

**EGI-Engage**

Platforms for the long tail of science

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Abstract

This document presents the status of the long tail of science platform. It includes a description of the architecture, the processes, and the associated services integrated or under integration. The deliverable also reports on a survey done among NGIs and service providers about the services that should be higher priority for future integration.

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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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**Executive summary**

The long tail of science platform has been designed to provide a zero-barrier access to the EGI resources, at least to a subset of the EGI services with limited capacity. This can serve occasional users who perceive joining a Virtual Organization as an excessive, and also users who potentially would start a long term collaboration with EGI and who want to try first some services to understand if they fulfil their requirements.

The LTOS platform is composed of a user registration portal, an e-token server, a pool of resources supporting a catch-all VO, and a set of science gateways. The platform has been integrated with one science gateway so far, more are in the pipeline.

One of the purposes of this document was also to provide an assessment of the platforms and services that are mostly wanted by the users. Surveying users of the long tail of science is a very difficult task, since by definition they are not organized and do not have contacts that could be interviewed, unless these contacts are gathered from the users already using the LTOS platform. Unfortunately without a critical mass of capabilities available through the platform, the platform is not attractive for new users, and currently there is no a user base to interview. The solution has been to ask the service providers who are actually supporting long tail users, such as some NGIs very active in supporting the long tail, which services are most important in the users’ daily activities. The result of this investigation is that the basic services (job submission, VM instantiation, basic storage activities) are the most popular, and should be higher priority. DIRAC, iRODS and Slipstream are some of the services that will be evaluated for high priority integration.

# Introduction

EGI identifies Long Tail of Science (LTOS) users as the individual researchers and small laboratories who - opposed to large, expensive collaborations - do not have access to computational resources and online services to manage and analyse large amount of data.

The users of the LTOS generally are not interested in long-term and continuative collaboration with EGI, but more in a spot usage of the EGI resources, to accommodate bursts of computing capacity requirements.

EGI has well established processes to allocate resources for user communities, in particular well established and organized collaborations. However individual researchers and small research teams perceive some barriers accessing HTC and cloud compute and storage resources from the network of NGIs. Examples of these barriers are:

* Obtain an IGTF[[1]](#footnote-1) personal certificate;
* Set-up a virtual organization (VO) or join an existing one;
* Have the VO enabled in the resources, and use resources.

Although EGI has processes and solutions to overcome these barriers, to some users the overhead associated is enough to discourage and make them look for alternatives, in most of the cases these new users are looking for quick access to resources to cope with their deadlines.

Recognising the need for simpler and more harmonised access for users of the LTOS, the EGI community started to designed a prototype for a new platform to support these users and to reduce, if not eliminate, the mentioned barriers. The platform main features are:

* Username/password user authentication
* Use a catch-all virtual organization, the LTOS VO, to support all the users of the platform
* Aggregate an initial pool of resources already configured to support the LTOS VO

This LTOS platform allows individual researchers and small research teams to perform compute and data-intensive simulations on large, distributed networks of computers in a user friendly way.

The platform, besides the technical services, aims to create communication channels between EGI and the NGIs who have already implemented processes and services for the national LTOS users, and who could better support their users. Through the platforms users will be able to get in contact with the user support of related NGIs, in case the use case could be better supported locally.

This document provides an overview of the architecture of the LTOS platform, the components and the interactions, the processes that support the workflows and how its modular nature can evolve to expand the services offered to the users.

In summary the LTOS platforms is designed to be an almost zero barriers access to the EGI services.

# Architecture of the Long Tail of science Platform

The LTOS platform is composed by the following main technical components, as shown in Figure 1:

* A user registration portal (access.egi.eu);
* A catch-all VO;
* A pool of resources where the catch-all VO is pre-enabled;
* A set of science gateways and portal;
* A X509 credentials factory.

**

Figure , high level architecture of the LTOS platform

The **user registration portal** is composed by a website (access.egi.eu) which allows users to authenticate using either social credentials or EGI SSO IdP[[2]](#footnote-2) and to provide information about their contacts, institutions, and research topic. The website is the initial user-facing interface for both the end users and the support team who will approve and manage the registrations and requests.

The user registration portal has also an interface for the services, such as the science gateways, in the form of an identity provider (IdP) which is used by the science gateways to get user authorization data and attributes. While the user interface has been designed and developed specifically for the LTOS use case, the IdP interface is using Unity[[3]](#footnote-3), a pre-existing authentication and authorization management solution using OpenID Connect as standard interface.

The **catch-all VO** is the Virtual Organization (vo.access.egi.eu) under which all the the activities of the LTOS users are performed. This VO can be used only by users owning credentials authorized by the LTOS platform.

The **pre-allocated pool of resources** is a number of EGI sites, both cloud and HTC, that accepted to enable the vo.access.egi.eu VO on their resources. The services on these sites are configured to recognize the X509 per-user sub-proxies, and handle the credentials according to the LTOS procedures and policies.

The **Science Gateways** (SG) are user interfaces, usually web portals, which provide a set of tools for the user to get an easy access to the EGI services. Since command-line interface may be too complicated for new users, SGs provide a user friendly web based interface. Integration of Science Gateways with the LTOS platform is needed to consume authorization information from the User registration Portal and to implement the use of the per-user sub proxies through the credential factory. These integration developments have proven to be not particularly heavy in terms of development effort.

The **X509 credentials factory** (or e-token service) is a service that is directly contacted by the science gateways to generate a per-user-sub-proxy (PUSP)[[4]](#footnote-4) from a robot certificate[[5]](#footnote-5). Permission to request for robot certificate proxies is granted only to the science gateways integrated in the LTOS platform and only when the user accessing the SG is authorized. The purpose of a per-user sub-proxy (PUSP) is to allow identification of the individual users that operate using a common robot certificate. This is achieved by creating a proxy credential from the robot credential with the proxy certificate containing user-identifying information in its additional proxy CN field. The user-identifying information may be anonymised where only the portal knows the actual mapping.

The LTOS platform integrated as X509 credential factory the solution developed by the Italian National Institute of Nuclear Physics (INFN), division of Catania, the e-tokes server. E-Tokens server allows central management of robot certificates and provides credential proxies to get seamless and secure access to computing e-Infrastructures, based on local, Grid and Cloud middleware supporting the X.509 standard for authorization. This solution permits to add some additional information during the proxy generation process to allow the identification of the individual users that operate using a common robot certificate. This is key for accounting and traceability of the usage of e-Infrastructures.

The interaction between the components is described in Figure 2, the steps represented are the following:

1. User registers in the access.egi.eu portal, a user ID is associated to the user and kept in the user database of the portal;
2. The user, once approved, can log into the SG, to access EGI resources;
3. The SG confirms that the user is authorized with the IdP provided by the access.egi.eu portal and retrieves the UID of the user through the IdP interface.
4. The SG generated a PUSP from the credential factory (not in the picture), including the UID information in the sub-proxy, and use it to submit the payloads of the users to HTC or cloud resources in the LTOS pool.

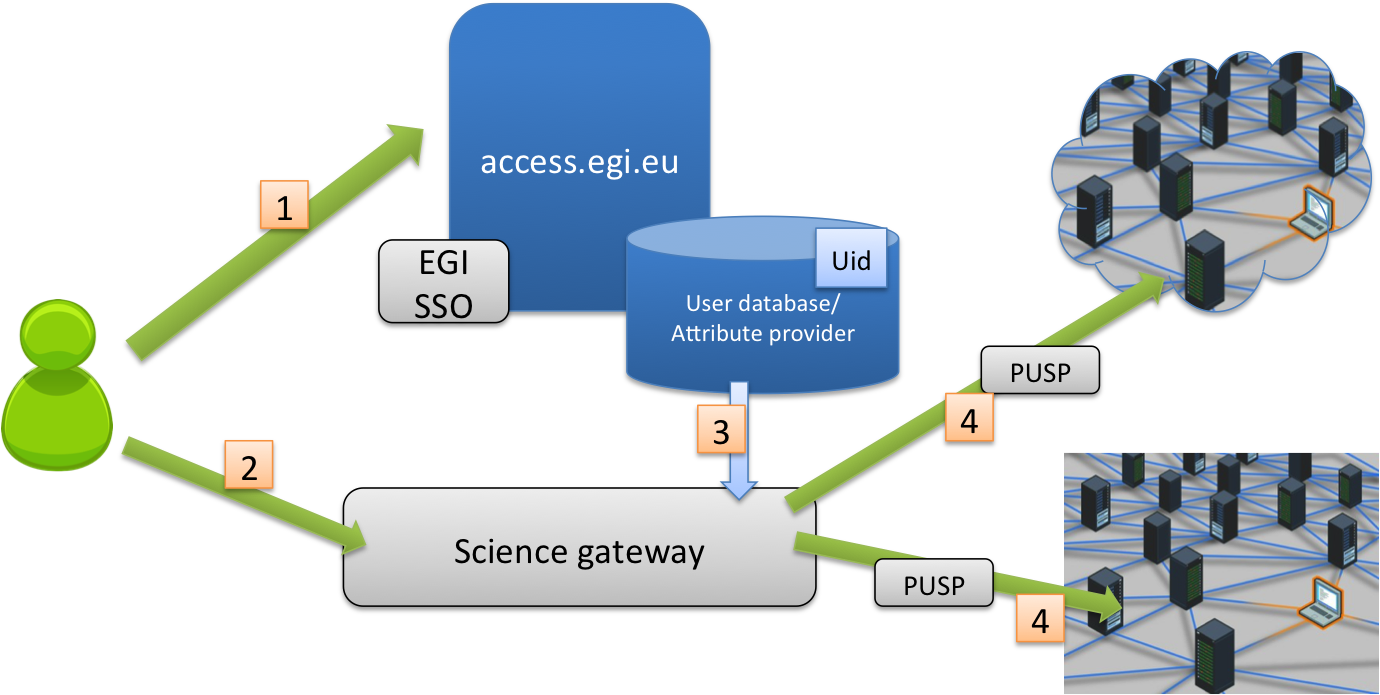


Figure , Interactions between the components of the LTOS

The advantages of the centralised user management are as follow:

* EGI can control centrally the users’ activities
  + Users are associated to a persistent unique identifier which is used in all the services accessed through the platform
  + Users can be quickly suspended in case of a security issue
* Science Gateways do not have to keep a users database or manage authorization, since these information are hosted centrally

# Operational processes and business model

This section analyses the policies and processed that have been developed to support the LTOS, providing an overview of the non-technical components of the platform.

## User validation and user management

New users register in the user management portal (access.egi.eu), as described in the previous sections, providing information about their institution, referee and topic of the research for which they would like to use EGI resources.

New users registration required validation, and this is a manual process that must be performed by either the EGI user community support team, in collaboration with the NGI user support representatives. The process of validation filters out users who are not eligible of using the EGI services, and provides an additional level of assurance to the service providers who enable the LTOS VO trusting EGI in authorizing the right users.

The process for validating a user must be limited to the essential steps to reduce any additional overhead and therefore the resources requested to handle the LTOS community. The necessary checks to be implemented are:

* The user is affiliated to a research institution, or is collaborating with someone affiliated to a research institution.
* The user has no other active accounts in the LTOS platform.
* The topic of the research that will use the EGI resources is relevant.

The checks that the user support team member will verify are the following:

1. Is the institution reported by the user a research institution, or another legal entity with research purposes?
   1. If not, the request will be rejected.
2. Has a user with the same name, or with the same email another account on the LTOS platform?
   1. In case the users already has another account the new one will not be approved.
3. Has the user registered with an institutional email, and/or has the user provided the link to a contact page on the website of their institution containing the user’s contacts?
   1. Using an institutional email, verified during the registration process, and reported on the contacts page is usually enough to provide the minimum level of assurance to access the LTOS platform. If a phone number is available on the institution site of the user the user support team will use it for a phone confirmation of the data.
4. If the user suggests a referee in a research institution, this reference must be checked by phone.
5. Has the user previously used the LTOS, has they properly acknowledged EGI and reported results to be associated to their use of EGI services (e.g. publications)?
   1. User must provide an explanation for not following this policy, before being approved again.
6. Is the research topic relevant?
   1. This step is not a review of the quality of the research, but only checks that the resources devoted to the user will be used for research and non for profit goals.

Some simple tagging mechanisms are being implemented in the LTOS in order to make easier to apply filters to the notifications of new registrations sent via email, to make easier for the NGI representatives to filter out all the notifications that are not relevant to their NGIs.

The future integration with eduGAIN[[6]](#footnote-6) will streamline the authorization process. LTOS platform will be able to automatically retrieve information about the users’ association to the research and education community, for the users using eduGAIN credentials. After an initial test period, the eduGAIN users could be automatically approved.

Once the user has been approved they can access EGI resources, as long as the approved status is valid. Currently the reasons for which a user can be suspended are:

* The user has used the maximum amount of resources allocated to given user
  + Temporary suspension in order to understand if the allocation of more resources is needed, or if the user should join another production VO in EGI. Alternatively, larger amount of resources can be requested through the e-grant[[7]](#footnote-7) tool.
* The user has been approved 12 or more months ago
  + Temporary suspension in order to confirm the validity of the data reported by the users 12 months ago.
* The user behaviour does not comply with the EGI policies
  + Depending on the severity of the non-conformity suspension can be permanent.

## Security policy and AUP

The deployment of the LTOS platform required policy work to support the technical solutions. The existing EGI VO portal policy[[8]](#footnote-8) limits science gateways in the actions that can be performed on behalf of the user with a robot certificate.

A LTOS security policy**[[9]](#footnote-9)** has been developed as part of the activities of the project to define what services integrated with the LTOS are allowed to do on behalf of the user, and what the EGI requirements are. The policy also describes the risk envelope of the LTOS platform, and it suggests what mitigations the resource providers should implement.

The main points in the security policy are:

1. User access should be subject to explicit approval.
2. User affiliation must be verified at the moment of the approval, and verified every 13 months
3. User information must be kept in the platform for at least 13 months after the user’s last access
4. The resource providers shall accept the risks introduced by supporting the LTOS users, and shall protect the rest of the infrastructure from that additional risk

The security policy also suggests a list of implementation guidelines for the resource providers, to be compliant with the policy and minimize any risk associated to the LTOS to an acceptable level.

The security policy allows users of the LTOS to access a set of features that are similar to the capabilities offered to users owning a personal certificate, for example submitting arbitrary binaries. The verification of the user identity, although acceptable, is not as strong as it is performed by a certification authority who releases certificates. This introduces the additional risk that is evaluated in the policy and that should be mitigated by implementing the recommendations.

The second policy document produced to support the LTOS activities is the Acceptable Use Policy and Conditions of Use of the EGI Platform for the Long-tail of Science[[10]](#footnote-10). It is an extension of the general AUP for the EGI users[[11]](#footnote-11), which implements the specifics requirements and limitations of the platforms from a user’s perspective. Every user is required to accept the AUP during registration in the portal.

The main points in the LTOS VO AUP are:

1. The user is authorized to use the EGI resources through the LTOS platform only for the purposes described during the registration.
2. Access is suspended after the usage of resources exceeded the assigned allocation (the same for every user), or the time limits.
3. User must provide appropriate acknowledgement of the EGI support in the outputs of their work
4. Contact information must be kept up-to-date in the access.egi.eu portal
5. The LTOS platform, and the resource providers, are allowed to track user’s activities to be kept confidential and used only for operational and security purposes
6. User accepts the risk that their access to the LTOS platform can be suspended and is provided without any guarantee

Both policies have been approved by the EGI bodies and are in production.

## Business model

**Zero barrier access**

The first use case of the platform is to be an easy zero-barrier access gate to EGI general purpose services. The LTOS platforms implements a scalable process, requiring minimum effort and minimum bureaucracy, to allow individual users to access EGI resources. The platform will support users and small collaborations who have as main requirements computing and storage capabilities, while the provisioning of services that require dedicated support at resource centres level is for the moment out of scope.

For NGIs who do not have existing processes to support their LTOS users, enabling the LTOS platform would be as easy as enabling a new VO in their resources, and redirect their users to the EGI LTOS platform.

**Enabling access to existing tools**

Existing services provided by the NGIs or by the Virtual Organizations can benefit from the LTOS as well. In case of a service that needs to be open and easy to access, for example to provide access to open data, the service provider can delegate user management to EGI and to the LTOS platform, since it is already providing the necessary features

In particular platforms or Virtual research environment that are using the EGI resources would highly benefit from the out of the box provision of X.509 credentials and a pre-allocated pool of resources.

VOs or communities who are developing tools for a specific research discipline may want to make the tool available to as many users as possible, to increase the use base of their software. Integrating it with the LTOS, will both achieve the results of creating a short-cut for new users to join, and advertise the tool in the LTOS platform portal.

**Integration with the EGI Marketplace**

LTOS is an access mode to EGI services, not a service by itself. Therefore LTOS platform will not be directly published in the EGI Marketplace, but as component enabling one access mode to other services. For example:

* HTC computing
  + HTC Computing element
  + LTOS Access
* Cloud computing
  + Cloud management system
  + LTOS access

Where "VO access” means the traditional access mode with dedicated agreements between resource providers and the VO. The LTOS platform can be integrated as a component with other services, as described in section 3.4, platforms and virtual research environment, for example to provide a “trial” access to the service.

## Integration of new services in the platform

As described in previous sections, the LTOS platform has developed a user registration and management process and associated a pre-allocated pool of resources. The link between the users and the resources are the science gateways or other services that can help users in easily use the resources.

The requirements for the science gateways and other services (called SG for simplicity) are the following:

* The SG must authenticate the users through the LTOS platform, using access.egi.eu
* The SG must allow the users to act on the EGI resources only if they are authorized in the access.egi.eu portal
* SG must use the UID provided by access.egi.eu to log user activity
* If X.509 credentials are required for some actions or to access other services, the SG must use robot certificates and per-user sub-proxies. The PUSP must contain the UID provided by access.egi.eu

To fulfil these requirements the development work for a SG is relatively limited.

* The SG should implement OpenID Connect authentication, since the unity service releases user information through the OIDC interface. Many portal frameworks already have OIDC plugins that can be used out of the box.
* The SG should retrieve the X.509 credentials from the credential factory. This can be done as easily as with a HTTPS call through a REST interface. Credential factory (token service) can provide robot certificate proxies already in the per-user sub-proxy format (UID is provided by the SG in the REST call, and added as an extension to the X509 proxy), and already with the VO extensions for the LTOS VO.

The steps required for the integration on the LTOS side are very simple as well:

* Authorize the SG to retrieve authentication and authorization information from access.egi.eu
* Add a link of the list of SG in the pages of access.egi.eu

The integration process is tracked through EGI helpdesk tickets[[12]](#footnote-12) by the “Operations” support unit. Before the technical implementation, the operations and the user support team evaluate the new SG in terms of maturity and effectiveness to support LTOS users.

# Services integrated or evaluated for integration

At the moment of writing only one science gateway has been fully integrated with the EGI LTOS platform, but other services are undergoing the integration and will be integrated in the coming weeks.

## Catania Science Gateway

The Catania Science Gateway Framework[[13]](#footnote-13) (CSGF) is an open source toolkit developed by the Italian National Institute for Nuclear Physics (INFN), division of Catania, to build, in a fast and easy way, standard-based web 2.0 Science Gateways to exponentially increase the number of potential users of Distributed Computing Infrastructure (DCIs) worldwide.

The framework, originally conceived in the context of the CHAIN project, has been used in the last couple of years to develop Science Gateways for several EU co-funded projects such as: DECIDE[[14]](#footnote-14), EarthServer[[15]](#footnote-15), EUMEDGRID-Support[[16]](#footnote-16), GISELA[[17]](#footnote-17), DCH-RP[[18]](#footnote-18), INDICATE[[19]](#footnote-19) and CHAIN-REDS[[20]](#footnote-20) just to name a few. Today this framework will be completely re-engineered in the context of the INDIGO-DataCloud[[21]](#footnote-21) project to include more additional functionalities and improve its performance.

The CSGF is based on well established and widely adopted standards, such as: SAGA[[22]](#footnote-22), SAML[[23]](#footnote-23), OCCI[[24]](#footnote-24) and it is fully compliant with both the EGI.eu VO Portal and User Traceability policies[[25]](#footnote-25).

In more details, user Authentication and Authorization framework is based on the SAML standard for Identity Federations, including Social Networks’ credential providers, while application interfaces are based on the OGF SAGA standard and are thus middleware-independent. It is worth mentioning that the framework does not require users any more to hold personal digital certificates to run their jobs on different kinds of DCIs (Grid, Cloud and HPC).

In the context of the EGI-Engage project, the CSGF has been further extended developing a new plug-in[[26]](#footnote-26) to support the Authentication schema based on the OpenID Connect[[27]](#footnote-27) protocol.

The CSGF allows users to execute applications on the EGI Federated Cloud and HTC resources, through web portals/SGs. The Science Gateways based on CSGF provide users with intuitive web interface to execute applications on the Cloud as jobs and to manage these jobs during their running (check the status and download the output). The SG takes care of starting the VMs on the EGI Federated Cloud, transfer the needed files (e.g. executable, input files, etc.), stop the VMs and download the output in behalf of the user.

The LTOS users can exploit the CSGF features to:

* Execute applications already integrated in one of the existing Science Gateways;
* Add their applications in one of the existing Science Gateways;
* Deploy a new Science Gateway.

## Services under integration

The following science gateways are in the pipeline for the integration with the LTOS:

**WS-PGRADE[[28]](#footnote-28)**

WS-PGRADE is an open source science gateway framework that enables users to access HTC and cloud infrastructures. gUSE is developed by the Laboratory of Parallel and Distributed Systems (LPDS) at Institute for Computer Science and Control (SZTAKI) of the Hungarian Academy of Sciences.

WS-PGRADE is a Web portal hosted in a standard portal framework, using the client APIs of gUSE services to turn user requests into sequences of gUSE specific Web service calls. A graph editor component can be downloaded from WS-PGRADE and can be used to define the static skeleton of workflows, while the HTML pages of WS-PGRADE provide interfaces to add content to graphs, to generate complete Grid/Web service applications. The members of gUSE community can access WS-PGRADE via ordinary web browsers. Application developers can access to all the advanced workflow features (graph, abstract workflow, template, application and project) to develop new workflow applications and upload them to the gUSE repository. For scientific end-users WS-PGRADE gives full access to the parameterization and execution of applications downloaded from the gUSE repository.

WS-PGRADE is in a very advanced status of integration, at the moment of writing.

**QCG[[29]](#footnote-29)**

The QCG middleware is an integrated system offering advanced job and resource management capabilities to deliver to end-users supercomputer-like performance and structure. By connecting many distributed computing resources together, QCG offers highly efficient mapping, execution and monitoring capabilities for variety of applications, such as parameter sweep, workflows, MPI or hybrid MPI-OpenMP. Thanks to QCG, large-scale applications, multi-scale or complex computing models written in Fortran, C, C++ or Java can be automatically distributed over a network of computing resources with guaranteed QoS. The middleware provides also a set of unique features, such as advance reservation and co-allocation of distributed computing resources.

The integration of QCG has started.

# Assessment of the requirements of the long tail of science users

The LTOS platform needs to evolve integrating a core mass set of SGs to offer the functionalities and tools to be attractive to the users, and start to grow in terms of user base.

Identify the services that would be needed by potential users of the LTOS is one of the major challenges of this activity. By definition LTOS users are a extremely diverse, not organized, category, it is therefore very difficult to identify interlocutors to gather requirements.

Instead, the requirements for the LTOS platform has been gathered from the services providers, within the NGIs, who have extensive experience in supporting the LTOS users. The questionnaire targeting the NGIs contained few questions about the services that the NGIs consider important for the LTOS users, both general purpose and discipline specific. The survey have been circulated among NGIs Operations managers and NILs.

Some NGIs, who have been more active in the past in structuring the support for the LTOS in their countries, have been addressed directly to discuss more in details their experience.

The following sub-sections summarize the information that we could gather in this process about the users’ expectations.

## Services for data management

Data services provided by NGIs are at the moment associated with the HTC or Cloud computing. NGI France allows access to iRODS[[30]](#footnote-30) service for the users of the long tail of science. iRODS is accessible through the NGI France national catch-all VO, and allows users to manage their data in a virtualised storage, and to manage datasets, apply access control and implement rules for replication and high availability of the data. iRODS provides native GUI.

## Computing services

**HTC Computing**

The majority of the user support teams highlighted the importance of providing easy to access generic computing services. LTOS users often are interested in computing capacity to run their own scientific code, using their submission frameworks (e.g. scripts) which they were using on local computing resources until they needed to scale up the available capacity and applied for resources in EGI. To achieve this result, users could be given either access to a command-line interface or to a generic enough user interface, both accessed using username/password-like credentials.

NGI France has been providing DIRAC[[31]](#footnote-31) for their long tail of science users, with good feedbacks. DIRAC is a workload management system with pilot jobs[[32]](#footnote-32) introduced by the DIRAC project is now widely used by various communities as main tool for computing task submission. Through the web interface of DIRAC users can submit one or multiple computing tasks, monitor their status and retrieve outputs. DIRAC offers also command-line clients.

Other NGIs, such as NGI CZ, allow users to access with username/password machines where batch submission is enabled to the local clusters.

**Cloud computing**

Based on the answers provided to the survey, LTOS users are using GUI to manage cloud resources. Users are both accessing directly the site cloud management framework GUI, for example Open Nebula, or using a cloud broker to use resources from multiple sites.

NGI France reports the use of slipstream[[33]](#footnote-33), a cloud broker, to allow LTOS users to instantiate virtual machines across multiple cloud sites.

In terms of virtual machines images, users have access to general-purpose virtual machine images, where they can install their applications and use the virtual machine, or multiple virtual machines, to run it.

## Discipline specific services

None of the NGIs reported to provide discipline-specific or specialized tools to their LTOS users. Although NGI CZ reported that they are supporting their users with pre-installed software, such as R, or Matlab. In particular commercial software are highly appreciated by the users, who cannot access to licenses locally.

From an EGI perspective commercial software are a very difficult use case: providing licenses requires funds, and an assessment of the target users, which is easier to do at national level. Therefore EGI will redirect users requesting services such as Matlab to their NGIs, if it is available at the users’ national level.

Non-commercial software (R, for example) can be integrated and made available also at EGI level, although the answers to the survey did not highlighted this use case as a priority. It is for example available in the Catania SG, or it could be used by users through virtual machines with pre-installed software.

## Roadmap for the integration

Building on the experience of the NGIs supporting their national LTOS users the following priorities can be identified for the integration of new services in the LTOS platform, to be integrated in parallel with the SGs currently under integration.

**Direct access to HTC computing**.

This is the highest priority based on the use cases listed by the NGIs through the survey, and based on the availability of the resources. HTC computing is the most available service in EGI, and therefore it is the service for which the pool of resources could be expanded more easily, having more resource providers who could potentially contribute to it.

The Catania SG, WS-PGRADE and QCG can all use HTC resources, but the requirements suggest that simpler access modes are made available. In the context of the EGI LTOS platform, command line access is not possible – at the moment – since users should not be allowed to manipulate the X509 credentials generated by the token server. DIRAC is a workload management system which can support basic job submission, and its integration can improve the experience of the users. At the moment of writing EGI is evaluating with the DIRAC team the feasibility of the technical integration of DIRAC as described in section 3.4. Once confirmed the feasibility of the integration, the technical developments should be relatively small, an initial assessment of the timeline would be mid 2016.

**Direct access to cloud computing**

At the moment there is no cloud access from the LTOS platform, but extensions planned for the science gateways will enable this type of resource as well.

Slipstream broker could be one solution to be adopted to allow users to span multiple sites with the VMs instantiations. Slipstream is being evaluated with the federated cloud with other EGI-related activities, with particular focus on the support for the federating interfaces promoted by the EGI federated cloud.

Based on the results of the testing, and the feasibility of the technical integration of slipstream, EGI will evaluate during the 2016 the offering of cloud resources to the LTOS through this tool.

**Storage services**

iRODS is the solution offered by NGI France, and it seems to satisfy the needs of the LTOS users. Before integrating iRODS with the LTOS platform, we are considering to wait the results of the open data platform under development in EGI-Engage, and possibly offer with this service also a LTOS flavour.

# Conclusions

The current status of the platform itself is near to be production-ready, the missing step forward is the integration of more SGs, in order to offer to the LTOS users a attractive catalogue of services. What is missing is a simple interface to submit computational tasks, and instantiate virtual machines, this is only partially provided by the SG currently integrated.

There are open actions to complete the full integration of the LTOS platform in the EGI production infrastructure, for examples the integration of the LTOS portal with the monitoring infrastructure, the definition of OLA and SLA supporting the service. These actions are already scheduled to be completed in the coming month.

The technical review of the document, described in M5.1[[34]](#footnote-34), highlighted some technical issues. The most urgent issues require small developments to be implemented, and the development timeline of such requirements is being defined at the moment of writing.

Even though the platform has been already reviewed several times within the EGI community, and many improvements have been already planned, once the number of user will get to a minimum critical mass, another study or ergonomic review of the tool should be planned. With real users registered in the portal, a feedback-based review will be possible, and this is critical to identify if any gaps are still missing to be filled to reach the ‘zero barriers’ goal.

1. Interoperable Global Trust Federation: https://www.igtf.net/ [↑](#footnote-ref-1)
2. EGI SSO identity provider: <https://www.egi.eu/sso/> [↑](#footnote-ref-2)
3. <http://www.unity-idm.eu> [↑](#footnote-ref-3)
4. <https://wiki.egi.eu/wiki/Fedcloud-tf:WorkGroups:Federated_AAI:per-user_sub-proxy> [↑](#footnote-ref-4)
5. Robot certificates are X509 credentials that can be used programmatically, for example to generate proxy credentials, without the need for the user to perform direct actions, e.g. inserting a password. [↑](#footnote-ref-5)
6. http://services.geant.net/edugain/Pages/Home.aspx [↑](#footnote-ref-6)
7. e-grant.egi.eu [↑](#footnote-ref-7)
8. <https://documents.egi.eu/document/80> [↑](#footnote-ref-8)
9. <https://documents.egi.eu/document/2734> [↑](#footnote-ref-9)
10. <https://documents.egi.eu/document/2635> [↑](#footnote-ref-10)
11. <https://documents.egi.eu/document/2623> [↑](#footnote-ref-11)
12. <http://helpdesk.egi.eu> [↑](#footnote-ref-12)
13. <http://www.catania-science-gateways.it/> [↑](#footnote-ref-13)
14. <https://www.eu-decide.eu/> [↑](#footnote-ref-14)
15. <http://www.earthserver.eu/> [↑](#footnote-ref-15)
16. <http://www.eumedgrid.eu/> [↑](#footnote-ref-16)
17. <http://www.gisela-grid.eu/> [↑](#footnote-ref-17)
18. <http://www.dch-rp.eu/> [↑](#footnote-ref-18)
19. <http://www.indicate-project.org/> [↑](#footnote-ref-19)
20. <https://www.chain-project.eu> [↑](#footnote-ref-20)
21. <https://www.indigo-datacloud.eu/> [↑](#footnote-ref-21)
22. <https://www.ogf.org/documents/GFD.90.pdf> [↑](#footnote-ref-22)
23. <http://saml.xml.org/> [↑](#footnote-ref-23)
24. <http://occi-wg.org/> [↑](#footnote-ref-24)
25. <https://documents.egi.eu/document/80> [↑](#footnote-ref-25)
26. <https://github.com/csgf/OpenIdConnectLiferay> [↑](#footnote-ref-26)
27. <http://openid.net/connect/> [↑](#footnote-ref-27)
28. <http://guse.hu/about/architecture/ws-pgrade> [↑](#footnote-ref-28)
29. <http://www.qoscosgrid.org/trac/qcg> [↑](#footnote-ref-29)
30. <http://irods.org/> [↑](#footnote-ref-30)
31. <http://diracgrid.org/> [↑](#footnote-ref-31)
32. <https://en.wikipedia.org/wiki/Pilot_job> [↑](#footnote-ref-32)
33. <http://sixsq.com/products/slipstream/> [↑](#footnote-ref-33)
34. <https://documents.egi.eu/document/2697> [↑](#footnote-ref-34)