**EGI-InSPIRE**

**Operational Level Agreements (OLAs) within**

**the EGI production infrastructure**

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| AbstractThis document describes the status of Operational Level Agreements (OLAs) within the EGI project. It describes the status of existing OLAs in the National Grid Infrastructures, plans for their expansions, as well as additional OLAs that could enhance the quality of the pan-European grid infrastructure. |

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EGI-InSPIRE (“European Grid Initiative: Integrated Sustainable Pan-European Infrastructure for Researchers in Europe”) is a project co-funded by the European Commission as an Integrated Infrastructure Initiative within the 7th Framework Programme. EGI-InSPIRE began in May 2010 and will run for 4 years.

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**PROJECT SUMMARY**

To support science and innovation, a lasting operational model for e-Science is needed − both for coordinating the infrastructure and for delivering integrated services that cross national borders.

The EGI-InSPIRE project will support the transition from a project-based system to a sustainable pan-European e-Infrastructure, by supporting ‘grids’ of high-performance computing (HPC) and high-throughput computing (HTC) resources. EGI-InSPIRE will also be ideally placed to integrate new Distributed Computing Infrastructures (DCIs) such as clouds, supercomputing networks and desktop grids, to benefit the user communities within the European Research Area.

EGI-InSPIRE will collect user requirements and provide support for the current and potential new user communities, for example the ESFRI projects. Support will also be given to the current heavy users of the infrastructure, such as high energy physics, computational chemistry and life sciences, as they move their critical services and tools from a centralised support model to one driven by their own individual communities.

The objectives of the project are:

1. The continued operation and expansion of today’s production infrastructure by transitioning to a governance model and operational infrastructure that can be increasingly sustained outside of specific project funding.
2. The continued support of researchers within Europe and their international collaborators that are using the current production infrastructure.
3. The support for current heavy users of the infrastructure in earth science, astronomy and astrophysics, fusion, computational chemistry and materials science technology, life sciences and high energy physics as they move to sustainable support models for their own communities.
4. Interfaces that expand access to new user communities including new potential heavy users of the infrastructure from the ESFRI projects.
5. Mechanisms to integrate existing infrastructure providers in Europe and around the world into the production infrastructure, so as to provide transparent access to all authorised users.
6. Establish processes and procedures to allow the integration of new DCI technologies (e.g. clouds, volunteer desktop grids) and heterogeneous resources (e.g. HTC and HPC) into a seamless production infrastructure as they mature and demonstrate value to the EGI community.

The EGI community is a federation of independent national and community resource providers, whose resources support specific research communities and international collaborators both within Europe and worldwide. EGI.eu, coordinator of EGI-InSPIRE, brings together partner institutions established within the community to provide a set of essential human and technical services that enable secure integrated access to distributed resources on behalf of the community.

The production infrastructure supports Virtual Research Communities − structured international user communities − that are grouped into specific research domains. VRCs are formally represented within EGI at both a technical and strategic level.

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# Introduction

## Purpose

This document describes xxxxxxxx.

## Application area

This document is a formal deliverable for the European Commission, applicable to all members of the EGI-InSPIRE project, beneficiaries and Joint Research Unit members, as well as its collaborating projects.

## References

**Table 1: Table of references**

|  |  |
| --- | --- |
| R  | EGEE III SA1 SLA <https://edms.cern.ch/document/860386> |
| R  | Operational Level Agreement between GGUS and TPMs within the ROCs <https://edms.cern.ch/document/888089> |
| R  | Site-NGI OLA <https://documents.egi.eu/document/31> |
| R  | GridView <https://twiki.cern.ch/twiki/bin/view/LCG/GridView> |
| R  | Nagios for Grid monitoring <https://twiki.cern.ch/twiki/bin/view/LCG/SAMToNagios> |
| R  | GGUS tool <https://gus.fzk.de/pages/home.php> |
| R  | GOCDB tool <https://goc.gridops.org/> |
| R  | Middleware in EGI <http://knowledge.eu-egi.eu/knowledge/index.php/Middleware_Components_and_Middleware_Consortia> |
| R  | EGI League Tables <https://wiki.egi.eu/wiki/Availability_and_reliability_monthly_statistics> |

## Document amendment procedure

Amendments, comments and suggestions should be sent to the authors. The procedures documented in the EGI-InSPIRE “Document Management Procedure” will be followed:
<https://wiki.egi.eu/wiki/Procedures>

## Terminology

A complete project glossary is provided in the EGI-InSPIRE glossary:

 <http://www.egi.eu/results/glossary/>.

# EXECUTIVE SUMMARY

OLAs are internal “back to back” agreements that define how two different organizations will work together to support the delivery of defined IT services to Customers and Users.  Within EGI OLAs serve to ensure mutual understanding of the principles of cooperation between EGI parties; to define the responsibilities of each party, to set the procedures for monitoring the fulfilment of commitments towards the users of the infrastructure; to define a set of requirements that satisfy the users and the operators of the infrastructure; and to establish reporting and problem-solving procedures. OLAs inherited from EGEE will continue to be enforced and adjusted to the new requirements that are expected within a distributed de-centralised infrastructure. Additional OLAs needed to cover the new interactions between the EGI partners will be identified and produced with the aim of maintaining a uniform smooth experience for users of the infrastructure across the growing numbers of participating NGIs.

# Definitions

*[ITIL definition of OLA, explanation of EGEE Service Level Description.]*

|  |  |
| --- | --- |
| SLA | An SLA ("Service Level Agreement") usually refers to a formally negotiated agreement between two parties. It is a contract that exists between customers and their service provider, client or between service providers. It records the common understanding about services, priorities, responsibilities, guarantee, and such — collectively, the level of service. For special restrictions on the use of this term in EGEE, please see the "background" section of this document. |
| SLD | Name given to the initial EGEE-II ROC-Site agreement, where “D” stands for Description. |
| OLA | An operational level agreement (OLA) defines the interdependent relationships among the internal support groups working to support a Service Level Agreement. The agreement describes the responsibilities of each internal support group toward other support groups, including the process and timeframe for delivery of their services. The objective of the OLA is to present a clear, concise and measurable description of the service provider's internal support relationships. |

# Current OLAs

*[Description of the current status of OLA definitions in European Grid Infrastructure, as they were defined during the EGEE projects.]*

AUTH

The EGEE project had produced throughout its creation two OLAs, one between sites and ROCs [R 1] , and one for the 1st line support [R 2]. These OLAs defined set of metrics that covered the most crucial aspects of a pan-European production Grid infrastructure, that being site performance and reaction to support requests by the communities relying upon the grid. These OLAs serve as a basis in EGI start-up phase to ensure the smooth continuation of the operations from EGEE to EGI.

## Site-NGI OLA // AUTH

*[Explain that this is the EGEE-SLD document, provide links and an overview.*

*Overview of how many sites signed that. Explain that SLD signing is now part of site certification procedure, so all new sites are required to sign prior to being member of the production infrastructure.]*

Improving the quality of the infrastructure has been an ongoing task throughout the EGEE projects. To that end, effort was put on convincing ROCs and site about the necessity to measure certain KPIs (Key Performance Indicators) and achieve agreement on acceptable targets. These targets were made part of the SLA between site and ROC and initially it was planned that the SLA would be signed by every site participating in the EGEE production infrastructure.

However, a number of issues were raised that prevented the global adaptation of the SLA by all sites. First of all, the term SLA contains certain legal implications in certain legal jurisdictions, which made ROCs and sites in that country very reluctant to sign it. In addition, signing by all sites was shown to be impractical. This was solved to a great extend by adding SLA conformance acceptance as part of the certification process of a new site.

In order to facilitate acceptance of the SLA where the term carried legal implications, the term SLD has been used as synonymous, along with the addition of an explicit mention in the SLA text that it is not legally binding. Despite these measures, concerns were not fully addressed, and also additional concerns were raised to the point of the whole exercise.

In EGI, the term OLA is used to replace the SLA/SLD, thus avoiding the legal implication that would be associated with the term SLA. The site-NGI OLA [R 3] is available in the EGI document repository and is based around the EGEE SLD, adjusted for the EGI era. It is a template for the NGIs to base their agreements with their sites. It defines the availability, reliability and support metrics on which the sites will be evaluated, the responsibilities of both parties, as well as the targets that must be met for each metric.

The site-NGI OLA scope covers sites running a recent version of EGI endorsed middleware [R 8]. The minimum hardware requirements defined in the OLA include the essential infrastructure for running a number of key core services, as defined in table 2. Also defined are the metrics that are evaluated on monthly basis by automated tools (mostly Gridview [R 4] / Nagios [R 5]) and site feedback.

The NGI responsibilities towards a site are also covered. The NGI has to provide help-desk facilities to support the site, provide third-level party support with problems that can not be resolved by the site administrators, register site administrators to its support facilities, follow-up tickets to make sure they have been appropriately addressed by the site administrators and should respond to site tickets in a timely manner. The site has to adhere to the operational procedures (which define security, operational and availability policies), maintain accurate information on its provided services in the GOCDB [R 7], run supported versions of EGI endorsed middleware, respond to GGUS tickets swiftly and adhere to the terms and conditions of the OLA.

### Metrics and related measurement tools

*[Explain which OLA metrics are currently monitored and what are the involved tools]*

The metrics currently measured are shown in table 2. Currently Availability and Reliability are being monitored by Nagios, and the monthly results are produced by GridView. The response times to tickets are measured by site feedback.

**Table 2: Site-NGI OLA metrics**

|  |  |  |
| --- | --- | --- |
|  | **Value** | **Section** |
| Minimum number of site BDIIs | **one** | 8 |
| Minimum number of CEs or SEs | **one** | 8 |
| Minimum number of WN CPUs/cores | **eight** | 8 |
| Minimum capacity of SE(s) | **one TB** | 8 |
| Minimum site availability | **70%** | 10 |
| Minimum site reliability | **75%** | 10 |
| Period of availability/reliability/outage calculations | **per month** | 10 |
| Minimum number of system administrators | **one** | 11 |
| Maximum time to acknowledge GGUS tickets | **four hours** | 11 |
| Maximum time to resolve GGUS incidents | **five working days** | 11 |
| Minimum number of supported user-community VOs | **one** | 11 |
| Tracking of SLA conformance | **monthly** | 12 |

The defined metrics and limits are based on what consists a functional grid site with an acceptable response time on handling operational issues.

Nagios is the monitoring and alerting tool that is being used to monitor the infrastructure. A number of probes has been developed by the Operations Automation Team [R 5] in EGEE III that are executed against a site that simulate common workflows and tasks that a grid user performs. Successful execution of the probes indicates that a site is functioning properly. The results are stored in database which the Gridview tool accesses every month to calculate the monthly results.

### Enforcement procedure

*[Description of EGI procedure to monitor OLA metrics, escalation procedure, how to handle suspension according to the NEW EGI workflow]*

The EGI League tables are used to enforce the site-NGI OLA. Publication of the results themselves serves as in incentive for sites to achieve better results. However an enforcement and escalation procedure is needed when OLA minimum thresholds are not reached. The procedure is still being defined with the first proposal in the EGI wiki, which is the following:

1. The results are produced by GridView in Excel and PDF format the first days of every month
2. TSA 1.8 examines the results for any obvious errors/inconsistencies
3. The results are e-mailed to the NOC managers mailing list and a ticket is opened to the COD with the results
4. COD analyzes the results for sites that are below expectations or eligible for suspension
5. COD opens child tickets to the NGIs for the sites that either are under performing or eligible for suspension
6. Underperforming sites respond to tickets with sufficient explanation, or the ticket is escalated.
7. Sites eligible for suspension are suspended, unless the NGI providers outstanding conditions justify non suspension, or the EGI Chief Operations officer objects.

The finalized procedure will be based on the feedback received from the NGI managers on the topic.

## 1st Line Support OLA

The 1st line support OLA as defined in EGEE clearly describes the involved parties in the GGUS system, service hours and the responsibilities of the involved parties. Goal is to quickly identify the nature of the problem described in the ticket, assign in to the proper support unit, and ensure that tickets are properly followed up until they reach a terminal state.

### Metrics and related measurement tools

*[Explain which OLA metrics are currently monitored and what are the involved tools]*

The GGUS tool has the ability to produce detailed reports about the tickets into its database and their status. Such are weekly escalation reports that measured for every ticket two important values:

* Ticket Age: Number of days the ticket was open
* Inactivity index: A score produced by a special alogorithm taking into account the ticket age, and the time passes since the last update was made by TPM or a support unit. Higher numbers indicate that the ticket was not handled properly.

Monthly reports are also generated which measure:

* Number of tickets handled per support unit
* Average ticket closing time

### Enforcement procedure

*[Description of EGI procedure to monitor OLA metrics and escalation if any]*

In EGEE III enforcement of OLA was performed during the USAG meetings where the escalation reports were evaluated. The reports were also submitted to SA1 management for evaluation. For EGI a procedure similar with the site-NGI could be adapted, where the escalations reports are emailed to support units leaders and the SA1 management. Thresholds for acceptable Inactivity index could be defined for every support unit and explanations could be asked when the targets are not met.

# Roadmap

*[discuss here what we aim to accomplish in the next 1st year, explain that extensions are needed to the existing OLAs and new OLAs have to be introduced to define the services that NGI commits to EGI and viceversa EGI to the NGIs (the global services)]*

*[Explain that the roadmap will also be detailed according to the input gathered from NGIs through a questionnaire, and that the final roadmap will be circulated for approval to the NGI Operations Managers]*

In the 1st year of the project effort will be given into updating extending the OLAs from EGEE to cover the needs of the EGI. In addition, with the goal of delivering a reliable infrastructure which offers a smooth user experience, additional OLAs will need to be defined covering NGI to EGI services and vice versa. NGI managers will be asked to provide their thoughts based on the questionnaire in the Appendix A of this document. The OLA for 1st line support will also need to be adjusted in order to take into account that the bulk of user support will be performed by the NGIs, but also that not all NGIs will have the same effort commitments. These are better covered in the next sections.

## Extensions of existing OLAs

*[describe which future extensions can be introduced, Dimitris double check with your notes, I didn’t take notes during our conversation, the following list of extensions may be incomplete]*

### Tuning of thresholds

A recommendation has been made that the minimum availability and reliability monthly limits are slightly increased to 80% and 85% respectively. This increase reflects the progress that has been made in infrastructure performance throughout the EGEE projects.

For new NGIs and sites different thresholds might be applied for a grace period of six months (see Section 4.1.3 for more details).

### Cases for site suspension

Currently a site will be suspended if Availability and Reliability drop below 50% for three consecutive months. This can be expanded to include more cases like the following:

* site is suffering critical security issues according to EGI CSIRT assessments and fails to act on them
* site does not handle operational tickets at all, or handling is inadequate for an extended amount of time

### Differentiated Quality of Service

It is envisioned that under certain conditions, acceptable reliability and availability targets could be different that the ones defined in the Site - NGI OLA. Cases where this could occur include:

* newly deployed sites: a grace period of 6 months should be given to new grid sites as they assimilate the peculiarities of operating in a production grid environment.
* Availability and reliability thresholds need to take into account user perception of availability; this implies including VO test results into calculations. These VO statistics should be combines with the already existing monitoring VOs (OPS, NGI monitoring VO) availability figures. To this end, it would be useful for example, if a given VO may declare the minimum availability requested to sites that support it. This information may be part of the VO ID card, and could be extracted by the availability calculation engine. Requested thresholds can evolve over time. If a site supports N VOs that requested minimum availability/reliability according to thresholds [thr(vo1), thr(vo2), .. thr(voN)] then the minimum quality of services needs to provided to all (logical AND).
* Site defines its on availability by its own profile. It is expected that not all sites can offer the same performance given effort and experience constraints. This could be combined with VO availability/reliability requirements in order to ensure that VOs are supported on sites that their profile matches the VO minimum requirements.
* Helpdesk response times: Not all NGIs are expected to have the same amount of effort available for user support tasks. Thus, response, solution and inactivity thresholds would have to be defined by each NGI according to its own requirements.

### New services

* availability and reliability statistics should include other types of Grid services hosted by sites, such as top-level BDII, VOMS, WMS/LB etc. where available.
* Network availability: measurement of network downtime through the Downcollector or its successor

## New OLAs

### NGI-EGI OLA

[Define this OLA and explain importance of a NGI-EGI OLA]

Given that constant evaluation of the infrastructure status, introduction of new features, and trouble handling relies on interactions between NGIs and EGI, it is critical to define the framework of the responsibilities for NGIs and EGI in order to ensure smoothness and efficiency. This will be filled by an OLA covering both the NGI to EGI and vice versa.

#### Part 1: NGI to EGI

This part defines which services the NGI needs to offer in order to be part of a pan-European Grid infrastructure. Example of services for which metrics such as availability and reliability should be defined are:

* + Operational services
		- NGI monitoring infrastructure
		- NGI Accounting infrastructure
		- NGI helpdesk
		- Other regionalized tools when available (GOCDB, dashboards etc.)
		- Other services that will be identified in the process.
	+ Core services
		- WMS/LB
		- Central LFC
		- Top-level BDII
		- VOMS
		- FTS
	+ Response time of NGI CSIRT
	+ Response time of NGI ROD in case of requests for suspension

#### Part 2: EGI to NGI

EGI will offer certain services to all NGIs that are essential for coordination and support. Such services are the following:

* + Central operational services
		- Central monitoring infrastructure components
		- Central accounting infrastructure (portal and databases)
		- GGUS
		- Dashboard and operations portal
		- GOCDB
		- MyEGI portal
		- Messaging broker network
	+ Core services
		- VOMS dteam and other central VOMS services
		- UMD repositories
	+ User community services
		- application database
		- VO dashboards (if provided)
		- Response time to VO validation when new VOs are generated

### Site-VO OLA

OLAs can be established directly between resource provides and the VOs supported.

For example in the site-VO OLA a given minimum availability/reliability threshold can be negotiated and agreed upon by the site and the VO manager. Monthly availability/reliability statistics will need to be computed by taking into account not only OPS statistics but also VO statistics. A VO may also wish to define additional metrics associated with its requirements which could be measured by its own monitoring infrastructure.

### Tool extensions

*[Discuss here impact of new OLAs on tools (which tools should be extended?) and possible extensions required]*

Monitoring tools so far focused on calculating the Availability/Reliability of grid sites by automatically testing their behaviour against common grid tasks. In order to monitor helpdesk response times in a similar automated fashion it would be required for the helpdesks itself to be able to generate such statistics on its own, or generate sufficient data in a format that could be processed by a tool specialized for this purpose.

Some other tools like for example an NGI GOCDB would require specialized checks beyond the basic ones (ie network reach ability) and not grid middleware related in order to have their functionality efficiently monitored. The Nagios system is sufficiently flexible to permit such specialized probes to be developed as appropriate metrics are defined. Gridview would need to take these new results into account in for its calculations.

Tools such as Nagios or Gridview will also need to support multiple thresholds for availability/reliability defined by special VO-Site OLA, Site profiles in order to produce reports that reflect the acceptable performance level for a particular site.

# Conclusions

AUTH

Operational Level Agreements are a key element into providing a quality infrastructure to its users by defining the targets and responsibilities of the individual units and services working together to achieve this. In EGI the experience obtained by the EGEE projects will be used to extend the OLAs used so far for better adoption to the realities of a pan-European diverse Grid of different teams, different architecture and different middleware stacks. Evaluation of the OLA metrics will be done on a monthly basis in order to ensure accuracy, monitor progress and undertake corrective action if needed.

New OLAs will be defined in order to cover the interactions between NGI – EGI, and this milestone aims to use NGI experiences and feedback in order to further refine the OLAs in order to establish productive partnerships in the EGI grid.

# Annex A: NGI questionnaire

## ****OLA status****

1. Number of certified sites in the NGI

2. Number of sites that have already signed an OLA or comparable document

3. In case of a comparable document being used, describe deviations from the metrics used in the original EGI OLA document.

4. What is the main obstacle to the adoption of the OLA by all sites?

5. Which are the main considerations / objections of sites to the OLA?

6. Describe any modifications that you would consider to the OLA metrics definitions?

7. Are there any metrics that should be added/removed from the OLA? Include a brief justification for your answer.

## ****Enforcement methodology****

8. Are there any improvements you would propose to apply in your NGI to the current enforcement methodology of the OLA? (Monthly League Table, justifications for breach of A/R metrics)

9. What kind of rewards/penalties for sites would you consider for over/underachieving sites?

10. Do you find the current system for providing justifications for A/R failures adequate? If not why? What else would you use?

11. Do the justifications in general adequately describe the incident, main cause and the recovery strategy used?

## ****Monitoring Tools****

14. Describe any defects that you’ve encountered with the OLA monitoring tools currently used (e.g. Nagios, GridView)?

15. Describe any improvements that you would consider to the OLA monitoring tools currently used (e.g. Nagios, GridView)?

## ****Future developments****

16. Do you think that the OLA should remain part of site certificate process or there is a different procedure you would like to use?

17. How do you (or would you) manage OLAs in your NGI?

18. Would you object to an increase of the minimum Availability/Reliability thresholds to 80% and 85% and respectively?

19. Would you object to permitting a grace period of 6 month for new sites were availability and reliability thresholds are 70% and 75% respectively?

20. What thresholds would you like to see for EGI core services? Do you agree with 80%/85% as in sites?

21. Please provide any additional comments that were not covered with the previous questions