Evaluation of e-Infrastructures and the development of related Key Performance Indicators

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http://e-irg.eu

Colophon

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1 Introduction

National Funders and the European Commission are funding the development and the operation of project-specific as well as general-purpose e-Infrastructures to provide services and facilities to research communities. In its White Paper 2013 e-IRG has introduced the e-Infrastructure Commons for knowledge, science and innovation. This e-Infrastructure Commons is an integrated living ecosystem of resources and services that should be open, user-friendly and accessible to European researchers and scientists, continuously adapting to the changing requirements of research and to the opportunities of new technologies. Moreover, the recent discussions on a European Open Science Cloud (EOSC) have re-framed and emphasized this ecosystem of services. It challenges the e-Infrastructure (service) providers in all their diversity, computing/storage/networking and publicly/commercially funded, to position themselves in this EOSC. The recent discussions on the EOSC have emphasised the need to assess and classify the value of the various e-Infrastructures, at pan-European as well as at the regional and national levels.

Following this vision of an integrated ecosystem, the various stakeholders are keen to understand how to assess the use, operation and innovation of e-Infrastructures in Europe[1] and thus the efficiency of e.g. their investment strategies, based on common metrics and measures. As such, Key Performance Indicators (KPIs) are intended to provide a means for an operational, technical and socio-economic impact assessment of e-Infrastructures and the services they provide[2].

[1] http://ec.europa.eu/research/participants/data/ref/h2020/wp/2016_2017/main/h2020-wp1617-infrastructures_en.pdf

[2] As an example, the e·nventory project provides a suitable basis http://www.enventory.eu/

2 Objectives

The objective of this e-IRG document is to provide an *initial* framework for evaluation and assessment of regional, national, and European e-Infrastructures and to develop a categorisation of KPIs for key areas/components and other cost-related information, basically for the funder and policy level.

This initial framework is the starting point for further development and implementation. As KPIs should be based on the aims of the different stakeholders, a *final* framework can only be established by close interaction with these stakeholder groups. The stakeholder groups consist of funders of public e-Infrastructures, end users, and providers of e-Infrastructures and related services. This interaction will be based on the results of this document. More concretely, the eInfraCentral and e-IRG Support Programme 5 projects will use the initial framework, and consider the various KPI types and formats, the application of these KPIs on different e-Infrastructures and their comparability.

3 Proposed Approach

3.1 Meaning of the Numbers

Measuring the performance of services is not a new subject and is addressed in several best-practice frameworks (e.g. ITIL – Information Technology Infrastructure Library). Usually the definition and rating of Key Performance Indicators are used to address and verify the output of an organisation or a department compared to predefined business goals. Also, the effectiveness of the implementation of processes is measured.

e-Infrastructures are by definition large-scale resources built with (often considerable) initial capital investments, which generate no or just small profits by themselves while having the most value indirectly as externalities for a variety of user groups (e.g. research communities) and a wide public audience. Thus the users' experience, support and satisfaction are mandatory elements to define KPIs, and to evaluate and improve added value or 'return on investment'. This indicates clearly a difference between more operational/technical and innovation metrics on the one hand, and on the other hand measures that depict the appreciation by the various user groups, hence a first categorisation should distinguish between these.

Figure 1 illustrates the diversity of users by showing two extremes (lead users vs. long tail) and by plotting the various scientific domains along this axis. In addition various service classes are mentioned, that could be detailed in terms of more specific services, and in terms of performance measures – from an operational and user point of view. The governance layer shown in the figure, although presented in the context of the EOSC, contains elements that are in the focus of this e-IRG document.

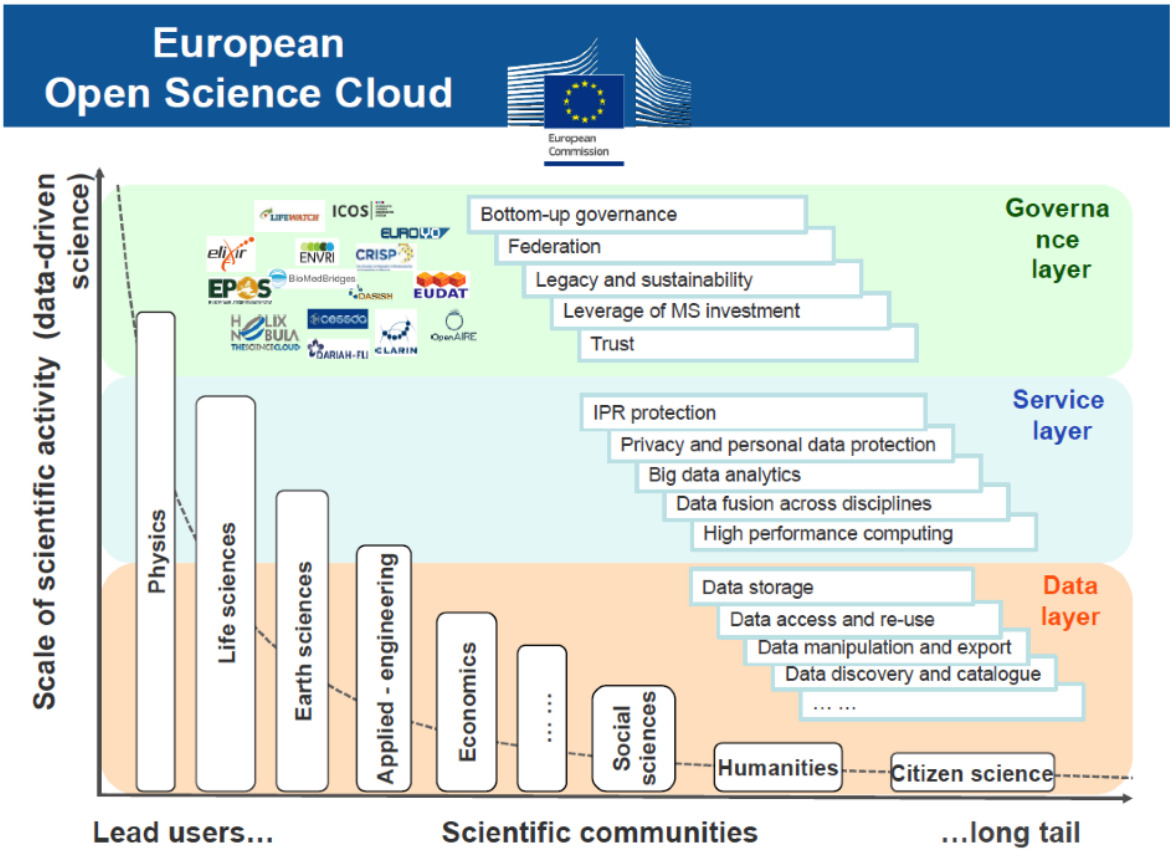

Figure 1 – The concept of the European Open Science Cloud[3]

All e-Infrastructures, as well as projects in general, have been asked to produce KPIs[4] which can be quantified. The numbers provided by the various e-Infrastructures and projects can just be used in the context of the e-Infrastructure or project itself. Due to the very different foci, objectives, and technologies of these e-Infrastructures and projects, a direct comparison of individual KPIs is not an adequate approach. Thus it is proposed that each e-Infrastructure or project lists its goals by categories, and then provides a rating of each of its individual KPIs with respect to how much this KPI contributes to each category of goals. These categories should also get a weighting. During the course of a pilot phase the categorisation and the weighting can be remediated to substantiate the classification and categories.

[3]From the presentation "Open Science policy: Results of the consultation on 'Science 2.0: Science in transition' and possible follow up" by J.C. Burgelman, June 3 2015 at e-IRG workshop

[4]Horizon 2020 indicators. Assessing the results and impact of Horizon https://ec.europa.eu/programmes/horizon2020/en/news/horizon-2020-indicators-assessing-results-and-impact-horizon

3.2 Three-step Approach

To mediate high-level goals, defined by funders and decision makers on one side and metrics provided by the different e-Infrastructure providers, initiatives and projects on the other hand, an approach with three levels is proposed. These are:

1. the specification of high-level goals of the funding agencies, governing body, end users, and the general public,
2. the classification of goals into categories and
3. the harmonisation of metrics.

4 High-Level Goals of the funding or governing body

The goal to implement and operate an e-Infrastructure on various levels, ranging from regional to European transnational scale is defined by political decisions. Documents that contain national roadmaps, good governance models, policy models, and official communications of the European Commission express their high-level goals and thus provide frame and measures for the outcome of e-Infrastructure's development and organisation.

Relevant high-level goals to be considered are (list without claim of completeness):

1. Offer access to state-of-the-art infrastructure and high-quality services[5]
2. Meet the users' needs and enable them to conduct excellent research[6]
3. Provide access to results of research (stressing the re-use of data/content, based on the recently adopted FAIR-principles)[7]
4. Increase the efficiency, effectiveness and excellence of public research system[8]
5. Provide high-speed, secure and trustworthy infrastructures and content services[9]
6. Reinforce trust and security in digital services and in the handling of personal or sensitive data[10]

[5]Data and Distributed Computing e-infrastructures for Open Science
http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/einfra-12-2017.html
[6]Horizon 2020 Work Programme 2016-2017, European Research Infrastructures
https://ec.europa.eu/research/participants/data/ref/h2020/wp/2016_2017/main/h2020-wp1617-infrastructures_en.pdf
[7]Open Access to Scientific Publications and Research Data in Horizon 2020
https://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-pilot-guide_en.pdf
[8]A Reinforced European Research Area Partnership for Excellence and Growth
https://ec.europa.eu/research/science-society/document_library/pdf_06/era-communication-partnership-excellence-growth_en.pdf
[9]Right environment for digital networks and services https://ec.europa.eu/digital-single-market/en/environment-digital-single-market
[10]A Digital Single Market for Europe: Commission sets out 16 initiatives to make it happen
http://europa.eu/rapid/press-release_IP-15-4919_en.htm

7. Open national systems to each other and to the world, in order to be more inter- connected and more inter-operable
8. Offer participation in the developed e-Infrastructure to other stakeholders ("citizen science"; corporations according to accepted EOSC governance models)
9. Governance to guarantee long-term sustainability and enable stakeholders' trust

This heterogeneous list is extracted from various sources. An illustration of the way high-level goals can be translated into more concrete elements is depicted in Figure 1 for the governance layer, which is composed of five aspects:

a. bottom-up governance,
b. federation/interoperability (of resources),
c. legacy and sustainability,
d. leverage of member state investments,
e. (increase of) trust.

The remainder of this report will detail these aspects in terms of metrics that together enable an evaluation. It is recognized that the goals of the e-Infrastructures should be consistent with the political goals since the e-Infrastructure implementation and operation is directly or indirectly financed through public funding and thus the existing KPIs, defined by the e-Infrastructures should be used to be matched to these political goals.

5 Classification of high-level goals

A complex and difficult task is the translation of the high-level goals, which are formulated on a meta-level, into the categories, which represent all stakeholders' expectations in an adequate way. An additional difficulty is that political goals on a European and national level can be contradictory to each other or to users' needs.

The classification takes several viewpoints into account, breaking down the specific interest groups:

- Political perspective (EC and member states) – need to justify spending in e-Infrastructure operation and development (why is public money spent?)
- e-Infrastructure provider perspective – need to justify spending in hardware, services (software) and people (how is the money spent?)
- User perspective – does the spending support my needs in an optimal way?
- General public perspective – what is eventually the outcome of the spending and how are societal challenges addressed (including innovation aspects)?

Derived from these perspectives the following four classes are identified and illustrated by examples in Chapter 6:

- Class of political expectations
- Class of e-Infrastructure provider's expectations
- Class of (scientific) user's expectations
- Class of expectations of the general public

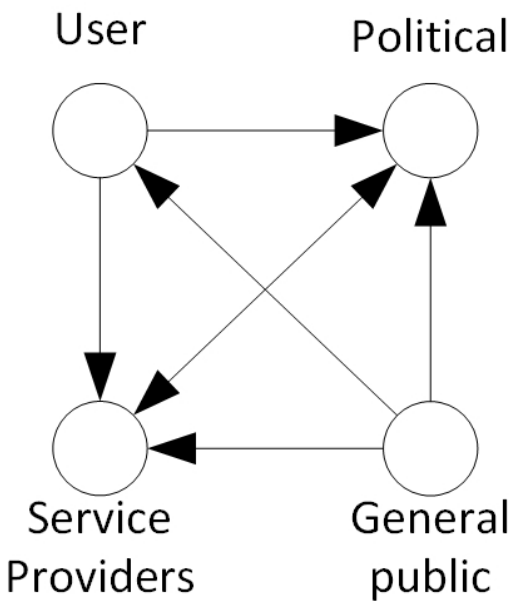

Figure 2: Expectations between the different e-Infrastructure stakeholders

Figure 2 depicts the different stakeholder groups and their expectations to each other. In most cases these expectations are bi-directional but not always, e.g. the e-Infrastructure providers may have no expectations to the general public but the general public may have some expectations to the e-Infrastructure providers. Moreover, not all expectations are in the scope of this document, e.g. the expectations of the general public to the political class may not be relevant in the context of this document.

6 Categories and numbers within current projects

In the process of defining metrics derived from classes it is necessary to derive categories within each of these classes. Some of these categories correspond to technical parameters of the e-Infrastructures and enable a translation into critical success factors and finally into key performance indicators. Others require the creation of new KPIs to be meaningful. Furthermore a prioritisation of the categories and metrics is necessary, so that they have a different weighting in the overall assessment reflecting their importance.

6.1 Harmonisation of the metrics

In order to compare sets of KPIs originating from different projects, a dedicated metric must be defined. Metrics are functions that determine the distance between each pair of elements of the set. Calculation of the metrics is performed with a bottom-up approach. It starts with the definition and denomination of the indicator value then harmonization is made and finally the obtained value is multiplied by weight. The process is described below.

Indicators are expressed by numbers, which present the degree of implementation of diverse project goals. These numbers have different magnitudes and in order to combine them into one group and allow comparison a harmonization process is required. The harmonisation reduces the numbers to the same scale and shows their true worth. Without this harmonization indicators with higher numerical values would play a more important role in the calculated metric than those with lower values. During the harmonisation procedure the following values are determined: min and max value of the source interval, min and max of the destination (after harmonisation) interval.

A weight is then assigned to each indicator. The weight is a factor, which determines the importance of a given indicator with respect to the other indicators. By manipulating the set of weights the measurement policy can be adjusted depending on the general predefined objectives.

Categorization allows to group similar indicators or groups of indicators into similar collections. By assigning weights to the category it is possible to take into account its importance with respect to the goals. There are two types of categories: a general one, relevant for most projects or users, and a specific one, which highlights the *specificities* of projects. By adjusting the category weight a general KPI strategy is determined with emphasis on certain aspects pre-defined by the policy makers.

6.2 *Preliminary list of possible metrics*

The table below shows examples of possible metrics corresponding to the four classes, grouped by categories.

Class	Category	Harmonised metrics (examples are shown here)	Weighting & Comments
Political expectations towards the e-Infrastructure providers and the (scientific) users			
	Federation/interoperability	Service Level Agreements in place Standards used	
	Long-term sustainability	Years of guaranteed funding	
	Bottom-up governance	User representatives in governing bodies	
	Leverage of member states investments	National research programs	
	Trust	Transparency procedures Communication with representatives	
e-Infrastructure providers Operational success (expectations towards the political domain and (scientific) users)			
	Technical indicators	Number of CPUs, bandwidth, storage	
	Operational indicators	Number of up- and downtime Availability (7/24)	
	Scientific outcome	Number of MSc and PhD theses, scientific publications, patents (short-/middle-/long-term value determined by questionnaires to projects, even when the project is over)	
Scientific Users expectations towards the service providers and the politics			
	User satisfaction	Quotient of active/passive users Quotient of long-/short term user groups	

		Frequency of acquiring user feedback/responsiveness to user feedback Number of incidents/mean time to repair	
	User development	Number of days of trainings and numbers of attendees Number of users and increase of amount of users Number of scientific domains reaching the level of advanced users	
	Service requests	Number of service requests Basic/Advanced service usage	
	e-Accessibility and barrier free indicators	Adaptability of infrastructure to modify accessibility needs	
		Adaptability of Infrastructure to different end-user devices	
		Adaptability of e-Infrastructure and related services to more than a language	
		Customizability to these groups of persons (user): • Deaf • Hearing impaired • Blind people (better wording?) • People with other special needs	
		Factors measuring inclusion • Generation gap avoiding factor • Minorities including factor	
		Adaptability of infrastructure to modifications in law	
General public expectations to e-Infrastructure providers and (scientific) users			
	Knowledge transfer	Number of knowledge transfer events	
	Socio-economic impact	Number of applications from and	

		exploitation by industry Amount of saved private expenses Contribution to the number of developed products or/and services (short-/middle-/long-term value determined by questionnaires sent to projects, even when the project is over)	
	Innovation aspects	Number of innovation prizes (short-/middle-/long-term value determined by questionnaires sent to projects, even when the project is over)	

As explained, the table only shows examples of metrics for each category. The next step in the KPI framework development will have to identify gaps and propose additional relevant metrics when necessary. For instance, the examples linked to the general public are currently restricted to economic impact.

It should be stressed that the KPIs and their interpretation may have been adjusted over the time in order to take into account the evolution of services, user needs and technologies. A key aspect is to consider the maturity level of the services. Also, when looking for possible metrics for certain goals (for instance a key goal such as "user satisfaction"), it appears that the goal cannot always be easily measured by only numerical indicators.

7 Further Framework Activities

The development of a self-contained framework, which enables the assessment of investments in European e-Infrastructures, needs the involvement of funders and policy makers, e-Infra–structures and user communities. The various stakeholders have to approve the framework to get a general acknowledgement and acceptance. e-IRG, with support of its support programme, will conduct workshops with focus groups, interviews, surveys, etc. to progress with the development of indicators, which are:

- accepted by all stakeholders,
- clear on responsibility and accountability for measurement,
- clearly defined in data source and way of measurement,
- easy to collect by a maximum of automation to keep down the costs and overhead,
- customizable to the providers infrastructure,
- subject to a continual improvement process.

Also, the limits due to the restriction of KPIs to numerical values should be identified and alternative possibilities assessed if some key goals cannot be well covered that way.

Following a transparency policy the access of the general public to the list of classes categories should be obligatory. The decision to publicise the real numbers to the general public should be left to the provider of the numbers.

To address the specific goals of the EOSC, especially the federation aspects, interoperability and the sustainability of the complex system composed by several, different e-Infrastructures it is likely that existing KPIs will need to be aggregated and new KPIs, which refer to these aspects, need to be set up. The question of ownership and accountability of KPIs is a challenge in particular for federated systems like the EOSC and need to be addressed in the governance setup of such a federation. The way this is managed by existing federations (e.g. GÉANT) has to be assessed as a starting point.

It is recognised that the definition, measurement and interpretation of KPIs related to user satisfaction is still an open issue. It should be noted here that the context in which user satisfaction metrics are gathered has to be taken into account.

8 Conclusions

This paper defines a basic framework of clustered KPIs. Funding and evaluation bodies can use the proposed 3-step approach in order to achieve effective funding taking into account the point of view of the individual stakeholders. A continuous feedback loop should provide a stepwise finer granulated set of metrics, and thus allow a continuous improvement of the effectiveness of the e-Infrastructure according to the focused goals. Further development of this proposed framework is required taking into account the diversity of the e-Infrastructures in order to have a multidimensional tool. Each e-Infrastructure which plays its role in the EOSC, can thus objectively be evaluated and equally treated.

9 Annex: Examples of specific KPIs

9.1 The following projects can be addressed by the KPI recommendations

AARC
BlueBRIDGE
EarthServer2
EDISON
EGI ENGAGE
e-IRG(SP4,SP5)
EUDAT2020
EVER-EST
GEANT
IndigoDataCloud
LEARN
MuG
OpenAIRE
OpenDreamKit
OpenMinTed
Phenomenal
PRACE
RDA
READ
SESAMENET
THOR
Vi-SEEM
VRE4EIC
West-Life

9.2 Examples of KPIs[11]

9.2.1 BioExcel CoE

- Performance and scaling improvements of the pilot codes

[11]The KPIs are taken from the Digital4Science Portal (https://ec.europa.eu/futurium/en/content/how-set-kpis-work) and in case of EGI and PRACE from the corresponding web pages

- Availability of pilot codes on European HPC/HTC systems - nationally, in PRACE, and internationally
- Usage of Workflows
- Number of runs submitted via web portals portals (% increase with respect to previous year)
- Number of academic and commercial institutions (both industry and SMEs) joining the user group
- Number of projects developed with academic and commercial partners
- Number of organized training events
- Number of people trained (academic and industrial)
- Number and severity of bugs found and fixed through targeted testing on workflows important to BioExcel user groups

9.2.2 POP CoE

- for the entire project: customer savings by the identified improvements, ROI, awareness of the application performance issues, customer satisfaction
- for the community development: size of the POP community
- for the technical work: number of codes served and some more detailed metrics of the percentage of improvement like N times faster codes
- for the dissemination: POP awareness levels among European community

9.2.3 West-Life

- Some are binary:
    - UI and Processing jobs use virtual folder mechanism.
- Some are usage counts:
    - Installations of repository,
    - Visits to provenance reports,
    - Number of jobs using new functionalities,
    - Number of publications resulting from use of the infrastructure,
    - Number of registered users.
- Some measure resource consumption:
    - CPU hours made available via the VRE.
- Metrics that really represent the scientific goals of the VRE are more complicated, but still feasible:
    - To follow discipline-hopping, we can monitor users who access portals for different structural biology techniques,
    - accesses by researchers other than the original depositor,

- Structures solved using the infrastructure, by combining experimental data from different techniques,
- Jobs run by industrial user,
- Joint publications/position papers involving authors from infrastructures beyond the current partnership.

9.2.4 BlueBridge

Infrastructure related operational KPIs:

- Number of operated VREs, i.e. web-based application environments each tailored to the specific working needs of a community of actors sharing a common goal;
- Number of interfaced e-Infrastructures /served e-Infrastructures;
- Number of exploited third-party data repositories and service providers;
- Number of datasets, algorithms and tools accessible through the infrastructure;
- Availability: per VRE and per each of the provided service.
- Technology related KPIs
- Number of new/enhanced services and libraries;
- Number of software releases issued;
- Average incident resolution time;
- Average ticket request closing time.

Socio-economic related KPIs

Across-VREs KPIs

- Number of organizations (both internal and external to the project) sustaining the VRE operation and the development of new products through in kind-contribution & co-funding;
- Number of users exploiting the VREs on a regular basis [here we can distinguish between "direct users" of the VRE and "indirect users", i.e. users of third-party services using the VRE];
- Number of organization and SMEs making available their resources through the infrastructure;
- Distribution of the users exploiting the VREs on a regular basis: number of countries, number of international organizations, SMEs, and academic institutions.

VRE domains specific KPIs

- Number of VRE-specific tasks executed;
- Number of access to the data products generated through the VRE;
- Number of discussion threads activated in a VRE (BlueBRIDGE VREs, as any D4Science enabled VRE, are provided with social tools);
- Number of activities facilitated through the VRE usage, e.g. number of VRE-enabled academic courses, number of students trained;
- Number of SMEs providing resources to and using the VRE;

- Number of planned outcomes delivered, e.g. aquaculture farms performance indicators, thematic regional maps, stocks and fisheries described with a unique id.

Communication & Dissemination related KPIs:

- Stakeholder community addressed communication: number of posts in social networks, press-releases, newsletters, organised events, presentations, qualified community contacts with whom the project engages;
- Scientific communication: number of publications [with (alt-)metrics - including data & sw publications – with a specification of how many of them are open access publications]
- Number of SME representatives trained
- Number of innovation focused webinars on BlueBRIDGE exploitable results

Project management related KPIs

- Timeliness in deliverables and milestones submission;
- Timeliness in internal reporting;
- Number of management meetings (with respect to the initially planned ones);
- Usage of the project social tools for internal communication;
- Number of new synergic contact established.

9.2.5 EGI[12]

- Project objectives
- Objective 1: Ensure the continued coordination of the EGI Community in strategy and policy development, engagement, technical user support and operations of the federated infrastructure in Europe and worldwide.
- Objective 2: Evolve the EGI Solutions, related business models and access policies for different target groups aiming at an increased sustainability of these outside of project funding. The solutions will be offered to large and medium size RIs, small research communities, the long-tail of science, education, industry and SMEs.
- Objective 3: Offer and expand an e-Infrastructure Commons solution
- Objective 4: Prototype an open data platform and contribute to the implementation of the European Big Data Value.
- Objective 5: Promote the adoption of the current EGI services and extend them with new capabilities through user co-development

Supported Project objective	Definition	Type	Polarity	Target PM12	Target PM24	Target PM30
O4	Number of open research datasets	Cumulative	Up	0	10	20

[12]See https://wiki.egi.eu/wiki/EGI-Engage:Main_Page#Objectives and https://wiki.egi.eu/wiki/EGI-Engage:Metrics#KPIs

Supported Project objective	Definition	Type	Polarity	Target PM12	Target PM24	Target PM30
	that can be published, discovered, used and reused by EGI applications/tools (KPI.1.JRA2.OpenData)					
O1, O2	Number of RIs and e-Infrastructures Integrated with EGI (KPI.2.SA1.Intergation)	Cumulative	Up	9	11	13
O1, O2	Number of new registered software items and VM appliances (KPI.3.SA1.Software)	Per period	Up	50/50	60/60	70/70
O1, O2	Number of providers offering compute and storage capacity accessible through open standard interfaces (KPI.4.SA1.Cloud)	Cumulative	Up	25	30	35
O5	Number of researchers served by EGI (KPI.5.SA2.Users)	Cumulative	Up	40 000	45 000	47 000
O3	Number of users adopting federated IdP (KPI.6.JRA1.AAI)	Cumulative	Up	TBD	TBD	TBD
O5	Number of new research communities served (KPI.7.SA2.Users)	Per period	Up	20	20	20
O2	Number of VO SLAs established (KPI.8.SA1.Users)	Cumulative	Up	4	8	10
O5	Number of scientific publications supported by EGI (KPI.9.NA2.Communication)	Cumulative	Up	NA	NA	NA
O2	Number of relevant authorities informed of the policy paper on procurement (KPI.10.NA2.Communication)	Cumulative	Up	5	20	25

Supported Project objective	Definition	Type	Polarity	Target PM12	Target PM24	Target PM30
O5	User satisfaction (KPI.11.SA1.Users)	Average	Up	4	5	5
O2	Number of services, demonstrators and project ideas running on EGI for SMEs and industry (KPI.12.NA2.Industry)	Cumulative	Up	2	7	10
O5	Number of delivered knowledge transfer events (KPI.13.SA2.Support)	Per period	Up	15	15	15
O3, O5	Number of compute available to international research communities and long tail of science (KPI.14.SA1.Size)	Cumulative	Up	TBD	TBD	TBD
O3, O5	Number of storage available to international research communities and long tail of science (KPI.15.SA1.Size)	Cumulative	Up	TBD	TBD	TBD
O2, O5	Number of international support cases (for/with RIs, projects, industry) (KPI.16.SA2.Support)	Cumulative	Up	30	60	90
O3, O5	Number of compute resources available to the long tail of science (KPI.17.SA1.Size)	Cumulative	Up	300	500	500

9.2.6 PRACE[13]

PRACE's impact on evolving research

- number of project applications received via PRACE Calls for Proposals for Project Access,
- number of rejected projects below the technical quality threshold,
- number of projects above technical threshold

International Cooperation

[13]PRACE KPI http://www.prace-ri.eu/prace-kpi/

- number of projects with PIs from a different country than the machine on which the research is executed
- number of national, international and EC co-funding for PRACE-awarded projects

PRACE's impact on scientific production

- number of MSC and PHD thesis
- number of publications
- number of scientific talks
- number of patents

PRACE's impact on growing know-how in Europe

- number of person-days of training through attendance-based courses
- courses attended by unique individuals
- rate of recurring participation
- number of participants in PRACE Advanced Training Centres courses
    - from academia
    - from non-academia

PRACE's impact on attracting the industrial sector

- number of industrial attendees at the two main HPC events (Supercomputing (SC) and Supercomputing Conference (ISC)) that made contact with the PRACE booth
- number of participation of industry in PRACE Advanced Training Centre courses

10 Glossary

Term	Explanation
AAI	Authentication and Authorization Infrastructure
AARC	Authentication and Authorization for Research and Collaboration (EU-funded project)
CPU	Central Processor Unit
EC	European Commission
EGI	European Grid Initiative, a federation of resource centres and coordinated by EGI.eu
e-Infrastructure	Networks, grids, data centres and collaborative environments infrastructure intended to include supporting operation centres, service registries, credential delegation services, certificate authorities, training and help-desk services
EOSC	European Open Science Cloud
EU	European Union
EUDAT	European Data Infrastructure (EU-funded project)
e-IRG	e-Infrastructure Reflection Group
e-IRGSP4	e-Infrastructure Reflection Group Support Programme 4
e-IRGSP5	e-Infrastructure Reflection Group Support Programme 5
FAIR	Findable, Accessible, Interoperable and Reusable
GÉANT	Pan-European network that connects the NRENs in Europe and beyond and name of the organisation that operate the network
H2020	Horizon 2020 (EU Research and Innovation programme 2014
HPC	High Performance Computing
HTP	High Throughput Computing
ISC	Supercomputing conference in Europe
ITIL	Information Technology Infrastructure Library
KPI	Key Performance Indicator

MSc	Master of Science
OpenAIRE	Open Access Infrastructure for Research in Europe
PhD	Doctor of Philosophy
PRACE	Partnership for Advanced Computing in Europe
RDA	Research Data Alliance
RI	Research Infrastructure
SC	Supercomputing conference in USA
SLA	Service Level Agreement
SME	Small and Medium Enterprises
VO	Virtual Organization
VRE	Virtual research Environment

http://e-irg.eu