availability	Inform users
		y	2.1.4.1	Reporting	Reporting: The service provider is able to view usage reports for users, groups and communities that are using his/her service. The usage report shows data about:
		y	2.1.4.2	Reporting	Number of users
		y	2.1.4.3	Reporting	Services used
		y	2.1.4.4	Reporting	Service consumption
		y	2.1.5.1	Tickets	Tickets: The service provider is able to manage his tickets:
		y	2.1.5.2	Tickets	reply to tickets
		y	2.1.5.3	Tickets	close tickets
		y	2.1.5.4	Tickets	delete tickets
			2.2	User	User of provisioned services
		y	2.2.1	Tickets	Tickets: The user is able to open support tickets.
	y		2.2.2	Publications	Publications: Claim publications that were possible as a result of services (e.g. backend integrated with OpenAIRE, data fed into OpenAIRE)
y	y	y	2.2.3	List	List: The user can list all services they have access to see details (pricing, how to access, SLAs, associated information, creation date, last update, etc.):
y		y	2.2.3.1	List	Services
y	y	y	2.2.3.2	List	Applications
y	y	y	2.2.3.3	List	Appliances
y	y	y	2.2.4	Search	Search: The user is able to search and filter for resources on the basis of:
y	y	y	2.2.4.1	Search	characteristics
y	y	y	2.2.4.2	Search	search term
y	y	y	2.2.4.3	Search	virtual organization
		y	2.2.5	Status	Status: The user is able to view the status of services:

y	y	2.2.5.1	Status	Availability (available, unavailable, service outage, maintenance, etc.)
		2.2.6	Negotiation	Policies: Negotiate the SLA through a broker or accept the pre-defined SLA associated to the service
	y	2.2.7	Policies	Policies: The user can accept or decline usage policies.
	y	2.2.8	Contact	Contact: The user is able to contact the service provider via messages.
y		2.2.9	Rating	Rating: The user is able to review and rate services and service providers:
y		2.2.9.1	Rating	Rating and commenting system
y	y	2.2.10	Usage	Usage: The user is able to view his own usage information including:
	y	2.2.10.1	Usage	Services used
y		2.2.11	Documentation	Documentation: access documentation (knowledge base)
	y	2.2.12	Finance	Finance: The user is able to review incurred expenses and pay for a service.
	y	2.2.13	Resource access	Resource access: request authorization to access one or more services
		2.3	Directory Manager	Management of organizations, groups, departments, projects, and communities
	y	2.3.1	Reporting	Reporting: The directory manager is able to view reports for:
y	y	2.3.1.01	Resources available	Resources available to his virtual organization / users
		2.3.1.02	Resources used	Resources used by his virtual organization / users
		2.3.1.03	Resources booked	Resources booked by his virtual organization / users
	y	2.3.1.04	Number of users	Number of users
		2.3.1.05	Services used	Services used
		2.3.1.06	Consumption / usage	Consult consumption / usage
		2.4	Administrator	Manage resource providers
	y	2.4.1	manage provider requests	Provider management: The administrators is able to manage resource provider requests:
	y	2.4.1.1	accept resource requests	Accept resource provider request

	y	2.4.1.2	decline resource requests	Decline resource provider request (with reason)
	y	2.4.1.3	disable provider	Disable a provider (with reason)
		3	Access Management	
	y	3.1	Service Provider	Manage of service providers
y	y	3.1.1	Service access request	Service access request: The service provider can manage service access requests for an individual user, group or community:
y	y	3.1.1.1	Service access request	Allow access
y	y	3.1.1.2	Service access request	Decline access (with reason)
y	y	3.1.2	Directory Management	Directory management: The service provider can manage all users, groups and communities that have access to his/her service:
y	y	3.1.2.1	Directory Management	List of all members
y	y	3.1.2.2	Directory Management	Remove members
y	y	3.1.2.3	Directory Management	Invite members
	y	3.1.3	Usage limits	Usage limits: The service provider can manage usage quotas for his resources and assign them to users, groups and communities:
	y	3.1.3.1	Usage limits	Define quota (e.g. time)
	y	3.1.3.2	Usage limits	Assign quota
	y	3.1.4	Service access	Service access: The service provider is able to publish his/her services in the service catalogue and can manage to whom his/her services are visible as well as hide services:
y	y	3.1.4.1	Service access	Users
y	y	3.1.4.2	Service access	Groups
	y	3.1.4.3	Service access	Virtual organizations
y	y	3.1.4.4	Service access	Everyone
		3.2	Directory Manager	Manage access to organizations, groups, departments, projects, and communities

y	y	y	3.2.1	Manage directory requests	Directory requests: A directory manager can manage membership requests for users:
y	y	y	3.2.1.1	Accept directory requests	Accept membership request
y	y	y	3.2.1.2	Decline directory requests	Decline membership request (with reason)
y	y	y	3.2.2	Manage memberships	Directory management: The directory manager is able to manage the memberships:
y	y	y	3.2.2.1	List members	List of all members
y	y	y	3.2.2.2	Remove members	Remove members
y		y	3.2.2.3	Invite members	Invite members
y	y	y	3.2.2.4	Promote to administrator	Promote member to administrator
			3.3	User	User of provisioned services
y	y	y	3.3.1	Create a provider	Provider registration: Request Users can request to become a resource provider.
		y	3.3.2	Directory search	Directory search: search for suitable VO
		y	3.3.3	Directory requests	Directory requests: The user is able to request access to:
	y	y	3.3.3.1	Request access to services	Services
		y	3.3.3.2	Request access to VO	Virtual Organizations
	y	y	3.3.3.3	Request access to groups	Groups
			3.4	Administrator	Directory manager
y	y	y	3.4.1	Manage directory	Directory administration: Able to manage all aspects of the directory to support directory managers and users.

Appendix IV. Consultation of experts to assess the technologies to implement the EGI marketplace

Expert 1

Adequacy of the solution against requirements	
AppDB	3
GOCDDB	2
FIWARE Marketplace Generic Enabler	2
Open IRIS	5
PrestaShop	4
WooCommerce	4
Motivation / comments on rating:	
<p>The solutions proposed for evaluations are very different from each other both in terms of target and content. This is very interesting and rewarding for the marketplace. The concept of marketplace is not only used in its original sense of commercial sales but rather as a forum for exchange of knowledge.</p> <p>I have noted quite severely GOCDDB and FIWARE because they must make a major effort to meet the requirements. Indeed, the service description of these services is really not clear to non-specialists. A major effort must be made to make available all the tools.</p> <p>The OpenIRIS solution is by far the most complete on compliance requirements. This solution provides a set of original and interesting elements for the management of equipment.</p> <p>The evaluation of Prestashop and WooCommerce solutions raise the question of the scope of the EGI marketplace. Indeed, these solutions are in my opinion not in the main scope of the EGI marketplace. I thought that EGI marketplace scope was: "Establishment of a marketplace where Researchers can discover and exchange services falling to Their research, Ideally Applying the one-stop-shop concept for data and services." (taken from https://wiki.egi.eu/wiki/EGI_Marketplace).</p>	

Possible costs in terms of licenses and support, 1 (high cost for EGI) - 5 (low cost for EGI)	
AppDB	4
GOCDDB	4
FIWARE Marketplace Generic Enabler	4

Open IRIS	5
PrestaShop	4
WooCommerce	4
Motivation / comments on rating:	
<p>The cost evaluation of the different solutions seems difficult to assess with the available information. It seems to me that all solutions offer free use and access. Moreover, it is not clear whether hosting solutions is carried out by EGI or external hosts. Indeed, if the hosting is external to EGI, the cost is almost virtually zero as EGI will only collect information about solutions that follow defined requirements. It seems to me more interesting if EGI could also offer hosting for data confidentiality. This is fundamental for projects such as OpenIRIS, which makes available state-of-the-art scientific and technological instruments.</p> <p>Furthermore, the accessibility of the service is a crucial point for proper operation. Management of the number of connection, frequency and the need for a connection without interruption varies by project. The AppDB community will surely be diverse and large rather GOCDB is addressed more to a specialist community. For its part, OpenIRIS requires frequent connection number and a service available 7/7 with a well-defined community.</p> <p>I noted OpenIRIS with a score of 5 because the development of this solution has already obtained funding and various European research institutes are getting organized to sustain this solution.</p>	

Is the solution supportable in terms of expertise within EGI, 1 (poor) - 5 (good)	
AppDB	4
GOCDB	4
FIWARE Marketplace Generic Enabler	4
Open IRIS	3
PrestaShop	2
WooCommerce	2
Motivation / comments on rating:	
<p>The information available does not allow me to answer this question accurately. Indeed, I do not know the expertise of EGI.</p> <p>However, it seems to me that one can categorize solutions in three categories (in view of the proposed solutions):</p> <ul style="list-style-type: none"> Solutions related to software development (eg AppDB, etc). This is actually a kind of marketplace similar to AppStore (Apple). Making available software with different levels of validation. The community can be broad or specialized according to the type of 	

available softwares. I suppose EGI has a strong expertise in the field.

- Solutions for commercial development (eg Prestashop, WooCommerce.). Customized software that can have a strong economic impact.
- Original solution allowing the development of an innovative service in a community (eg OpenIRIS.). Software that provides a solution to a need that was not addressed before. Strong societal impact.

Additional general comments, feedback, or suggestions

Given my experience with this assessment. I find it difficult to accurately assess all solutions. Indeed, business expertise is clearly indispensable to answer the following questions: What is the target of the solution? How this solution improves your productivity? etc.

Moreover, it becomes clear that a marketplace is not only a list of materials/software that are available. This can be much more by offering tools to users to enable them to promote their products in a marketplace. The most interesting examples of this point of view are OpenIRIS (facility management), PrestaShop and WooCommerce (web shop).

The establishment of a marketplace by EGI is therefore important at European level to promote exchanges and knowledge. EGI should help hosting and promote software available in the marketplace. The service description must clearly appear and must be understandable by all although its use will be dedicated to a specialist public. Furthermore, all solutions will be highlighted on a dedicated portal (the EGI marketplace of the marketplace) that will enable search by categories and keywords.

Expert 2

Adequacy of the solution against requirements

AppDB	4
GOCDDB	3
FIWARE Marketplace Generic Enabler	3
Open IRIS	5
PrestaShop	3
WooCommerce	2

Motivation / comments on rating:

As far as I can estimate, OpenIRIS looks like a very good fit regarding the requirements (most comprehensive package).

With some programmatoric extensions AppDB could eventually be extended to achieve the

same amount of features.

All other tools would most probably have to be extended to much or tweaked to much to fit the extensive list of requirements.

I was quite impressed by the features of PrestaShop even it is obviously for non-scientific purposes. I do think that the visually very attractive design of this web shop software would also be helpful for the selected candidate for the marketplace. In the end, it is also about attracting users.

Possible costs in terms of licenses and support, 1 (high cost for EGI) - 5 (low cost for EGI)

AppDB	5
GOCDDB	5
FIWARE Marketplace Generic Enabler	3
Open IRIS	4
PrestaShop	4
WooCommerce	2

Motivation / comments on rating:

My rating is based on the fact that EGI-based software should be the cheapest with respect to cost of licenses.

OpenIRIS' increasing user base and its collaboration model should allow for a rather small running cost regarding licensing.

The PrestaShop license model as well as large community seems to be a strong model.

For FIWARE Marketplace it is not clear how big the user base is.

Is the solution supportable in terms of expertise within EGI, 1 (poor) - 5 (good)

AppDB	5
GOCDDB	5
FIWARE Marketplace Generic Enabler	3
Open IRIS	4
PrestaShop	3
WooCommerce	2

Motivation / comments on rating:

I reckon the EGI knows best about already implemented solutions. OpenIRIS should be relatively easy to get along with since strong interactions are already in place.

Additional general comments, feedback, or suggestions

If more feedback is necessary, I'm happy to dive into an TOP3 choice if reauested. Access to all platforms would be helpful at that moment.

Expert 3

Adequacy of the solution against requirements

AppDB	3
GOCDDB	2
FIWARE Marketplace Generic Enabler	4
Open IRIS	4
PrestaShop	1
WooCommerce	1

Motivation / comments on rating:

APPDB: seems to have the framework and could be further developed to become a marketplace but needs quite some development effort to do so.

Fiware Marketplace: I found it to be a bit confusing and rather infused into Fiware, which could be both pro and con/

GOCDDB: is a service registry and as such could be part of the ecosystem but I do not see who it can developed in a marketplace.

Open IRIS: seems to be a service publisher and scheduler and a such it could be the most appropriate tool for this task. Not sure however what is the cost; how easy it is to customise it to cater for our needs/policies/business models.

PrestaShop and WooCommerce: I don't see any value in them, they are online shops which is rather different than a market place.

Possible costs in terms of licenses and support, 1 (high cost for EGI) - 5 (low cost for EGI)

AppDB	3
GOCDDB	2
FIWARE Marketplace Generic Enabler	3
Open IRIS	3
PrestaShop	1
WooCommerce	1
Motivation / comments on rating:	
I'm not aware of the pricing model for each So i considered all to be free for use and evaluated the development effort that might be required.	

Is the solution supportable in terms of expertise within EGI, 1 (poor) - 5 (good)	
AppDB	3
GOCDDB	2
FIWARE Marketplace Generic Enabler	5
Open IRIS	3
PrestaShop	1
WooCommerce	1
Motivation / comments on rating:	
N.A.	

Additional general comments, feedback, or suggestions
N.A.

Expert 4

Adequacy of the solution against requirements	
AppDB	4
GOCDDB	2

FIWARE Marketplace Generic Enabler	3
Open IRIS	3
PrestaShop	1
WooCommerce	1

Motivation / comments on rating:

Although the AppDB was not designed as a marketplace, its existing features are very important for the future marketplace. It supports storing, sharing and publishing applications and virtual appliances. The latter ones are coming together with information on which clouds these appliances can be deployed and executed. This very important feature is completely missing from the other systems. More than that, this feature of AppDB could be easily extended with Occopus (developed at TRL6 level by MTA SZTAKI) features enabling extremely easy and automatic deployment of those appliances in the clouds of the EGI FedCloud. Furthermore, these appliances could easily be organized into collaborative services that are also deployed in the EGI FedCloud by Occopus. This integration of AppDB and Occopus is already on its way and close to be finished. The required marketplace functionalities could easily be developed for AppDB provided that the source code is available and the developers of AppDB provide at least consultancy support for the development.

FIWARE is similar to AppDB in many senses. It also supports applications and VMs but the main problem is that it is a product of a project that is not related to EGI and it is not clear what will happen to FIWARE after the end of the project. In addition, it is questionable how much the developers would be motivated to do the required extensions and modifications for the sake of the EGI community. That's why I gave less score for it than for AppDB.

Open IRIS has a very nice, well developed user interface for marketplace purposes. However, it misses the support for virtual appliances and their execution in the EGI FedCloud. This will be an extremely important feature in the future as the user communities more and more move and migrate into clouds.

GOCDDB's features are very limited compared to the generic requirements of the marketplace. Furthermore, it provides many features that are not needed at all for the marketplace and therefore they just cause useless complications for the potential users.

PrestaShop and WooCommerce strongly target commercial applications and commercial web design. Although they are well designed and user-friendly environments they miss many features required for the marketplace.

Possible costs in terms of licenses and support, 1 (high cost for EGI) - 5 (low cost for EGI)	
AppDB	5
GOCDDB	4
FIWARE Marketplace Generic Enabler	3

Open IRIS	3
PrestaShop	1
WooCommerce	1
Motivation / comments on rating:	
<p>AppDB is in principle open source (although I have not seen its code in any public repository yet) and developed by EGI community members. Therefore, its further development could easily be organized inside the EGI community (for example, SZTAKI is already voluntarily works with the developers of APPDB to enhance the AppDB features with Occopus services). The same is true for GOCDB although the work needed for extending it towards the required marketplace would require more efforts than for AppDB. FIWARE and OpenIRIS are also open source software based services but they are developed by communities which are not directly involved in the work of the EGI community and hence motivating them for doing the required developments could be more costly than for the EGI members. Alternatively, EGI members can do the required development based on the OSS but then the learning time will be long and costly. Finally, PrestaShop and WooCommerce are commercial code based systems. The EGI communities have no access to those codes and the companies are certainly not motivated to do code development for EGI communities or it will be very expensive.</p>	

Is the solution supportable in terms of expertise within EGI, 1 (poor) - 5 (good)	
AppDB	5
GOCDB	5
FIWARE Marketplace Generic Enabler	3
Open IRIS	3
PrestaShop	1
WooCommerce	1
Motivation / comments on rating:	
<p>As explained for the previous question, AppDB and COGDB are in the hand of EGI community members and hence EGI expertise is available to further develop them.</p> <p>FIWARE and OpenIRIS are OSS codes and hence after a certain learning phase EGI community members would be able to further develop them according to the EGI needs.</p> <p>PrestaShop and WooCommerce are closed codes and hence EGI communities will never have the required expertise to further develop and support them.</p>	

Additional general comments, feedback, or suggestions

My final recommendation: choose AppDB under the following conditions:

1. The developers of the AppDB code place the source code of AppDB into a public open repository (Sourceforge, Github, etc.);
2. At least two independent EGI member organizations will work on the extension of the existing code towards the marketplace. This guarantees that even if one of the developer organization leaves the project the work can go on. At this stage again a new, second organization should be involved in the code development. It would be better to start the code development with three organizations;
3. The current code owners of AppDB should provide initial training for the other organizations to learn the source code. In this way, after the training, the new organizations will be able to further develop the AppDB code.

Expert 5

Adequacy of the solution against requirements	
AppDB	3
GOCDDB	2
FIWARE Marketplace Generic Enabler	4
Open IRIS	4
PrestaShop	3
WooCommerce	3
Motivation / comments on rating:	
<p>None of the selected software have a ready-to-use solution compliant with the requirements identified for the EGI Marketplace. Some of these functionalities but some additional effort is still needed to include the missing ones and have a production EGI Marketplace complaint with the EGI ecosystem.</p> <p>In more details:</p> <p>GOCDDB:</p> <ul style="list-style-type: none"> • It is an EGI Service provided by STFC; • It is accessed by all the project actors (end-users, site-managers, NGI managers, support teams and VO managers); <ul style="list-style-type: none"> • It is possible to assign different roles; • No support for Identity Federations authentication; <ul style="list-style-type: none"> • Authentication based on X.509 digital certificates; 	

- It is focused on HTC and Cloud resources;
- It doesn't include functionalities to compare different resources;
- Provides functionalities to implement the basic Service Registration;
 - Can search and list for a HTC and Cloud-based resources;
- Does not provide functionalities to manage usage policies and SLA:
 - Can't create, modify, negotiate and assign SLA for his/her service;
 - Can't manage terms of usage and policies;
- Provides filtering functionalities;
 - The user is able to search and filter for resources on the basis of characteristics;
- Rating is not supported;
- No reports are available for users, groups and communities;
- No support for tickets is available;
- Provides functionalities to help SP to specify the availability for his/her service.
- Provides functionalities to scope resources and make them visible/invisible;
- It is not possible to contact service providers via messages (only via e-mail);
- Accounting, monitoring and billing services are not available;
- The solution is open-source.

AppDB:

- Accounting, Monitoring and Billing services are not available.
- It is already integrated with the EGI SSO.
- Provides functionalities to implement the basic Service Registration;
 - Listing services/applications/VAs/...;
- Does not provide functionalities to manage usage policies and SLA:
 - Can't create, modify, negotiate and assign SLA for his/her service;
- Provides functionalities to contact the service provider and customers via messages;
- Provides functionalities to rate services;
- Provides filtering functionalities;

- The user is able to search and filter for resources on the basis of characteristics, VO, search term;
- Offer the possibility to upload publications;
- Very basic reporting functionalities are available;
- It supports a very reliable and rich API;
- It does offer correlated information from many services (e.g. OpsPortal, Perun, GOCDB, BDII and OpenAIRE).
- The solution is open-source.

WMarket:

- It supports an authentication based on username and password or with an OAuth2 token;
 - It can be configured to uses external authentication system;
- Does not provide any services to manage usage policies and SLA, specify a time window when the service is available or unavailable;
- No ticketing system is available;
- Customer can browse the available offerings organized in different categories:
 - Clicking on a generic offering it is possible to get its details and review;
 - Customer can book offerings, compare different offerings, browse and review stores;
- The SW is distributed under the BSD license.

Open IRIS:

- The Open IRIS solution does not support Identify Federation Authentication;
- The solution is focused on resources (instruments and applications) sharing and create virtual pools of resources for collaborations and communities.
 - Every functionalities can be easily accessed from a central dashboard.
- Different profile of users are supported;
- From the dashboard different topology of users can:
 - track and manage any requests and functionalities for resource Listing, Booking, Pricing Service requests and produce usage statistics;
 - access to the service Usage Policy;
 - specify the time window when the resource is available, define unavailability
 - manage all the orders;

- book a service;
 - manage tickets;
 - access report statistics.
- Provides functionalities to implement the basic Service Registration;
 - The solution is open-source.

PrestaShop:

- It provides an e-commerce platform to manage different products.
- Very limited security policies are adopted.
 - No support for Identity Federation Authentication schema;
- Mobile friendly;
- PrestaShop is a free Open-Source e-commerce solution
- Support for real-time analytics;
- Customizable with different modules
- Easy to customize theme (More 2,000+ professional e-commerce templates);
- It implements many Merchant functionalities.

WooCommerce:

- Open-source e-Commerce platform and a powerful Content Management System (CMS) easy to adapt and customize (70Millions+ of websites);
- REST API available for developer;
- Free;
- Open Source;
- Thousands of plugins, themes and widgets available;
- Based on WordPress;
- Compliant with W3C standards.

Possible costs in terms of licenses and support, 1 (high cost for EGI) - 5 (low cost for EGI)

AppDB	5
GOCDDB	5
FIWARE Marketplace Generic Enabler	3
Open IRIS	3
PrestaShop	3
WooCommerce	3
Motivation / comments on rating:	
All the selected solutions are open-source.	

Is the solution supportable in terms of expertise within EGI, 1 (poor) - 5 (good)	
AppDB	5
GOCDDB	2
FIWARE Marketplace Generic Enabler	2
Open IRIS	2
PrestaShop	2
WooCommerce	2
Motivation / comments on rating:	
AppDB and GOCDDB are solutions widely used by EGI members.	
More than 52,000 websites have been created using PrestaShop and the trend is still increasing.	
Over the 30% of all online stores have been created with WooCommerce. This is the most popular e-Commerce platform on the web (http://trends.builtwith.com/shop).	

Additional general comments, feedback, or suggestions
N.A.

Expert 6

Adequacy of the solution against requirements

AppDB	5
GOCDDB	N.A.
FIWARE Marketplace Generic Enabler	5
Open IRIS	5
PrestaShop	5
WooCommerce	5
Motivation / comments on rating:	
I haven't been able able to access GOCDDB (server not found). I even haven't been asked for a certificate.	

Possible costs in terms of licenses and support, 1 (high cost for EGI) - 5 (low cost for EGI)	
AppDB	3
GOCDDB	3
FIWARE Marketplace Generic Enabler	3
Open IRIS	3
PrestaShop	4
WooCommerce	4
Motivation / comments on rating:	
<p>All of them are open source and/or offer community version with potentially commercial paid support especially for for PrestaShop and WooCommerce.</p> <p>AppDB and GOCDDB are already paid by EGI so the additional cost should be low.</p> <p>OpenIRIS is currently supported by the Swiss Federation.</p> <p>However for these 3, the cost may be considered as high as we have to consider long-term funding and support as they do not (yet) rely on a large and commercially supported model.</p> <p>The main cost may come also from the high-availability (HA) configuration to support thousands or hundreds of thousands of users. The support of HA is not described anywhere for more EGI-related products (AppDB, GOCDDB, Open IRIS) or FIWARE MP</p>	

Is the solution supportable in terms of expertise within EGI, 1 (poor) - 5 (good)

AppDB	5
GOCDDB	5
FIWARE Marketplace Generic Enabler	3
Open IRIS	4
PrestaShop	5
WooCommerce	5
Motivation / comments on rating:	
<p>I'm not sure about the expertise people have within EGI about Prestashop and WooCommerce but they are definitely supported by huge worldwide communities.</p> <p>AppDB and GOCDDB are already supported by EGI people, therefore the expertise is there but the user communities are currently much narrow, as for OpenIRIS.</p> <p>I'm not sure if people within EGI have any expertise using FIWARE MP</p>	

Additional general comments, feedback, or suggestions

N.A.

Expert 7

Adequacy of the solution against requirements

AppDB	4
GOCDDB	1
FIWARE Marketplace Generic Enabler	3
Open IRIS	3
PrestaShop	3
WooCommerce	3
Motivation / comments on rating:	
N.A.	

Possible costs in terms of licenses and support, 1 (high cost for EGI) - 5 (low cost for EGI)

AppDB	4
GOCDDB	3
FIWARE Marketplace Generic Enabler	2
Open IRIS	2
PrestaShop	2
WooCommerce	2
Motivation / comments on rating:	
N.A.	

Is the solution supportable in terms of expertise within EGI, 1 (poor) - 5 (good)	
AppDB	5
GOCDDB	3
FIWARE Marketplace Generic Enabler	3
Open IRIS	2
PrestaShop	2
WooCommerce	2
Motivation / comments on rating:	
N.A.	

Additional general comments, feedback, or suggestions
N.A.

Expert 8

Adequacy of the solution against requirements	
AppDB	4
GOCDDB	1
FIWARE Marketplace Generic Enabler	3

Open IRIS	4
PrestaShop	4
WooCommerce	5
Motivation / comments on rating:	
<p>Features selected for the evaluation (which I fully share) shows we need simple solution, not full ecosystem with complicated functionality. That is why my preference is in WooCommerce.</p> <p>OpenIRIS seems too much for our goals. AppDB is simple enough, but might missing some of the features in look&fell, which one: responsive design seems critical. GOCDDB is completely different purpose and mixing them with marketplace might lead to lost of understanding what are element of infrastructure and what is the offering.</p>	

Possible costs in terms of licenses and support, 1 (high cost for EGI) - 5 (low cost for EGI)	
AppDB	3
GOCDDB	3
FIWARE Marketplace Generic Enabler	2
Open IRIS	3
PrestaShop	2
WooCommerce	5
Motivation / comments on rating:	
<p>EGI solutions needs to be developed using mid to large programing effort.</p> <p>To integrate WooCommerce is not programming, is web site, that every interactive agency can do cheap. Maintenance is also important -- WooCommerce has big community to support solutions, and almost everyone can fix/extent, if not extended by wordpress plugin.</p> <p>PrestaShop seems more integrated and not relevant.</p> <p>It is hard too judge FIWARE Marketplace, but support might be poor.</p>	

Is the solution supportable in terms of expertise within EGI, 1 (poor) - 5 (good)	
AppDB	5
GOCDDB	5
FIWARE Marketplace Generic Enabler	1

Open IRIS	4
PrestaShop	3
WooCommerce	5
Motivation / comments on rating:	
<p>For AppDB and GOCDB it is obvious expertise, but the question for me is the effort available to provide such development. In case OpenIRIS I believe situation is similar, but AFAIK developer team is outsourced.</p> <p>In case WooCommerce I believe almost every partner staff, and for sure egi.eu staff, has some experience with doing websites with wordpress. Even if not, every interactive agency will do it.</p>	

Additional general comments, feedback, or suggestions

Having in mind long quest for searching appropriate tool for the marketplace, we need finally decide on the solution (simpler - better) and just start publishing the content, now. So, time-to-market(place) should also be essential in this evaluation. WooCommerce wins also at this criteria.

Open platform, such as wordpress with WooCommerce, with essential functionality will give us opportunity to focus on clarifying and shaping attractive content.

Functionality related technical details such exacting information about service elements, searching for appropriate image do deploy in specific site, or agree on details on allocation, should be still provided in specialised tools (GOCDB, AppDB, e-grant, respectively).