



EGI-InSPIRE

ANNUAL REPORT ON QUALITY STATUS

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Abstract

This document reports on the implementation of the EGI-InSPIRE quality assurance plan during the fourth year of the project. It reviews the main quality assurance mechanisms foreseen in the quality plan, analyses results and proposes some improvements for the next period.



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II. DELIVERY SLIP

	Name	Partner/Activity	Date
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Approved by	AMB & PMB		18-06-2014

III. DOCUMENT LOG

Issue	Date	Comment	Author/Partner
1	10-06-2014	First draft and collection of input from activity managers	T. Ferrari

IV. 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.

V. 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>

VI. TERMINOLOGY

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



VII. 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 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 within the ESFRI projects. Additional 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 (VRCs) – structured international user communities – that are grouped into specific research domains. VRCs are formally represented within EGI at both a technical and strategic level.



VIII. EXECUTIVE SUMMARY

This document reports on the implementation of the updated EGI-InSPIRE quality assurance plan, “D1.13 Quality Plan and Project Metrics”.

The PY4 quality report describes the actions undertaken to reflect Recommendation 9 and 10 received at the EGI-InSPIRE PY3 review:

- REC 9 - The deliverable production process should be refined in order to eliminate the consistent one-month delay.
- REC 10 - Continue with the refinement of project metrics. Consider the collection of end-user metrics, which should be collated and analysed in such a way as to help steer EGI.eu as moves into the future.

With reference to REC 9, objectives in terms of increased timeliness in submission of project deliverables and milestones were only partially achieved. This is due to an increased workload in project management duties starting in PY14 and to a reduced amount of resource available for quality management in PY4 due to the project extension of 8 months. The increased workload was due to the preparation of the project extension that started in PQ14 and was completed in PQ16, the organization of the handover of project direction and management duties, and the duties related to consortium management that increased due to the resignation of one partner from the EGI Council.

The objectives recommended in REC 10 were successfully accomplished by introducing additional user-orientated metrics in the project metrics table, by correlating the review of project metrics and activity metrics to steer the tactical actions required to implement the engagement strategy. The Engagement Strategy was introduced for the first time in PQ15, and is now a living document that is periodically updated taking into account the requirements and input of the EGI stakeholders as well as the performance indicators of the EGI-InSPIRE quality plan.

Additional activities not originally envisaged in the PY4 quality plan were successfully completed in PY4: service management best practices according to the recommendations of the FitSM standards were applied to the EGI.eu services for transnational access thus improving documentation, repeatability and professionalization of service management in a federated environment, and the EGI impact factors of the objectives of the European Commission were updated. New quality reporting processes were defined for the EGI Core Activities: a subset of EGI Global Tasks that as of May 2014 will turn into services regulated by independent Operational Level Agreements binding EGI.eu and the service providers.

During PY4 both the vision and strategy of EGI were profoundly revised. This required changes to the balanced scorecard. An interim revised version is presented in this document; a final version will be produced in PY5 taking into account the change.



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1 INTRODUCTION

This document reports on the implementation of the EGI-InSPIRE quality assurance plan, D1.13¹ during the fourth year of the project. It reviews the main quality assurance mechanisms set out in the quality plan, analyses the changes introduced in PY4 and describes the future actions for PY5.

This report is a self-assessment of the running of the project, and provides an analysis of the project metrics during the course of PY4 and in the project period PY1-PY4, with a focus on metrics that indicate the impact of community engagement activities. This analysis is complemented by specific annual activity reports that provide additional analysis of the activity metrics.

This document is complemented by the PY4 Periodic Report, which provides an overview of the project achievements and issues. Section 2 provides an overview of the changes introduced in PY4 according to the recommendations received at the PY3 review. A revised interim version of the balanced scorecard is provided in Section 7, which takes into consideration the changes in the EGI strategy and vision, which were approved by the EGI Council in September 2013 and April 2014. Section 8 concludes the report and defines the actions for PY5.

¹ D1.13 Quality Plan and Project Metrics, <https://documents.egi.eu/document/1757>

2 QUALITY ASSURANCE ORGANISATION STATUS

This section reports on the Quality Assurance management as implemented in the EGI-InSPIRE project and the related support tools.

In EGI-InSPIRE, the resources committed to Quality Assurance are provided by NA1 through quality management procedures and processes. Some Quality Assurance effort is also allocated within each activity in order to implement the QA policy and metrics defined in D1.9 Quality Plan and Project Metrics [R1].

The main tasks of the quality functions in NA1 include:

- Develop the Quality and Metrics Plan and update these annually;
 - **PY4:** project and activity metrics were updated in PY3 to include a larger number of user-orientated metrics allowing the assessment of the impact of community engagement activities, in terms of new user communities reaching the final stage of the engagement process and being ready to the pre-production use of the infrastructure as well as in terms of new user communities being still in the first stages of the engagement process.
- Ensure that agreed quality metrics are applied and measured within the activities;
 - **PY4:** activity and project metrics were regularly registered in the metrics portal of the project.
- Summarise the metrics for the Quarterly and Annual Periodic Reports
 - **PY4:** QR14² and QR15³ reports were extended by including an analysis of the trends in user communities by discipline (number of users, number of actives VOs)
- From PY4: provide the necessary indicators that allow to assess the effectiveness of the EGI Engagement Strategy⁴ and update it according to the lesson learned.
 - **PY4:** starting from QR15 project metrics are reviewed on a quarterly basis and are evaluated as part of the process that defines the EGI Engagement Strategy. The document is reviewed on a quarterly basis and includes the tactical actions that need to be implemented taking into account the outcome of activities around communications, promotion through the EGI Champions network and community engagement activities undertaken nationally and at a pan-European level through EGI.eu coordination.

The project metrics are summarised each quarter at <http://www.egi.eu/about/egi-inspire/metrics/index.html>. A project metrics portal was released by EGI-InSPIRE JRA1 in PY1, upgraded in PY2 and PY3 and is available at <http://metrics.egi.eu/>. All NGI and EGI.eu metrics and project task metrics are now reported in the metrics portal. Where possible metrics are automatically gathered from operational tools and activity managers and NGIs are requested to validate or modify them as needed. The remaining metrics are manually recorded in the portal.

Further operational tools that provide assistance in the extraction of the relevant metrics are available at the operational tools wiki page <https://wiki.egi.eu/wiki/Tools>. Statistic of service levels

² EGI-InSPIRE QR 14 report: <https://documents.egi.eu/document/2183>

³ EGI-InSPIRE QR 15 report: <https://documents.egi.eu/document/2111>

⁴ EGI Engagement Strategy: <https://documents.egi.eu/document/2079>



accomplished by Resource Centres and NGIs are gathered monthly and are accessible on wiki (<https://wiki.egi.eu/wiki/Performance>).

These performance figures are regularly monitored as part of the EGI service management procedures. Considerable resources were spent in PY4 to align EGI service management best practices to the FitSM standard⁵ in collaboration with the FedSM project, as reported in the following section.

2.1 Reporting of performance of EGI Core Activities

The technical profile and costs of the EGI-InSPIRE operations and technical Global Tasks were reviewed in preparation to a change in funding structure from May 2014 after the end of PY4. These tasks (currently delivered through SA1 and SA2 are yearly assessed through the project quality procedures) will evolve into support services – the so-called “EGI Core Activities” – that will still be delivered by partners of the EGI collaboration, but will no longer rely on EC project funding according to the EGI services sustainability plan.

A new set of partners responsible of providing these activities and services from May 2014 was appointed and the preparation of handover of activities started.

Quality assessment procedures and policies were defined for these activities, which will be applied starting in PQ17 of the project. Service levels, metrics, frequency and reporting mechanisms were defined in service Operational Level Agreements. More information about the OLA framework defined for service management of the EGI Core Activities and the related reporting processes and tools is provided in EGI-InSPIRE Milestone MS429⁶.

2.2 EGI metrics for DG-Connect Impact Assessment

EGI metrics are annual provided to the European Commission to contribute to assess the impact of EC actions for the implementation of the European Research Area. EGI metrics are gathered as indicators of the progress towards the achievement of the DG-Connect e-Infrastructures Unit:

GOAL (computational infrastructure): Europe leads in the supply and use of computational infrastructure and services in industry and academia, generating new knowledge and industrial innovation.

→ EGI the portfolio of EGI solutions for computing will be expanded by complementing the existing High Throughput Data Analysis solution with a standards-based Federated Cloud solution

→ Indicators:

- Computing cycles available for open transnational access
- Number of EGI users
- Percentage of transnational usage: percentage of foreign resources (CPU normalized wall time hours) used by users of a given country aggregated across the whole of EGI. BASELINE (DATE): 28% (May 2014). TARGET 2016: 35%

⁵ <http://www.fedsm.eu/fitm>

⁶ MS429 EGI Service Level Agreements and Operations Level Agreements framework, <https://documents.egi.eu/document/2239>



GOAL (data centric science and engineering): Europe leads in the supply and use of computational infrastructure and services in industry and academia, generating new knowledge and industrial innovation.

→ Indicators:

- Number of open access scientific publications that benefited from EGI
- Number of interoperable distributed data storage services available in EGI: DESCRIPTION: number of user interfaces to storage services providing capacity for data ingestion and management, registered in the EGI service catalogue. BASELINE (DATE): 358 service end-points. TARGET 2015: 370 (2015)

GOAL (Virtual Research Communities): Researchers across disciplines are digitally empowered through e-Science environments and tools tailored to their specific needs, resulting in better collaboration and higher efficiency and creativity in research

→ Indicators:

- Number of international virtual research communities that use EGI services: number of active international research collaborations supported yearly by EGI. BASELINE (DATE): 105 (April 2013-May 2014). TARGET 2015: 125
- Number of applications and platforms that are integrated with EGI computing services: number of user applications and user-community gateways integrated with the EGI compute and data services. These are provided by the Application Database⁷ of EGI. BASELINE (DATE): 495, TARGET 2015: 530

⁷ <https://appdb.egi.eu/>

3 IT SERVICE MANAGEMENT

A major effort was spent in PY4 for the improvement of quality, documentation and repeatability of processes with the objective of reaching a higher level of professionalization in service management applied to the EGI.eu services enabling the federation and transnational access.

Several EGI documents have mentioned IT Service Management as a strategic area for improving the way services are defined and managed across the infrastructure. The ITIL® framework is the most widely accepted approach to IT service management and the de facto standard for operating computer centres in the industrial sector, providing a cohesive set of best practices, drawn from the public and private sectors internationally. However, ITIL, along with a number of other standards and frameworks like ISO/IEC 20000 are extremely complex, which hinders if not stops actual implementation. In addition, they do not address a number of challenges faced in federated environments such as EGI: assumes single central control of service provision, hardly address collaborations, are topic specific or massive in content and traditional ITSM concepts/ideas do not always work.

With the kick-off of the FedSM project⁸ where EGI.eu is a client partner, a new lightweight service management standard was created called, FitSM. FitSM provides a pragmatic and achievable standard that allows for effective service management, copes with federated environments, which often lack the hierarchy and level of control seen in other situations, provides a baseline level of ITSM than can support ‘management interoperability’ and gives concrete support for ITSM implementation through assessment tools, guides, templates and samples.

Over the last year, EGI has worked to increase the maturity of its service management processes according to the requirements provided by this new standard in the areas of operations, policy and software delivery. One of the major benefits that has supported implementation is dedicated consultancy as well as templates provided by the FedSM project.

One of the main outcomes has been the creation of the EGI.eu service portfolio⁹ as a refactoring of the EGI-InSPIRE activities. This portfolio organises the services being provided from an organisational viewpoint and hence regardless of the project structure. The costs of the EGI Global Tasks have also been restructured to map across to the new service portfolio. The finalisation and publication of the portfolio was approved during the summer of 2013 and published as a service catalogue on the EGI website.

The initial scope of ITSM for EGI will first be on the “Federated Operations” service. This is mainly because it is the largest EGI service, to balance implementation effort and to gain experience and knowledge to then apply to other services. A maturity assessment was conducted based on a scheme developed by FedSM allowing EGI to target specific areas helping to more efficiently improve identified gaps. One of the main results was from looking at management processes from an overall service perspective and the realization that many of the processes and procedures were tied to service components and not the service itself. In fact, some were quite mature where others were completely missing.

Moving into the future, ITSM implementation will continue to expand, not only in defined processes and procedures, but in service coverage as well. ITSM is and will continue to be fundamental in supporting EGI’s evolution as a sustainable e-Infrastructure for accelerating research in Europe and beyond, by offering better predictability for how services are managed and delivered and evolve

⁸ <http://www.fedsm.eu/>

⁹ <http://www.egi.eu/services/catalogue/>



activities with a more customer-oriented approach to improve user experience and overall service “quality”.

4 PROJECT MANAGEMENT

The project management procedures and related materials used within EGI-InSPIRE in PY4 are based on the successful processes developed during the course of the previous years of the project.

4.1.1 Project overall assessment mechanisms

The following mechanisms have been established by the project to assess the project progress:

- Activity Management Board (AMB) meetings¹⁰ → the AMB is responsible of monitoring the progress of activities. Technical issues and progress in achieving the project milestones is discussed. As of PQ14 AMB weekly reports are collected through wiki at https://wiki.egi.eu/wiki/Activity_Management_Board
- Quarterly reports and periodic reports → https://wiki.egi.eu/wiki/Project_Deliverables_and_Milestones
- Deliverables and milestones reviews: https://wiki.egi.eu/wiki/Review_procedure
- Metrics web¹¹ and wiki pages¹²
- Project Management Board meetings → the role of the PMB is to manage issues that may arise within the consortium according to the duties and responsibilities defined in the Consortium Agreement
- External Advisory Committee reports → these are gathered every six months and feedback is provided to the PMB. In PY4, in preparation to the end of the project, a new advisory board: the “Strategy and Innovation Advisory Board” with strong user representation was approved by the Council to be constituted in 2014.
- EC annual project reviews.

Assessment:

The AMB includes the Activity Managers and key Task Leaders for the project and continues to meet on a weekly basis, with an annual face to face meeting. The meetings have driven the Deliverable and Milestone production and their associated review process, and have also proved to be a useful forum to raise and resolve project issues, and to discuss events. The quarterly reports have also been produced successfully, even if QR14 and QR15 were delayed in their final review stage, with a consequent delay in submission to the EC.

Delays were solely due to the greatly reduced effort within NA1 in the period PY4-PY5, due to the need to cope with a 8 month extension of the project until December 2014, and to the increase workload related to the organization of the project extension itself, to the consortium issues raised by the withdrawing of the German NGI from the EGI Council, and to the handover of project direction and project management activities that took place during PQ14 and 15.

Project Management Board meetings were held quarterly and co-located with the main EGI events. The third EC annual project review was held in June 2013.

The metrics portal has been constantly maintained to update it according to the new PY4 metrics plan.

¹⁰ <https://www.egi.eu/indico/categoryDisplay.py?categId=13>

¹¹ <http://www.egi.eu/projects/egi-inspire/metrics/>

¹² <https://wiki.egi.eu/wiki/Tools>

Changes proposed for PY5:

Part of the activities funded in PY4 will become services; performance metrics, reporting tools and procedures have been defined to ensure continuation of reporting and monitoring of performance. The Executive Board and the Council will be responsible of reviewing the performance delivered.

4.1.2 Document management procedure

The document management procedure includes the following elements, as described in previous deliverables: a document repository (DocDB¹³), naming conventions, document metadata, repository metadata.

Assessment:

The DocDB has functioned effectively as the document storage repository for all official EGI publications since the start of the project, including deliverables, milestones, review documents, presentations, reports and committee minutes. Statistics for the DocDB are listed at <https://documents.egi.eu/public/Statistics>. There are currently over 2200 documents (1570 at the end of PY3) and more than 16,500 files in the database (11,900 at the end of PY3), with 2390 registered authors (1890 at the end of PY3).

Guidelines for naming of official documents such as deliverables and milestones are set out in D1.9. The final step in the document review process is for the quality team to check that the conventions have been followed before producing a final pdf of the document for submission to the EC, as well as updating the document version to final, setting the modification and viewing permissions in the DocDB and publishing it to the website. The process for publishing a document with all the necessary metadata is outlined on the wiki¹⁴. The documents have been reviewed to ensure that they have the correct access rights by the correct groups.

Changes proposed for Year Five:

The DocDB will continue as the official repository for the EGI-InSPIRE documents and in general for EGI digital objects. Support of the tool will be ensured through EGI participants' fees and in-kind contributions.

4.1.3 Document review procedure

The formal outputs from the project, in the form of milestones and deliverables pass through a defined review process. The review process is timed to ensure that the output is available to the EC at the end of the project month (PM) that the material is due.

The timetable and detailed processes of the document review procedure are listed on the wiki site at https://wiki.egi.eu/wiki/Review_process_for_deliverables_and_milestones and are also described in D1.9 [R1].

No changes to the review process where applied in PY4.

Assessment

The established review process has run successfully during PY4, but quarterly reports still suffered from delays. These delays were mainly introduced during the final revision stage, due to the

¹³ <https://documents.egi.eu/secure/SearchForm>

¹⁴ https://wiki.egi.eu/wiki/Metadadata_management



drastically reduced NA1 effort allocated to quality management in PY4 in order to cope with the project extension and the workload due to the handover of project direction and project management duties which took place during PQ14 and PQ15.

Proposed changes for Year Five:

No changes are proposed. No delays are expected in the project outputs during the project extension PY5.

5 MAIN PROJECT MANAGEMENT TOOLS

5.1 Document Management Tools

The document management tools and standards recommended for EGI are the following:

- Word processing: MS Word 97-2003
- Spreadsheet: MS Excel 97-2003
- Slides presentation: MS PowerPoint 97-2003
- Document Management tools: DocDB

The following formats are used for exchanging documents:

- doc., xls., ppt.
- PDF
- HTML

All official documents must be available in PDF format. Documents produced by OpenSource versions of office software, and/or in OpenSource formats may also be submitted for review, but final documents should be available as PDFs.

Further templates are available from the website¹⁵, a presentation template in MS PowerPoint and LaTeX, and poster templates in MS PowerPoint and Libre Office.

Assessment:

Since version control and formatting can become difficult if different file formats are used between versions, the expectation during PY4 is to continue using both of these file formats for document creation and circulation.

Proposed changes for Year Five:

None.

5.2 Project Progress Tracking

For the whole project the project effort is tracked using:

- Project Progress Tracking: PPT (CERN tool, customised for EGI-InSPIRE):
<https://pptvm.cern.ch/egi/ui/main.do>

The PPT tool is hosted by CERN and is used by the EGI-InSPIRE project, and other EC-funded projects such as EMI, to track the work of its members across the different work packages and tasks. It manages the online completion of timesheets across the partners. The timesheets submitted are used as the source of data for the quarterly payments to partners, which are calculated based on estimated costs related to the effort recorded during the quarter and the average staff costs. Final

¹⁵ <http://www.egi.eu/about/egi-inspire/templates/>

adjustments to payments are made through the Form C's provided by the project partners at the end of each project year, based on real staff costs, and other costs. The Form C's are audited by the partners' institutional accountants, and Certificates on the Financial Statements are provided when necessary. All Form Cs are reviewed by the EC's financial and legal services and any queries resolved through the end of project year NEF session. EGI Global Tasks costs are gathered through a separate Spreadsheet, which is completed by partners based on the average or actual costs of providing the global tasks as a whole.

Monitoring of project effort within PPT (and by association the quarterly payments) is carried out by the Work Package leaders, to assess expended effort against planned effort. This analysis at both a work package and a project level is reported through the quarterly and periodic reports, along with any associated deviations from the work plan or project issues.

Assessment:

The use of PPT2 to support PY5 was successfully negotiated. PPT will also be used to report effort related to the EGI Core Activities, even if these will not be part of the EGI-InSPIRE Description of work.

Proposed changes for Year Five:

None.

5.3 Website and Wiki

- PUBLIC: Dedicated to the general public: <http://www.egi.eu/>
- Wiki: https://wiki.egi.eu/wiki/Main_Page

Assessment:

The EGI public website has continued to be developed, with new areas on EGI Champions, operations and federated clouds.

The project wiki site¹⁶ has been regularly updated during the course of the project and has been particularly useful in supporting and reporting the work of the Virtual Teams¹⁷.

The EGI website and wiki are hosted and maintained by EGI-InSPIRE partner CESNET. This includes security monitoring and patching, day-to-day maintenance, and more substantial updates to the CMS as were required for the relaunch of the website in PY2. The level of service provided by CESNET for the website, wiki, Indico (see below), document server and other technical services has shown excellent availability and reliability. The very occasional failures have been promptly resolved. The technical support and consultancy has been effective and responsive.

Plans for Year Five:

No changes.

¹⁶ https://wiki.egi.eu/wiki/Main_Page

¹⁷ https://wiki.egi.eu/wiki/Virtual_Team_Projects



5.4 Meetings

Meetings and related agendas are managed with Indico: <https://www.egi.eu/indico/>. These include EGI Community meetings, EGI Management meetings, such as the OTAG, SCG, USAG and UCB, operations meetings and EGI-InSPIRE meetings, such as the AMB, PMB and CB.

EGI also hosts two large annual events each year, the Community Forum and the Technical Forum.

Assessment:

Indico has been used throughout the third year for hosting meetings of the various EGI, EGI.eu and community groups, including the two large annual meetings. Indico continues to offer functionalities such as registration, programme generation, agenda, timetabling, abstract review, email lists of contributors and a permanent repository for documents such minutes, notes, abstracts and presentations. The performance of the Indico tool during the third year has been satisfactory, with no major outages experienced. No upgrades were necessary.

Plans for Year Five:

Indico will continue to be used to provide meeting planning for EGI.eu and the wider community in the fourth year.

6 EGI-INSPIRE PROJECT METRICS

EGI-InSPIRE defined the following project objectives (PO) as its goals:

- **PO1:** 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.
- **PO2:** The continued support of researchers within Europe and their international collaborators that are using the current production infrastructure.
- **PO3:** The support for current heavy users of the infrastructure in Earth Science, Astronomy & 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.
- **PO4:** Interfaces that expand access to new user communities including new potential heavy users of the infrastructure from the ESFRI projects.
- **PO5:** 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.
- **PO6:** Establish processes and procedures to allow the integration of new DCI technologies (e.g. clouds, volunteer desktop grids, etc.) and heterogeneous resources (e.g. HTC and HPC) into a seamless production

Progress towards these objectives was previously monitored through the project's metrics. Additional metrics were defined in PY4 to monitor the impact of EGI engagement activities, in particular in the area of scientific communities.

Therefore the metrics described in this document are used to measure work:

- As an Activity within the project
- Towards the project's overall objectives (PO1-6)
- Towards EGI's strategic goals outlined in the EGI Strategy Plan¹⁸

The original target metrics for the project level metrics are outlined below. The PY3 Targets for each metric have three values. The first figure is a foundation level performance and the two bracketed figures are ideal and stretch targets respectively for that metric.

The **new project metrics** that were added for PY4 are marked in bold in the table below. Additional project metrics were dropped in agreement with the PY4 quality plan document in project deliverable D1.13¹⁹. The new metrics were added to improve the alignment provide more information about VO trends, following the recommendations from the PY3 review. The metrics removed were about objectives fully accomplished.

¹⁸ <http://go.egi.eu/strategy>

¹⁹ <https://documents.egi.eu/document/1757>

6.1 PY4 Performance

Table 1: Achieved Project Year Four Project Metrics (Q13-Q16)

Project Objectives	Objective Summary	Metrics	PQ13	PQ14	PQ15	PQ16	Target PY4
PO1	Expansion of a nationally based production infrastructure	Number of resource centres in EGI-InSPIRE and integrated partners (M.SA1.Size.1) Only includes certified sites	337	341	335	361	345 (350) (355)
		Number of job slots available in EGI-InSPIRE and integrated partners (M.SA1.Size.2 A)	433,878	436,922	404,105	487,577	400,000 (425,000) (450,000)
		EGI monthly availability and reliability of site middleware services (M.SA1.Operation.5)	95.41%/ 95.91%	97.24%/ 97.96%	96.60%/ 97.04%	95.83%/ 96.42%	97.0/97.5% (97.5/98.0%) (98.0/98.5%)
		NEW Average monthly availability and reliability of NGI core middleware services (MSA1.Operation.4)	98.33%/ 98.53%	99.29%/ 99.75%	98.57%/ 99.65%	99.00%/ 99.63%	99.60/99.80% (99.65/99.85%) (99.67/99.87%)
		NEW EGI monthly availability and reliability of critical central	99.71%/ 99.91%	97.39%/ 97.42%	99.62%/ 99.63%	98.91%/ 99.10%	99.60/99.80% (99.65/99.85%) (99.67/99.85%)

		operations tools (MSA1.Operation.6a)					9.87%)
		NEW EGI monthly averaged VO availability and reliability (M.SA1.Operation.7)	97.27%/98.34%	98.13%/99.04%	98.18%/98.61%	96.88%/97.89%	98%/99% (98.5/99.0%) (98.7/99.2%)
PO2	Support of European researchers and international collaborators through VRCs	Number of papers from EGI Users (M.NA2.5)	9	36	10	27	Achieved /year: 82 (80) (90)
		Number of grid jobs done a day (Million) (M.SA1.Usage.1)	1.19 M (grid) 1.45 M (grid and local)	1.35 M (grid) 1.61 M (grid and cloud)	1.40 M (grid) 1.61 M (grid and local)	1.52M (grid and local)	1.6 M (1.8 M) (2.0 M)
PO3	Sustainable support for Heavy User Communities	Number of production sites supporting MPI (M.SA1.Integration.2)	80	89	69	74	90 (100) (120)
		Number of users from HUC VOs (M.SA1.VO7)	11,656	11,569	12,085	11,990 + 7,000 users with access to robot certificates	12,500 (13,000) (14,000)
		NEW Total number of High Activity VOs (M.SA1.VO.5) *quarterly value	53*	45*	41*	38* Achieved/year: 67	55** (60) (65)

		** yearly value					
PO4	Addition of new User Communities	Number of users from non-HUC VOs (M.SA1.VO.6)	10,368 (*)	7,532(*)	8,389	7,015(*) + 5,000 users with access to robot certificates	11,000 (11,500) (12,000)
		Public events organised (attendee days) (M.NA2.6)	210	2137	530	1553 Achieved/year: 4,430	15,000 (17,000) (19,000)
PO5	Transparent integration of other infrastructures	Number of on-going Research Infrastructures /new communities being integrated (M.SA1.Integration.4)	5 (**)	9 (***)	10 (***)	11 (****)	5 (7) (9)
		MoUs with resource providers (M.NA2.10)	3	4	5	6	4 (5) (5)
PO6	Integration of new technologies and resources	Number of resource centres offering federated cloud services accessible to authorised users (M.SA2.16)	14	19	14	15	15 (20) (25)

(*) The value decreased in PQ13, PQ14, PQ15 and Q16 due an on-going campaign aiming at decommissioning inactive VOs. This value needs to be incremented by 12,000 users (estimated value) from 40 VOs that are enabled to use robot certificates. The decommissioning of registered



users from expired projects affected the non Heavy User Communities more significantly as these are typically structured around short-term projects.

(**) DRIHM, EISCAT 3D, MAPPER, VERCE, VPH

(***) EISCAT, CTA, DRIHM, VPH, Mapper, LifeWatch, GAIA, ENVRI, DCHRP, ELIXIR

(****) EISCAT, CTA, DRIHM, LifeWatch, ENVRI, DCH-RP, EMSO, ICOS, VERCE, WeNMR, ESA

The operational metrics indicate that during PY4 the infrastructure continued its stable operations. The exceeded stretch value in terms number of sites (**Number of resource centres in EGI-InSPIRE and integrated partners** and **Number of resource centres offering federated cloud services accessible to authorised users**), with an achieved value of 361 vs a stretched target of 355 is thanks to the operational integration of e-Infrastructures from the Africa-Arabian region and in particular to the rolling into production of the EGI Federated Cloud infrastructures, which, with its 15 cloud providers, completed its preparatory phase in PQ16.

The new project metric **Total number of High Activity VOs** exceeded its yearly target of 65 (Achieved: 67, Stretch target: 65). The high activity VOs is an indication of the number of national and international collaborations that are active users of the infrastructure, either with long-term sustained computing workloads or with short terms ones (as it typically happens for the long-tail of research) with peaks of utilization over one or more weeks. As many new user communities are often added to existing VOs, what matters is that the total number is sustained over time. An increase in absolute terms is desirable, but a steady value is already good performance result.

A new metric introduced in PY4 is the **Number of on-going Research Infrastructures/new communities being integrated** (Achieved: 11, Target: 5). This new project metric is very important to capture the performance of the user support teams in their community engagement activities. Bringing international user communities to e-Infrastructures is a lengthy process due to young status of many RIs that are part of ESFRI, to the need to approach these communities with a coordinated pan-European strategy, and due to heterogeneous set of requirements within a single collaboration.

Especially for large Research Infrastructures that are still in their design phase or just about to start the implementation phase, the success of an engagement activity cannot be measured by simply looking at accounting data. The PY4 performance indicates that a lot of resources were allocated in PY4 to structurally approach Research Infrastructures of European relevance. Five of these ESFRIs are already experimenting EGI services and registered a Virtual Organization. For the remaining 6 the engagement process is still in the initial technical support stage.

As of PY4 the operations infrastructure is fully equipped to record the percentage of computational resources that are used from abroad by researchers of a different country, as well as to track how many resources in a different country are being made available to researchers from abroad. The **Percentage of transnational usage** indicates the percentage of foreign resources (CPU normalized wall time hours) used by users of a given country aggregated across the whole of EGI. While not a project metric, it is reported here, as it is an indicator of how EGI contributes to overcome the “insufficient European-level pooling and sharing of resources and scarcity of resources” that was identified by the EC as an issue²⁰. Values are now available from the EGI accounting portal. In the last 12 months the EGI averaged percentage amounted to the considerable value of 28% across the whole of EGI. The resource application and allocation process and tool (e-GRANT²¹) that were implemented in PY4 will contribute to increase this value to a PY5 target of 35%. However structural problems for pan-European procurement of resources and of the lack of mechanisms for claiming

²⁰ <http://ec.europa.eu/dgs/connect/en/content/einfrastructures-computational-infrastructure>

²¹ <https://e-grant.egi.eu/>

the costs of transnational access of e-Infrastructures need to be addressed to allow the current indicator to significantly increase. The percentage of transnational usage allowed by EGI is very high in various large countries of EGI, as indicated in the map below.

Percentage of External Consumption of resources by country (April 2014)

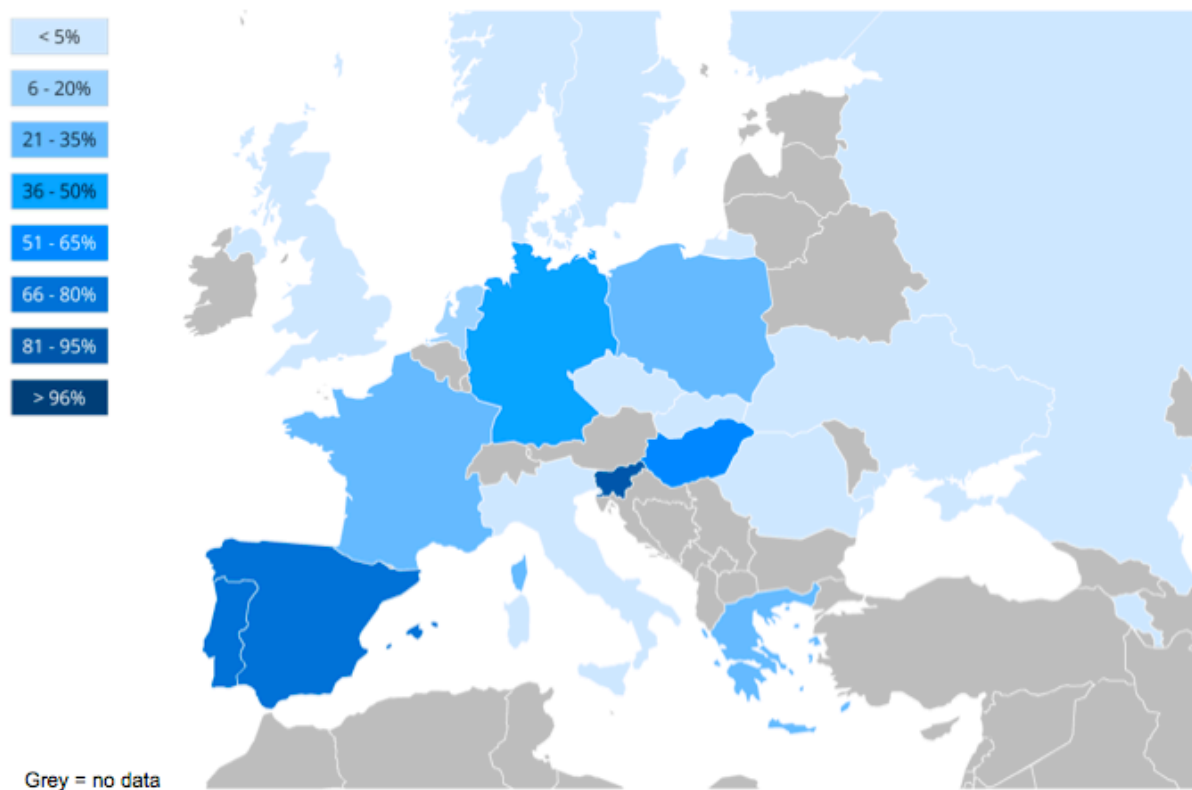


Figure 1. Percentage of transnational resource usage in each country. The percentage indicates the relative amount of resources from abroad used by the researchers from a given country. Information is extracted from the accounting portal. Association of users to countries is based on the Certification Authority which released the user certificate.

The **Number of papers from EGI Users** indicated in this table only reports on what is provided as information in the quarterly reports. A wealth of user-orientated publications is not counted in these. The PY1-PY4 total number of EGI papers with DOI exceeds 2,000, and the estimated value for the calendar year 2013 exceeds 400. The collaboration with OpenAIRE will continue in PY5 to allow for an easier tracking of papers related to e-Infrastructures.

By the end of PY4 the following communities are in an on-going process of integration: EISCAT, CTA, DRIHM, LifeWatch, ENVRI, DCH-RP, EMSO, ICOS, VERCE, WeNMR and ESA. The increase is driven by the integration of cloud resources into the production infrastructure and the variety of use cases that his service provisioning mechanism offers.

The status and plans regarding integration for each of the communities are as follows:

WeNMR: The objective of WeNMR is to optimize and extend the use of the NMR and SAXS research infrastructures through the implementation of an e-infrastructure in order to provide the user



community with a platform integrating and streamlining the computational approaches necessary for NMR and SAXS data analysis and structural modelling.

ICOS (Natural Science): During a face-to-face meeting between the ICOS Director General and the representatives of EGI.eu and a few NGIs (CZ, FR, PL, FI) initial topics for collaboration have been discussed, and it was agreed that these will be documented in a short document that will serve as a basis of scoping joint work between ICOS and EGI.

CTA (Natural Science; Physical sciences): Technology study for the Cherenkov Telescope Array ESFRI: The Virtual Team project was closed during Project Quarter 15²² (PQ15). The output was a technical recommendation for CTA about the integration of the WS-PGRADE and InSilicoLab technologies. The technological integration is estimated to require about 2PM effort and then the members would setup a central CTA gateway based on the integrated package. Once setup, the central CTA gateway would be promoted for the CTA community to gather applications and scientific workflows that can serve the broader community, and would generate more specific requirements for the 'CTA Very High Energy gamma-ray Science Gateway'. The integration and development of the gateway started in April 2014 outside of the Virtual Team project, but based on the technological recommendations of the VT.

EGI-DRIHM (Natural Science; Earth sciences) collaboration: The collaboration was established with the DRIHM project to setup a web based science gateway for the hydrometeorology community and enable them to run simulation workflows using resources from the European Grid Infrastructure as well as from other sources, particularly PRACE and 'local sites'. The collaboration made good progress during the year, and had successful demonstration at the DRIHM annual EC meeting, as well as at other events. The collaboration continues until the end of the DRIHM project, and will focus on the integration of Windows based simulations with the EGI Federated Cloud, the development of new workflow applications, development of community-specific GUIs for the workflows, the assessment of the portability of the current PRACE-based models to EGI given that the PRACE allocation that DRIHM currently receives, will expire at the end of 2014.

LifeWatch (Natural Science; Biodiversity conservation): EGI.eu participated in a LifeWatch ESFRI RI Operational meeting in Feb. 2014. EGI solutions were presented and a set of objectives to be implemented inside the Virtual Team framework were delineated. It is currently under consideration of LifeWatch.

ENVRI Study Case with **EISCAT_3D (Natural Science; Physical sciences):** During the reporting period the project worked with the ENVRI project to define and implement a proof of concept system for the EISCAT_3D ESFRI to help them define a big data system. The proof of concept system made ~2TB historical data set from earlier observations sharable, searchable and downloadable for the community through metadata. The proof of concept is based on the EGI Federated Cloud (as storage) and the Open Source Geospatial Catalogue as a catalogue and web frontend. The setup was successfully demonstrated to EISCAT_3D and ENVRI representatives in February 2014, and discussions about the scale-up and extension of this system for the start of the EISCAT_3D production state are currently on-going.

²² The 15th project quarter of EGI-InSPIRE run between 1st of February – 30th of April 2014.



The **ENVRI (Natural Science)** target is on developing common capabilities including software and services of the environmental and e-infrastructure communities. While the ENVRI infrastructures are very diverse, they face common challenges including data capture from distributed sensors, metadata standardization, management of high volume data, workflow execution and data visualization. The common standards, deployable services and tools developed will be adopted by each infrastructure as it progresses through its construction phase. In the context of the ENVRI project, the EGI Federated Cloud will host data access and dissemination service on the Federated Cloud Storage as a Service and provide computing resources to ENVRI processing services via the EGI Federated Cloud IaaS service. The objective is to offer to the ENVRI partners a reliable, flexible and easy to use system to perform data discovery and dissemination and to support computing services.

The **DCH-RP (Humanities)** project is willing to run data preservation services on the EGI Federated Cloud.

EMSO (Natural Science): EGI.eu invited EMSO ESFRI RI managerial team for a meeting, where current ESFRI status was discussed and willingness to explore EGI services portfolio assessed. A set of pertinent requirements by the ESFRI was captured and is under discussion.

VERCE (Natural Science; Earth sciences): Earthquake and seismology research addresses fundamental problems in understanding the Earth's internal wave sources and properties, thereby aiding society in the management of natural hazards, energy resources, environmental changes, and national security. VERCE is supporting this effort by developing a data-intensive e-science environment to enable innovative data analysis and data modelling methods that fully exploit the increasing wealth of open data generated by the observational and monitoring systems of the global seismology community.

European Space Agency (Natural Science; Physical sciences): in the context of the Helix Nebula initiative, the European Space Agency organized a Proof of Concept using EGI Federated Cloud resources. The objective is to prove the interoperability between commercial (Helix Nebula) and academic (EGI Federated Cloud) cloud providers and to prove the possibility to provide processing services to scientists using the Federated Cloud IaaS system. ESA target is volcano and earthquake monitoring in the context of the SuperSites Exploitation Platform project²³.

6.2 PY1-PY4 Performance

No	Objective Summary	Metrics	Achieved/Target PY1 (PQ4)	Achieved/Target PY2 (PQ8)	Achieved/Target PY3(PQ12)	Achieved/Target PY4 (PQ16)
PO1	Expansion of a nationally based productio	Number of resource centres in EGI-InSPIRE and integrated partners	344/ 300	347/ 330	347/ 350 (355) (355)	361/ 345 (350) (355)

	n infrastruc ture	(M.SA1.Size.1)				
		Number of job slots available in EGI-InSPIRE and integrated partners (M.SA1.Size.2)	239,895/ 200,000	290,300/ 250,000	361,287/ 300,000 (325,000) (333,000)	487,577/ 400,000 (425,000) (450,000)
		Reliability of resource centre functional services (M.SA1.Operation. 5)	94.6%/ 90%	94.8%/ 91%	96.9%/ 95% (96%) (97%)	96.42%/ 97/97.5% (97.5/98%) (98/98.5%)
		Reliability of NGI functional services (MSA1.Operations .4)	N/A	N/A	99.5%/ 97% (98.5%) (99%)	99.63%/ 99.6/99.8% (99.65/99.8 5%) (99.67/99.8 7%)
		Reliability of critical operations tools (MSA1.Operations .6a)	N/A	N/A	99.9%/ 97% (98.5%) (99%)	99.10%/ 99.6/99.8% (99.65/99.8 5%) (99.67/99.8 7%)
		EGI monthly averaged VO availability and reliability (M.SA1.Operation. 7)	N/A	N/A	N/A	97.89%/ 98%/99% (98.5/99.0 %) (98.7/99.2 %)
PO2	Support of European researchers and international collaborators through VRCs	Number of papers from EGI Users (M.NA2.5)	161/50	82/ 60	72/ 70 (80) (90)	82/ 70 (80) (90)
		Number of jobs done a day (M.SA1.Usage.1)	960,053/ 500,000	1,264,922/ 525,000	1.43/ 1.2M (1.4M) (1.5M)	1.6M/ 1.6 M (1.8 M) (2.0 M)
PO3	Sustainable support	Number of sites with MPI	96/ 50	108/ 100	77/ 120	74/ 90

	for Heavy User Communities	(M.SA1.Integration.2)			(130) (140)	(100) (120)
		Number of users from HUC VOs (M.SA1.VO.7)	7,103/ 5,000	10,856/ 5,500	11,595/ 12,000 (15,000) (17,000)	11,990+7,000/ 12,500 (13,000) (14,000)
		Total number of High Activity VOs (M.SA1.VO.5)	N/A	N/A	N/A	38/ 55 (60) (65)
PO4	Addition of new User Communities	Peak number of cores from desktop grids (M.SA1.Integration.3)	N/A	N/A	6,450/ 1,000 (5,000) (7,500)	N/A
		Number of users from non-HUC VOs (M.SA1.VO.6)	4,075/ 5,000	8,518/ 1,000	10,602/ 10,000 (12,000) (13,000)	7,015+5,000/ 11,000 (11,500) (12,000)
		Public events organised (attendee days) (M.NA2.6)	10,123/ 1,500	11,795/ 2,000	8,877/ 15,000 (17,000) (19,000)	1,553 in QR16 4,430/ 15,000 (17,000) (19,000)
PO5	Transparent integration of other infrastructures	Number of on-going Research Infrastructures/new communities being integrated (M.SA1.Integration.4)	N/A	N/A	N/A	11/ 5 (7) (9)/ NA
		MoUs with resource providers (M.NA2.10)	1/ 3	3/5	3/ 4 (5) (5)	6/ 4 (5) (5)
PO6	Integration of new	Number of HPC resources	49/ 1	39/ 3	44/ 50	N/A

technologies and resources	(M.SA1.Integration.1)			(50)	
	Number of resource centres part of the EGI Federated Cloud (M.SA2.16)	1/0	7/1	14/10 (15) (20)	15/15 (20) (25)

During the past four year, EGI established 41 multi-national and 26 national Virtual Organizations (VOs), of which five VOs are related to Research Infrastructures of the ESFRI to support infrastructure testing activities. The new VOs consumed 62 M CPU hours in total, attracted 680 power users (with personal certificate) and 80 user communities based on robot certificates. These statistics only reflect the final outcome of the engagement strategy.

251 new software appliances were registered in the Applications Database. Eight Virtual Team projects were established for 8 multi-national scientific communities.

More than 2000 peer reviewed scientific publications were made possible by the services of the EGI Collaboration.

Of the existing VOs, several increased their usage class during PY1-PY4 from low usage to high usage. Support activities VOs and Natural Sciences have been the disciplines with more VOs who increased their activities in the past four years. Support activities VOs mainly increased from Low Usage to Medium Usage, while all Natural Sciences VOs increase to High Usage.

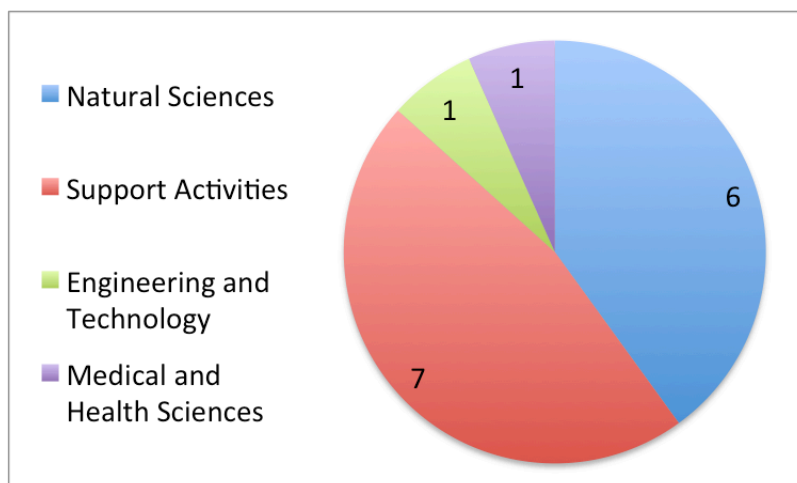
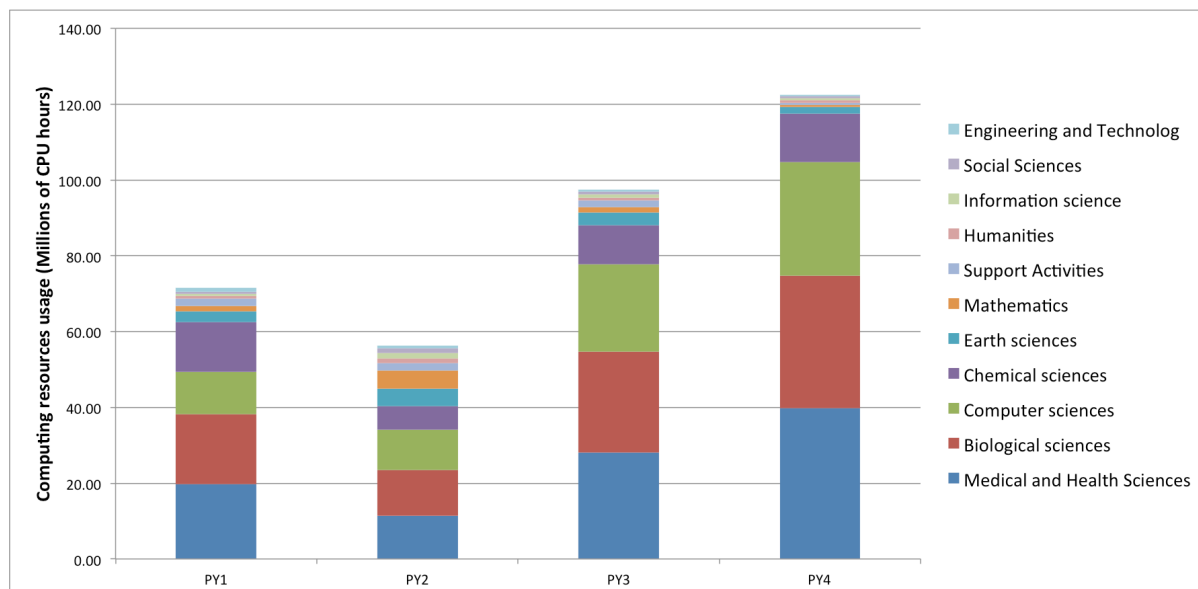


Figure 2. Distribution across disciplines of the VOs that increase the usage



(a)

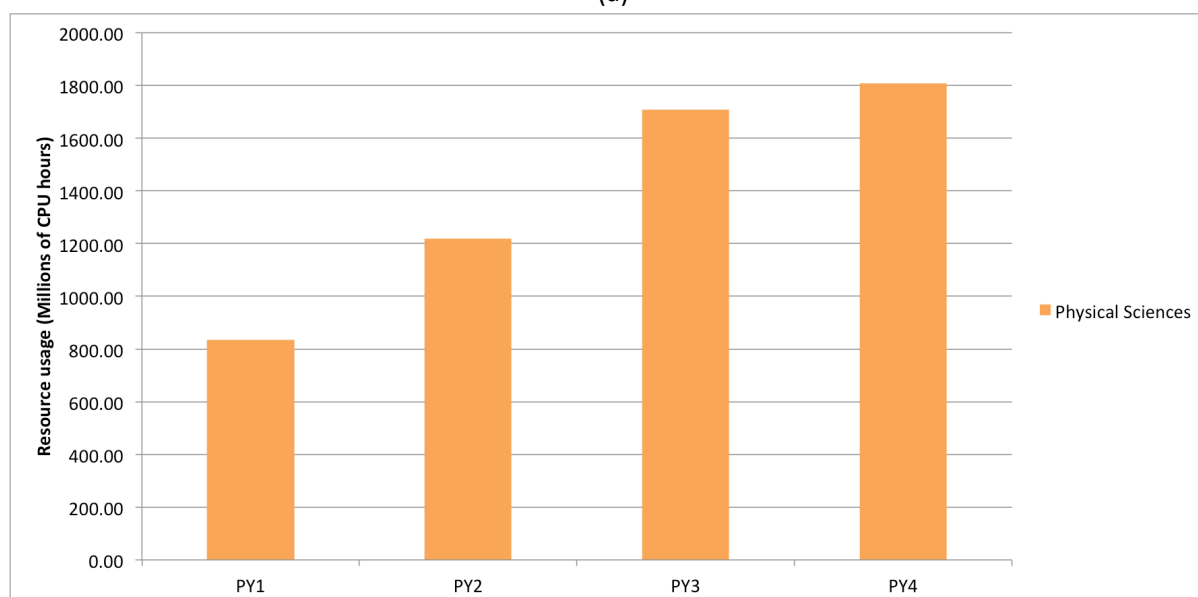


Figure 3, computing resources usage, grouped per discipline (a and b). Physical sciences are shown separately (b).

Figure 3 shows the resource usage, grouping by disciplines. Since Physical Sciences is bigger in scale than the other disciplines, it has been separated in a different chart. (b) Increase in usage has been constant through the years, during PY2 some disciplines reduced the usage, but this has been compensated during PY3 and PY4 with sizeable increases in usage in most of the disciplines, with big relative increases in all of the non-physical disciplines. Biological sciences and medical sciences are those that experienced the higher relative increase, stimulated by the outreaching activities in these areas also facilitated by the participation to the BioMedBridges ESFRI cluster project, and the presence of a well internally organized Virtual Research Community: the “Life Science Grid



Community”²⁴. This increase in usage is not reflected in new VOs since in many cases users join existing VOs that are already widely supported by EGI resource centres

6.3 Activity Metrics

Activity metrics for each quarter are available from the EGI Metrics Portal:

- http://metrics.egi.eu/quarterly_report/QR13/
- http://metrics.egi.eu/quarterly_report/QR14/
- http://metrics.egi.eu/quarterly_report/QR15/
- http://metrics.egi.eu/quarterly_report/QR16/

Plans for Year Five:

The project metrics will continue to be collected during the final year of the EGI-InSPIRE project and used to track the progress of the project’s objectives. At the end of the project and assessment of the effectiveness of these metrics will be made to inform any future activities.

²⁴ <http://www.egi.eu/community/collaborations/LSGC.html>

7 EGI STRATEGIC METRICS

In the last edition of this document (D1.11²⁵), we presented a full definition of a balanced scorecard that links the EGI vision, mission and core values to strategic objectives, which implementation can be tracked through a number of key performance indicators.

The balanced scorecard is recognised to be a valid measurement system, strategic management system and communication tool. During the third EGI-InSPIRE review, EC reviewers raised concerns on the suitability of the tool for not-for-profit organisations where stakeholders extend beyond shareholders. According to our investigations, the fourth-generation balanced scorecard offers the flexibility to adapt to non-profit organisations²⁶ by increasing the number of perspectives that tackle the different layers of stakeholders (from researchers to funding agencies). Nevertheless, we acknowledge that the tool needs to be further evolved in its adoption and more deeply embedded in the strategic decision-making process. Over the last year, both the EGI strategy and the sustainability analysis evolved, therefore this tool needs to be updated accordingly.

The fourth-generation balanced scorecard starts by defining a strategy map, which is a multi-layered diagram grouping the strategic objectives by perspectives that are naturally linked by a cause-effect relationship and connected to the EGI vision/mission and core values. The perspectives selected for the balanced scorecard and the related questions are:

1. **Learning & Growth:** “how EGI must learn, grow and develop as an organisation”
2. **Processes:** “to satisfy our beneficiaries and funders, what must we focus on and excel at?”
3. **Direct beneficiaries:** “what do our direct beneficiaries want?”
4. **Funders:** “what do our funders want in return for funds?”
5. **Income:** “if we succeed, what will our income look like?”

The previous version of the balanced scorecard was linked to the EGI strategy document ‘Seeking New Horizon – EGI’s Role in 2020’ (<https://documents.egi.eu/document/1098>). **In September 2013, the EGI strategy has been updated (<http://go.egi.eu/vision>), while in April 2014 the vision and mission statements have been further revised (see D1.15 and D2.25) and the update of the strategic objectives are under formulation.**

For this reason and due to the need of optimising efforts in light of the reduced manpower in the strategy and policy team, **this document present a preliminary update of the balanced scorecard with a new strategy map, new strategic objectives and key performance indicator definition.** The BSC and the definition of the data dictionary for the various metrics will be further developed during project year 5, when the new EGI strategy will consolidate.

With regards to the impact of EGI to the Europe 2020 vision (EU2020)²⁷, it should be considered that the two important key flagship initiatives are the Digital Agenda for Europe (DAE) and the Innovation Union (IU). EGI plays an important role in achieving a number of the key actions defined in these initiatives. The contribution of EGI to the Europe 2020 will be captured with a dedicated measurement framework available at the following link <https://wiki.egi.eu/wiki/EU2020>.

²⁵ D1.11 Annual Report on Quality Status (<https://documents.egi.eu/document/1587>)

²⁶ The Public Sector Strategy Map: Addressing both strategy and service delivery models http://www.excitant.co.uk/wp-content/uploads/2012/07/Excitant_WP_Public_Sector_Balanced_Scorecard.pdf

²⁷ http://ec.europa.eu/europe2020/index_en.htm

Figure 1 presents the EGI Strategy Map with the objectives that have been revised according to the latest results of the strategic conversations. This is still work in progress and the cause-effect relationships will be added during PY5.

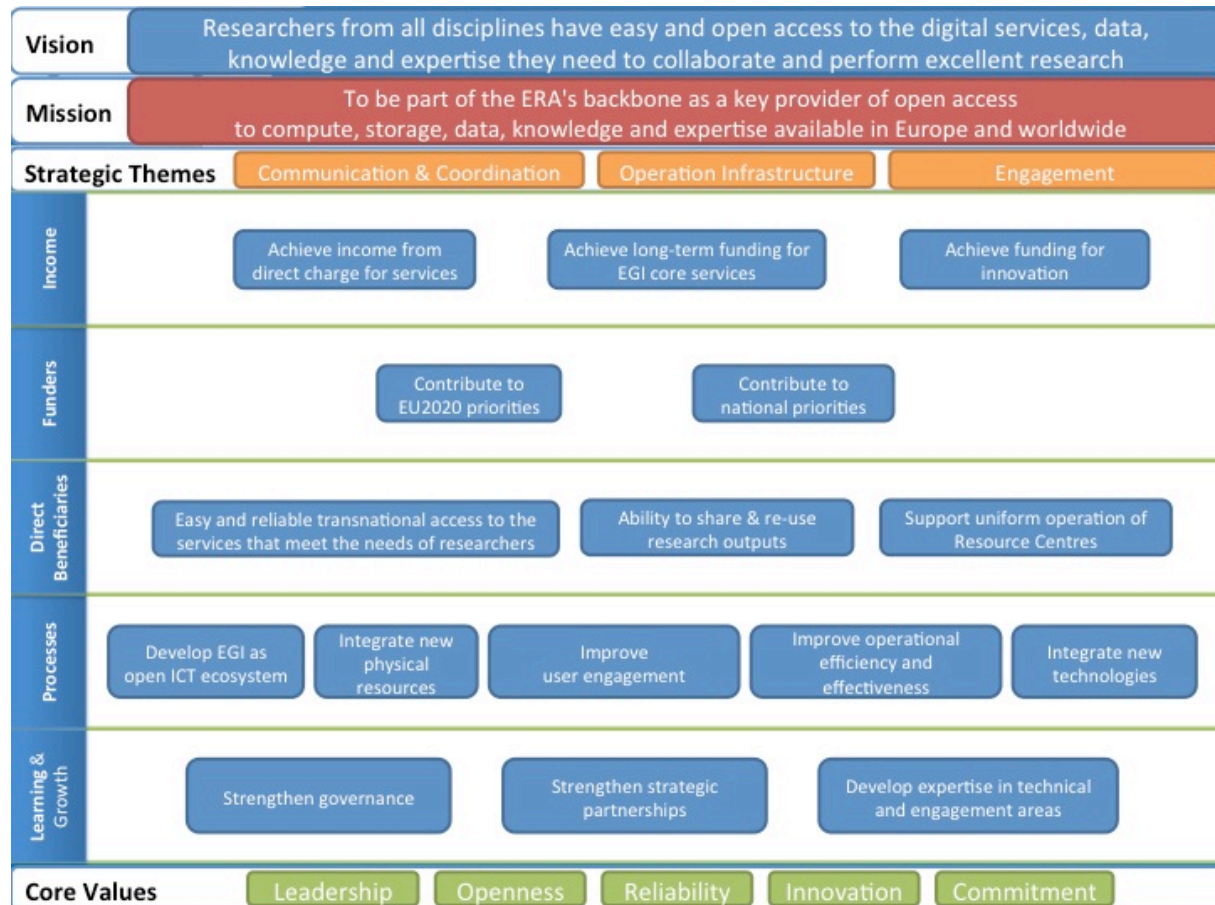


Figure 4 - EGI Strategy Map

Table 3 presents the balanced scorecard where the various strategic objectives identified in the strategy map are described and have a number of key performance indicators associated. Base and stretch target as well as baseline values will be added in PY

Table 3 EGI Balanced Scorecard

Objectives	Objective Description	Performance measures
Perspective: Learning & Growth		
1. Develop expertise in technical and engagement areas	Develop the human capital within the EGI ecosystem. This should have a positive impact on the technical effectiveness and capacity of the EGI ecosystem, the support that can be offered locally to all stakeholders, and the outreach capacity to scientists in different scientific disciplines.	<p>1.1 Number of NGI-supported training/tutorial attendee-days undertaken at NGI events a year.</p> <p>1.2 Number of NGI-supported training/tutorial attendee-days undertaken through EGI Forums and dedicated events a year.</p> <p>1.3 Number of projects for creating VTs (or similar activities) meant to address technical challenges of the scientific community.</p>
2. Strengthen strategic partnerships	Develop strategic relationships with peer-infrastructures and with organisations / projects that can contribute or expand the EGI ecosystem (e.g., broaden technology offer, consulting on IT service management, engaging with developing regions, strategic partnerships)	<p>2.1 Number of pilot projects for collaboration with peer-infrastructure (such as PRACE, EUDAT) (i.e. in areas such as file transfer and access across e-infrastructures for different disciplines)</p> <p>2.2 Number of external partners that actively contribute to EGI through defined agreements</p>
3. Strengthen governance	Align the EGI governance to sustain the development of an open ecosystem that looks forward to H2020, and to make governance more inclusive, flexible (takes into account changes that members have undergone in the last years) and decisive, which should be achieved by increasing the diversity of the stakeholders.	<p>3.1 Number of different stakeholders represented in the EGI Council</p>

Perspective: Processes		
4. Develop EGI as an open ICT ecosystem	With an open ICT ecosystem (including well-defined roles, processes and interfaces) the confidence of external actors to build on top of the EGI platforms should improve healthy competition and expanding the ecosystem.	4.1 Percentage of user-facing services offering an open standard API 4.2 Number of applications and platforms that are integrated with EGI computing services
5. Integrate new physical resources	Expand the installed physical capacity of EGI	5.1 Total number of job slots (LCPUs) available in EGI 5.2 Installed disk capacity (PB) in EGI 5.3 Installed tape capacity (PB) in EGI
6. Integrate new technologies	Integrate new functional services into EGI's Operational Infrastructure in order to increase the diversity and therefore the attractiveness of EGI to more research communities.	6.1 Number of different operational service types in EGI as recorded in GOCDDB. 6.2 Number of resource centres offering federated cloud services accessible to authorised users (See M.SA2.16)
7. Improve user engagement	Strengthen local outreach to existing and new research communities to increase awareness of EGI.	7.1 Number of international virtual research communities that use EGI services 7.2 Number of active VT projects (or similar activities operating as such) meant for addressing technical outreach issues (in the future it will also include Competence Centres) 7.3 Number of discipline-specific events in which EGI champions participate to introduce EGI
8. Improve operational efficiency and effectiveness	Improve the reliability and the delivery of the operational infrastructure through improvements in the operational tools and associated processes.	8.1 Number of EGI Global Services meeting published OLAs 8.2 Number of resource centres meeting the Resource Centre OLA. 8.3 Number of service providers that adopted FitSM and achieved maturity level 3

Perspective: Beneficiaries		
9. Easy and reliable transnational access to the services that meet the needs of researchers	Researchers expect services that meet their needs, have a good degree of usability and reliability. The transnational access is also an essential feature for the ERA.	9.1 Number of researchers using EGI's resources (either directly or through affiliated services – i.e. portals or integrated research infrastructures) 9.2 Percentage of transnational usage (i.e., foreign resources used by users of a given country aggregated across the whole EGI) 9.3 Reliability of EGI services 9.4 Net Promoter Score (NPS)
10. Ability to share and re-use research outputs	Ability to share and reuse of research outputs developed within the EGI ecosystem	10.1 Number of software items registered in the EGI AppDB (applications, virtual machine images, etc.) 10.2 Number of scientific publications registered in OpenAIRE and linked to EGI
11. Support the uniform operation of resource centres	Resource centres providing uniform operation and consistent access to services is a fundamental aspect of a transnational infrastructure.	11.1 Number of resource centres that run services for international VOs
Perspective: Funders		
12. Contribute to EU2020 priorities	EGI shows a clear impact on enabling the Digital ERA and other key EU strategic objectives for 2020 (e.g., pooling of resources, open access, open standards, international collaborations)	12.1 Number of scientific publications produced using EGI services 12.2 Number of scientific publications produced using EGI services and published as open access 12.3 Number of international virtual research communities that use EGI services 12.4 Number of user-facing services from the EGI service portfolio based on open standards 12.5 Number of European countries part of the EGI infrastructure 12.6 Percentage utilisation through EGI provisioned services by EGI VOs of the job slots (LCPUs) capacity made available for their use
13. Contribute to national priorities	NGIs, by collaborating with EGI, shows a clear impact on contributing to their national priorities	13.1 Number of NGIs able to demonstrate strong engagement and integration with the 'owner' or funder of their national activities. 13.2 Number of NGIs that are recognised in their national e-Infrastructure strategies or plans.



Perspective: Income		
14. Achieve funding for innovation	The EGI ecosystem is able to attract funding for innovation of EGI services for the researchers.	14.1 Number of European funded projects in which EGI.eu participate that are supporting innovation 14.2 Amount of money from European funded projects in which EGI.eu participate that are supporting innovation
15. Achieve long-term funding for EGI core services	Achieve long-term funding for EGI core services that are needed to ensure the integrated operation and coordination of the production infrastructure. The funding mix comes from different sources.	15.1 Number of years for which funding for continued operations of EGI global services have been secured 15.2 Percentage of funding coming from EGI.eu membership fee covering the critical part of EGI Global services 15.3 Percentage of funding coming from EGI.eu membership fee covering the EGI Global services 15.4 Percentage of funding coming from other sources (e.g., EC, user communities) covering the EGI Global services
16. Achieve income from direct charge for services	Achieve income for direct charge of services to users or their funding agencies (e.g. cloud or grid services, consultancy).	16.1 Income from pay-for-use services provided by EGI

The process itself of capturing EGI strategy into a map has been a deliberate effort to enhance the ‘quality of conversation’ as a way to help this organisation to become more flexible and agile. The basic idea behind it is to learn, as the outlined strategy is communicated and implemented.

The strategy map is divided in several perspectives. Each of one captures a particular view of the organization’s strategy. The perspectives build up to an overall story that makes it easier to communicate strategy to the people involved at different levels and engage them.

The organization’s purpose or mission statement has been placed at the top of the strategy map. EGI sees a future in which *researchers from all disciplines have easy and open access to the digital services, data, knowledge and expertise they need to collaborate and perform excellent research*. To achieve this vision EGI sets out *to be part of the ERA's backbone as a key provider of open access to compute, storage, data, knowledge and expertise available in Europe and worldwide*.

The organization’s values (Leadership, Openness, Reliability, Innovation and Commitment) are placed at the bottom of the strategy map. It makes clear that the overriding purpose of EGI is supported by the organization’s values and that the strategy is outlined to reach it.

The most important perspective in strategy map design is the one related to the direct beneficiaries, which are the researchers for EGI. They are expressed with variations of the same theme: “I want...” or “I need”, as follows:

1. I need easy and reliable access to computational and data services that support my investigation
2. I want to be able to use and reuse the applications, data or any research outputs useful for my investigations or I want to share them



3. I need that the operation of the resource centres is uniform across institutions, scientific disciplines or national boundaries.

The three previous statements condensed the basic needs expressed by the different layers across their own processes, and the customer groups and types identified in the customer research.

Considering the importance that the funding bodies have in the functioning of the EGI collaboration it has been created a separate perspective alongside the customer perspective. This emphasizes their importance as a part of the landscape of the organization. Naturally, the principle of expressing their needs in terms of objectives also applies. The funders, whether they are European, national or local, want that the funds they are providing are efficiently and effectively used. They also want to be assured that the activities they support are fully aligned with their strategies (in the European level it is Horizon 2020 with the Digital Agenda for Europe and Innovative Union as the instruments most directly related with EGI). The ability of the researchers to share datasets and other inputs for research and to obtain data and computing services across the frontiers, namely a main objective in almost all, if not all, European agendas, has been given a special consideration in the strategy, and thus in the BSC with their own indicators. Transnationality, understood as the ability to operate and investigate seamlessly across boundaries, as if they were no frontiers of any kind, contributes not only to the efficiency and effectiveness of the operations, but also and mainly to enhance exponentially the capacity of the European researchers of produce excellent science, that leads to innovations, which ultimately will bring about benefits at all dimensions.

The Income perspective is relevant because event though there is not a profit purpose, costs need to be covered and a clear strategy on how to cover them to ensure financial sustainability is important. In this case we have decided to include it as it condense very well the objectives set out to address the needs of both the direct beneficiaries (researchers) and the funding bodies. These objectives are expressed in terms of objectives for EGI:

1. Achieve long-term funding for EGI core services
2. Achieve funding for innovation
3. Achieve income from direct charge for services

The processes perspective addresses the question *what we must focus on (and excel at) to satisfy (superbly) EGI's beneficiaries and funders*. They have been described in such a way that it is possible to correlate them with the expressed objectives for EGI-InSPIRE (the numbers in a small circle).

1. Develop EGI as an open ICT ecosystem
2. Integrate new physical resources
3. Improve user engagement
4. Improve operational efficiency and effectiveness
5. Integrate new technologies

The Learning & Growth perspective addresses a most important question: *how EGI must learn, grow and develop as an organisation for maintaining the level and improving the process that will address the needs of direct beneficiaries and funders*. Three major objectives have been identified and linked with the EGI-InSPIRE's objectives:

1. Strengthen governance
2. Strengthen strategic partnerships
3. Develop expertise in technical and engagement areas



Last but not least, the Strategic Themes are outlined to communicate aspects of the strategy that work together to deliver the overall picture. They provide a golden thread for understanding the objectives, aligning them as part of the overall strategy.

The strategic theme **Infrastructure Operation** to support the creation of excellent science is the very reason of existence of EGI and their member organisations. The objectives of improving operational efficiency and effectiveness, integrating new technologies and new physical resources are naturally linked in this strategic them. The strategic theme **Coordination & Communication** reveals that coordination is the essential value that emerges from the federation of national initiatives, resource centres, and scientific communities. It is not that without coordination the operation of the federated infrastructure would not be as efficient and effective as it is currently, the sheer fact is that it not would be possible. The communication process allows this coordination and makes manifest the added value created at every level to all the stakeholders involved, creating a funding stream that feeds back the whole ecosystem. The **Engagement** strategic them creates the basis for effective growth in terms of integrating new user communities, improving the engagement of the existing ones or integrating new physical resources.



8 CONCLUSION AND FUTURE PLANS

New PY4 project metrics were collected for a closer monitoring of community engagement activities, including metrics for the monitoring of the progress of community engagement activities, for monitoring of the number of active virtual organizations in the different segments of research: long-tail, international collaborations and Research Infrastructures, and of percentage of transnational access supported by EGI. The performance of EGI-InSPIRE in PY4 was encouraging. In particular, efforts were concentrated on the engagement with large Research Infrastructures, and this is reflected by 5 ESFRIs who are actively participating to testing and pre-production activities and many other infrastructures who are in the early stages of engagement.

As of January 2015 community engagement activities are approached in a holistic manner, integrating efforts of EGI champions, communications teams, and user support teams. An engagement strategy was defined. This is a living document, which is periodically updated to reflect changes in the European landscape also tacking into account the EGI-InSPIRE project metrics and balanced score card. For these reason, the PY4 metrics will be collected for the whole duration of the project extension to provide support to the implementation of the strategy, even if PY5 funds a limited set of activities.

The annual reports on EGI Global Tasks will be reformulated in PY5 in the form of core service activity reports, as from May 2014 the majority of EGI Global Tasks will evolve into service activities independent from project funding and regulated by a specific Operational Level Agreement binding EGI.eu and the consortium of partners responsible of providing the service.

In PY4 the review process of deliverables and milestones still suffered from delays. These are due to the reduced effort for quality management and other project management activities in NA1 in order to cope with the project extension, and to the additional project management effort that was needed in PY4 to plan for the project extension, organize the third project amendment, and to organize the handover of project direction and management duties that occurred during PQ14 and PQ15.

The document also discusses the future strategy for tracking the progress of the project towards its strategic objectives. The EGI strategy was considerably redefined in September 2013 by the EGI Council, and the vision and mission statements have been further revised (see D1.15 and D2.25) in April 2014. As a consequence, in PY5 the balanced scorecard will be reviewed and metrics will be collected to reflect the changes of objectives of the strategy. The present document only presents an interim revised version: the document reports on a preliminary update of the balanced scorecard with a new strategy map, new strategic objectives and key performance indicator definition.

The Balanced Scorecard and the definition of the data dictionary for the various metrics will be further developed during project year 5, when the new EGI strategy will consolidate.

APPENDIX I: EGI Scorecard Data Dictionary Template

In order to provide a more precise definition of each measure, a descriptive table could be developed supporting the creation of a measure dictionary. Table 5 presents a Scorecard data dictionary template providing full information on the measure and how this should be monitored and interpreted. Following to that, guidelines on how to fill each item are provided following the book “Balanced Scorecard Step-by-Step for Government and Non-profit Agencies” by Paul R. Niven.²⁸

Table 5 EGI Scorecard Data Dictionary Template

Perspective: internal	e.g.	Metrics Number:	Measure Name:	Owner:
Strategic theme:			Objective: e.g. Develop technical expertise Description:	
Measure Description:				
Lag/Lead:		Frequency: e.g. yearly, quarterly	Unit type: e.g. numbers, percentages	Polarity: e.g. high values are positive
Formula: describes specific element of calculation				
Data Source:			Data Collector:	
Data Quality: High/Low/Medium			Collection Quality: High/Low/Medium	
Baseline:			Stretch Target:	Ideal Target:
Target rationale: How did you define Stretch and Ideal Target			Initiatives: Current and anticipated initiatives to reach defined target 1. 2.	

- **Perspective**

Displays the perspective under which the measure falls. For EGI the Perspectives are: Learning & Growth, Internal, Direct Beneficiaries, Funders and Income.

- **Measure Number**

All performance metrics should be provided a number. The number is important should you later choose an automated reporting system. In EGI, it is a notation based on two numbers “X.Y” where X is the number of the objective, while Y is the relative number of the related measure.

²⁸ <http://www.amazon.com/Balanced-Scorecard-Step-Step-Government/dp/0470180021>



- **Measure Name**

The measure name should be brief, but descriptive. For EGI it is the name of performance measure.

- **Owner**

The Balanced Scorecard also should create a climate of accountability for results. Central to the idea of accountability is the establishment of owners for each and every measure. Simply put, the owner is the individual responsible for results. Should the indicator's performance begin to decline, it is the owner and specific individual you look to for answers and a plan to bring results back in line with expectations. If the metrics are assigned to functions and titles people will tend to hide behind it, but an employee who sees his or her name associated with the performance of a key organizational measure will tend to promote more action and accountability than will a job function.

- **Strategic theme**

Displays the specific strategic theme within the EGI Strategy that the measure will positively influence. There are three strategic themes in the EGI Strategy: Operational Infrastructure, Virtual Research Environments and Communication & Coordination.

- **Objective and Objective Description**

The strategic objective to which the measure refers and its description

- **Measure Description**

Concise and accurate description that captures the essence of the measure so that anyone reading it will be able to quickly grasp why the measure is critical to EGI.

- **Lag/Lead**

Outline whether the measure is a core outcome indicator or a performance driver. Lag: if it measures the focus on results at the end of a time period. Normally characterising historical performance. It usually lacks predictive power (e.g. number of resource centres meeting OLA) Lead: if it measures the "drive" or lead to the performance of lag measures. It normally measures intermediate processes and activities. May prove difficult to identify and capture, often there are new measures with no history at the organization (e.g., number of active champions).

- **Frequency**

How often do you plan to report performance on this measure? Do you want to report performance on a daily, weekly, monthly, quarterly, semi-annual, or annual basis?

- **Unit Type**

This characteristic identifies how the measure will be expressed. Commonly used unit types



include numbers, dollars, and percentages.

- **Polarity**

When assessing the performance of a measure, you need to know whether high values reflect good or bad performance. In most cases, this is very straightforward. Lower costs and increased employee satisfaction are good, while a high value for complaints reflects performance that requires improvement.

- **Formula**

In the formula box, provide the specific elements of the calculation for the performance measure.

- **Data Source**

Every measure must be derived from somewhere—an existing management report, EGI AppDB, DocDB, Training Marketplace, Compendium, etc. In this section you should rigorously attempt to supply as detailed information as possible. If the information is sourced from a current report, what is the report titled, and on which line number does the specific information reside? Also, when can you access the data? The more information you provide here, the easier it will be to begin actually producing Balanced Scorecard reports with real data. Conversely, if you provide vague data sources, or no information at all, you will find it exceedingly difficult to report on the measure later.

- **Data Quality**

Data quality is related to reliability of provided data.

- **Collection Quality**

Use this area of the template to comment on the condition of the data you expect to use when reporting Scorecard results. If the data is produced automatically from a source system, and can be easily accessed, it can be considered “high.” If, however, you rely on an analyst’s Word document that is in turn based on some other colleague’s Access database numbers that emanate from an old legacy system, then you may consider the quality “low.” This is related to collection quality. Data quality is related to reliability of provided data.

- **Data Collector**

You identified the owner of the measure as that individual who is accountable for results. Often, this is not the person you would expect to provide the actual performance data.

- **Baseline**

Users of the Balanced Scorecard will be very interested in the current level of performance for all metrics. For those owning the challenge of developing targets, the baseline is critical in their work.

- **Base target**

The base target is the minimum value to achieve to consider a successful performance in the



real circumstances.

- **Stretch Target**

The stretch target is used to set higher expectations that cannot be met by simply working a little harder or a little smarter. To achieve a stretch target, people have to invent new strategies, new incentives—entirely new ways of achieving their purpose.

- **Target Rationale**

This will apply only to those metrics for which you currently have a performance target. The rationale provides users with background on how you arrived at the particular target(s). Did it come from an executive planning retreat? Is it an incremental improvement based on historical results? Was it based on a mandate? For people to galvanise around the achievement of a target, they need to know how it was developed, and that while it may represent a stretch, it isn't merely wishful thinking on the part of an overzealous senior management team.

- **Initiatives**

At any given time, EGI.eu may be simultaneously engaged in dozens of initiatives or the mini projects. Often, only those closest to the project know anything about it, hence any possible synergies between initiatives are never realized. The Scorecard provides an opportunity to evaluate these initiatives in the context of their strategic significance. If a Virtual Team or mini project, that EGI.eu is participating in, cannot be linked to the successful accomplishment of your strategy, the question has to be asked why is EGI participating in it? Use this section of the template to map current or anticipated initiatives to specific performance metrics.