

Exploring how researchers can pay for EGI Resources

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Abstract:

This report aims at providing a thought experiment around pay-for-use models for EGI services that compliments current usage models where users are billed for the services and resources consumed. The different roles, models and plans are proposed for how such models could be applied within EGI including in a short-term experiment for NGIs to participate that would feed into longer-term initiatives.

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1 For EGI Council Decision

The key points within this report that need the endorsement of the EGI Council are:

1. For EGI.eu to explore in more depth the legal and financial impacts of the different models on it, user communities and resource providers.
2. For EGI.eu to implement the proof of concept described in the report with NGIs, Resource Centres and User Communities that are able to engage in this model and develop it further.
3. To fully assess the policy and legal issues that would need to be addressed if this model was to be adopted within EGI and the potential impact it could have.

2 Introduction

Sustainability has been an issue explored by EGI in various ways over the last couple years. There are also messages from the European Commission that keeping the status quo is not an option for e-Infrastructures and EGI should therefore explore options around a more market driven e-Infrastructure for supporting the ERA. However, EGI operates within a publicly funded research and academic environment providing services free at point of delivery with resources bought from grants dedicated to certain groups or disciplines either by direct allocation or by peer review. With the advent of cloud computing, business models and user expectations are shifting towards on-demand and pay-per-use service provision increasing flexibility and agility. This new paradigm provides another motivation for EGI to explore new service definitions by enabling the possibility to provide ICT services that can be paid for the use, along with the more traditional procurement of resources to be managed and offered for free to the owners.

This report therefore explores how pay-for-use models for EGI resources could be implemented alongside existing procedures where users are billed for the usage of resources. Payments would be made through two main scenarios that could co-exist: 1) payment to EGI.eu who in turn provide part of the revenues to the service providers (e.g. NGIs, EIROs, commercial organisations), 2) payment directly to each resource provider. This approach is meant to compliment the current allocation and usage models by providing an additional means of researchers to access EGI's resources. The resource providers would be able to 'opt-in' for those who are able and willing to participate in such a model. Potential use cases could be new researchers who need rapid access to new/additional resources or potential changes to funding models where funds are allocated to researchers who then need to purchase a set amount of resources and/or services for their specific research.

3 Actors and Roles

Within a pay-for-use business model, it is important to distinguish between who is consuming the service, who is paying for the service and who is providing the service. Upon clarifying these definitions then the required relationship and supporting services can be defined.

A 'consumer' is the person actually using the service (user). A 'customer' is the person or entity that negotiates the level of services and commissions the service provider or broker and may pay, doing so on behalf of a number of consumers (users). Although these two actors need to be treated the same from an IT service point a view, it is important to distinguish these two roles. A 'service provider' is an organisation supplying services to one or more consumers. In our scenario, we distinguish two main types of service providers: a 'resource provider' that is an organisation offering access to ICT resources through service abstractions (e.g., computing power, storage) and a 'broker' that is an organisation facilitating or arranging transactions and agreements between a customer and one or more resource providers.

As EGI operates in a distributed environment, services are provided by a variety of different organisations spread across Europe and beyond. Within this environment, EGI.eu is playing the role of a ‘federator’, providing the necessary technology, processes and governance to enable users to access an integrated set of services from autonomous organisations. The NGIs play a similar role on a national level.

4 Brokering Models

There are a number of different brokerage models used by a variety of domains. In this section, we present three main models that could be applied within the EGI ecosystem.

4.1 Model 1: Independent Advisor

In the ‘Independent Advisor’ model, the federator provides a general listing of services, facilitates relationships between customers, consumers and resource providers while playing only a support role if required during the service lifecycle. Through the federator, resource providers can promote their services to customers, while retaining the direct dialogue concerning the resource allocation, contracts and financial transactions. This model requires the customer to interact with individual (potentially multiple) resource providers to obtain the services it requires (Figure 1). Therefore, interactions are decentralised leading to higher overheads for the number of relationships that customers/resource providers must maintain. The federator is able to fund the services it provides through a membership model, which restricts the customers and resource providers that can use them. This is the current model used by EGI.eu.

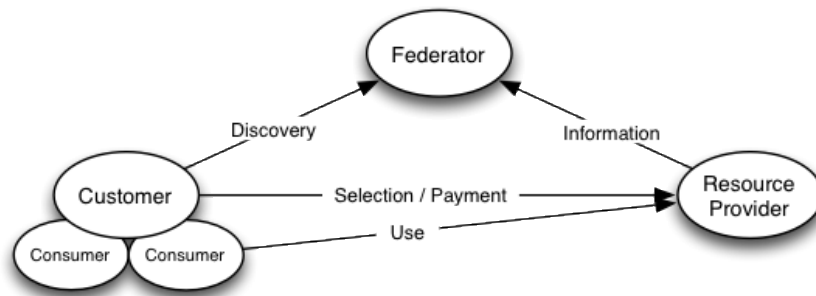


Figure 1: Independent Advisor Broker Model

4.2 Model 2: Matchmaker

In the ‘Matchmaker’ model, the resource allocation is managed by the federator. The customer discusses requirements and receives a resource allocation from the federator with a resource provider. The contractual agreement is established by the federator with the customer on behalf of the resource provider but any financial transaction is handled directly between the customer and resource provider (Figure 2) with the resource provider paying the federator for establishing the contractual agreement. This model is more suitable for customers who need access to many resource providers.

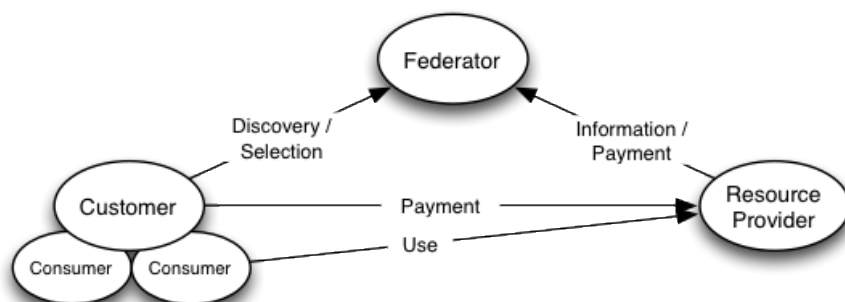


Figure 2: Matchmaker Broker Model

4.3 Model 3: One Stop Shop

The 'One Stop Shop' model fully relies on the federator to handle the service publication, matchmaking, contract and agreement negotiation, as well as financial transactions (Figure 3). The resource provider receives payment for the resources used by the consumer collected by the federator from the customer. Reliance on such a service reduces organisation overhead on both customers and resource providers by offering them a single point-of-contact to many independent counter-parts.

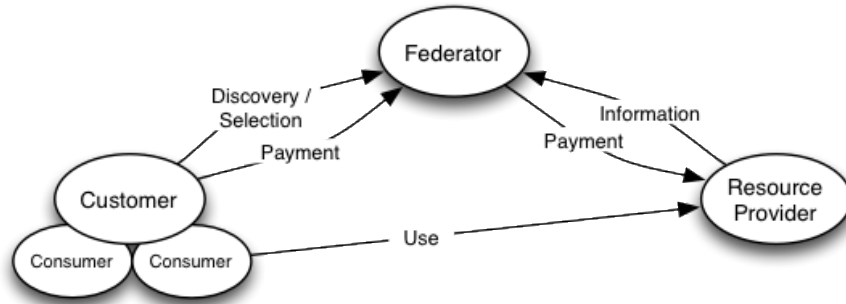


Figure 3: One Stop Shop Broker Model

4.4 Comparison Analysis

Features	Independent Advisor	Matchmaker	One Stop Shop
Consolidated Information	√	√	√
Resource Allocation	X	√	√
Contract/SLA	X	X	√
Customer Pays Resource Provider	X	√	X
Resource Provider Pays Federator	X*	√	X
Customer Pays Federator	X	X	√
Adv./Disadv. for Customer	(+) Find best solution (-) Many-to-many relationship (-) Own responsibility	(+) Find best solution (+) Single point of contact for resource allocation (-) Many-to-many relationship	(+) Find best solution (+) Single contact point for resource allocation, contracts/SLA, payment
Adv./Disadv. for Resource Provider	(+) Promotion of services (+) Receive targeted customers (+) Full control of service delivery (-) High overheads (-) Complex CRM	(+) Promotion of services (+) Receive targeted customers (+) Balance of control over service delivery (+) Shared Overheads/CRM (-) Fragmented across borders	(+) Promotion of services (+) Receive targeted customers (+) Single contact point for allocation, contracts/SLA, payments (+) Streamlined Overhead/CRM (-) 3 rd party reliance

* The independent advisor generates revenues with membership fees from the resource providers

5 A Simple Experiment

The 'Matchmaker' and 'One Stop Shop' model both provide advantages and disadvantages beyond the current 'Independent Advisor' model used within EGI. To establish which models can be implemented and is most appropriate for EGI.eu as a federator, the following points need to be defined.

5.1 Central Accounting

The accounting portal will need to provide the underlying information needed for an invoice to be generated manually per organisation/user who is aiming at using EGI's services in a pay-per-use fashion. Once it is known that an invoice can be generated manually and a model adopted, the work needed to produce invoices from the accounting portal can be assessed. The items that resource providers will need to charge for being consumed need to be aligned with those items that can be accounted for. This is initially proposed to be:

- Batch processing: core/hour (with price depending also on the amount of RAM available, ranges can be defined).
- VM on demand: core/hour (resources provided through the EGI Federated Cloud Task Force could be purchased by users as an option to be further explored).

5.2 Resource Provider Pricing

Initially, resource provider pricing needs to be linked to consumed quantities that are already being accounted for. Centrally, accounting records the resources consumed by a job such as CPU time or memory. Future work could consider a broader service portfolio (e.g. storage, training, virtual machine usage, consultancy) that could be made available through a broker or through a 'yellow pages' directory service. Costs incurred on the services provided may vary (e.g. only for the physical resources or resources provide free at the point of delivery, while charging for the uniformed coordination of those resources).

5.3 Broker Service

To bootstrap and to be able to adapt to the early usage of this pay per use capability, a manual approach will be adopted to its implementation on top of existing functional capabilities within EGI. For instance:

1. EGI.eu will need to establish an appropriate agreement with any cooperating NGIs and their resource providers describing the service endpoint and the cost of their individual resources that will be enabled with the template PayPerUseVOs.
2. Each customer organisation will need to establish an appropriate agreement with EGI.eu (the broker) on behalf of its resource providers.
3. Once the agreement has been made EGI.eu will add appropriate consumer identities tokens to a previously unused PayPerUseVO on the PayPerUse VOMS server.
4. The consumer will use existing interfaces to access and use the resources within the PayPerUseVO with resource usage being recorded in the accounting system and eventually in the accounting portal.
5. The accounting portal will be used to extract resource usage from the individual PayPerUseVOs and using the costs established with the NGIs to generate an account for the customer and for the resource provider.
6. At intervals the customer will be invoiced for the consumed resources and payments made to the NGI for the resources they have provided. EGI.eu will add a % and/or flat rate to the cost of the consumed resources presented to the customer.

6 Future Considerations

6.1 Short-term

Some immediate issues need to be considered:

1. Which NGIs are able to receive payments and for which resources at what rate?
2. What are the VAT implications and other legal issues for EGI.eu to send invoices to customers and for NGIs to invoice EGI.eu for the resources consumed through this program?
3. How would a central broker reconcile taxation issues across Europe?
4. What is the overhead for EGI.eu to set up and calculate bills?
5. In which additional services (e.g., EGI.eu's catch all services such as VOMS, WMS) should the PayPerUseVOs be enabled?

6.2 Long-term

To broaden out and formalise a pay for usage model the following issues are foreseen:

1. All customer-facing services should be structured within a well-defined service portfolio with a clear pricing models and indication of available volume.
2. Identification through a gap analysis of customer, consumer, broker and resource provider supporting services (either new or extensions to the current tools) that will enable the increased automation of the process once it has been manually established.
3. Evaluate where there need to be legally binding and enforceable agreements and how these agreements could be implemented.
4. Legal issues around accepting payments for services provided that were originally obtained through public funds (e.g. state-aid and competition laws) may block global adoption of this model across all countries, but it will enable those resource providers that can accept payments to proceed.
5. Investigation of the various legal entity forms as to the opportunities and limitations around pay-for-use models (e.g. Foundation; ERIC legal framework; limited company) and issues such as VAT, liability, etc.

7 Implementation Roadmap and Proof of Concept

The table below provides a roadmap of potential activities that would need to take place in order to move further towards implementing pay-for-use models. In order to test the agreed models and approaches, a proof of concept would be run with willing NGIs and user communities (e.g. approx. 3 each). From those willing participants, an understanding of the level of required effort and resources would need to be defined and agreed.

Timeline	Action	Description	Responsible
31 Oct 2012	Pay-for-Use report submitted to the EGI Council	The pay-per-use report is finalised by the working group and delivered to the EGI Council	EGI.eu and working group
22 Nov 2012	Launch questionnaire after EGI Council meeting	NGIs interested in participating in the simple experiment to provide initial set of information	Interested NGIs

Timeline	Action	Description	Responsible
30 Nov 2012	Analyse the questionnaire and refine the implementation plan	Based on analysis of the questionnaire develop an agenda for the January Workshop and refine the implementation plan with cooperating NGIs user communities.	EGI.eu and cooperating NGIs
30 Nov 2012	Define the detailed implementation plan	Define the implementation plan for the simple experiment and seek user communities willing to cooperate in using this model	EGI.eu and cooperating NGIs
End Jan 2013	Pay-for-use Workshop	A workshop is held on key topics with the interested parties; the workshop can involve e-FISCAL and FedSM representatives	EGI.eu
10 Mar 2013	Final Report	A final report is written on the experiences to date and possible future directions in preparations for the 3 rd EGI-InSPIRE EC Review that is endorsed by the EGI Council.	EGI Council / EGI.eu

8 Questionnaire

This questionnaire will be presented to NGIs to help identify the participants (both NGIs and customers) in the simple experiment.

1. Name of your NGI:
2. Would your NGI be willing to participate in the simple experiment about pay-for-use models?
 - a. Yes
 - b. No
 - c. Other (please specify)
3. If yes, what kind of resources, for what price and how much capacity/people could you provide?

Free text
4. Who is the NGI contact point (technical & financial) regarding participation in the simple experiment?

Free text
5. Are the physical resources owned by (multiple choice):
 - a. The NGI
 - b. Resource Centres
 - c. Universities and Research Institutions
 - d. Other (please provide further details)
6. Are there any legal constraints around charging for your consumed services?

Free text
7. Can your NGI issue invoices?
 - a. Yes
 - b. No

- c. Other (please specify)
8. If so, is the invoice subject to VAT?
- Yes
 - No
 - Other (please specify)
9. Do you foresee any issues invoicing for services provided and redistributing them to the resource provider as a means of cost recovery?
- Free text
10. If your NGI could not support pay-for-use models, could responsibilities be delegated to someone with your country who could?
- Yes
 - No
 - Other (please specify)
11. Do you foresee any issues in invoicing EGI.eu for the resources consumed in this model?
- Yes
 - No
 - If yes, please describe
12. Can you suggest potential user communities who would be willing to participate as paying customers?
- Free text
13. EGI.eu would plan to hold a workshop in January 2013 regarding pay-for-use models, what are the most important topics you think should be discussed? (Place an X in the box)

Topic	Not Important	Somewhat Important	Important	Very Important	Not sure
State-aid and competition laws					
National policies/legal issues					
Organisation policies/legal issues					
Supporting Services (e.g. billing, accounting, monitoring, SLAs, UCs)					
Developing business models					
Defining service portfolios					
Understanding costs					
Applying pricing models					
Other (please specify)					