THE EGI COMPENDIUM

of National Grid Infrastructures in Europe

2011 Edition

FOREWORD

Welcome to the **2011 EGI Compendium of National Grid Infrastructures in Europe** – an essential body of structured information about EGI's key stakeholders: National Grid Infrastructures (NGIs) and European Intergovernmental Research Organisations (EIROs).

This first edition provides a wealth of detail regarding the 'state-of-the-art' of grid infrastructures in Europe and will be used as a benchmark to track the independent evolution of NGIs and EIROs in the coming years.

As a structured collection of information describing NGIs and EIROs and their relationships with user communities, the compendium will help EGI.eu and the EGI community understand the diversity of EGI and its activities. This will increase transparency and improve clarity among the EGI community, which will, in turn, inform our strategic planning activities.

I am most grateful to all NGIs and EIROs, particularly to ones who gathered, submitted, clarified and checked the data included in this publication. Special thanks also are extended to the members of the "EGI Compendium" Virtual Team for their tireless effort to compile this initial volume and the work of the EGI.eu Strategy and Policy Team in leading its development.

We hope that the first edition of the EGI Compendium will prove to be valuable for you. You are welcome to provide us your feedback in order to improve future editions of this annual report through policy@egi.eu!

Steven Newhouse

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KEY FINDINGS

The EGI Compendium report is an authoritative reference on the development of National Grid Infrastructures (NGIs) in Europe, working together to enable digital research within the European Research Area.

Out of the 38 NGIs, 28 NGIs that responded to EGI Compendium survey: Armenia, Croatia, Cyprus, Czech Republic, Estonia, France, Ireland, Israel, Italy, Lithuania, Luxembourg, Moldova, Montenegro, Portugal, Turkey, Finland, Germany, Greece, Hungary, Latvia, Macedonia, Netherlands, Romania, Serbia, Spain, Switzerland and United Kingdom. These NGIs provided answers to at least 20 questions out of the 86 total questions that made up the EGI Compendium survey.

NGI Strategy and Policy

- **Strategy**: Six NGIs (25%)[1] have defined a strategy document for grid and distributed computing. These documents are typically written in the national languages and in some cases they are part of more general strategy, not specifically focused only on distributed computing.
- **Vision**: Fifteen NGIs have defined their vision for grid and distributed computing. Some of the mentioned key terms are: Research, Services, Infrastructure, Computing, Support and National.
- **Mission**: Twenty-one NGIs provided a mission statement. Some of the mentioned key terms are: Research, National, Grid, Computing, Resources, NGI etc
- **Core Values**: Thirteen NGIs have defined a list of their core values. The most recurrent core values are: Reliability, Innovation, Integration, Coordination, Leadership and Openness.
- **Business Model**: Three NGIs (12%, Croatia, Italy and Spain) have defined a business model.
- **Policies**: The majority of NGI policies are related to the users and their specific needs (71.4%), followed by Operations (57.1%), Security (57.1%) and Technology (28.6%) Green IT as a policy area is not addressed by any of NGIs. Seven NGIs have a webpage with the list of policies/procedures that apply to them. Fifteen NGIs do not enforce additional restrictions on the infrastructure in addition to EGI policies. However, five NGIs have placed additional policies in order to support a specific areas related to operations, security and middleware deployment, specific national Operational Level Agreement (OLA) adjustment, different policies required by law of a country of origin, etc.
- **Resource Allocation Model**: The process by which an existing/new user community can apply for new resources in the NGIs is quite diverse. For example, some NGIs provide quotas for free CPU hours per annum, certain percentages of the resources are reserved, new resources are allocated on the base of declared interest in the form of an application proposal, or the resource allocation model is based on fair share model, agreements or best effort. In addition, some of the NGIs specified an approach to recover costs.

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[1] Percentages refer to the proportion of respondents to each question (not the percentage of the total NGIs).

- **Major changes occurring in NGIs during 2011**: Ten NGIs (66.6%) went through major changes such as technology upgrades (e.g., deployment of academic clouds, virtualisation platforms), increase of active users, secured funding, beneficial impact of using Structural Funds and state recognition as a large infrastructure. Concerning the foreseen changes for the coming year, a number of NGIs are expecting that 2012 will be a very important year of transition. Some NGIs have started using virtualisation and private cloud solutions or foresee a change in the user base, thus, plan to work on a more scalable user support policy.

Governance Opportunities

- **Coordinating body**: Fourteen NGIs are organised as a group of interest, thus, they have not established a dedicated legal entity. Ten NGIs are coordinated by a dedicated non-profit legal national entity. Only one NGI (Turkey) is coordinated by a for-profit legal national entity. Some NGIs are planning to establish a dedicated legal entity, however, the majority do not plan to set up a dedicated organisation while representation in the EGI Council is delegated to a partner. Therefore, significant numbers of NGIs are represented in the form of a consortium of legal entities or in one case as a Joint Research Unit (Italy).
- **Roles**: Twenty-three NGIs have roles of national coordinating body (95.8%), while 20 NGIs have a role of Resource infrastructure provider (83.3%). Eleven NGIs perform the role of Resource Centre (45.8%), ten NGIs perform the role of Technology Provider (41.7%), ten NGIs perform the role of Platform Integrator (41.7%) and nine NGIs perform the role of Platform Operator (37.5%).
- **Stakeholders & Governing body**: Twenty-two NGIs have academic institutions (95.7%) as a stakeholder in its governing body, while 16 (69.6%) have research institutes as well. Six NGIs (26.1%) have the national government as a stakeholder while five NGIs (21.7%) have resource centres. Three NGIs have Industry (13.0%), two NGIs have VOs (8.7%) and only one NGI has user communities (4.3%) as stakeholders. In most cases (85.0%), the lead organisation in the NGI also represents the NGI in the EGI Council. The average number of members in an NGI partnership is 11, while the median is eight
- **Stakeholders & Advisory board**: Nine NGIs (36.0%) have an advisory board. User communities are stakeholders in 90.0% of the cases, followed by 40.0% with resource centres, 30.0% with technology providers and 10.0% with industry. In two cases (Croatia, Turkey) government and university representatives also have their place in the advisory board.
- **Relationship with the government**: Four NGIs (16.7%) have a direct hierarchical subordination to their national ministry, while eight NGIs (33.3%) have a formalised relationship with their government, either through having a delegated responsibility from a ministry or having a ministry representative as a board member. Ten NGIs (41.7%) have an informal, indirect and looser relationship with their government. Only one NGI does not have any kind of relationship with its national government (Hungary).

Sustainability Prospects

- The EGI Compendium makes a distinction between an NGI as a *legal organisation* (that coordinates all activities) and an NGI as an *infrastructure* (all the hardware, software, networks, facilities, etc. that are required to develop, test, deliver, monitor, control or support applications and IT Services).

	NGI as a Legal Organisation	NGIs as an Infrastructure
Sources	• The biggest funding source for 11 NGIs (90.9%) comes from national public funding (e.g. state, universities). • Six NGIs are funded at least partially by the European Commission (54.5%), principally through the EGI-InSPIRE project and in some cases funded through Structural Funds. • Five NGIs (45.5%) are funded by institutes, while three NGIs are funded by users (Finland, Switzerland and Turkey). • For two NGIs, funding comes from membership fees (Czech Republic and Switzerland). • None of the NGIs is funded through donations and royalties.	• For the creation and operation of NGIs infrastructure, 19 NGIs (90.5%) receive funding from national public funding (e.g. state, universities). • The second biggest funding source for 17 NGIs is the European Commission (81.0%), principally through the EGI-InSPIRE project and in some cases projects funded by Structural Funds. • Eleven NGIs or 52.4% of NGIs are funded by institutes, while only 9.5% of funding coming from membership fees. • One NGI (Netherlands) is partly funded through private investments, while one NGI (Switzerland) is funded through user payments. • None of the NGI's infrastructure is funded through donations and royalties.
Models	• 60.0% of NGIs receive funding as a recurrent line item, which is a recognition from their national funding agencies. • 60.0% of NGIs receive funding on a project basis meaning many are supplementing and/or enhancing their organisational resources for specific objectives. • One NGI (Turkey) is funded on a usage-basis. • None of the NGIs have subscription fee funding scheme.	• 84.2% (16 NGIs) receive funding as a recurrent line item • 57.9% (11 NGIs) also receive funding on a project basis. • Only one NGI is funded on usage-based type • No NGI has a subscription fee funding type and only one of the NGIs is in process of having recurrent funding.
Levels	• The average annual budget for 2011 was around 1.7M€, while for the 2012 it is around 2M€, an increase of 17%.	• On average, 2.34M€ is dedicated to operate/upgrade the infrastructure part of EGI.
Duration	• Three NGIs have guaranteed funding for three or more years. • Two NGIs have funding guaranteed only on a year-by-year basis or every two years, while for some NGIs the funding situation is unclear. • In the most critical situations, some of the NGIs do not have a fixed budget and are only being funded on-demand for specific activities, or they have applied for national funding and are awaiting a decision. In most cases a funding scheme is not defined and funding beyond 2014 is not certain.	
Staffing	• In 2011, 10.1 FTEs were dedicated to running the average NGIs infrastructure. However, because of different size of NGI infrastructure the number of FTEs varies from 1 to 35. • In 2011, 46.3% of FTEs are dedicated to operations, while 17.1% is dedicated to middleware development and 16.8% to user support. The rest is divided between user application development (9.4%), management (7.7%), administration (6.1%), training (6%) and dissemination (5.3%). • On average, an expected increase of FTEs dedicated to e-Infrastructure activities within the NGIs in the 2012 is 20.7%, for 2013 is 22.0% and for 2014 is 19.7%. • None of the NGIs expects a decrease in staff.	

Serving the user communities

- **Outreach:** Thirteen NGIs (46.0%) publish a regular newsletter, annual report, case studies or booklet. Twenty NGIs (71.0%) run regular events. The majority organise events in the form of annual scientific events, annual assemblies together with training days, summer schools or user conferences. Twelve NGIs run their project websites while three NGIs (UK, Italy and Ireland) are active in social media.
- **NGI Certification Authorities:** Concerning the NGIs internal Certification Authority, 18 NGIs (78.2%) have an internal Certification Authority to issue certificates for users and for servers. Only six NGIs (27.7%) issue certificates for code signing, while two NGIs (9.5%) rely on other organisations within the country. Other NGIs delegate certification authority on a regional level.
- **Services to the users:** Twenty NGIs (90.9%) provide data management and job management services to the users. Following this, the majority of NGIs provide the users with VO membership service (81.8% or 18 NGIs), digital certificates services (72.7% or 16 NGIs) and VO monitoring (54.5% or 12 NGIs). Six NGIs (27.3%) provide science gateways to the users (Finland, Germany, Ireland, Italy, Netherlands and UK).
- **Training days and events:** In 2011, the average number of training days for grid end-users or grid operators was 8.4 days. The biggest number of training days was done by Spain (60). On average, 63 grid end-users or operators attended training events during 2011. Spain has the biggest number of trained grid end-users or grid operators – 400.
- **End-Users and Virtual Organisations:** On average, each NGI has 448 grid end-users with valid credentials released by the NGIs at the end of 2011. The average number of VOs supported by an NGI is 18. The top VO by usage (logical CPU walltime) is ATLAS, followed by Alice in second place and CMS in third.
- **Research Areas:** The research area in which the NGIs are mostly involved is 'Multidisciplinary' with 84.4% or 27 NGIs. Twenty-six NGIs support High-Energy Physics (81.3%), while 24 NGIs support Life Sciences (75.0%). Following this, 17 NGIs support Astronomy, Astrophysics and Astro-Particle Physics (53.1%), Computer Science and Mathematics (53.1%), Earth Sciences (53.1%). Sixteen NGIs support Computational chemistry (50.0%) while seven NGIs (21.9%) support Fusion. Half of the NGIs (16) support other research areas e.g. Humanities, Social Sciences, Arts, Biomedical Sciences, Computational Fluid-Solid State Dynamics, Climate/Weather Modelling, Materials.
- **Projects:** Nine NGIs were involved in other projects either directly or indirectly. Six NGIs (Czech Republic, France, Germany, Italy, Netherlands and Spain) were involved in ESFRI projects during 2011.

Infrastructure and Technology Status

- **Resource Centres:** There is total of 310 recorded Resource Centres (RCs) through the EGI Compendium survey. The most RCs coordinated by one NGI is 53 (Italy), followed by Spain (24), UK (22) and France (18). The median number of RCs is six per NGI.
- **CPU, GPU and Storage:** The total logical CPUs (cores) available via the NGIs at the end of 2011, was 278,504 of which 15 NGIs reported 16,976 cores being used to run virtual machines. The percentage of utilisation of the logical CPU (core) capacity in 2011 is around 66%, on average. The total GPUs available via the NGIs at the end of 2011 is around 30 (11 NGI responded). Most of the NGIs (75%) do not have GPU related statistics. The median logical CPUs (cores) available via the NGIs is 2126. The total size of disk storage available via the NGIs at the end of 2011 is 123,490 (TB). The total size of tape storage is 126,719 (TB).

- **Availability and ownership of NGI resources:** New EGI end-users can make use of logical CPUs and Disk Storage resources, but no Tape Storage is available. Total CPUs available to new users is 4,344 CPUs (12 NGIs respondents) and 215 TB of Disk Storage (nine NGIs respondents). Seven NGIs stated that they do not have available Tape Storage. The average NGI pool of resources is 362 CPUs and 23.89 TB of Disk Storage. Regarding whether the resources for new users to try-out are owned by the NGIs as a legal entity and/or offered through affiliated resource centres, 57.1% is owned by affiliated resource centres/institutions (eight NGIs), 28.6% is owned by NGIs (four NGIs) and 28.6% of resources are of mixed ownership (four NGIs).
- **Middleware components:** EMI components from gLite are by far the most common category of middleware components being deployed by 94.6% of NGIs (35 NGIs). The second most deployed middleware component is dCache with 37.8% (14 NGIs), followed by EMI components for ARC with 24.3% (nine NGIs), Globus with seven NGIs (18.9%) and EMI components from UNICORE and StratusLab at the same percentage at 5.4% (two NGIs). The least deployed middleware components are EDGI with only one NGI (France).

Recommendations

- **Develop an NGI strategy document:** Many NGIs have yet define their strategic path within the EGI ecosystem and on a national level. All NGIs are encouraged to develop a strategy document with vision, mission, core values and strategic goals.
- **Develop a sustainability plan:** NGIs, as EGI's main stakeholders, are encouraged to develop sustainability plans, as well as business plans and models.
- **Develop national policies:** NGIs may need to address specific local issues by defining additional policies in the various fields, e.g.: users, security and technology. Local NGI policies and procedures (in addition to EGI's) should be published and their stakeholders should be made aware of them, especially RCs and VO managers.
- **Improve outreach:** NGIs are encouraged to work more on publishing and disseminating their results (through newsletters, blogs, social media, online magazines) by the use of case studies in order to gain the visibility necessary for further expansion of their user base and to improve the reliability of their funding.
- **Investigate what roles within EGI ecosystem should be embraced:** Even though every NGIs is unique, NGIs are encouraged to investigate which roles are suitable for them within EGI ecosystem (e.g. National coordinating body, Resource Infrastructure Provider, Resource Centre, Technology Provider, Platform Integrator and Platform Operator). Sometimes, embracing different roles can result in more interactions and added value delivered for different kind of actors across the EGI ecosystem.
- **Widen NGI stakeholder base:** Encouraging diversity and inclusion of different stakeholders within a governing body can increase recognition and publicity and bring more benefits to NGIs. For example, having a more user-community-centric approach in strategic e-Infrastructure governance is desirable.
- **Engage more with ESFRI projects:** In future years, more involvement with ESFRI projects will make a real impact in NGI activities.

1. INTRODUCTION

EGI's strategy and long-term sustainability is to establish an open ICT ecosystem that can attract research communities from across the whole digital European Research Area, while evolving a set of services that will increase the flexibility in how the infrastructure can be used by these individual research communities. The different providers of the ecosystem, including NGIs, must be able to be individually developed, maintained, supported and allowed to establish effective processes with each other to enable them to scale as required – how and to what extent will depend on their individual value to each other.

A key factor in bringing new researchers into EGI will be to successfully marshal the distributed assets (e.g. technical expertise, software, resources) that exist within EGI to meet their needs. Expanding our knowledge base to include information about the assets within the NGIs and collaborating projects (i.e. a service portfolio) will help us to understand what we, as a community, are capable of doing in the short, medium and longer term.

The purpose of the EGI Compendium is to provide knowledge base that can significantly improve the efficiency and flexibility of the interaction between the NGIs, EGI.eu and other organisations to achieve common goals.[2] Therefore, the major motivation for the EGI Compendium report is expressed in three major goals:

1) increase the transparency of EGI's activities;
2) support the strategic planning and long-term development of EGI;
3) provide an essential body of information for the various EGI stakeholders.

The EGI Compendium report is an authoritative reference source that can be used to chart the development of federated computing in Europe, covering areas such as General Information, Strategy, Governance, Funding and Staffing, Policy, Outreach, Services, Users, Infrastructure and Technology.

Tables with detailed information for each area are provided in Appendices.

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[2] The EGI Compendium was introduced through a dedicated Virtual Team project that at the beginning of this year defined the structure of the questionnaire and launched the first iteration of the data collection process to the 38 members (National Grid Infrastructures and EIROs). EGI.eu's Strategy and Policy Team led the virtual team with active participation from the Irish and Moldovan NGIs. Following the data collection, a summary document and a detailed report were published.

2. GENERAL INFORMATION

Section 2.1 provides general information on the NGIs and EIROs, which responded to the EGI Compendium survey conducted in the first months of 2012.

2.1 Respondents

Of a total of 38 NGIs[3], 28 responded to the EGI Compendium survey. Table 2.1.1 provides an overview of the NGIs that answered at least 20 questions out of the 86 questions that make up the survey including ten NGIs that did not answered the survey and will not be covered by the 2011 compendium edition.

Over the years, EGI has collected a variety of information, some of which explicitly covered by the compendium survey. This existing information was used to prefill survey questions where appropriate to reduce redundant requests for information and to minimise the time required for its completion. Some of this prefilled information regards NGIs that did not formally answered the survey. The data was however taken into account where applicable.

Figure 2.1.1 lists the percentage of completed answers per section per NGI.

Further information in the Appendix:

Table 2.1.2 - Snapshot of the general information about individual NGIs including full name and abbreviation both in Enlish and national languages.

Table 2.1.3 - Website URLs of the NGIs.

Table 2.1.4 - NGIs member and deputy member of the EGI Council, as well as NGIs International Liaison contact and deputy contact.

Table 2.1.5 - Operations manager and deputy of the NGIs.

Table 2.1.6 - Year of establishment of the NGIs and the year of start of grid operations started in the NGIs country.

Table 2.1.7 - History of the NGIs as related to the grid activities or URL to a webpage.

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[3] For the purpose of this document – the EGI Compendium 2011 – and for the sake of simplicity, the meaning of the acronym 'NGIs' (plural) has been expanded to include EIROs as well (NGIs then means the group comprising NGIs and CERN).

Fig. 2.1.1 – Percentage of completed answers per NGI

EGI Compendium 2011 - Answers

	CERN	United Kingdom	Turkey	Switzerland	Sweden	Spain	Slovenia	Slovakia	Serbia	Russia	Romania	Portugal	Poland	Norway	Netherlands	Montenegro	Moldova, Republic of	Macedonia	Luxembourg	Lithuania	Latvia	Italy	Israel	Ireland	Hungary	Greece	Germany	France	Finland	Estonia	Denmark	Czech Republic	Cyprus	Croatia	Bulgaria	Bosnia & Herzegovina	Belgium	Armenia
identity	47%	100%	100%	76%	47%	100%	41%	94%	100%	53%	82%	59%	41%	35%	94%	100%	94%	100%	82%	100%	47%	100%	94%	100%	76%	76%	100%	100%	94%	94%	47%	94%	100%	100%	35%	35%	41%	94%
strategy	0%	50%	100%	33%	0%	100%	0%	67%	100%	0%	100%	17%	0%	0%	100%	83%	100%	33%	33%	83%	17%	100%	100%	50%	50%	0%	100%	100%	83%	33%	0%	50%	33%	83%	0%	0%	0%	83%
governance	0%	100%	100%	100%	0%	100%	0%	92%	92%	0%	92%	15%	0%	0%	92%	92%	92%	92%	54%	92%	15%	92%	85%	85%	77%	23%	100%	100%	92%	85%	8%	100%	77%	100%	8%	8%	8%	100%
funding NGI	0%	0%	100%	25%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	75%	0%	0%	0%	50%	0%	0%	0%	100%	50%	0%	0%	0%	0%	100%	0%	0%	100%	0%	75%	0%	0%	0%	50%
funding infrastructure	0%	27%	100%	0%	0%	100%	0%	0%	55%	0%	18%	0%	0%	0%	100%	73%	100%	100%	18%	0%	0%	100%	82%	27%	0%	0%	9%	100%	100%	18%	0%	100%	45%	64%	0%	0%	0%	27%
policy	0%	75%	100%	0%	0%	75%	0%	50%	75%	0%	75%	0%	0%	0%	100%	75%	100%	75%	25%	75%	0%	75%	25%	25%	25%	0%	100%	75%	100%	50%	0%	100%	75%	75%	0%	0%	0%	50%
outreach	0%	100%	60%	60%	0%	60%	0%	40%	60%	0%	80%	40%	0%	0%	80%	60%	60%	60%	40%	60%	60%	100%	60%	40%	60%	60%	60%	60%	60%	60%	0%	60%	60%	60%	0%	0%	0%	60%
services	0%	100%	100%	0%	0%	100%	0%	100%	100%	0%	50%	0%	0%	0%	100%	100%	100%	100%	25%	75%	0%	100%	100%	50%	25%	0%	100%	100%	100%	50%	0%	100%	100%	100%	0%	0%	0%	100%
users	50%	67%	83%	50%	33%	100%	50%	67%	83%	50%	67%	50%	50%	33%	67%	83%	100%	83%	0%	83%	33%	100%	67%	50%	50%	50%	100%	100%	50%	33%	50%	100%	100%	83%	50%	50%	33%	67%
infrastructure	33%	50%	100%	33%	33%	100%	42%	58%	100%	42%	50%	42%	42%	33%	58%	75%	100%	92%	0%	83%	33%	100%	50%	58%	33%	42%	58%	75%	100%	92%	67%	42%	75%	92%	67%	42%	8%	42%
technology	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
other	0%	33%	33%	0%	0%	67%	0%	33%	33%	0%	33%	0%	0%	0%	67%	33%	33%	33%	33%	0%	0%	67%	67%	33%	0%	0%	100%	33%	100%	33%	0%	67%	33%	67%	0%	0%	0%	33%

2.2 Geographical Breakdown

Map 2.2.1 shows EGI.eu participants and associate participants across Europe.

EGI is a federation of resource providers set-up to deliver sustainable, integrated and secure computing services to European researchers and their international partners.
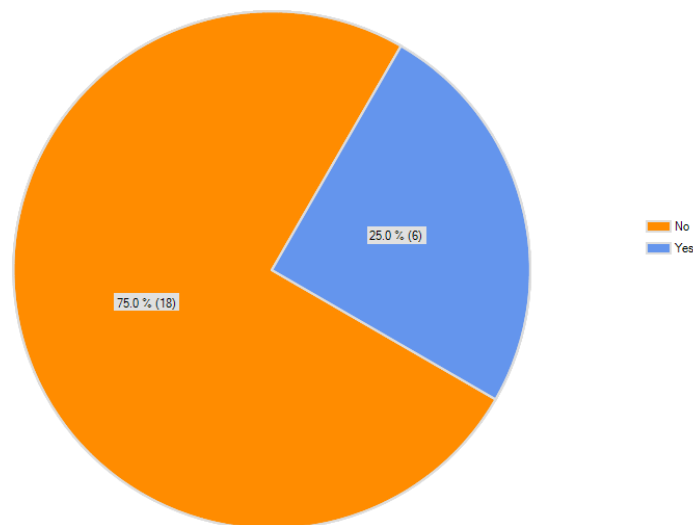
3. STRATEGY

EGI's strategy[4] aims to establish an open ICT ecosystem that can attract research communities from across the whole digital European Research Area, while evolving a set of services that will increase flexibility in how the infrastructure is used. The goal is, that by the end of EGI-InSPIRE, EGI will have established an open ICT ecosystem where individual actors supported through public and/or private funding are able to define their own added value and business models. This foundation will enable EGI to continue to play a key role in sustainably bringing the digital European Research Area online.

The following section offers a snapshot at where the NGIs are in terms of planning, vision, mission, core value and areas of opportunity moving into the future.

3.1 Planning

Of the respondent NGIs, six (25.0%) have a defined strategy to document the provision of grid and distributed computing services (see Figure 3.1.1 below).

Does the NGI/EIRO have a defined strategy document for Grid and distributed computing?

- 25.0 % (6)
- 75.0 % (18)
- No
- Yes

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[4] https://documents.egi.eu/document/1098

The majority of the strategies are written in their national languages; in some cases the documents includes sections on strategy, not specifically focused on distributed computing (see Table 3.1.1).

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3.2 Vision, Mission and Core Values

3.2.1 Vision

Fifteen NGIs have defined their vision for grid and distributed computing. The full list of vision statements is documented in Table 3.2.2. Some of the mentioned key terms are: Research, Services, Infrastructure, Computing, Support and National.

3.2.2 Mission

Twenty-one NGIs provided a mission statement. The full list of mission statements is documented in Table 3.2.2. Some of the mentioned key terms are: Research, National, Grid, Computing, Resources, NGI etc.

3.2.3 Core values

Thirteen NGIs have defined a list of their core values. The full list of core values is documented on Table 3.2.3. The most recurrent core values are Reliability, Innovation, Integration, Coordination, Leadership and Openness.

3.3 Opportunities

Three NGIs (12%) have a defined business model. Other respondents (88%) do not have business models in place (see Table 3.3.1).

RECOMMENDATION

Develop a sustainability plan: NGIs, as EGI's main stakeholders, are encouraged to develop sustainability plans, as well as business plans and models.

3.4 Major Changes

Major changes occurred within ten NGIs (66.6%) during 2011, including major technology upgrades (e.g. deployment of academic clouds, virtualisation platforms), increase of active users, secured funding, beneficial impact of using Structural Funds and state recognition as a large infrastructure. Four NGIs reported no major changes in 2011.
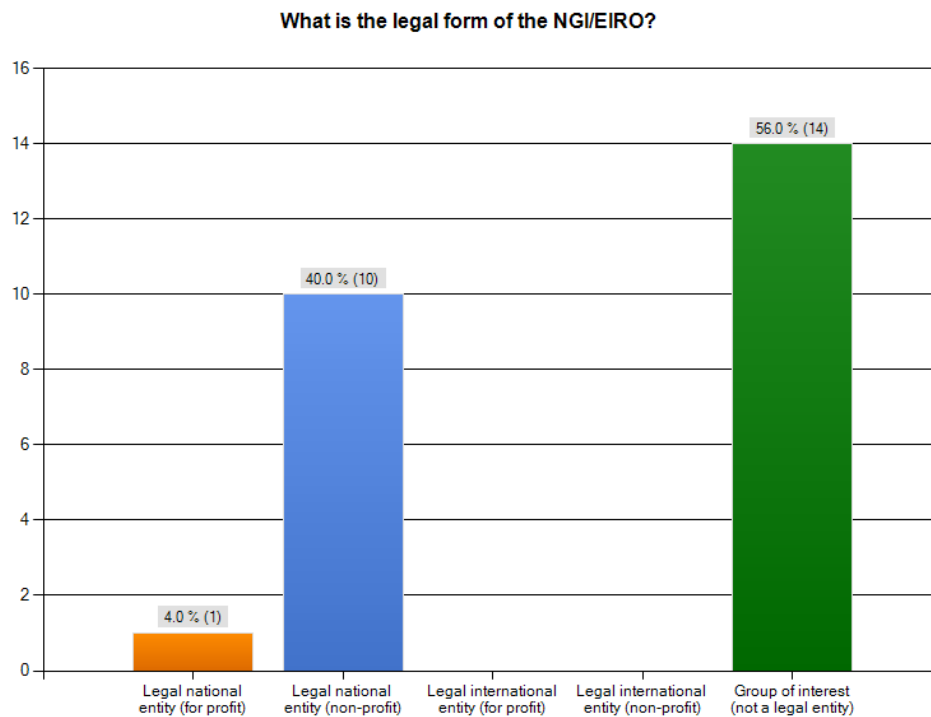
Concerning the foreseen changes for the coming year, three NGIs are expecting that 2012 will be a very important year of transition. Some NGIs started using virtualisation and private cloud solutions or foresee a change in the user base, thus, plan to work on a more scalable user support policy (see Table 3.3.2).

4. GOVERNANCE

4.1 Legal Forms and Agreement Duration

More than half of the NGIs (14) are not legal entities (56%) and belong to the 'group of interest'-type, while 40% of the NGIs (10) are a non-profit legal national entity. Only one NGI (Turkey) is coordinated by a for-profit legal national entity. None of the NGIs is a legal international entity, whether profit oriented or not.

Some NGIs are planning to establish a dedicated legal entity, however, the majority do not plan to set up a dedicated organisation since representation in the EGI Council is delegated to a partner. Therefore, three NGIs are represented in the form of a consortium of legal entities, or in one case (Italy) as a Joint Research Unit (see Figure 4.1.1). Table 4.1.1 provides a list of NGIs with specific information regarding their legal forms and agreement duration.

What is the legal form of the NGI/EIRO?

Most NGIs (78.5%) have unlimited agreement duration (see Figure 4.1.2).

Duration of legal agreement

Category	Value
Unlimited	11
2012	1
2014	1
2015	1

(axis: 0, 2, 4, 6, 8, 10, 12)
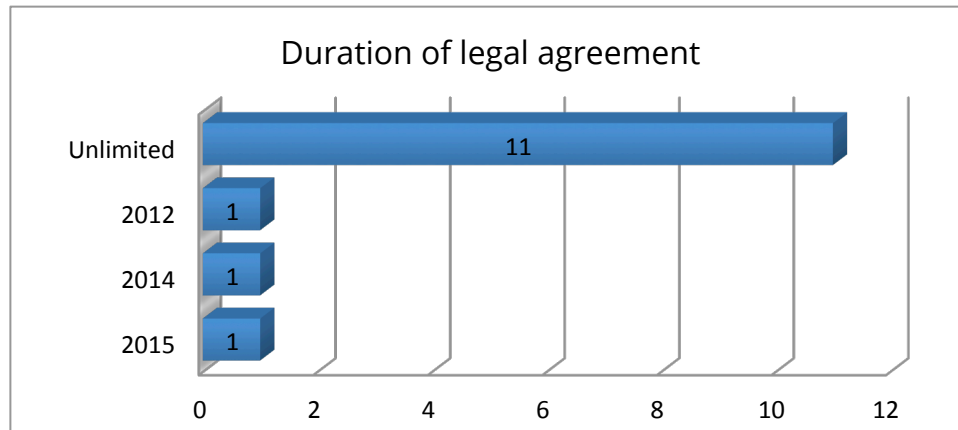
In order to be eligible to deliver services to EGI.eu or other organisations, it is expected that partners will need to be contractually able to sign SLAs. This may lead to more NGIs considering in the future to become a legal organisation[5].

4.2 Roles and Functions

Over the last decade, the EGI community has been evolving towards an open, sustainable ecosystem that meets the needs of research communities. This is achieved through a combination of a variety of different roles, services, capabilities, and values that are independently delivered across the EGI ecosystem.

There are six roles within the EGI ecosystem, defined in the EGI-InSPIRE D2.14 Evolving the EGI Business Model report[6]: National coordinating body, Resource Infrastructure Provider, Resource Centre, Technology Provider, Platform Integrator and Platform Operator.

Twenty-three NGIs have roles of National coordinating body (95.8%), while 20 NGIs have a role of Resource infrastructure provider (83.3%). Eleven NGIs perform the role of Resource Centre (45.8%), ten NGIs perform the role of Technology Provider (41.7%), ten NGIs perform the role of Platform Integrator (41.7%) and nine NGIs perform the role of Platform Operator (37.5%) (see Figure 4.2.1).

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[5] NGI sustainability depends on having a legal capacity to commit to other types contractual obligations, which can be only signed between legal parties. In addition, by becoming a legal organisation, NGIs will be able to bid for certain activities (e.g. EGI Global Task activities) and it will potentially lead to more business opportunities and opportunities for collaboration in general.

[6] https://documents.egi.eu/document/1040

Table 4.2.1 shows individual NGIs and the roles they are covering.

Roles covered by NGI/EIRO

4.3 Membership

The majority of respondent NGIs (92%) have a participant membership status within EGI.eu, while 8% have an associate participant status. On average, 11 members compose an NGI partnership, while the median number is eight. In most cases (85%), the same organisation is representing the NGI in the EGI Council and is the lead organisation.

In addition to participant/associate participant status, information about organisations representing the NGI in the EGI Council, lead organisation of the NGI, number of member institutions as part of the NGI and the name of the NGIs governing body is shown in Table 4.3.1.

4.4 Stakeholders

a) Governing body

Twenty-two NGIs have academic institutions (95,7%) as a stakeholder in its governing body, while 16 (69.6%) have research institutes as well. Six NGIs (26.1%) have the national government as a stakeholder, while five NGIs (21.7%) have resource centres. Three NGIs (13.0%) have a representatives from Industry, two NGIs (8.7%) have VOs and one NGI (4.3%) has user communities as a stakeholder (see Figure 4.4.1).

Table 4.4.1 show individual NGIs and types of stakeholders represented in their governing body.

Fig. 4.4.1 – Stakeholders represented in giverning body
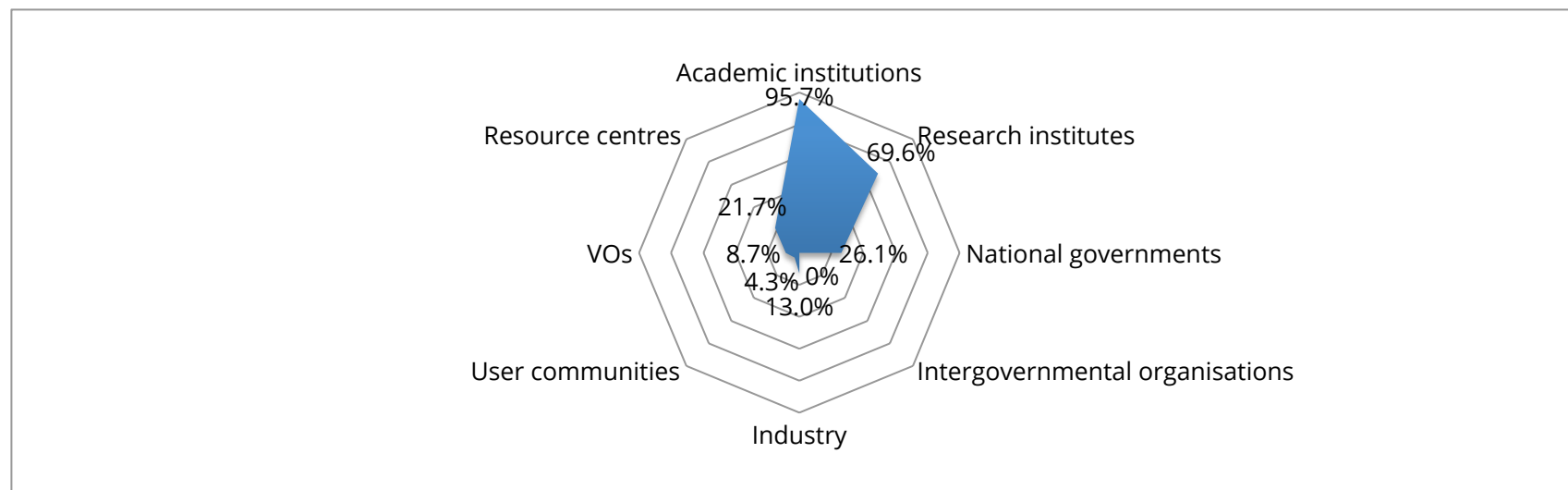
Of the respondent NGIs, nine (36.0%) have an advisory board, while 16 (64.0%) do not. User communities are stakeholders in 90.0% of the cases, followed by 40.0% with resource centres, 30.0% with technology providers and 10.0% with industry (see Figure 4.4.2). Government and university representatives also have their place in the advisory board in two NGI cases (Croatia and Turkey).

Table 4.4.2 show individual NGIs and types of stakeholders presented in their advisory body.

Fig. 4.4.2 – Stakeholders represented in advisory boards
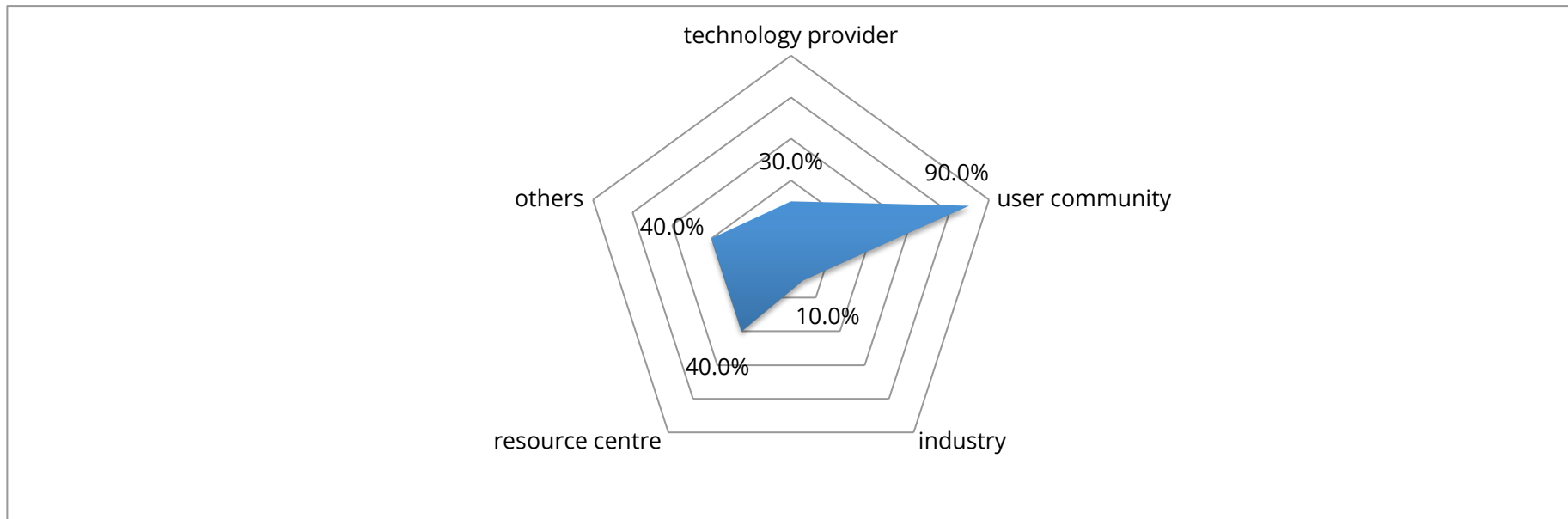
RECOMMENDATION

Widen NGI stakeholder base. Encouraging diversity and inclusion of different stakeholders within a governing body can increase recognition and publicity and bring more benefits to NGIs. For example, having a more user-community-centric approach in strategic e-Infrastructure governance is desirable.

4.5 Government Relations

This section distinguishes five types of relationship with a government:

a) Hierarchical (e.g. subordinate to a responsible government body);

b) Direct/Formal (e.g. board member; contact with Ministry);

c) Informal/Indirect (e.g. goverment liaison; proposals; tenders) and

d) Non-existent

e) Other

Four NGIs (16.7%) have a direct hierarchical subordination to their national Ministry, while eight NGIs (33.3%) have a direct/formal relationship with their government, either through delegated responsibility from a Ministry or having a Ministry representative as a board member. On the other side, ten NGIs (41.7%) have an informal/indirect relationship with their government and one NGI (4.2%) does not have any kind of relationship with their national governments (Hungary) (see Figure 4.5.1, right). One NGI (Netherlands) has a relationship with government through other organisations (in this case, SURF and NWO).

Table 4.5.1. lists the webpages describing the governance model of 37.5% of the NGIs. The remainder do not have a public webpage with this information.

Type of relationship NGI/EIRO has with the national government

- Hierarchical (e.g. you are subordinate to a responsible government body)
- Direct/Formal (e.g. board member; contact with Ministry)
- Informal/Indirect (e.g. gov't liaison; proposals; tenders)
- Non existent
- Other (please specify)

41.7 %
33.3 %
16.7 %
4.2 %
4.2 %
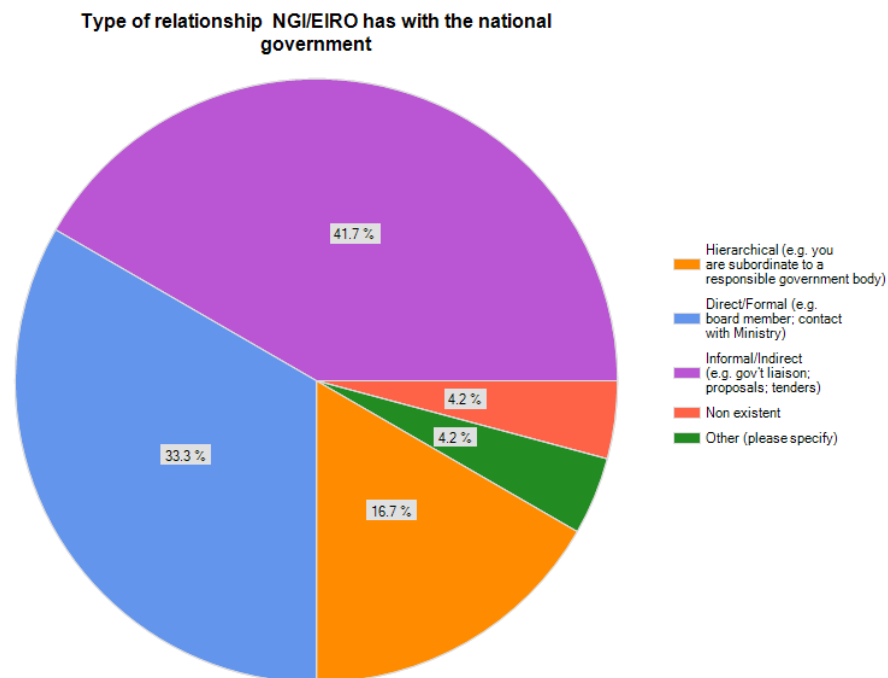
5. FUNDING AND STAFFING

For analysis purposes, a distinction is made between an NGI as a legal organisation and an NGI as an infrastructure. If an NGI is established as a legal organisation, it will include all coordination activities done by the coordinating body, while an NGI as infrastructure includes operations and upgrade activities, thus, activities of all national resource centers.

5.1 NGIs as Legal Organisations

Six NGIs disclosed data about their annual budget. Considering responses received, the average NGI annual budget for 2011 was around 1.7M€, while for the 2012 it is around 2M€ an increase of 17%.

The biggest funding source for 11 NGIs (90.9%) comes from national public funding (e.g. state, universities). Six NGIs (54.5%) are funded, at least partially, by the European Commission, through the EGI-InSPIRE project and in some cases by Structural Funds. Five NGIs (45.5%) are funded by institutes, while three NGIs (27.3%) are funded by users (Finland, Switzerland and Turkey). Two NGIs (Czech Republic and Switzerland) receive funding from membership fees. None of the NGIs is funded through donations and royalties (see Figure 5.1.1). Table 5.1.1. shows funding sources for individual NGIs.
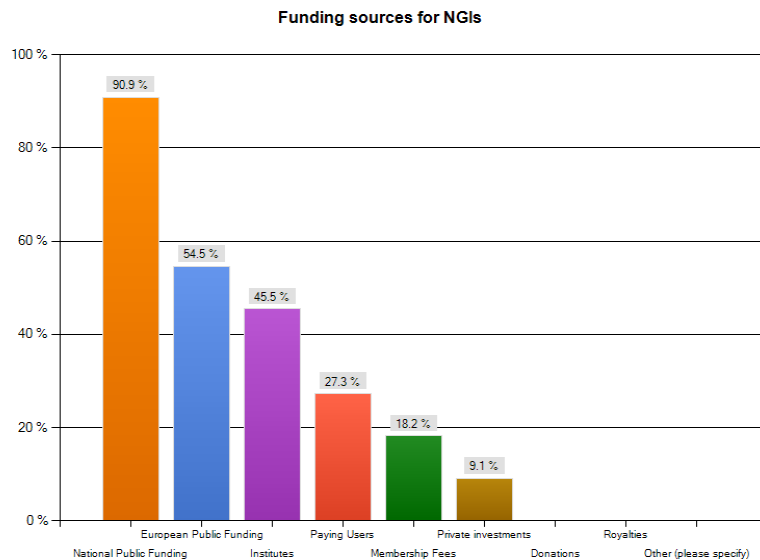
Funding as a recurrent line item is received by 60.0% of NGIs, while another 60.0% of NGIs receive funding on a project basis meaning many are supplementing and/or enhancing their organisational resources for specific objectives. One NGI (Turkey) is funded on a usage-basis. None of the NGIs has a subscription fee funding scheme (see Figure 5.1.2). Table 5.1.2 shows funding types for individual NGIs.
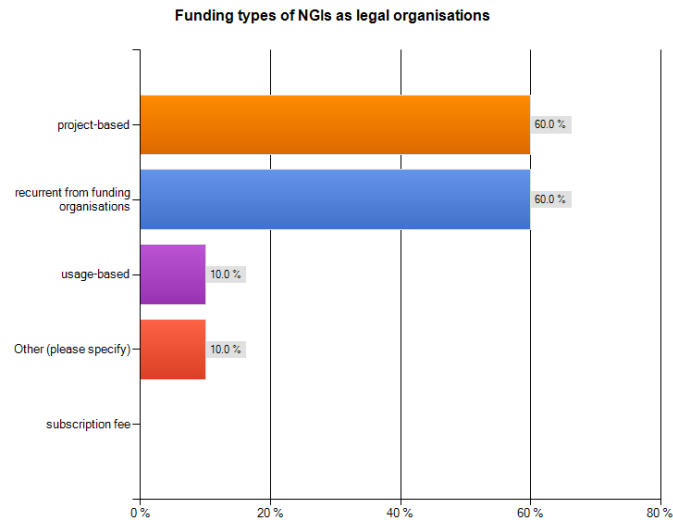
Funding types of NGIs as legal organisations

Three NGIs have guaranteed funding for three or more years. Two NGIs have funding guaranteed only on a year-by-year basis or every two years, while for some NGIs the funding situation is unclear. In some situations, NGIs do not have a fixed budget and are being funded on-demand for specific activities, or they have applied for national funding and are awaiting a decision. It seems that in most cases, a funding scheme is not defined and that funding beyond 2014 is critical.

5.2 NGIs as e-Infrastructures

For the creation and operation of NGIs infrastructure, 19 (90.5%) NGIs receive funding from national public funding (e.g. state, universities). The second biggest funding source for 17 NGIs (81.0%), is the European Commission, principally through the EGI-InSPIRE project and in some cases projects funded by Structural Funds. Eleven NGIs or 52.4% of NGIs are funded by institutes, while 9.5% of funding coming from membership fees. One NGI (Netherlands) is partly funded through private investments, and one NGI (Switzerland) is funded through user payments. None of the NGIs infrastructure is funded through donations and royalties (see Figure 5.2.1).

Table 5.2.1 shows funding sources for individual NGIs as e-Infrastructures.

Funding sources for creation and operation the NGI/EIRO e-infrastructure
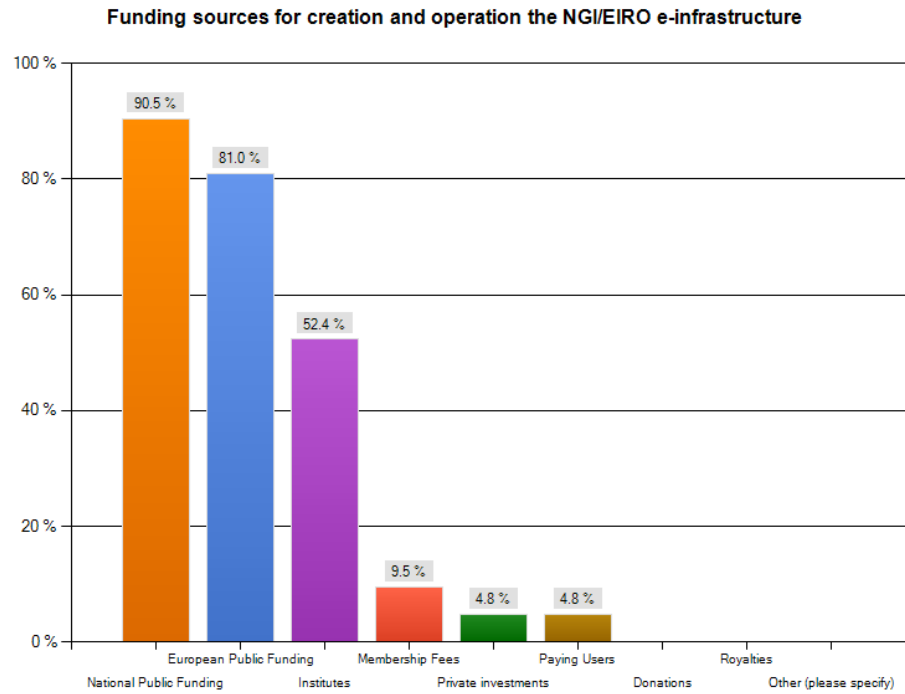
Sixteen NGIs (84.2%) receive funding as a recurrent line item while 11 NGIs (57.9%) also receive funding on a project basis. One NGI (Turkey) is funded on usage-based type. No NGI has a subscription fee funding type and one of the NGIs is in the process of having recurrent funding (see Figure 4.2.2).

Table 5.2.2 shows funding types for individual NGIs as e-Infrastructures.

Funding types for NGI/EIRO e-Infrastructure
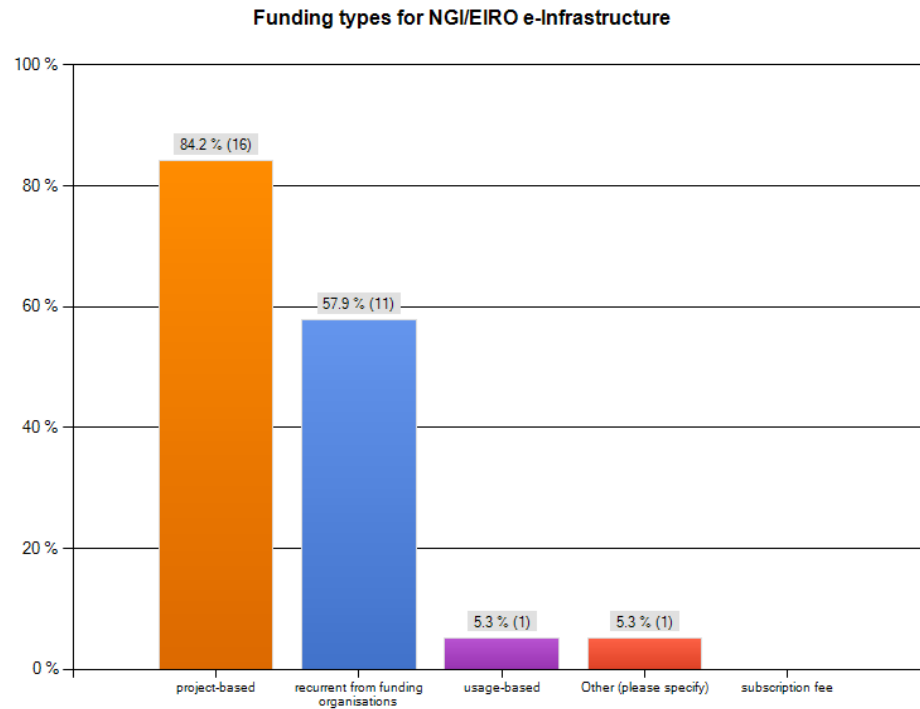
On average, 2.34M€ of the overall annual budget for the NGIs is dedicated to operate/upgrade the infrastructure as part of EGI. For the NGIs, the overall budget includes all the individual budgets of the various resource centres and provides an estimate of the financial resources needed operate/upgrade the infrastructure in millions of Euros at the exchange rate as of April-May 2012 (see Table 5.2.3).

Concerning funding sources for 2011 budget, the biggest funding source (71.1%) comes from national public funding (e.g. state, universities etc.). Second biggest funding source for most of the NGIs are funds from Institutes with 29.5%, while the third is the European Commission with 26.7%. Membership fees contribute with 15.0% and users with 1.0% of funding, respectively. None of the NGIs is funded through donations and royalties (see Figure 5.2.3).

Estimation of the sources of 2011 budget
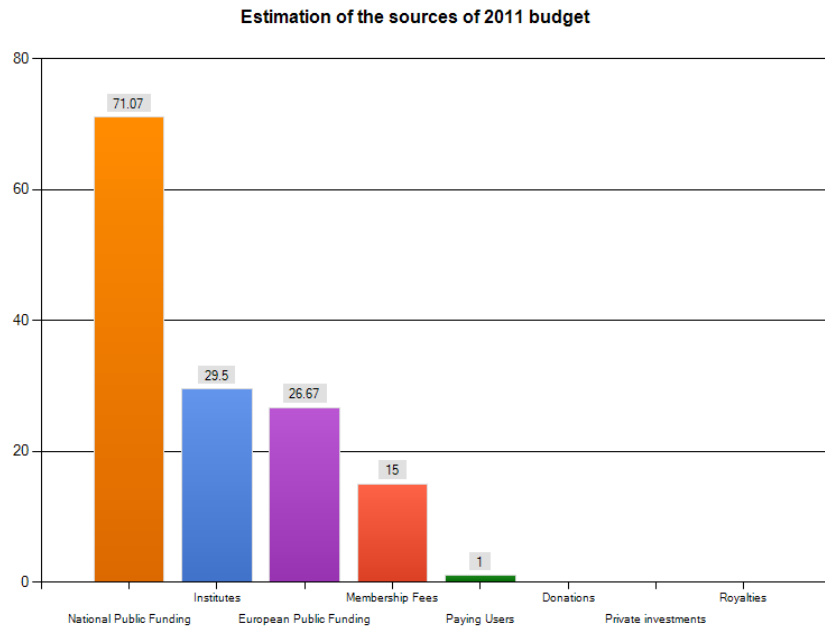
The percentage of the 2011 budget dedicated to Capital expenditures (CAPEX) (as opposed to Operational Expenditures (OPEX)) is on average 35.5%. Sample values vary from 0% to 85.0%.

The percentage of the CAPEX budget dedicated to the acquisition of computing resources is at 55.3%, on average. Other resources (e.g. auxiliary equipment such as UPS and cooling) consume 31.4%. Storage resources are the third budget line with 20.2% (See Figure 5.2.4).

Percentage of the CAPEX budget dedicated to acquisition of computing or storage resources
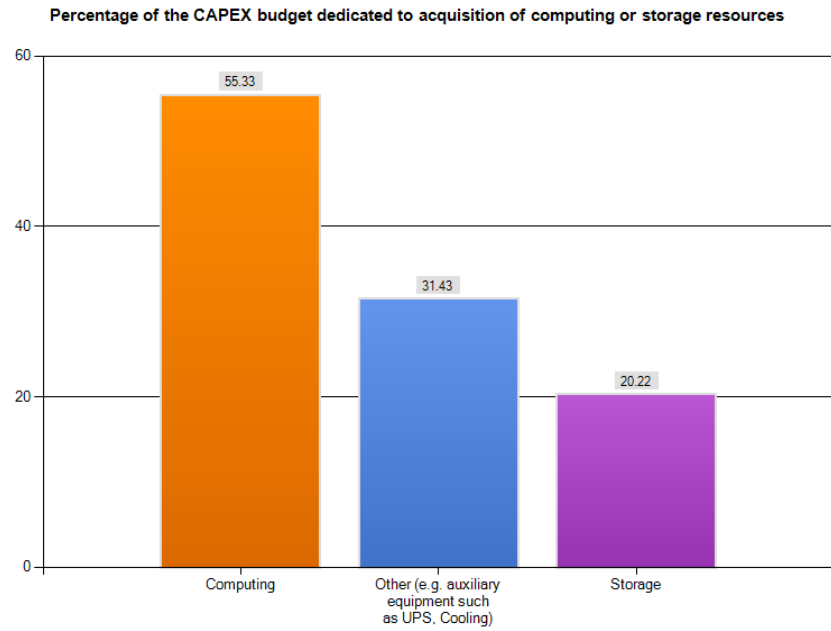
Regarding computing and storage resources acquired and installed during 2011 with the mentioned CAPEX budget, the average per NGI has around 2,000 Logical CPU/cores, 518.38 TB of disk and 385 TB of tape storage (see Figure 5.2.5).

Computing and storage resources acquired and installed during 2011 with the mentioned CAPEX budget
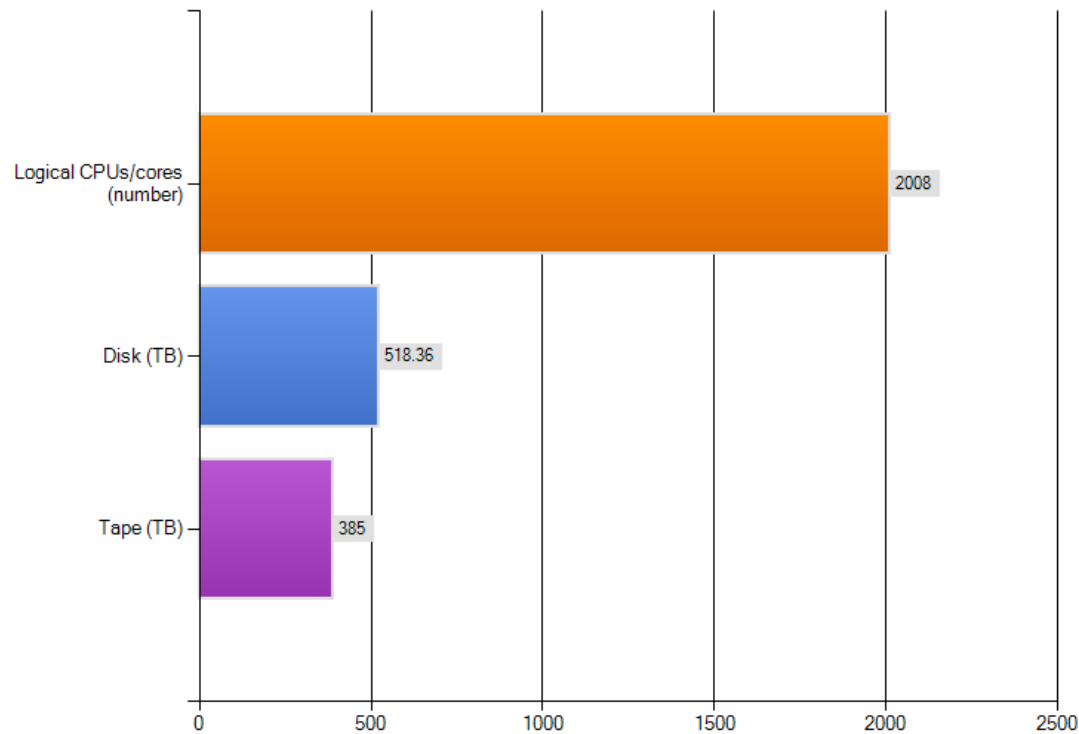
The percentage of the OPEX budget that was dedicated to personnel is on average 60.7% of the overall budget. Sample values vary from 22% to 80% . The NGIs infrastructure was run, on average by 10.1 dedicated Full Time Equivalents (FTEs). Given the variation in size between the different NGI infrastructures, sample values vary between 1 to 35 FTEs.

Concerning the split among the functional areas in 2011, 46.3% of FTEs are dedicated to operations, while 17.1% and 16.8% is dedicated to middleware development and user support, respectively. The rest is equally divided between user application development (9.4%), management (7.7%), administration (6.1%), training (6.1%) and dissemination (5.3%) (see Figure 5.2.6)

FTEs in 2011 split among the different functional areas
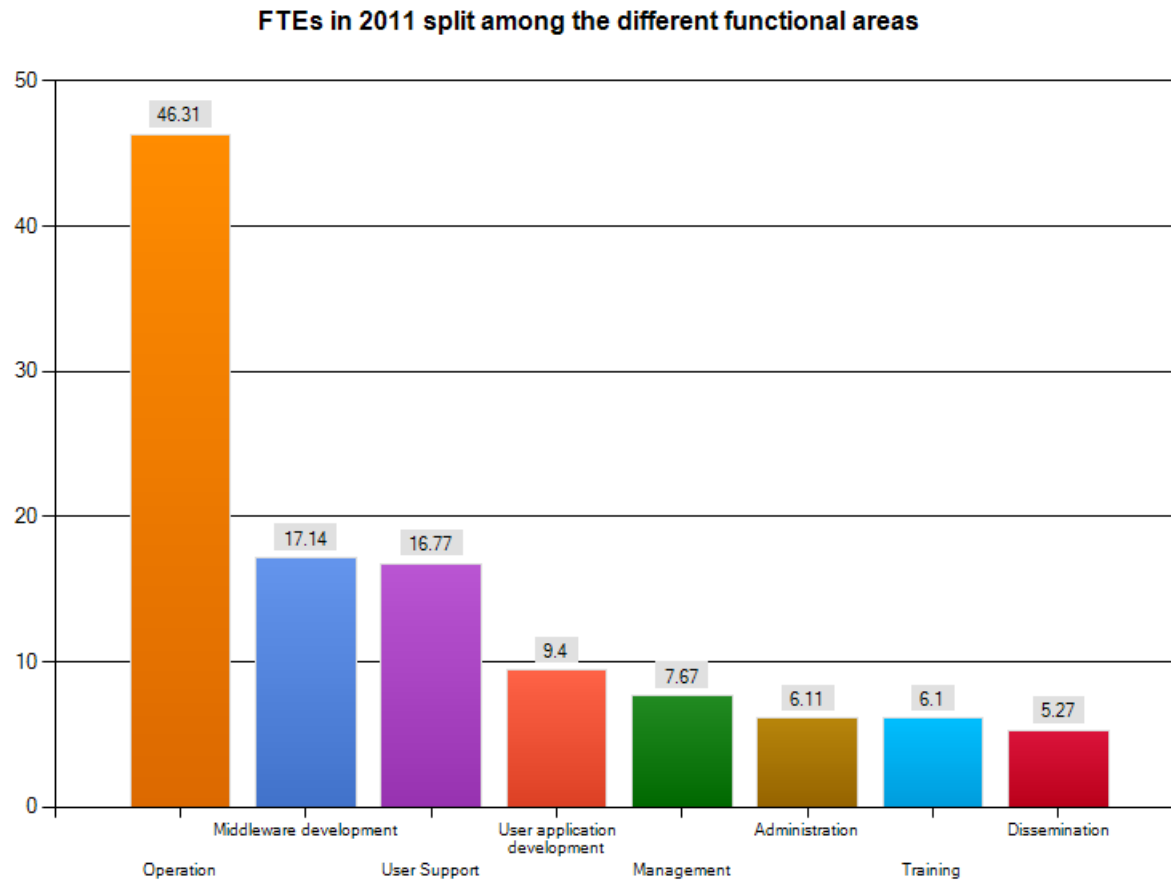
On average, NGIs expect an increase of FTEs dedicated to e-Infrastructure activities of 20.7% in 2012, 22% in 2013, and 19.7% in 2014. None of the NGIs expects a decrease in staff, a trend that suggests NGI plans for further expansion of activities.

6. POLICY

6.1 Resource Allocation

The process by which an existing/new user community can apply for new resources in the NGIs infrastructure is quite diverse. For example, some of NGIs provide quotas for free CPU hours per annum, certain percentages of the resources are reserved to new user communities, new resources are allocated on the base of declared interest in an application proposal, or the resource allocation model is based on fair share model, agreements or best effort. In addition, some of the NGIs specified an approach to recover costs (see Table 6.1.1).

6.2 EGI vs. National Policies

The majority of NGIs (15) do not enforce additional restrictions on the infrastructure in addition to EGI policies. Five NGIs have placed additional policies in order to support a specific areas related to operations, security and middleware deployment, specific national Operation Level Agreement (OLA) adjustment, different policies required by law of a country of origin (see Table 6.2.1).

Areas affected by locally defined policies are shown in Figure 6.2.1.

Most policies are related to the users and their specific needs (71.4%), followed by Operations (57.1%), Security (57.1%) and Technology (28.6%). Green IT as a policy area is not addressed by any of NGIs.

Seven NGIs (29.2%) have a webpage with the list of policies/procedures that apply to the coordinated e-Infrastructure (see Table 6.2.2).

NGI/EIRO policy affected areas
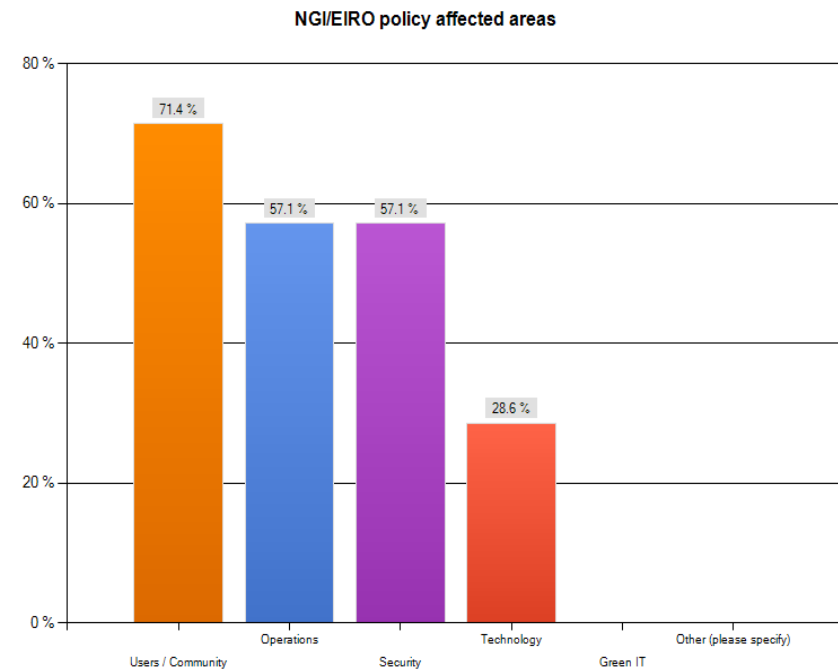
RECOMMENDATION

Develop national policies. NGIs may need to address specific local issues by defining additional policies in the various fields, e.g.: users, security, technology. Local NGI policies and procedures (in addition to EGI's) should be published and their stakeholders should be made aware of them, especially RCs and VO managers.

7. OUTREACH

7.1 Publications

Of the respondent NGIs 13 (46.0%) publish a regular newsletter, annual report, case studies or booklet (see Table 7.1.1).

7.2 Events

Twenty NGIs (71.0%) run at least one regular event. The majority organise events in the form of annual scientific events, annual assemblies together with training days, summer schools or users conferences (see Table 7.2.1).

7.3 Websites and Social Media

Half of NGIs (12) run their project websites (see Table 7.3.1). Three are active in social media (see Table 7.3.2 and Figure 7.3.1).
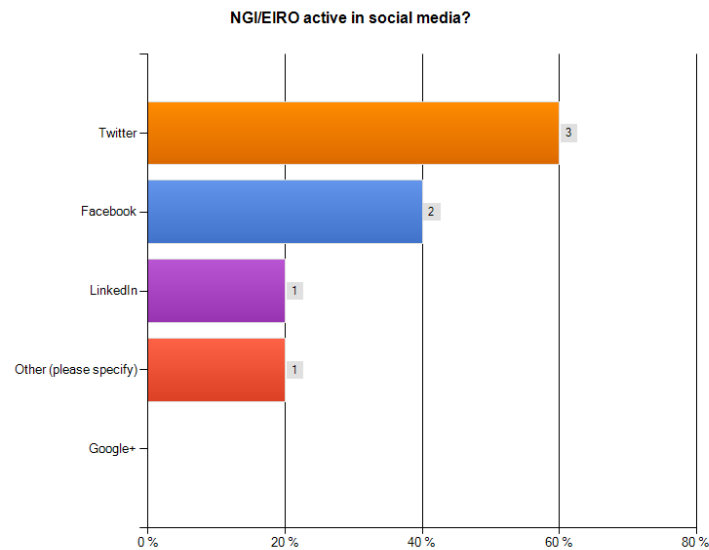
RECOMMENDATION

Improve outreach: NGIs are encouraged to work more on publishing and disseminating their results (through newsletters, blogs, social media, online magazines) by the use of case studies in order to gain the visibility necessary for further expansion of their user base and to improve the reliability of their funding

8. SERVICES

8.1 Certification Authorities

Eighteen NGIs (78.2%) have an internal Certification Authority to issue certificates for users and for servers. Six NGIs (27.7%) issue certificates for code signing while two (9.5%) rely on other organisations within the country. Other NGIs delegate certification authority on a regional level (see Figure 8.1.1 and Table 8.1.1).
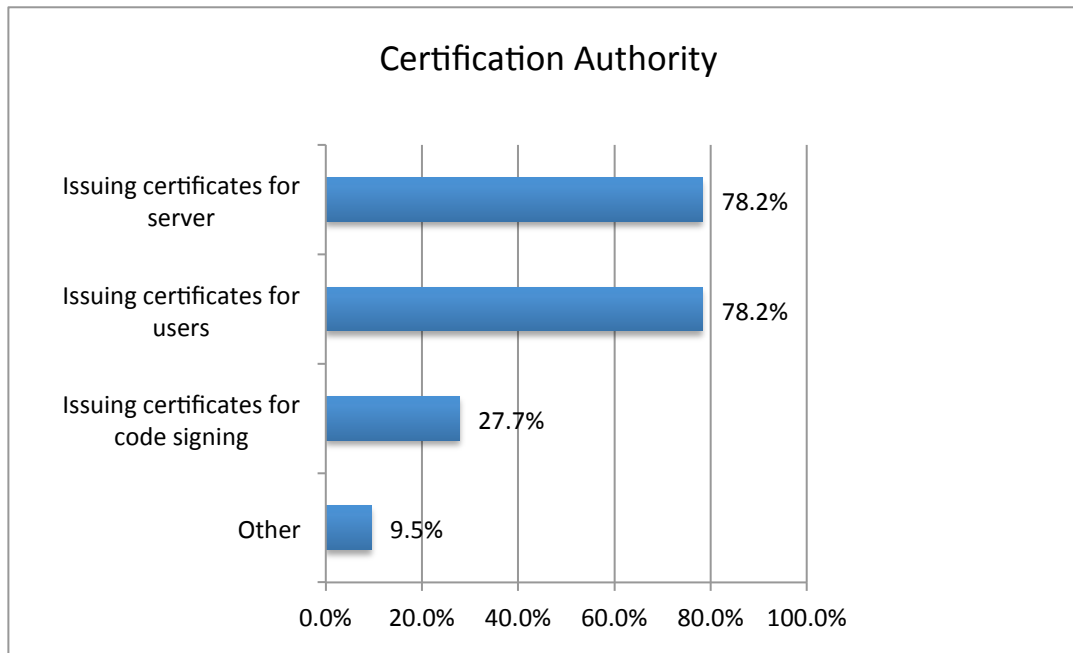
8.2 Services for Users

Twenty NGIs (90.9%) provide data management and job management services to the users. NGIs also provide the users with a VO membership service (81.8%), digital certificates services (72.7%) and VO monitoring (54.5%). Six NGIs (27.3%) provide science gateways to the users (Finland, Germany, Ireland, Italy, Netherlands and UK) listed in the Table 8.2.1.

Services provided by the NGI/EIRO to the users
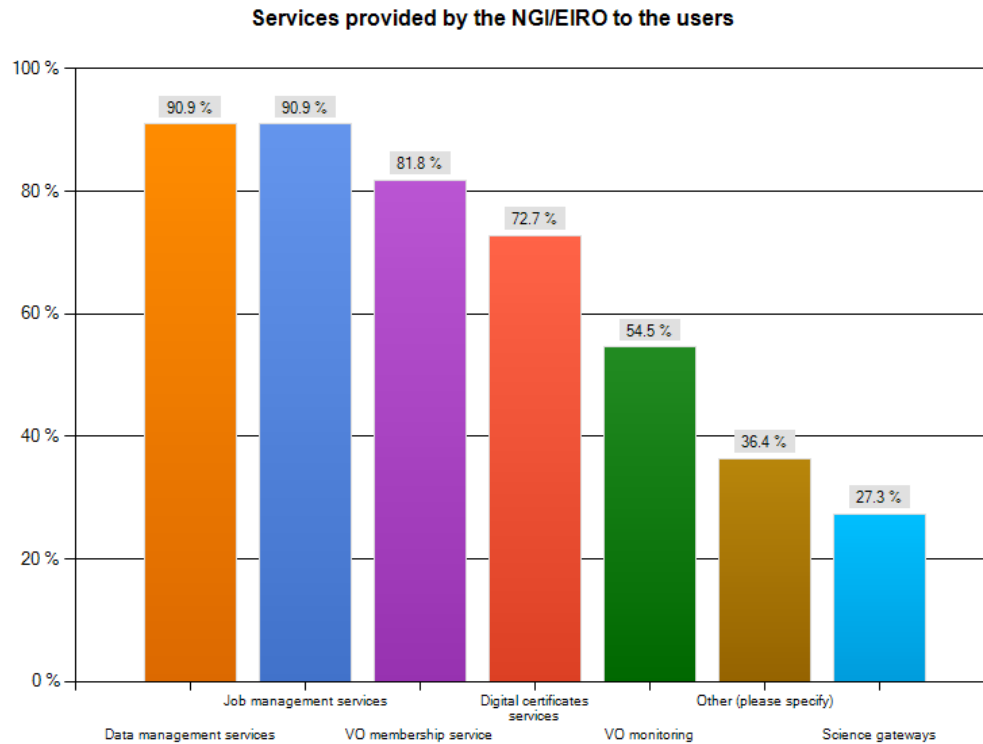
8.3 Training

In 2011, the average number of training days for grid end-users or grid operators was 8.4 days. The biggest number of training days was organised by Spain (60), while Croatia and Finland did not report organising any training days. On average, 63 grid end-users or operators attended training events during 2011. Spain reported the largest number of trained grid end-users or grid operators – 400 (see Table 8.3.1).

9. USERS

9.1 End-Users and Virtual Organisations

On average, each NGI has 448 grid end-users with valid credentials released by the NGIs at the end of 2011. The average number of VOs supported by an NGI is 18. The top VO by usage (logical CPU walltime) is ATLAS, followed by Alice in second place and CMS in third (see Table 9.1.1)

9.2 Research Areas

The research area in which the NGIs are mostly involved is 'Multidisciplinary' with 84.4% or 27 NGIs. Other research areas include High-Energy Physics (81.3% of the NGIs), Life Sciences (75%), Astronomy, Astrophysics and Astro-Particle Physics (53.1%), Computer Science and Mathematics (53.1%), Earth Sciences (53.1%), Computational Chemistry (50%), Fusion (21.9%). Half of the NGIs (16) support other research areas e.g. Humanities, Social Sciences, Arts, Biomedical sciences, Computational Fluid-Solid State Dynamics, Climate/Weather Modeling, Materials (see Figure 9.2.1).

Table 9.2.1 shows the individual NGIs and their involvement in different research areas.

Research areas supported by the NGI/EIRO infrastructure
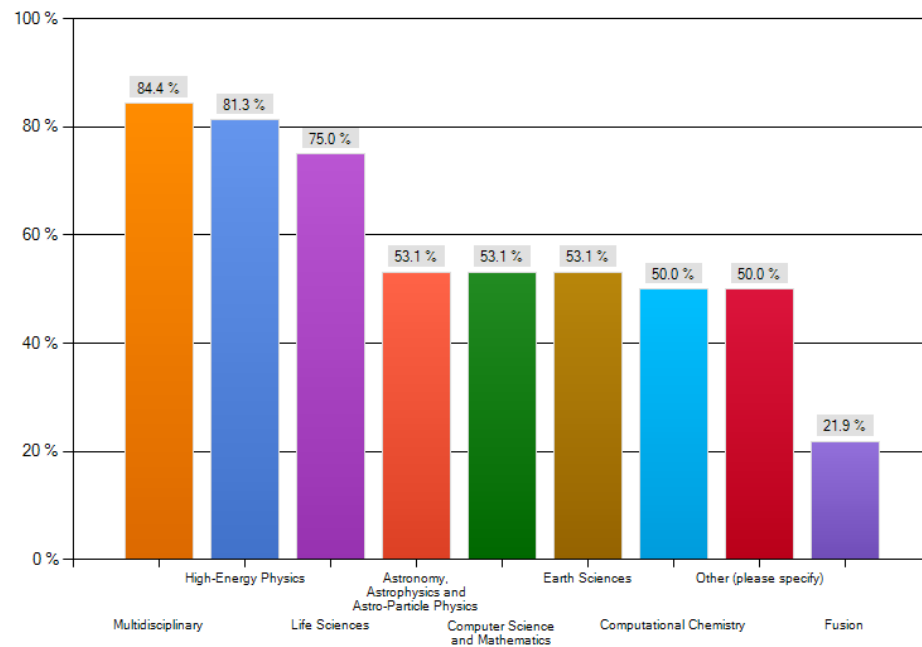
9.3 Projects

During 2011, nine NGIs were involved in other projects either directly or indirectly. Six NGIs (Czech Republic, France, Germany, Italy, Netherlands and Spain) were involved in ESFRI projects during 2011 (see Table 9.3.1).

RECOMMENDATION

Engage more with ESFRI projects. In future years, more involvement with ESFRI projects will make a real impact in NGI activities.

10. INFRASTRUCTURE

10.1 Resource Centres

According to the data collected in the EGI Compendium survey, the EGI infrastructure comprises a total of 310 recorded Resource Centres (RCs). Italy coordinates the most RCs (53), followed by Spain (24), UK (22) and France (18) (see Table 10.1.1).

The median number of RCs is 6 per NGI (see Figure 10.1.1)
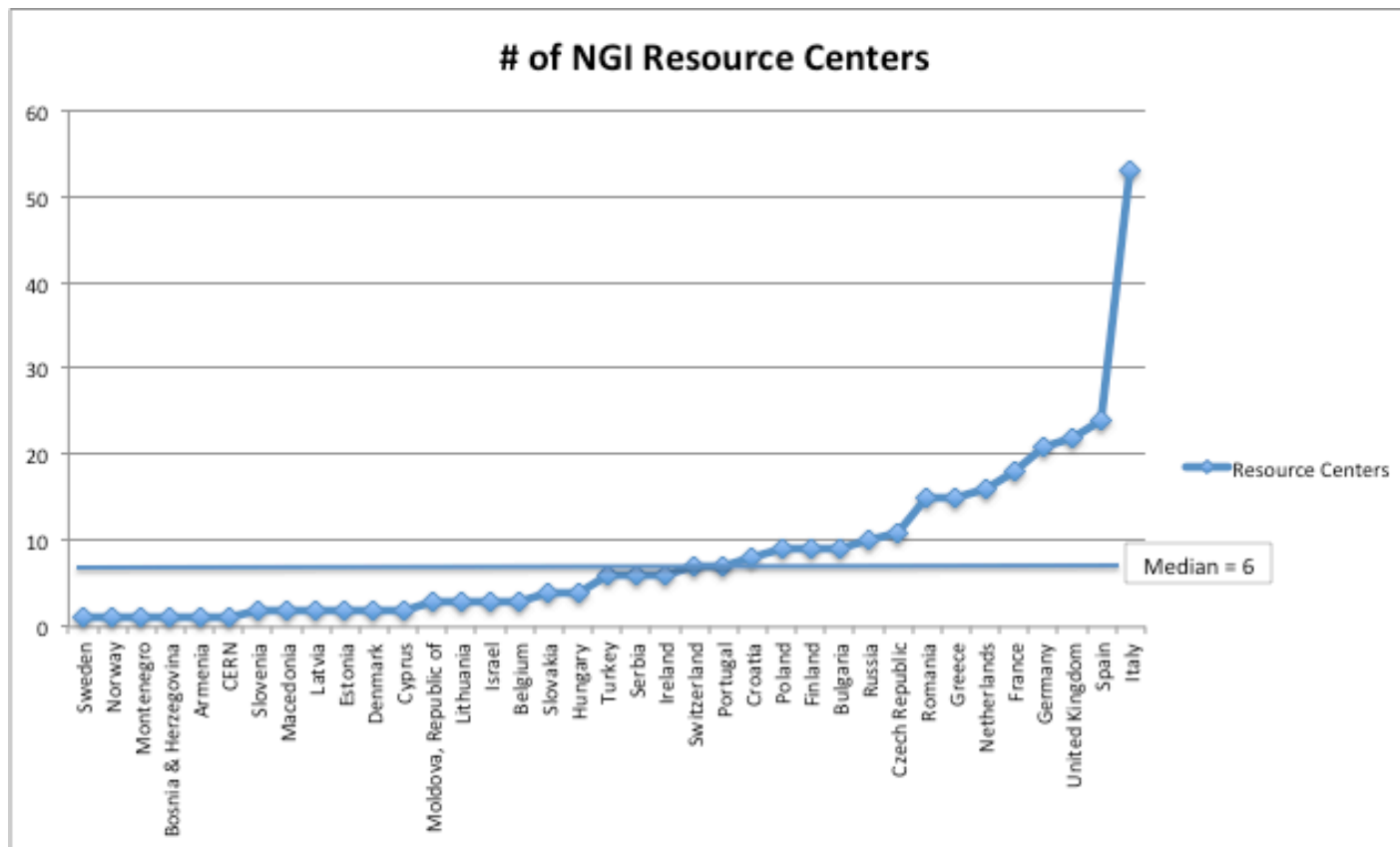
10.2 CPU/GPU

The total logical CPUs (cores) available via the NGIs infrastructure at the end of 2011, was 278,504. Of these, 15 NGIs reported 16,976 cores being used to run virtual machines. The average percentage of use of the logical CPU (core) capacity in 2011 is 66%.

The median logical CPUs (cores) available via the NGIs is 2,126 (see Table 10.2.1, Figure 10.2.1).

The total GPUs available via the NGIs infrastructure at the end of 2011 is 30, distributed by 11 respondent NGIs. Most of the NGIs (75%) do not collect GPU-related statistics.
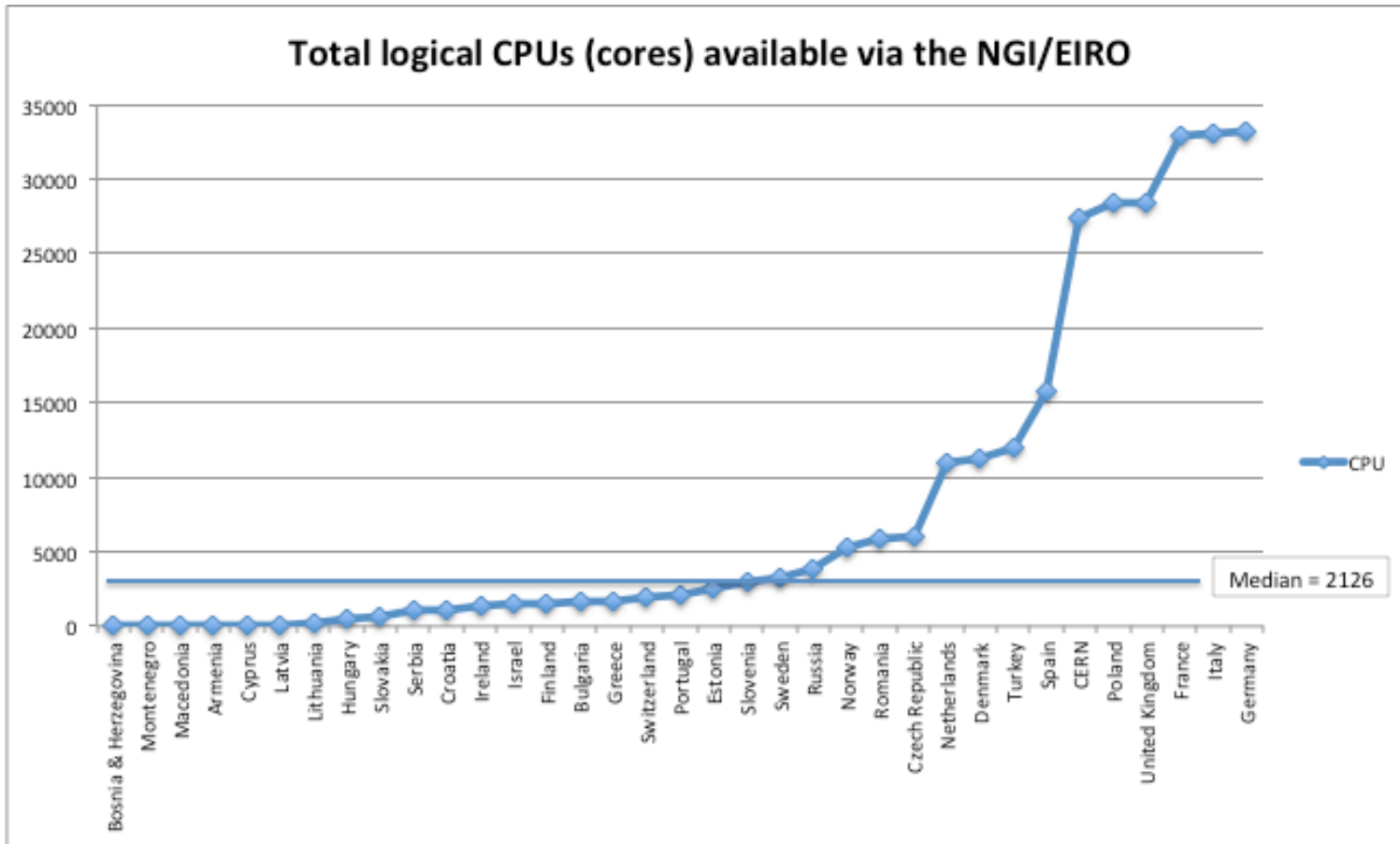
During 2011, the NGIs infrastructure consumed a median number of median value: 7,350,657 logical CPU hours (wall clock time; see Figure 10.2.2).
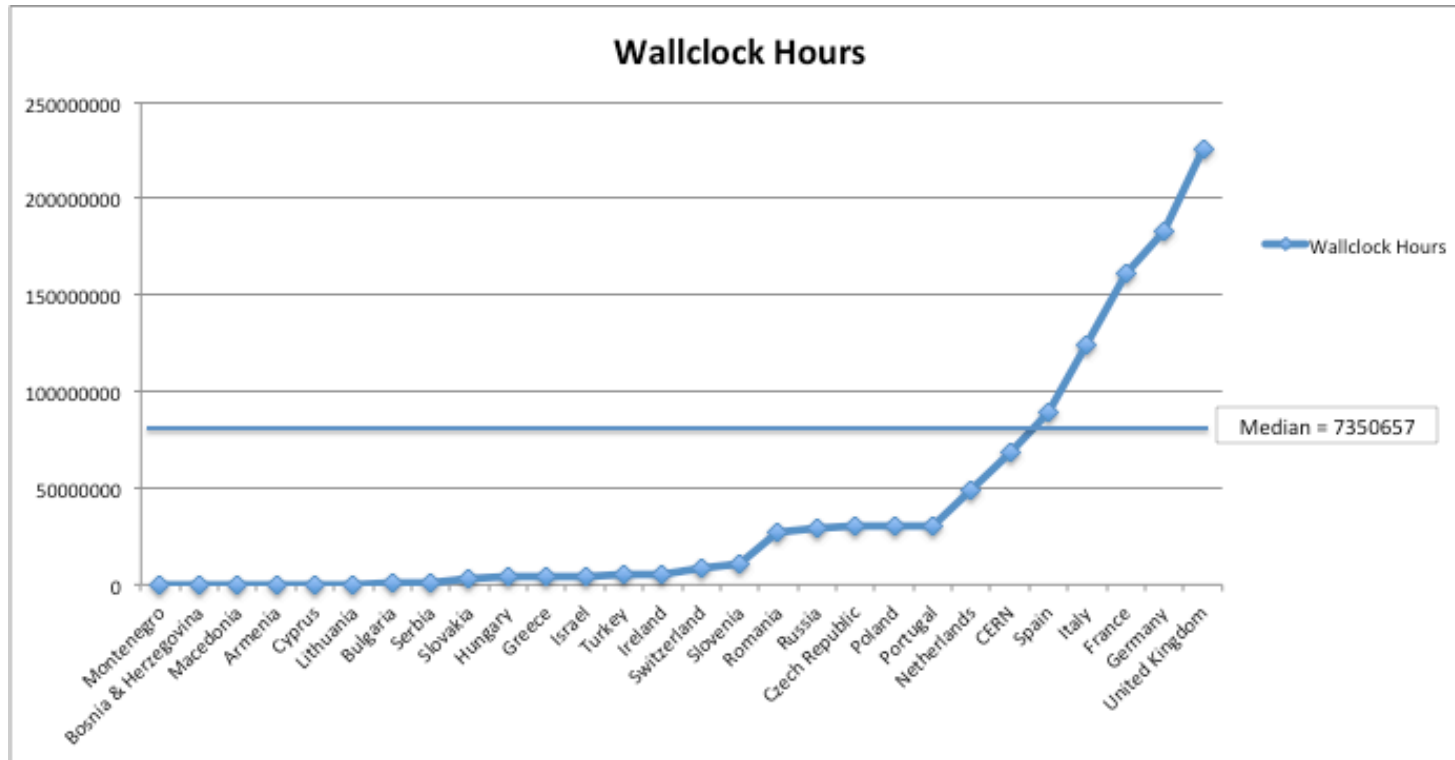
10.3 Storage

Total size of disk storage available via the NGIs infrastructure at the end of 2011 is 123,490 TB. Total size of tape storage available via the NGIs at the end of 2011 is 126,719 TB (see Table 10.3.1 and Figure 10.3.1 per NGIs).
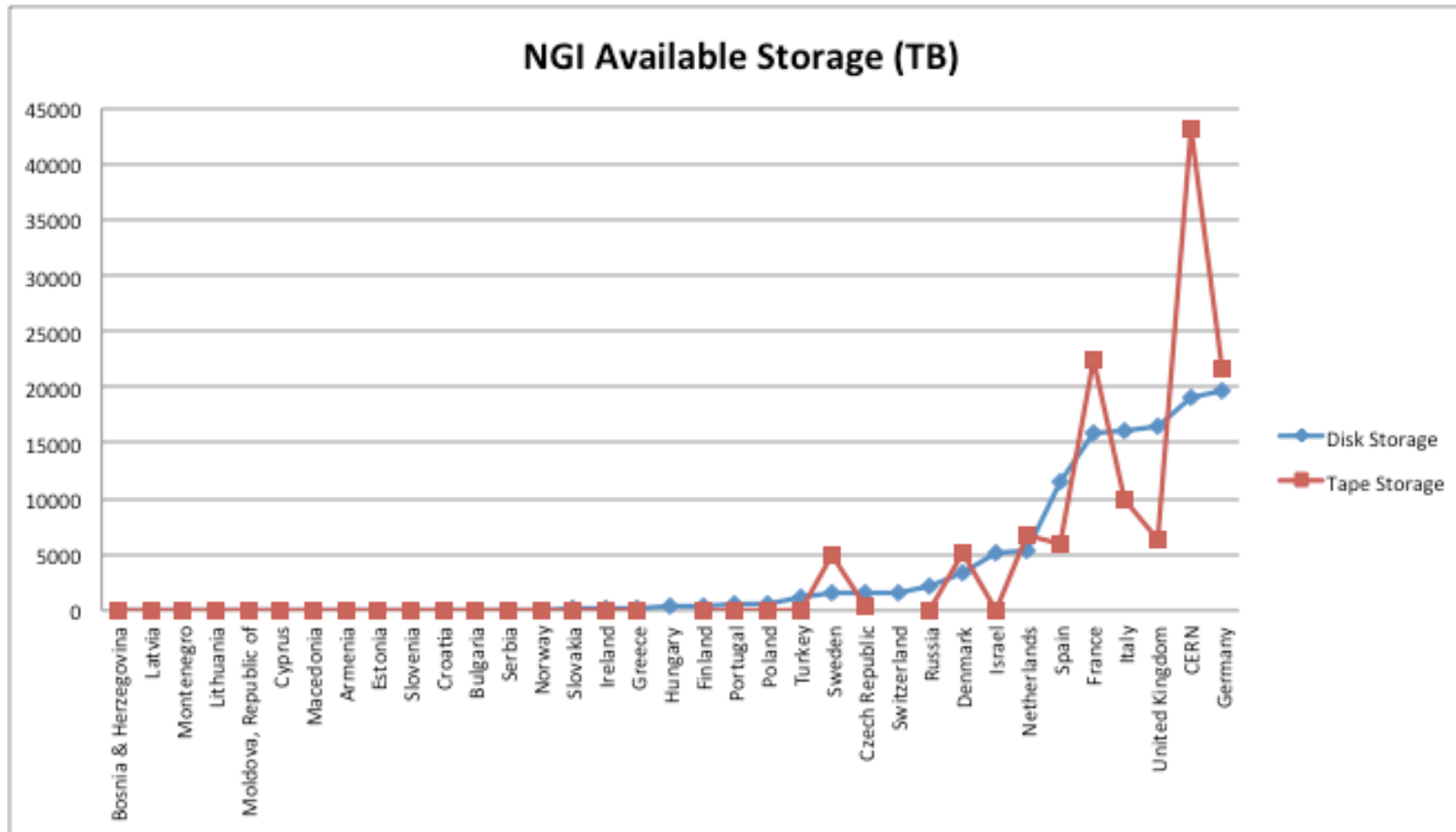
10.4 Availability and Ownership of NGI Resources

New EGI end-users can make use of logical CPUs and Disk Storage resources, but no Tape Storage (see Table 10.4.1). Total CPUs available to new users is 4,344 CPUs (12 NGIs respondents) and 215 TB of Disk Storage (nine NGIs respondents). Seven NGIs stated that they do not have available Tape Storage.

The average NGI pool of resources for new users is 362 CPUs and 23,9 TB of Disk Storage.

Of the resources available to new users, 57.1% are owned by affiliated resource centres/institutions (eight NGIs), 28.6% are owned by NGIs (four NGIs) and 28.6% of resources are of mixed ownership (four NGIs) (see Figure 10.4.1 and Table 10.4.2).

Resources for new users try-out owned by the NGI as legal entity and/or offered through affiliated resource centres
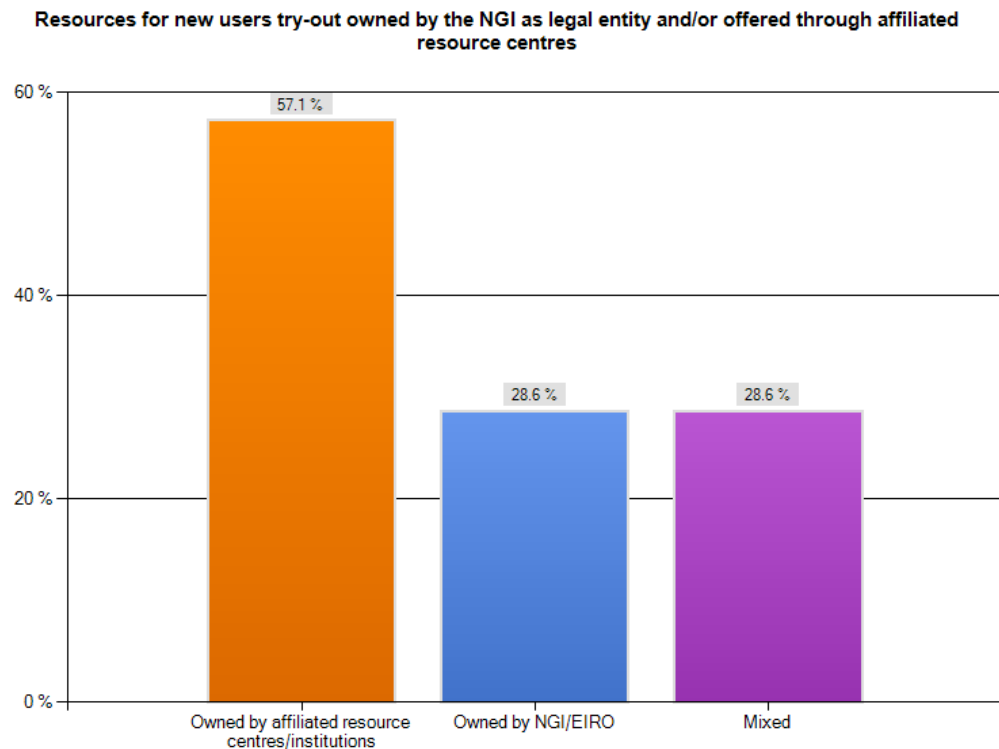
11. TECHNOLOGY

11.1 Middleware

EMI components from the gLite stack are the most popular category of middleware being deployed by 94.6% of NGIs (35 NGIs). The second most deployed middleware component is dCache with 37.8% (14 NGIs), followed by EMI components for ARC with 24.3% (nine NGIs), Globus with 18.9% (seven NGIs) and EMI components from UNICORE and StratusLab, both with 5.4% (two NGIs). The least deployed middleware components are EDGI with one NGI (France) (see Figure 11.1.1 and Table 11.1.1).

Categories of middleware components deployed in the NGI/EIRO infrastructure
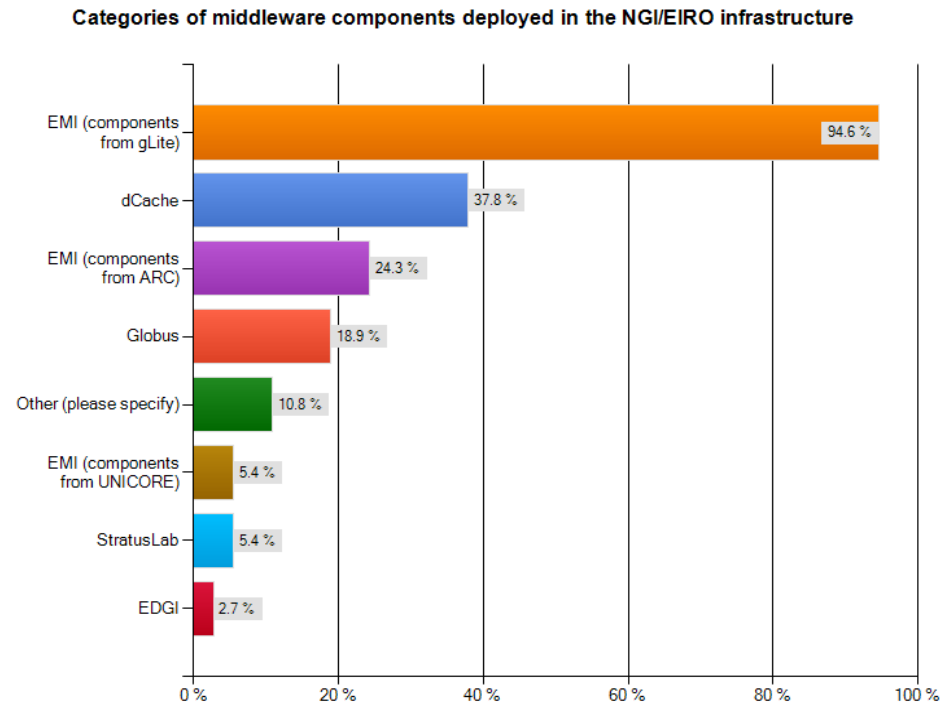
APPENDIX I - GLOSSARY OF TERMS

Bussines Model - Describes the rationale of how an organisation creates, delivers, and captures value. The process of business model construction is part of business strategy. The term business model is used for a broad range of informal and formal descriptions to represent core aspects of a business, including purpose, offerings, strategies, infrastructure, organizational structures, trading practices, and operational processes and policies.

Core Values - Core values are guiding beliefs that guide the internal conduct as well as its relationship with the external world

European Grid Infrastructure (**EGI)**: A federation of shared computing, storage and data resources from national and intergovernmental resource providers that delivers sustainable, integrated and secure distributed computing services to European researchers and their international partners.

EIRO - A legal organisation and member of the EIROForum that has extensive expertise in the areas of basic research and the management of large, international infrastructures, facilities and research programmes.

Mission - The mission is a written declaration of the NGIs's core purpose and focus that normally remains unchanged over time. Properly crafted mission statements serve as filters to separate what is important from what is not, clearly state which markets will be served and how and communicate a sense of intended direction to the entire organisation. A mission is different from a vision in that the former is the cause and the latter is the effect; a mission is something to be accomplished whereas a vision is something to be pursued for that accomplishment

National Grid Infrastructure (NGI) - The national federation of shared computing, storage and data resources that delivers sustainable, integrated and secure distributed computing services to the national research communities and their international collaborators. The federation is coordinated by a National Coordinating Body providing a single point of contact at the national level and has official membership in the EGI Council through an NGI legal representative.

Open ICT system - An ICT ecosystem is open when it is capable of incorporating and sustaining Interoperability, collaborative development and transparency, while increasing capacities to create flexible, service-oriented ICT applications that can be taken apart and recombined to meet changing needs more efficiently and effectively.

Vision - The vision is considered to be an aspirational description of what the NGIs would like to achieve or accomplish in the mid-term/long-term future, and should serve as a clear guide for choosing current and future courses of action.

VRC - A group of large-scale research collaborations, or a number of separate VOs grouped according to research domain or computational technique. The group shares information and experience in achieving their goals through the usage of an e-Infrastructure (e.g., best practices, applications, training material).

For further terms and definitions see http://go.egi.eu/glossary.

APPENDIX II - TABLES

This section includes the full responses provided by the NGIs. The answers listed below were not edited nor modified during the preparation of the EGI Compendium 2011.

The Tables are organised and numbered according to their compendium section.

Chapter 2 - General Information

Table 2.1.1 NGIs that did and did not respond to the EGI Compendium survey

Country	Acronym	Completed	Country	Acronym	Completed
Armenia	ArmNGI	✔	Lithuania	NGI-LT	✔
Belgium	BEgrid	✗	Luxembourg	LUgrid	✔
Bosnia & Herzegovina	-	✗	Macedonia	MARGI	✔
Bulgaria	-	✗	Moldova	MD-GRID NGI	✔
CERN	-	✗	Montenegro	NGI_ME	✔
Croatia	CRO NGI	✔	Netherlands	BiG Grid	✔
Cyprus	CyGrid	✔	Norway	-	✗
Czech	NGI_CZ	✔	Poland	-	✗
Denmark	-	✗	Portugal	INGRID	✔
Estonia	Estonian NGI	✔	Romania	RoGrid-NGI	✔
Finland	NGI_FI	✔	Russia	E-ARENA	✗
France	FG	✔	Serbia	AEGIS	✔
Germany	NGI-DE	✔	Slovakia	SlovakGrid	✔
Greece	NGI_GRNET	✔	Slovenia	ARNES	✗
Hungary	NGI-HU	✔	Spain	CSIC	✔

Country	Acronym	Completed	Country	Acronym	Completed
Ireland	NGI_IE	✓	**Sweden**	SNIC	✗
Israel	Isragrid	✓	**Switzerland**	SwiNG	✓
Italy	IGI	✓	**Turkey**	TRUBA	✓
Latvia	-	✓	**UK**	NGI_UK	✓

Table 2.1.2 General information about individual NGI including full name and abbreviation both in English and national languages

NGI	Full name of the NGI	The abbreviation of the full name in English of the NGI	Full name and abbreviation of the NGIs in the national language(s)
Armenia	Armenian National Grid Initiative	ArmNGI	-
Croatia	Croatian National Grid Infrastructure	CRO NGI	Hrvatska nacionalna grid infrastruktura, CRO NGI
Cyprus	CyGRID_NGI	CyGrid	CyGRID_NGI
Czech Republic	MetaCentrum	NGI_CZ	-
Estonia	Estonian NGI		Eesti Grid
Finland	Finnish National Grid Initiative	NGI_FI	-
France	France Grilles	FG	France Grilles, FG
Germany	National Grid Initiative for Germany	NGI-DE	Nationale Grid Initiative für Deutschland (NGI-DE)
Greece	Greek Research and Technology Network	NGI_GRNET	-
Hungary	Hungarian National Grid Initative	NGI-HU	Hungarian Magyar (Nemzeti) Grid Iniciativa NGI-HU
Ireland	Grid-Ireland (Grid Ireland National Grid Initiative Ltd.)	G-I (the limited company is GINGI Ltd.; NGI_IE is often used in the EGI context)	English is used nationally. Greille-Éireann G-É

NGI	Full name of the NGI	The abbreviation of the full name in English of the NGI	Full name and abbreviation of the NGIs in the national language(s)
Israel	The Israel National Infrastructure for Grid and Cloud Computing	Isragrid	ישראגריד
Italy	Italian Grid Infrastructure	IGI	Italian Grid Infrastructure (IGI)
Lithuania	Lithuanian Grid Infrastructure	NGI-LT	Lietuvos akademinių institucijų lygiagrečių ir paskirstytų skaičiavimų tinklas
Luxembourg	LUgrid	LUgrid	LUgrid
Macedonia	Macedonian Academic and Research Grid Initiative	MARGI	Македонска академска и истражувачка грид иницијатива
Moldova, Republic of	MD-GRID National Grid Initiative	MD-GRID NGI	MD-GRID Iniţiativă Naţională Grid
Montenegro	NGI Montenegro	NGI_ME	Crnogorska grid inicijativa
Netherlands	BiG Grid – The dutch e-science grid	BiG Grid	-
Portugal	Portuguese National Grid Initiative	INGRID	-
Romania	National Grid Initiative RoGrid	RoGrid-NGI	Initiativa Nationala Grid RoGrid / RoGrid-NGI
Serbia	Academic and Educational Grid Initiative of Serbia	AEGIS	Akademska i obrazovna Grid inicijativa Srbije, AEGIS
Slovakia	Slovak National Grid Infrastructure SlovakGrid	SlovakGrid	Slovenská gridová iniciatíva SlovakGrid (SlovakGrid)
Spain	ES-NGI Spanish National GRID Initiative	CSIC	Iniciativa Grid Nacional Española
Sweden	Swedish National Infrastructure for Computing	SNIC	-
Switzerland	Swiss National Grid Association	SwiNG	-

NGI	Full name of the NGI	The abbreviation of the full name in English of the NGI	Full name and abbreviation of the NGIs in the national language(s)
Turkey	Turkish Science e-Infrastructure	TRUBA	Türk Ulusal e-Bilim e-Altyapısı, TRUBA
United Kingdom	UK NGI	NGI_UK	-

Table 2.1.3 Website URL of the NGIs

NGI	NGI url	NGI	NGI url
Armenia	http://www.grid.am	**Lithuania**	www.litgrid.lt
CERN	http://public.web.cern.ch/public/	**Macedonia**	www.margi.ukim.mk
Croatia	www.cro-ngi.hr	**Moldova**	http://www.grid.md
Cyprus	http://cygrid.org.cy	**Montenegro**	www.mren.ac.me (NGI_ME is working under MREN)
Czech Republic	http://metacentrum.cz	**Netherlands**	www.biggrid.nl
Estonia	http://grid.eenet.ee	**Portugal**	http://www.gridcomputing.pt/
Finland	www.csc.fi	**Romania**	http://www.ici.ro/
France	http://www.france-grilles.fr/	**Serbia**	http://www.aegis.rs/
Germany	http://www.ngi-de.eu/	**Slovakia**	http://www.slovakgrid.sk
Greece	www.hellasgrid.gr	**Spain**	www.es-ngi.es
Hungary	https://www.mgkk.hu/ngi_hu	**Sweden**	http://www.snic.vr.se/
Ireland	http://grid.ie/	**Swtzerland**	http://www.swing-grid.ch/
Israel	http://www.isragrid.org.il	**Turkey**	http://www.truba.gov.tr
Italia	http://www.italiangrid.it	**United Kingdom**	http://www.ukngi.ac.uk/

Table 2.1.4 NGIs member and deputy member of the EGI Council, NGIs International Liaison and deputy

NGI	Member of the EGI Council	Deputy member of the EGI Council	NGI International Liaison	Deputy NGI International Liaison
Armenia	Prof. Samvel Haroutiunian	Dr. Hrachya Astsatryan	Dr. Hrachya Astsatryan	-
CERN	Robert Jones	David Foster	-	-
Croatia	Ivan Marić	Dobriša Dobrenić	Emir Imamagic	Dobriša Dobrenić
Cyprus	Professor Marios Dikaiakos	Lectures George Pallis	Ms Maria Poveda	Professor Marios Dikaiakos
Czech Republic	Jan Gruntorád	Luděk Matyska	Ivana Krenkova	Luděk Matyska
Estonia	Mr. Mihkel Kraav	Mr. Hardi Teder	Mr. Hardi Teder	-
Finland	Dr. Per Öster	Dr. Pekka Lehtovuori	Dr. Vera Hansper	Ms. Johanna Lähti
France	Mr Etienne Augé	Mr Laurent Crouzet	Mme Genevieve Romier	Mme Géraldine Fettahi
Germany	Prof. Dieter Kranzlmüller	Prof. Achim Streit	Dr. Torsten Antoni	Wilhelm Buehler
Greece	Panagiotis Louridas	Tryfon Chiotis	Kostas Koumantaros	-
Huy	Tamás Máray	-	Agnes Szeberenyi	-
Ireland	Dr. Brian Coghlan	Mr. John Walsh	Dr. David O'Callaghan	Mr. John Walsh
Israel	Hank Nussbacher	-	Hank Nussbacher	Paul Podolny
Italy	Dr Mirco Mazzucato	-	Dr Daniele Cesini	Dr Alessandro Costantini
Latvia	Inara Opmane	Baiba Kaskina	Baiba Kaskina	Dana Ludviga
Lithuania	prof. Algimantas Juozapavičius	Mr. Arunas Stasionis	prof. Algimantas Juozapavičius	Mr. Arunas Stasionis
Luxembourg	Antoine Barthel	Théo Duhautpas	Claude Tompers	-
Macedonia	Prof. Dr. Boro Jakimovski	Prof. Dr. Aneta Buckovska	Prof. Dr. Boro Jakimovski	Prof. Dr. Anastas Mishev
Moldova	Dr.Peter Bogatencov	-	Dr. Peter Bogatencov	Mr. Alexandr Golubev
Montenegro	dr Božo Krstajić	mr Luka Filipović	dr Božo Krstajić	mr Luka Filipović

NGI	Member of the EGI Council	Deputy member of the EGI Council	NGI International Liaison	Deputy NGI International Liaison
Netherlands	Arjen van Rijn	Patrick Aerts	Tom Visser	Evert Lammerts
Portugal	Luis Magalhães	Jorge Gomes	Miguel Angel Nunez-Vega	Gonçalo Borges
Romania	Prof.dr. Doina Banciu	-	Monica Anghel	-
Serbia	Dr. Aleksandar Belic	Dr. Antun Balaz	Dr. Antun Balaz	Mr. Dusan Vudragovic
Slovakia	Dr. Ladislav Hluchý	Miroslav Dobrucký	Ladislav Hluchý	-
Spain	Dr. Isabel Campos Plasencia	Victor Castelo	Miguel Angel Nuñez Vega	Gonçalo Borges
Sweden	Sverker Holmgren	-	Mats Nylén	-
Switzerland	Sigve Haug	Christoph Grab	Sergio Maffioletti	Simon Leinen
Turkey	Serkan Orcan	Onur Temizsoylu	Dr. Burcu Ortakaya	Onur Temizsoylu
United Kingdom	Dr Matthew Dovey	Dr Neil Geddes	Dr Claire Devereux	Dr John Gordon

Table 2.1.5 NGIs Operations Manager and deputy

NGI	Operations Manager	Operations Manager deputy	NGI	Operations Manager	Operations Manager deputy
Armenia	Dr. Hrachya Astsatryan	Mr. Wahi Narsisyan	Lithuania	Mr. Rolandas Naujikas	Mr. Eduardas Kutka
Croatia	Dobriša Dobrenić	Emir Imamagic	Luxembourg	Claude Tompers	-
Cyprus	Ms Andoena Balla	Professor Marios Dikaiakos	Macedonian	Prof. Dr. Boro Jakimovski	Bozhidar Proevski
Czech Republic	Miroslav Ruda	Jiri Chudoba	Moldova	Mr. Pavel Vaseanovici	Mr. Nicolai Iliuha
Estonia	Mr. Hardi Teder	Mr. Tõnu Raitviir	Montenegro	Mr Luka Filipović	Mrs Lidija Milosavljevic
Finland	Dr. Vera Hansper	Mr. Ulf Tigerstedt	Netherlands	David Groep	Ron Trompert
France	Mme Hélène Cordier	Mr Gilles Mathieu	Romania	Alexandru Stanciu	-
Germany	Dimitri Nilsen	Pavel Weber	Serbia	Dr. Antun Balaz	Mr. Dusan Vudragovic
Hungary	Csaba Hajdu	-	Slovakia	Ján Astaloš	Miroslav Dobrucký
Ireland	Mr. John Walsh	Dr. Eamonn Kenny	Spain	Dr Carlos Fernandez	Dr Pablo Orviz
Israel	Paul Podolny	Paul Podolny	Turkey	Feyza Eryol	OnurTemizsoylu
Italy	Dr Paolo Veronesi	Dr Riccardo Brunetti	United Kingdom	Dr John Gordon	Dr Claire Devereux

Table 2.1.6 Year of establishment of the NGIs and year of start of grid Operations

NGI	Year of establishment of the NGI	Year of start of grid Operations started in the NGI country (or EIRO)	NGI	Year of establishment of the NGI	Year of start of grid Operations started in the NGI country (or EIRO)
Armenia	2010	2009	Italy	2007	2003
CERN	-	2004	Lithuania	2005	2007
Croatia	2007	2007	Luxembourg	2011	2011
Cyprus	2010	2003	Macedonia	2005	2004
Czech Republic	1996	1996	Moldova	2007	2008
Estonia	2004	2005	Montenegro	2006	2010
Finland	1971	2004	Netherlands	2006	2004

NGI	Year of establishment of the NGI	Year of start of grid Operations started in the NGI country (or EIRO)	NGI	Year of establishment of the NGI	Year of start of grid Operations started in the NGI country (or EIRO)
France	2010	2004	Romania	2002	2004
Germany	2010	1997	Serbia	2005	2005
Greece		2004	Slovakia	2005	2002
Hungary	2010	2006	Spain	2005	2005
Ireland	1999	2000	Turkey	2003	2005
Israel	2010	2004	United Kingdom	2010	2001

Table 2.1.7 History of the NGIs as related to the Grid activities or URL to a webpage

NGI	History of the NGIs as related to the Grid activities or URL to a webpage
Armenia	http://www.grid.am
Croatia	http://www.cro-ngi.hr/index.php?id=1396&L=1
Cyprus	LINC took the responsibility to formalise a National body for Grid operations in Cyprus through the concept of a National Grid Initiative (NGI). LINC agreed to establish a framework for research rg (Germany) 2. Ecole Nationale Supérieure des Mines de St-Etienne (France) cooperation with key-role partners within the region and Europe. This initiative was consolidated, a few years later, through the signature of a Memorandum of Understanding for collaborative research between the University of Cyprus and a number of national and international institutions. CyGrid, the Cyprus Grid Collaboration Initiative started activities in 2002, 2 years later the Cyprus Grid Certification Authority was established. CyGrid operates the Cypriot Grid infrastructure, which comprises clusters with over 100 CPUs and 3.5 TB of storage.
Czech Republic	http://www.metacentrum.cz/en/about/meta/index.html
Finland	http://www.csc.fi/tutkimus/Laskentapalvelut/gridymparisto/fgi/index_html
France	http://www.france-grilles.fr/-Presentation-
Germany	http://www.ngi-de.eu/english/history.php
Greece	Provision of high performance computing services (High Performance Computing, High Throughput Computing) in the Greek academic and research community. Installation, operation and support of 14 computing and storage nodes in Greece– HellasGrid. Support of the users for the transfer of their applications in the infrastructure. Support of applications and provision of libraries and support software. Resources of the infrastructure are use Greek researchers and by European programmes. During the last years a significant and increased number of users from various scientific fields (physics, biotechnology, computing chemistry, information technology, meteorology, etc.) uses the HellasGrid infrastructure for their computing needs.
Hungary	https://www.mgkk.hu/node/1
Ireland	The Grid-Ireland infrastructure has been managed since 1999 from the operations centre (OpsCentre) hosted by TCD's Computer Architecture and Grid (CAG) research group, and Grid-Ireland has been involved in the EU projects DataGrid (unfunded), CrossGrid, Int.EU.Grid, EGEE, EGEE-II and EGEE-III. On a national level, it has been a core member of the past Irish Computational Grid, Cosmogrid and WebCom-G grid projects. At present Grid-Ireland is part of EGI and e-INIS, the Irish National e-Infrastructure.
Israel	Isragrid is the Israeli National Infrastructure for Grid and Cloud Computing. A cooperation between the Ministry of Industry, Trade and Employment and the Israeli Science Academy led to the establishment of Isragrid, operating as a project of the National Infrastructures for R&D Forum (TELEM). The conclusion of establishing Isragrid was the result of a committee composed of subject matter experts from the academy and industry, headed by Mr. Yehuda Zisafel. The goal of the project is to enable an efficient e-Science research in various fields by providing production e-Infrastructure taking advantage of Grid and Cloud computing technologies. Isragrid services include: Grid production

NGI	History of the NGIs as related to the Grid activities or URL to a webpage
	infrastructure: • Access to vast amount of Compute/Data resources via EGI(European Grid Infrastructure). • Help with establishing new VO's (Virtual Organizations). • Certificate Authority. User support: • Dedicated technical and information support for Grid users (Helpdesk). • Help with adapting user's applications and tools into the Grid. Training: • Consultation on establishing private Grid Computing environments. • Grid workshops.
Italy	The Italian Grid Infrastructure started from the pioneering developments of the Istituto Nazionale di Fisica Nucleare (INFN), the public Institute that promotes, coordinates and develops experimental and theoretical fundamental research in nuclear and sub-nuclear physics and the University of Lecce. The INFN-Grid Project started in 1999 with a special yearly grant that continued until today. It has created the INFN-Grid Infrastructure which integrates resources from more than 25 INFN sites located among the most important Italian universities and, although primarily focused on the development of the computing infrastructures for LHC and other INFN experiments, it has been, since the beginning, open both to other fields of research (bio-medicine, earth observation, etc.) and industry. From INFN-Grid to the Italian Grid Infrastructure for Research With a series of grants received from the Ministry of Education University and Research (MIUR), a new collaboration started in 2003 (GRID.IT) of INFN with other National Research Institutions, CNR (National Research Council), INAF (Institute for Astrophysics), INGV (Institute for Geophysics), many Universities and Centres of Excellence for Computing, has opened the way to the development of a general Italian grid empowered Infrastructure supporting globally the Italian Research Area. This has grown with time thanks to additional governmental funds to become the current IGI infrastructure. INFN early contribution to EU FP5-Projects INFN pioneered together with CERN the development of the first European Grid project DataGrid, started in 2000, funded by the European Union and involving not just physics but also researchers from other scientific fields which has developed the first prototype of the European Grid Infrastructure. INFN has contributed to various area of grid middleware development and provided grid services for job execution, accounting, security etc. Leveraging from DataGrid, the European DataTAG (Trans Atlantic Grid) project, started in 2002, has prototyped a fast trans-atlantic optical network connection supporting grid activities and developed early interoperability between the grids in Europe and USA. Responsible in DataTAG for the crucial activity of integrating the EU middleware with US, INFN has played a prime role in prototyping the creation of an intercontinental grid infrastructure thanks to the intensive and effective collaboration with the US projects Condor, iVDGL, GriPhyN, Globus, PPDG, all funded by the US National Science Foundation and US Department of Energy. This has supported the initial activities of the LHC Computing Grid (LCG). Grid in the world and the LCG Project INFN has been a major contributor to the CERN lead World-wide LCG initiative, born in 2001, which has created the large Grid computational infrastructure for LHC. EGEE and EGI When CERN, as coordinator, has promoted and realized the new EGEE (Enabling Grids and E-science in Europe) European project series, involving Institutions from all European countries which have finally developed a production (24 x 7) general pan-European grid infrastructure, the Italian Institutions have established with an MoU the Joint Research Unit – IGI which was later recognized by the Ministry to represent the National Grid Initiave IGI has taken over the responsibilities in the development of the middleware, the management of the Italian Regional Operation Centre (ROC) and the provision of the general grid and cloud services required by the Italian grid infrastructure which today includes 53 sites and more than 1000 users. In particular IGI today develops and support (and operates in production) the following components: the EMI-CREAM computing element, the EMI-WMS workload management system, the EMI-STORM storage element, the EMI-ARGUS authorization service, the EMI- WnODES cloud system, the DGAS accounting system, the HLRMON accounting portal, and the IGI-PORTAL as a general purpose job submission and data management portal to the grid infrastructure. See also: http://www.italiangrid.it/
Lithuania	The initial development of Grids in Lithuania was influenced by BalticGrid project and started in the first half of 2005, when Lithuanian

NGI	History of the NGIs as related to the Grid activities or URL to a webpage
	National Science and Studies Foundation initialised a research project to introduce and develop Grid tehnology for the academic community. Under this project products and services were developed comprising of: the Litgrid operational infrastructure and support; analysis and development of parallel and distributed algorithms for various research applications of scientist; dissemination and management services.
Macedonia	The NGI was formed as a result of the activities that the University Ss. Cyril and Methodious team, at that time the Macedonian NREN, that was involved in the series of regional FP7 projects (SEE-GRID, SEE-GRID-2 and SEE-GRID-SCI). The result of the projects were successful deployment of Grid infrastructure in the region, and establishment of regional operations. By the end of the third project, every NGI took over its own operations.
Moldova	http://grid.md/projects/ MD-Grid - National Grid Initiative of Moldova was fficially inaugurated on the plenary session entitled "National Grid Initiative MD-Grid: presentation and inauguration" of RENAM Users Conference – 2007 on May, 14 2007 after receiving approval letters from Ministry of Information Development of Moldova (http://www.mtic.gov.md/) and the Academy of Sciences of Moldova (http://www.asm.md/). The MD-Grid NGI Consortium governed by RENAM as its Coordinating NREN joins 6 partners: research, education and industry institutions that expressed their intent to participate in the processes of National Grid Infrastructure building and using.
Montenegro	NGI_ME successfully participated in few FP7 projects and built their grid infrastructure and user community through them.
Netherlands	2001-2003: Nikhef and SARA in EDG 2004-2010: Nikhef, SARA, RUG and NCF in EGEE-projects 2004-2009: Virtual Lab for e-Science (national project) created proof of concept infrastructure 2003-2006: NWO/NCF: first national grid infrastructure funding (3.3 M euro 2006: NWO/NCF: BiG Grid funded (29 M euro running from 2007 to 2012) >= 2012: SURF to incorporate e-Infrastructure including grid infrastructure; NCF dissolved
Romania	In a first period, the development of the network of Grid resource centers in our country was based on the participation of academic and research organizations to the national or international projects, with the main contribution of the RoGrid consortium member organizations: ICI Bucharest - coordinator, University "Politehnica" of Bucharest (UPB), National Research - Development Institute for Physics and Nuclear Engineering "Horia Hulubei" (IFIN-HH) Bucharest, National Institute for Aerospace Research (INCAS) Bucharest, Technical University of Cluj-Napoca (UTCN), West University of Timisoara (UVT), University of Bucharest (UB). An important role in consolidation of these centers and their adaptation to operational requirements specific to production regime (24 / 7) played their integration in European grid infrastructures, either neutral in terms of supported research domains (e.g. EGEE, SEE-GRID) or dedicated to CERN experiments in high energy physics. First attempt to formulate a coherent set of principles and objectives regarding the development of this domain was the proposal for the "National Strategy for Grid development in Romania" (December 2002), a project developed by the RoGrid consortium members (ICI, UPB, IFIN-HH, INCAS, UB). In March 2006 the "Strategic plan for pilot implementation of the national Grid infrastructure" was published, based on the "e-Infrastructure" concept and recommendations from the previous strategy. The document was prepared by a National Taskforce coordinated by the National Authority for Scientific Research, with the main contribution of the RoGrid consortium and RoEdu. In accordance with this Strategic Plan, the Report for 2007 of the Romanian Committee for Research Infrastructures included in the list of proposals for priority investment projects in the Information Technology and Communications field, the following projects: "High-speed communications network for education and research" and "National Grid Infrastructure for Research". In 2010, the ROGrid Consortium was reorganized according to the EGI transition requirements and a new Agreement for RoGrid-NGI was signed by member organizations: ICI Bucharest –

NGI	History of the NGIs as related to the Grid activities or URL to a webpage
	coordinator, UPB, UTCN, UVT, INCAS, UB, National Institute for Research and Development for Textiles and Leather, University of Pitesti.
Serbia	Academic and Educational Grid Initiative of Serbia (AEGIS) was established in 2005 to coordinate efforts on developing academic and educational high performance computing facilities (e.g. computers, storage, networks, instruments, and visualization resources) in Serbia, and help to integrate them in the AEGIS infrastructure. One of the major AEGIS tasks is dissemination and training activities organization, and help to Serbian research communities in developing and production use of applications on the AEGIS eInfrastructure. AEGIS is also focal point in Serbia for facilitation of wider participation of AEGIS members in Framework Programme 7 and other international Grid projects, coordination of fund raising efforts to improve AEGIS infrastructure and human resources, creation of national Grid development policy, and lobbying for its position within an overall research agenda.
Slovakia	2002 - EU project Crossgrid started, IISAS being a member 2003 - CEGC (Central European Grid Consortium) established AT, SK, CZ, PL, H, SI) 2005 - SlovakGrid - free association created at GCCP'2005 workshop 2008 - NGI_SK created (end of EGEE-II)
Spain	http://www.es-ngi.es/es-ngi.php
Turkey	http://www.truba.gov.tr/eng/truba/history/
United Kingdom	The UK NGI is a collaboration between the NGS and GridPP projects, although in future as new projects mature we will expand. For a history of GridPP see: http://www.gridpp.ac.uk/timeline/

Chapter 3 - Strategy

Table 3.1.1 NGI Strategy

Country	URL
Armenia	It is charter in native language
Czech Republic	it is part of Large Infrastructure project, not public, in Czech language only
Italy	http://www.italiangrid.org/sites/default/files/infrastruttura-igi-v4.5.pdf
Netherlands	BiG Grid proposal 2005 (see www.biggrid.nl)
Spain	http://www.es-ngi.es/usuarios.php
Turkey	http://www.grid.org.tr/trgridolusumu/politika/TR-Grid_UGO_Strateji.pdf

Table 3.2.1 NGI Vision

Country	Vision
Armenia	EGI2020 Vision is perfect, particularly to support the online ERA through a pan-European research infrastructure.
Croatia	Those areas are covered in main document of CRO NGI (unfortunately only in Croatian): http://www.cro-ngi.hr/fileadmin/cro-ngi/dokumenti/CRO_NGI_Pravilnik_v1.pdf
Finland	To enable (Finnish) users in grid technologies across a broad range of research areas. http://www.csc.fi/english/csc/overview/valuesandvision/index_html/?searchterm=CSC%20vision
France	France Grilles aims at building and operating a multidisciplinary national Distributed Computing Infrastructure open to all sciences and to developing countries. This DCI should become an open space for collaborations within and across disciplines and organizations. France Grilles was created in 2010 as a Scientific Interest Group by 8 organizations including the French ministry of Research and Higher Education.
Germany	People who have visions should go to see their doctor. (Helmut Schmidt, Chancellor of West Germany from 1974 to 1982: "Wer Visionen hat, soll zum Arzt gehen.")
Israel	Isragrid vision is to interconnect Israeli academic resource centers and federate it's Grid/Cloud/HPC services under one user portal.
Italy	IGI develops and delivers ICT services to support a distributed federated computing and archiving infrastructure including virtualization and cloud access for the benefit of the Italian scientific community in strong partnership with other NGIs and EGI.eu in Europe and other institutions around the world. IGI aims at being constantly at the leading edge of the innovation, continuously evolving the software components to better

Country	Vision
	satisfy the users needs and provide more and more efficient and effective services. IGI is promoting the usage of open source technological solutions behind its services also outside the realm of the research communities. The federative power of IGI and EGI is today mainly technological since it is based on complex and robust grid services that only the EGI eco-system can guarantee to Europe. The introduction of virtualization and cloud in all centers will be done in a natural and evolutionary way by means of the new WNoDeS component without any disruption of the current services.
Lithuania	To be visible as a public phenomena, not just for computing.
Moldova	To co-ordinate of the implementation of the National Grid Infrastructure and participate in the development of national policies related to Grid and HPC. To support the development and expansion of the existing MD-GRID infrastructure. To unite in Virual Organizations research teams from various scientific fields having special needs for high performance computing resources and to provide their support and development
Montenegro	Support to the online European Research Area through a pan-European research infrastructure.
Netherlands	Build and operate an ICT infrastructure; Providing access to the infrastructure; Stimulate use of the infrastructure through: suitable hardware and middleware/software environment; support and development effort; dissemination, education and training;
Romania	Being a representative organization at the national level, acting as an authoritative single point of contact for both governmental bodies, research communities and resource centers as regards ICT services for e-science
Serbia	AEGIS will focus on uniform provision of advanced and reliable computing services, storage and data resources to national research community, but also to other researchers from user communities supported by EGI.
Spain	Scientific users in Spain are already for a long time advocating for an integration of computing resources at the country level. The advantages of such a federated structures are becoming everyday more obvious to the funding agencies in Spain, which no longer finance small isolated clusters, but rather apply the principles of economy of scale to fund integrated infrastructures, like resources (both human and material) for the institutions participating in the National Grid Initiative and the Spanish Supercomputer Network. We see the NGI in the future as integrator of resources and user support expertise for the scientific world in the country, at the level of public or private research centers.
Turkey	To provide uniformly accessed, reliable and European integrated national e-Infrastructure based on the computing, and storage.

Table 3.2.2 NGI Mission

Country	Mission
Armenia	EGI2020 mission is perfect, particularly to establish a sustainable grid infrastructure in Armenia and interact with pan-European and regional correspondent infratsrtctures
Croatia	Those areas are covered in main document of CRO NGI (unfortunately only in Croatia): http://www.cro-ngi.hr/fileadmin/cro-ngi/dokumenti/CRO_NGI_Pravilnik_v1.pdf
Finland	CSC's mission statemen CSC, as part of the Finnish national research structure, develops and offers high quality information technology services. CSC operational goals are to improve conditions for research and product development in universities, polytechnics, research institutions and commercial life to comply with the information strategy of the Ministry of Education, Science and Culture by providing national services that would be impracticable to establish at the university level to promote collaboration between universities and polytechnics, research institutions and companies that utilize information technology for science to provide internationally competitive supercomputing and data communication services to serve as a pioneer and information provider in the latest information technologies for science.
France	In France, the National Grid Initiative takes the shape of a Scientific Interest Group gathering 8 major research organizations. Operated by CNRS Grid and Cloud Institute, France Grilles oversees the deployment of production grids integrating at a national level distributed computing and storage resources for high throughput data analysis in multiple scientific fields. Identified among the Very Large Research Infrastructures by the French Ministry of Higher Education and Research, France Grilles focuses on responding to the exponentially growing needs of many scientific disciplines for IT resources. France Grilles builds on regional grids for supporting its users and reaching out to all scientific communities. It also coordinates French contribution to the European Grid Initiative.
Germany	The mission of NGI-DE is to provide the reliable access to and the collaborative use of federated IT resources from science communities for science in Germany and worldwide.
Hungary	NGI_HU is the National Grid Initiative for Hungary. It is being coordinated by the Hungarian Grid Competence Center (MGKK), where the leadership rotates amongst partners every 2 years. Currently, 5 academic institutes are involved in the work of NGI_HU. The goal of our NGI is to provide a reliable and secure e-infrastructure for Hungary by joining all Distributed Computing Infrastructures within the country. NGI_HU provides access to grids, desktopgrids and clouds for academic and industrial use thus giving the Hungarian researchers opportunities to collaborate with their international fellows.

Country	Mission
Ireland	The aim of Grid-Ireland is to enable communities of users, for example, astrophysicists, geneticists or linguists, to construct virtual organizations above Grid-Ireland. The guiding principle is that there may be many virtual organizations, but there only needs to be one grid layer. The benefit is a research platform for scientists and an object of research for computer scientists, and a natural symbiosis between the two.
Israel	Isragrid aims to facilitate Israel research by providing access to a production quality e-infrastructure based on Grid/Cloud technologies. The service is provided both for Israeli academy and industry R&D
Italy	To accomplish its vision IGI will: 1) collect requirements through a strong interaction with its user communities and also at European and world-wide level 2) develop and strengthen its services improving stability, efficiency, availability and reliability looking for collaborative efforts from other NGIs or Institutions 3) ease usage and access to its services in order to increase the user base within all the research areas
Latvia	MD-GRID NGI was created by uniting research teams from various scientific fields having special needs for high performance computing resources. Representatives from main universities and research institutions of the Academy of Sciences of Moldova joined NGI. As NGI coordinating body taking into account the existing capacities of the NGI members in terms of computing and human resources was selected RENAM Association – National Research and Educational Network of Moldova that was a partner in a series of regional eInfrastructure development projects. MD-GRID NGI goal is to unite all existing in Moldova computing resources into a common national, regional and pan-European infrastructures. NGI is participating in the development of national policies related to Grid and HPC. Together with its members is organizing dissemination and training events, provides support for users' community in developing and deploying Grid and HPC applications.
Lithuania	1. Links with EGEE as well as such tasks as "Virtual Musem', "Virtual Data Repositories: Fully integration in the EGI; 2. Creation method and tools for interaoperability issues; 3. The design and development of CERN Data and Visualisation Centre; 4 . Design and development of Cloud computing; 5. To connect Lithianian researchers from all disciplines with the reliable and innovative ICT services they need to undertake their collaborative world-class research. 6. To connect Lithianian enterprise, publick sector and researchers from all disciplines with the reliable and innovative ICT services they need to undertake for their effective work and comunication.
Moldova	To unite all existing in Moldova computing resources into a common national infrastructures and to provide Moldavian scientists and their international partners with a sustainable, reliable access to e-Infrastructure that can support their needs for large-scale data analysis.
Montenegro	To provide access to national research community with the reliable and innovative ICT services.
Netherlands	To realise a national 'world class' ICT infrastructure for scientific research such as particle physics, life sciences and other sciences, including a variety of hardware facilities to enable e-Science.
Portugal	The Portuguese National Grid Initiative aims to support the development of resource sharing for demanding computing applications and ensure the enhancement of strategic competences and capacities of special interest for this type of computing in Portugal. Main objectives: - Promote the integration of Portugal in international grid computing infrastructures. - Reinforce the national competence and capacity in the grid computing domain due to its strategic importance. - Improve the conditions for scientific activities and for applications of economic and

Country	Mission
	social relevance requiring complex computing or access to large datasets. - Reinforce the multidisciplinary and collaboration among research communities and users of high performance computing resources.
Romania	To coordinate the development, operation and use of the National Grid Infrastructure in benefit of national research communities and their international cooperation.
Serbia	AEGIS is created in response to the growing need of Serbia's academic and educational community for high performance computing resources, and taking into account the existing capacities of the parties in terms of computing and human resources, as well as their experience in operating and using Grid eInfrastructureseeks. AEGIS aims to unify Serbia's computing resources into a robust national, regional and pan-European infrastructures. The initiative represents one of the focal points for the development of national policies related to HPC. AEGIS organizes dissemination and training activities,provides support in developing and deploying Grid applications, and coordinates related fund-raising activities.
Slovakia	The Slovak national grid infrastructure SlovakGrid contributes to the progress of scientific research and development by performing activities to promote grid computation and enable access to enormous European computational and storage resources.
Spain	The ES-NGI functions can be summarized in the following points: -Operating platform Grid computing services nationwide - Offering a unified service to the R&D users in the country, applying criteria of homogeneity to facilitate the access. - Provide the necessary services to integrate the Spanish infrastructure in the European Infrastructure of EGI. -Computational support for international projects of the Spanish research groups that require Grid technology in the context of EGI.eu -Coordinate with the other activities of the Spanish Network for e-Science. -Advise the Ministry Science and Innovation (MICINN), at his request, in its scope, and participate in the initiatives that the MICINN determine, national or international level.
Switzerland	Ensure competitiveness of Swiss science, education and industry by creating value through resource sharing. Establish and coordinate a sustainable Swiss Grid infrastructure as a dynamic network of resources across different locations and administrative domains. Provide a platform for interdisciplinary collaboration to leverage the Swiss Grid activities supporting end-users, researchers, education centers, resource providers and industry. Represent the interests of the national Grid community towards other national and international bodies.
Turkey	To increase the national research capacity as well as collaboration between industry, public and research institutions.

Table 3.2.3 NGI Core Values

Country	Core Values
Armenia	1. Reliability 2. Openness 3. Leadership
France	1. Serving the communities 2. Collaborating with the scientific communities 3. Building human networks
Germany	1. German Gründlichkeit (thoroughness) 2. Precision 3. Openness 4. Reliability 5. Innovation
Israel	1. dedicated service to our customers 2. flawless execution 3. honesty and maturity 4. scale up the status quo
Italy	1. National Reference for the development and provisioning of distributed grid and cloud services enabling a general federated infrastructure with uniform access to the research area 2. Strong connection to European initiatives and projects 3. Enabling the sharing of all types of ICT resources belonging to different administrative domains for the optimization of their usage 4. Open source and standardized solutions 5. Easy access to resources and services
Lithuania	1. NGI.LT will became a part of the pan-European infrastructure to be used for the worldwide computing, storage and data resources to support an economy built on innovation and knowledge transfer 2. NGI.LT provides a reliable infrastructure for the High energy physic research communities and help them collaborate with their peers. 3. NGI.LT delivers innovation and offers for their users the newest , more powerful tools for research, work and collaboration 4. NGI.LT will continue to meet the needs of enterprises, publick and researcher by partnering to bringing new technologies into production. 5. NGI.LT will continue to meet the needs of Lithuanian research communities and help them operating at unparalleled geographic

Country	Core Values
	and technical scale by partnering to bringing new knowledge.
Moldova	1. Reliability. To provide a reliable access to national and international eInfrastructure. To collect user requirements and provide support for the current and potential new user communities. 2. Promotion. To organize dissemination and training events, provides support for users' community in developing and deploying Grid and HPC applications. To monitor the implementation of the new culture in scientific cooperation at the national level, based on sharing both resources and benefits to achieve common objectives. 3. Propagation. To increase awareness about MD-GRID activities and benefits among potential users. Dissemination of information received from European institutions which is relevant for the development of the GRID domain. 4. Evolution. To support the development of the MD-GRID integrated project as a consistent and coherent part of the European R&D activity in this field. To encourage and facilitate the involvement of other interested and competent institutions nation wide. To implement of the MD-GRID enlargement mechanism based on the capacity of candidate institutions to promote and fulfill NGI component projects. To represent of the MD-GRID integrated project in the international cooperation, including FP7 European projects.
Montenegro	1. Innovation 2. Openness 3. Reliability
Netherlands	1. Reliability 2. Expertise 3. collaboration and connection 4. crossing boundaries 5. large scale
Romania	1. Openness - transparent coordination based on careful consideration of various proposals and requirements. 2. Participatory - stimulating and being dependent on stockholders' contribution. 3. Adaptability - capable to meet various operating and interoperability requirements and trends. 4. Resilience - ability to provide and maintain an acceptable level of service.
Serbia	1. Research 2. Integration 3. Innovation 4. Development 5. Education
Spain	1. Federating resources country-wide 2. Innovation in what refers to the development of new techniques to federate resouces 3. Supporting users from all fields of science

Country	Core Values
Turkey	1. Coordination 2. Leadership 3. Sustainablity 4. Reliability 5. Integration

Table 3.3.1 Business Model

Country	URL for Business Model
Croatia	http://www.cro-ngi.hr/fileadmin/cro-ngi/dokumenti/CRO_NGI_Pravilnik_v1.pdf
Italy	It is under development - IGI is currently formally supported by the Italian Ministry for University and Research (MIUR) with specific funding in 2010 and 2011 for the baseline work. Innovation is funded through the participation to national and EC-funded projects such as EGI-InSPIRE and EMI
Spain	We have a strategy to support scientific users: http://www.es-ngi.es/usuarios_acceso_ngi.php

Table 3.3.2 Major changes in 2012 and foreseen changes for the coming year

Country	Major changes in 2012 and foreseen changes for the coming year
Croatia	There were no major changes in 2011.
Czech Republic	CESNET is financed as a large infrastructure recognized in national Road Map of Large Infrastructures in the Czech republic. * MetaCentrum became a coordinator of the national resources (new large resource centers CERIT-SC and IT4Innovation) * data storage activity as a separate activity of CESNET NREN, not involved in NGI
Finland	In 2011 the funding for the second generation grid infrastructure in Finland was approved, thereby enabling Finland, through CSC, to move this technology into the future.
France	Deployment of academic clouds
Germany	No major changes in 2011.
Israel	2011 was a critical year for our NGI as it was the year in which the NGI was re-organized and "rebuilt from scratch". New team members, new equipment and new technologies were introduced. More than 50 active R&D users were added during this period, some of the case studies can be found here: https://www.isragrid.org.il/case_studies

Country	Major changes in 2012 and foreseen changes for the coming year
Italy	The current structure of the NGI has been defined in 2011, now IGI is structured in 4 units. During 2011 the coordinators of the units have been recruited as well as the units' staff. During 2012 IGI will acquire some computing and storage resources for new user communities in addition to the resources currently provided by the IGI partners within the production infrastructure.
Montenegro	Transference of GRID-sites on the virtualization platforms.
Netherlands	Most important is the transition to bringing all e-Infrastructure provisioning, including all of BiG Grid under the SURF umbrella. The year 2012 will be the year of this transition.
Romania	The low funding level of the research activity, in the well known economic context, had a negative impact on infrastructure usage and on dynamics of user communities. On the other side, the support provided by structural funds had a beneficial influence on the improvement of available computing and storage resources for the majority of NGI_RO sites. From technological point of view, it should be noted the interest for testing Globus in parallel with gLite, as an alternative middleware solution. UTCN is participating in IGE project, and ICI is also interested to deploy Globus services. Using virtualization and private cloud solutions like OpenNebula to run the grid infrastructure and scale up or down resources depending on the usage.
Serbia	Structure of the AEGIS basically remained the same after 2011. We have successfully migrated NGI Grid services from gLite to EMI technology, while the number of active users is significantly increased.
Slovakia	Still waiting for major technology upgrade
Spain	We foresee a change in the user base. Therefore we need to work on a more scalable user support policy.
Turkey	IaaS and PaaS services for both academic and public research institutes were started in 2011. Grid services are planned to be given on this IaaS infrastructure.
United Kingdom	The main recent change in the UK NGI occurred within the NGS side of the project. Following direction from our funders the focus of the NGS has changed from providing end resources to individual users, to providing services to projects and institutions which enables them to utilize national and internation resources.

Chapter 4 - Governance

Table 4.1.1 Type of organisation and duration of legal agreement

Country	Legal national entity (for profit)/ Legal national entity (non-profit)/ Group of interest (not a legal entity)	Duration of legal agreement
Armenia	Legal national entity (non-profit)	unlimited
Croatia	Legal national entity (non-profit)	unlimited
Cyprus	Group of interest (not a legal entity)	unlimited
Czech Republic	Legal national entity (non-profit)	unlimited
Estonia	Group of interest (not a legal entity) EENet represents the NGI, but other institutions provide computing and storage recources also based on consortium agreement	not a legal organisation
Finland	Legal national entity (non-profit)	unlimited
France	Group of interest (not a legal entity) FG is a consortium of legal entities, operated by the IdGC (Grid and Cloud Institute), a service unit of the CNRS (French RPO)	not a legal organisation
Germany	Group of interest (not a legal entity) NGI-DE works on behalf of the Gauß-Allianz e.V. (registered association)	unlimited
Hungary	Group of interest (not a legal entity)	not a legal organisation
Ireland	Legal national entity (non-profit)	unlimited
Israel	Legal national entity (non-profit)	not a legal organisation
Italy	Group of interest (not a legal entity) A Joint Research Unit, based on a MoU signed by all partners in 2007, managing a Special Project structure within INFN. The process for the establishment of a legal entity is ongoing	2014
Lithuania	Group of interest (not a legal entity)	not a legal organisation

Country	Legal national entity (for profit)/ Legal national entity (non-profit)/ Group of interest (not a legal entity)	Duration of legal agreement
Luxembourg	Legal national entity (non-profit)	unlimited
Macedonia/	Group of interest (not a legal entity)	not a legal organisation
Moldova	Group of interest (not a legal entity)\n\nDiscussions on NGI transformation to new legal entity with main national authorities responsible on eInfrastructure development have started in 2011. The status of the negotiation is that it's planned to establish new legal entity not earlier then in 2014 under umbrella of the Academy of Sciences of Moldova and coordination of the Ministry of Information Technologies and Communications.	unlimited
Montenegro	Group of interest (not a legal entity)	not a legal organisation
Netherlands	Legal national entity (non-profit)	limited\n\nBiG Grid runs officially until end 2012.
Romania	Group of interest (not a legal entity)	limited\n\n2015
Serbia	Group of interest (not a legal entity)\n\nNot planned, NGI is coordinated and represented by the Institute of Physics Belgrade, on behalf of the consortium.	not a legal organisation
Slovakia	Group of interest (not a legal entity)	not a legal organisation
Spain	Legal national entity (non-profit)	limited
Switzerland	Legal national entity (non-profit)	unlimited
Turkey	Legal national entity (for profit)	unlimited
United Kingdom	Group of interest (not a legal entity)\n\nNo plans to become legal organisation, although our funder (who pays EGI subscriptions) plan to become a legal entity in August 2012	not a legal organisation

Table 4.2.1 NGIs roles

Country	National coordinating body	Resource Infrastructure Provider	Resource Centre	Technology Provider	Platform Integrator	Platform Operator
Armenia	✓	✓	✓	✓	✓	✓
Croatia	✓	✓	✗	✗	✗	✗
Cyprus	✓	✓	✓	✓	✓	✓
Czech Republic	✓	✓	✓	✓	✓	✓
Estonia	✓	✓	✓	✗	✓	✓
Finland	✓	✓	✓	✓	✓	✓
France	✓	✗	✗	✗	✗	✗
Germany	✓	✓	✗	✗	✗	✗
Ireland	✓	✓	✗	✗	✓	✓
Israel	✓	✓	✗	✓	✗	✗
Italy	✓	✓	✓	✓	✓	✓
Lithuania	✓	✗	✓	✓	✗	✗
Luxembourg	✓	✓	✗	✗	✗	✗
Macedonia	✓	✓	✗	✗	✗	✗
Moldova	✓	✓	✗	✓	✗	✗
Montenegro	✓	✓	✗	✓	✗	✗
Netherlands	✓	✓	✓	✓	✓	✓
Romania	✓	✓	✗	✗	✗	✗
Serbia	✓	✓	✓	✓	✓	✓
Slovakia	✓	✓	✗	✗	✗	✗
Spain	✓	✗	✗	✗	✓	✗

Country	National coordinating body	Resource Infrastructure Provider	Resource Centre	Technology Provider	Platform Integrator	Platform Operator
Switzerland	✓	✗	✗	✗	✗	✗
Turkey	✓	✓	✓	✗	✗	✗
United Kingdom	✓	✗	✗	✗	✗	✗

Table 4.3.1 Membership of the EGI Council

Country	Participant/ Associate Participant	Organisation representing NGI in the EGI Council	Lead Organisation	Number of member institutions	Name of governing body
Armenia	Participant	Institute for Informatics and Automation Problems of NAS RA	Institute for Informatics and Automation Problems of NAS RA	6	Council
Croatia	Participant	SRCE	SRCE	8	Council of Partners of CRO NG
Cyprus	Participant	University of Cyprus	University of Cyprus	2	-
Czech Republic	Participant	CESNET	CESNET	27	general assembly (general meeting of stakeholders)
Estonia	Participant	EENet	EENet	4	-
Finland	Participant	CSC	CSC	1	CSC Board
France	Participant	CNRS	CNRS	8	Conseil de Groupement
Germany	Participant	Gauß-Allianz e.V.	Karlsruhe Institute for Technology (KIT)	9	JRU-Leitung
Greece	Participant	GRNET	GRNET	24	-

Country	Participant/ Associate Participant	Organisation representing NGI in the EGI Council	Lead Organisation	Number of member institutions	Name of governing body
Hungary	Participant	Hungarian Grid Comptence Centre, currently represented by MTA Wigner RC (also rotates) and NIIF	Rotates. Currently it is Wigner RC (former MTA KFKI RMKI)	6	-
Ireland	Participant	Trinity College Dublin	Trinity College Dublin	-	Grid-Ireland Board of Directors
Israel	Participant		/ IUCC	8	
Italy	Participant	Italian Institute for Nuclear Physics (INFN)	Italian Institute for Nuclear Physics (INFN)	17	IGI Coordination Commitee (IGI Council)
Lithuania	Associate participant	Vilnius University	Vilnius University	5	Council of NGI-LT
Luxembourg	Participant	Fondation RESTENA	-	/	-
Macedonia	Participant	University Ss. Cyril and Methodius in Skopje	University Ss. Cyril and Methodius in Skopje	3	Council
Moldova	Associate participant	RENAM (Research and Educational Networking Association of Moldova)	RENAM (Research and Educational Networking Association of Moldova)	7	MD-GRID NGI Executive Committee
Montenegro	Participant	University of Montenegro	University of Montenegro	11	MREN Council
Netherlands	Participant	NIKHEF	NCF is the spokesperson for the organisation	6	BiG Grid directorate and Supervisory Council
Portugal	Participant	Lab of Instrumentation and Experimental Particle Physics (LIP)	Portuguese Science Foundation (FCT)	-	-
Romania	Participant	National Institute for Research and Development in Informatics – ICI Bucharest	National Institute for Research and Development in Informatics – ICI Bucharest	8	RoGrid-NGI Council, including one representative per each

Country	Participant/ Associate Participant	Organisation representing NGI in the EGI Council	Lead Organisation	Number of member institutions	Name of governing body
					member organization of the RoGrid-NGI consortium
Serbia	Participant	Institute of Physics Belgrade	Institute of Physics Belgrade	25	Board
Slovakia	Participant	IISAS	IISAS	17	the coordinator
Spain	Participant	CSIC	CSIC	12	Comité Ejecutivo
Switzerland	Participant	SwiNG	SwiNG	17	SwiNG Assembly
Turkey	Participant	TUBITAK ULAKBIM	TUBITAK ULAKBIM	8	TUBITAK ULAKBIM
United Kingdom	Participant	JISC	JISC (Funder)	28	NGI Management Board

Table 4.4.1 Types of stakeholders represented in NGI governing body

Country	Academic institutions	Research Institutes	National Government	Industry	Resource Centers	User Communties	VOs	Intergov'tal Organisations	Others
Armenia	✓	✓	✓	✗	✓	✗	✓	✗	✗
Croatia	✓	✓	✓	✗	✓	✓	✗	✗	✗
Cyprus	✓	✗	✗	✗	✗	✗	✗	✗	✗
Czech Republic	✓	✓	✗	✗	✗	✗	✗	✗	✗
Estonia	✓	✓	✗	✗	✗	✗	✗	✗	✗
Finland	✓	✓	✓	✓	✗	✗	✗	✗	✗
France	✓	✓	✓	✗	✗	✗	✗	✗	NREN (RENATER)
Germany	✓	✓	✗	✗	✗	✗	✗	✗	D-Grid GmbH, DFN e.V.
Hungary	✓	✓	✗	✗	✗	✗	✗	✗	✗
Ireland	✓	✓	✗	✗	✗	✗	✗	✗	✗
Israel	✓	✗	✗	✓	✗	✗	✗	✗	✗
Italy	✓	✓	✗	✗	✗	✗	✗	✗	One member from each partner of the JRU
Macedonia	✓	✗	✗	✗	✓	✗	✗	✗	✗
Moldova	✓	✓	✗	✗	✗	✗	✗	✗	✗
Montenegro	✓	✓	✓	✓	✓	✗	✗	✗	✗
Netherlands	✓	✓	✗	✗	✗	✗	✗	✗	✗
Romania	✓	✓	✗	✗	✗	✗	✗	✗	✗
Serbia	✓	✓	✗	✗	✗	✗	✓	✗	✗

Country	Academic institutions	Research Institutes	National Government	Industry	Resource Centers	User Communties	VOs	Intergov'tal Organisations	Others
Slovakia	✓	✗	✗	✗	✗	✗	✗	✗	✗
Spain	✓	✓	✗	✗	✗	✗	✗	✗	✗
Switzerland	✓	✗	✗	✗	✗	✗	✗	✗	✗
Turkey	✗	✗	✓	✗	✗	✗	✗	✗	✗
United Kingdom	✓	✓	✗	✗	✗	✗	✗	✗	✗

Table 4.4.2 Types of stakeholders represented in NGI advisory body

Country	User Community	Technology provider	Resource Centre	Industry	Others
Armenia	✓	✓	✓	✗	✗
Croatia	✓	✗	✗	✗	Government and universities representatives
Czech Republic	✓	✗	✗	✗	✗
France	✓	✗	✗	✗	EGI.eu, members of other NGIs
Germany	✓	✗	✗	✗	The name of German Advisory Board is NGI-DE-Beirat
Spain	✓	✓	✓	✗	✗
Switzerland	✓	✓	✗	✗	✗
Turkey	✓	✗	✓	✓	Ministry representatives
United Kingdom	✓	✗	✓	✗	NGS and GridPP have Advisory Body

Table 4.5.1 Relationship with Government and Governance Model

Country	Type of relation has the NGI with the national government	Web page describing the governance model
Armenia	Direct/Formal (e.g. board member; contact with Ministry)	-
Croatia	Direct/Formal (e.g. board member; contact with Ministry)	http://www.cro-ngi.hr/index.php?id=1580&L=1
Czech Republic	Informal/Indirect (e.g. gov't liaison; proposals; tenders)	-
Estonia	Hierarchical (e.g. you are subordinate to a responsible government body)	-
Finland	Direct/Formal (e.g. board member; contact with Ministry)	-
France	Direct/Formal (e.g. board member; contact with Ministry)	http://www.france-grilles.fr/Organigramme-France-Grilles
Germany	Informal/Indirect (e.g. gov't liaison; proposals; tenders)	-
Hungary	Non existent	-
Ireland	Informal/Indirect (e.g. gov't liaison; proposals; tenders)	-
Israel	Direct/Formal (e.g. board member; contact with Ministry)	-
Italy	Informal/Indirect (e.g. gov't liaison; proposals; tenders)	-
Lithuania	Informal/Indirect (e.g. gov't liaison; proposals; tenders)	-
Luxembourg	Hierarchical (e.g. you are subordinate to a responsible government body)	-
Macedonia	Informal/Indirect (e.g. gov't liaison; proposals; tenders)	-
Moldova	Informal/Indirect (e.g. gov't liaison; proposals; tenders)	http://grid.md/contact-us/grid-management/
Montenegro	Direct/Formal (e.g. board member; contact with Ministry)	http://www.mren.ac.me/organization.php
Netherlands	Other (please specify) - Via SURF and NWO	http://www.biggrid.nl/about-big-grid/organization/
Romania	Direct/Formal (e.g. board member; contact with Ministry)	-
Serbia	Informal/Indirect (e.g. gov't liaison; proposals; tenders)	-
Slovakia	Informal/Indirect (e.g. gov't liaison; proposals; tenders)	-
Spain	Direct/Formal (e.g. board member; contact with Ministry)	http://www.es-ngi.es/es-ngi.php
Switzerland	Hierarchical (e.g. you are subordinate to a responsible government body)	http://www.swing-grid.ch/organisation/

Country	Type of relation has the NGI with the national government	Web page describing the governance model
Turkey	Hierarchical (e.g. you are subordinate to a responsible government body)	http://www.truba.gov.tr/eng/truba/management/
United Kingdom	Informal/Indirect (e.g. gov't liaison; proposals; tenders)	-

Chapter 5 - Funding and Staffing

Table 5.1.1. Funding sources for individual NGIs

Country	National Public Funding	European Public Funding	Institutes	Paying Users	Membership Fees	Private Investments	Donations	Royalties	Others
Armenia	✗	✓	✗	✗	✗	✗	✗	✗	✗
Croatia	✓	✗	✗	✗	✗	✗	✗	✗	✗
Czech Republic	✓	✓	✗	✗	✓	✗	✗	✗	✗
Finland	✓	✓	✓	✓	✗	✗	✗	✗	✗
Ireland	✓	✓	✓	✗	✗	✗	✗	✗	✗
Israel	✓	✓	✓	✗	✗	✗	✗	✗	✗
Luxembourg	✓	✗	✗	✗	✗	✗	✗	✗	✗
Netherlands	✓	✗	✓	✗	✗	✓	✗	✗	✗
Spain	✓	✗	✓	✗	✗	✗	✗	✗	✗
Switzerland	✓	✗	✗	✓	✓	✗	✗	✗	✗
Turkey	✓	✓	✗	✓	✗	✗	✗	✗	✗

Table 5.1.2 Funding types for individual NGI

Country	Project based	Reccurent for funding organisations	Usage based	Subsription fee	Others
Armenia	✓	✗	✗	✗	✗
Croatia	✗	✓	✗	✗	✗
Czech Republic	✓	✓	✗	✗	✗
Finland	✓	✓	✗	✗	✗
Ireland	✓	✗	✗	✗	✗
Israel	✗	✓	✗	✗	✗
Luxembourg	✗	✓	✗	✗	✗
Netherlands	✓	✗	✗	✗	Funding is in the process of becoming recurrent
Spain	✗	✓	✗	✗	✗
Turkey	✓	✗	✓	✗	✗

Table 5.2.1 Funding sources for NGIs as e-infrastructures

Country	National Public Funding	European Public Funding	Institutes	Paying Users	Membership Fees	Private Investments	Donations	Royalties	Others
Armenia	✗	✓	✗	✗	✗	✗	✗	✗	✗
Croatia	✓	✗	✗	✗	✗	✗	✗	✗	✗
Cyprus	✓	✓	✗	✗	✗	✗	✗	✗	✗
Czech Republic	✓	✓	✗	✗	✓	✗	✗	✗	✗
Estonia	✓	✓	✓	✗	✗	✗	✗	✗	✗
Finland	✓	✓	✗	✗	✗	✗	✗	✗	✗
Ireland	✓	✓	✓	✗	✗	✗	✗	✗	✗
Israel	✓	✗	✓	✗	✗	✗	✗	✗	✗
Luxembourg	✓	✗	✗	✗	✗	✗	✗	✗	✗
Macedonia	✓	✓	✓	✗	✗	✗	✗	✗	✗
Moldova	✓	✓	✓	✗	✗	✗	✗	✗	✗
Montenegro	✓	✓	✓	✗	✗	✗	✗	✗	✗
Netherlands	✓	✓	✓	✗	✗	✓	✗	✗	✗
Romania	✓	✓	✓	✗	✗	✗	✗	✗	✗
Serbia	✓	✓	✗	✗	✗	✗	✗	✗	✗
Spain	✓	✓	✓	✗	✗	✗	✗	✗	✗
Switzerland	✓	✗	✗	✓	✓	✗	✗	✗	✗
Turkey	✓	✓	✗	✓	✗	✗	✗	✗	✗
United Kingdom	✓	✓	✓	✗	✗	✗	✗	✗	✗

Table 5.2.2 Funding types for NGIs as infrastructures

Country	Project based	Reccurent for funding organisations	Usage based	Subsription fee	Others
Armenia	✓	✗	✗	✗	✗
Croatia	✗	✓	✗	✗	✗
Cyprus	✓	✗	✗	✗	✗
Czech Republic	✓	✓	✗	✗	✗
Estonia	✓	✗	✗	✗	✗
Finland	✓	✓	✗	✗	✗
Ireland	✓	✗	✗	✗	✗
Israel	✗	✓	✗	✗	✗
Macedonia	✓	✓	✗	✗	✗
Moldova	✓	✓	✗	✗	✗
Montenegro	✓	✗	✗	✗	✗
Netherlands	✓	✓	✗	✗	Funding is in the process of becoming recurrent
Romania	✓	✗	✗	✗	✗
Serbia	✓	✗	✗	✗	✗
Spain	✓	✓	✗	✗	✗
Turkey	✓	✗	✓	✗	✗
United Kingdom	✓	✓	✗	✗	✗

Chapter 6 - Policy

Table 6.1.1 Resource Allocation model

Country	Resource Allocation model
Croatia	We use fair share model for allocating all resources.
Cyprus	For new user communities applying for resources in CyGRID, firstly, a certificate is created for the users and then, they are subscribed to the corresponding VO supporting their application. If the application is not supported in any VO, the user will join the SEE VO and the application will be installed in our clusters. No financials are involved.
Czech Republic	Best effort, priorities for ESFRI projects - prioritization also related to the scientific outcome of individuals & research teams
Finland	Under development
France	Existing communities access resources on existing VOs. New communities access seed resources through regional grid initiatives and larger resources on the national France-Grilles VO
Germany	The resource owners decide about the usage of their resources. NGI-DE only moderates between owners and users.
Italy	5 to 10% of the resources of the participating resource centers are reserved to new user communities through catch all VOs. More resources are available to new users in an opportunistic way. IGI has a small amount of resources for new users too. No granting mechanisms are applied to have access to this resources, activities are evaluated on the outcome of the researches conducted exploiting the NGI resources. Costs are covered by the funding agencies as described before.
Lithuania	Agreement
Macedonia	Since all infrastructure is funded by the national public funding, and since the current users do not utilize the infrastructure in its full potential, the NGI allocates new resources the new users on the base of expression of interest in the form of application proposal. After the application proposal is evaluated and approved by the NGI, the resources are allocated for the new community.
Moldova	New or existing User with new application applies for resources allocation through his institution manager. Application description must be prepared in accordance with recommended by MD-Grid NGI form. Filled form submits to MD-Grid NGI Executive committee for acceptance.
Montenegro	All potential users will have support from UoM/MREN.
Netherlands	Users can submit a resource request through the national research organization (NWO).
Romania	In order to use the resources, users must be registered to a national, regional or international VO. If needed existing users can ask the sites to allocate more resources for their VO. If the users contact directly the NGI, the request is forwarded to the sites. Each site is free to decide its own policy for resource allocation. Costs are covered by the projects that support respective VOs.

Country	Resource Allocation model
Spain	An existing user or new community is entitled to use the infrastructure as long as their research project has been approved in a competitive call at the National or European level. If this is not the case, the community needs to bring in their own resources to the infrastructure.
Turkey	Dedicated resources for TUBITAK and national research projects. Shared queue of remaining resources which is open to all individual national researchers.
United Kingdom	Start up - 2000 CPU hrs per annum free to any individual researcher or small project via NGS; purchase CPU or data storage from NGS sites; GridPP donate a % capacity to non-LHC VOs, VOs can approach GridPP to apply to be supported

Table 6.2.1 NGI National Policies

Country	National policies
Czech Republic	National users are required to acknowledge usage of the NGI infrastructure in their publications
Finland	Under development. The OLA needs adjusting to comply with Finnish Law.
Germany	If German law requires different policies.
Netherlands	General NWO Regulation on Granting apply to all uses of the infrastructure, regulating who may submit a grant proposal, what may be applied for, permissible uses, and reporting requirements. The NGI adopted the EGI security policies but reserves the right to augment to supersede these policies.
Serbia	NGI defines policies related to operations, security and middleware deployment. Resource centers define policies for use of their resources.

Table 6.2.2 NGI Webpages with the list of policies/procedures

Country	Webpage with the list of policies/procedures
Croatia	http://www.cro-ngi.hr/fileadmin/cro-ngi/dokumenti/CRO_NGI_Pravilnik_v1.pdf

Country	Webpage with the list of policies/procedures
Czech Republic	https://meta.cesnet.cz/wiki/MetaVO_usage_rules plus policies of each VO
Germany	http://www.ngi-de.eu/english/policies.php
Lithunia	http://www.litgrid.lt
Luxemburg	www.lugrid.lu
Netherlands	http://www.biggrid.nl/big-grid-infrastructure/policies/
Spain	http://www.es-ngi.es/usuarios_acceso_ngi.php

Chapter 7 - Outreach

Table 7.1.1 NGI Regular newsletter/annual report/case study/book

Country	Regular newsletter/annual report/case study/book
Croatia	NGI publishes monthly reports to users: http://www.cro-ngi.hr/izvjestaji/
Czech Republic	Yearbook MetaCentrum (grid) - http://www.metacentrum.cz/en/about/results/yearbooks/ CESNET - http://www.ces.net/doc/annual-reports.html Newsletter - http://www.cesnet.cz/doc/datagram/ (in Czech language) Press releases - http://www.ces.net/doc/press/
Finland	www.csc.fi
France	Regular newsletters in French (email)
Germany	Internal Reports and D-Grid brochure (in German) http://www.ngi-de.eu/reports.php
Hungary	Case studies on the website.
Netherlands	Our lifesciences platform www.ebiogrid.nl publishes a newsletter
Portugal	A 2011 report will be released in the context of IBERGRID.
Serbia	AEGIS annual reports are prepared and presented on a yearly basis at AEGIS annual assemblies.
Spain	http://www.es-ngi.es/publicaciones.php
Switzerland	http://www.swing-grid.ch/resources/documents/Publications
Turkey	Annual report is given to the funding ministry.
United Kingdom	fortnightly email bulletin ngs-news@jiscmail.ac.uk quarterly newsletter and case studies - see www.ngs.ac.uk facebook UK NGI page https://www.facebook.com/UKNGI

Table 7.2.1 NGI Events

Country	Events
Croatia	NGI organizes annual one day event "CRO NGI Day": http://www.cro-ngi.hr/dan/2011/
Cyprus	Cyprus Grid Days, Training events, user support, application development and support.
Czech Republic	Annual Workshops for local users - http://metavo.metacentrum.cz/en/seminars/index.html
France	Annual scientific event: Rencontres scientifiques France Grilles first edition 2011 Bi-annual operation workshop
Germany	NGI-DE Jahrestagung (annual work shop series together with D-Grid) - http://dgi-2.d-grid.de/termine.php GridKa School @ KIT (supported by NGI-DE) - http://gridka-school.scc.kit.edu/
Hungary	e-Science Cafe Roadshow (former Cafe Grid) - http://www.lpds.sztaki.hu/roadshow/ DCI Summer School - http://www.lpds.sztaki.hu/eudciss2011/
Italy	There used to be INFNGRID workshops, now we are organising the first IGI workshop
Latvia	The following events are organized on a yearly basis: - two dissemination events every year - two training events for MD-GRID NGI users - MD-GRID NGI training for site administrators Reports from all principal events are available at MD-GRID NGI web site: http://www.grid.md/training-events/
Lithuania	Scientific seminars that is held one time per month
Macedonia	Annual workshop during the national IT CIIT conference, http://ciit.finki.ukim.mk
Moldova	http://www.renam.md/uc/ RENAM Users' Conference
Montenegro	IT conference in Zabljak, Montenegro
Netherlands	http://www.biggrid.nl/news-events/ http://sara.nl/news/ http://www.nikhef.nl/generalstorage/tt-news/evenementen/ http://www.esciencecenter.com/agenda/ http://www.nbic.nl/about-nbic/events/all-events/ http://www.ebiogrid.nl/
Portugal	Yes in the context of IBERGRID we organize an yearly conference. http://www.ibergrid.eu/
Serbia	The following events are organized on a yearly basis: - AEGIS annual assembly - AEGIS training for users - AEGIS training for site administrators Reports from these events are available at AEGIS web site news section: http://www.aegis.rs/news
Slovakia	Int. Workshop on Grid Computing for Complex Problems (GCCP2005 ? GCCP2011) http://conference.ui.sav.sk/gccp2011
Spain	http://www.es-ngi.es/eventos.php
Switzerland	Swiss Distributed Computing Day and Swiss Grid School http://www.swing-grid.ch/resources/education-and-outreach/

Country	Events
Turkey	National High Performance Computing Conference http://www.basarim.org.tr
United Kingdom	GridPP Collaboration Workshops (www.gridpp.ac.uk) NGS/SeIUCCR Summer School - see www.ngs.ac.uk

Table 7.3.1 Project websites

Country	URL	Country	URL
Croatia	http://www.cro-ngi.hr/	**Lithuania**	www.litgrid.lt
Cyprus	cygrid.org.cy	**Luxemburg**	www.lugrid.lu
Czech Republic	http://www.metacentrum.cz/en/index.html	**Macedonia**	http://www.margi.ukim.mk
Germany	http://www.ngi-de.eu/	**Netherlands**	www.ebiogrid.nl
France	Neugrid4you.eu stratuslab.eu creative-B.eu envri.eu	**Romania**	http://wiki.gridmosi.ro/ http://www.pegaf.ro/
Italy	www.italiangrid.it	**United Kingdom**	www.ukngi.ac.uk www.gridpp.ac.uk www.ngs.ac.uk

Table 7.3.2 Social Media

Country	Social media	URL
Ireland	Twitter	https://twitter.com/#!/grid_ie
Italy	LinkedIn	http://www.linkedin.com/company/2412075?trk=tyah
United Kingdom	Facebook	https://www.facebook.com/UKNGI

Chapter 8 - Services

Table 8.1.1 Certification Authorities

Country	Issuing certificates for users	Issuing certificates for code servers	Issuing certificates for code signing	Other
Armenia	✓	✓	✗	✗
Croatia	✓	✓	✗	✗
Cyprus	✓	✓	✗	✗
Czech Republic	✓	✓	✗	we arrange TERENA TCS certificate for users and servers
Estonia	✓	✓	✗	✗
Finland	✗	✗	✗	We use the TERENA model and also the NorduGrid CA
France	✗	✗	✗	CNRS presently is the certification authority
Germany	✗	✗	✗	CA are operated by KIT and DFN for users, servers and code signing
Hungary	✓	✓	✗	✗
Ireland	✓	✓	✗	✗
Israel	✓	✓	✗	✗
Italy	✗	✗	✗	Currently using the INFN CA, IGI is going to set up an online Certification Authority. By the end of 2012 this should be up and running
Luxemburg	✗	✗	✗	BEgrid
Macedonia	✓	✓	✗	✗
Moldova	✓	✓	✗	✗
Montenegro	✓	✓	✗	✗

Country	Issuing certificates for users	Issuing certificates for code servers	Issuing certificates for code signing	Other
Netherlands	✓	✓	✓	✗
Romania	✓	✓	✗	✗
Serbia	✓	✓	✗	✗
Slovakia	✓	✓	✗	✗
Spain	✓	✓	✗	✗
Turkey	✓	✓	✗	✗
United Kingdom	✓	✓	✓	✗

Table 8.2.1 NGI Services

Country	Data management services	Job management services	VO membership service	Digital certificates services	VO monitoring	Science gateways	Others
Armenia	✓	✓	✓	✓	✓	✗	✗
Croatia	✓	✓	✗	✗	✗	✗	BDII, MyProxy
Cyprus	✓	✓	✓	✗	✓	✗	✗
Czech Republic	✓	✓	✓	✓	✓	✗	cloud interfaces and virtual environment
Estonia	✓	✓	✓	✓	✗	✗	✗
Finland	✓	✓	✓	✓	✓	✓	✗
France	✗	✗	✗	✗	✗	✗	The above services are provided by the resource centers financed by the communities. France-Grille provides the technical coordination between these services and runs networking activities (user support, training, dissemination
Germany	✓	✓	✓	✗	✓	✓	Helpdesk

Country	Data management services	Job management services	VO membership service	Digital certificates services	VO monitoring	Science gateways	Others
Ireland	✓	✓	✓	✓	✗	✓	✗
Israel	✓	✗	✓	✓	✓	✗	✗
Italy	✓	✓	✓	✓	✓	✓	General purpose portal for job submission and data management Consultancy to application porting Grid usage Training Grid administration training user communities requirements gathering Cloud Service integrated in grid infrastructure (WNoDES)
Lithuania	✓	✓	✓	✗	✗	✗	✗
Macedonia	✓	✓	✓	✗	✗	✗	✗
Moldova	✗	✓	✓	✓	✓	✗	✗
Montenegro	✓	✓	✗	✓	✗	✗	✗
Netherlands	✓	✓	✓	✓	✗	✓	Infrastructure provisioning services (IAAS-HPCCLOUD) Data processing services ('Hadoop')
Romania	✓	✓	✓	✓	✗	✗	✗
Serbia	✓	✓	✓	✓	✓	✗	✗
Slovakia	✓	✓	✗	✓	✗	✗	✗
Spain	✓	✓	✓	✓	✓	✗	Support to Application porting
Switzerland							
Turkey	✓	✓	✓	✓	✓	✗	✗
United Kingdom	✓	✓	✓	✓	✓	✓	multitude of user tools see www.ngs.ac.uk application hosting see www.ngs.ac.uk

Table 8.3.1 NGI Training Days and attendents (end-users and operators)

Country	Number of training days	Number of attendants	Country	Number of training days	Number of attendants
Armenia	2	1	**Macedonia**	2	10
Croatia	0	0	**Moldova**	4	24
Cyprus	4	11	**Montenegro**	1	12
Czech Republic	4	80	**Netherlands**	5	150
Finland	0	0	**Serbia**	2	33
France	28	226	**Slovakia**	1	7
Germany	5	100	**Spain**	60	400
Israel	10	3	**Turkey**	1	60
Italy	10	50	**United Kingdom**	5	24
Lithuania	15	17			

Chapter 9 - Users

Table 9.1.1 Users and VOs

Country / EIRO	Number of end-users with valid credentials	Number of VOs	Top 3 VOs by usage (logical CPU walltime)
Armenia	✗	7	1. - alice
			2. - armgrid.grid.am
			3. - atlas
Belgium	✗	9	1. - cms
			2. - enmr.eu
			3. - cmsuser
Bosnia & Herzegovina	✗	3	1. - ops
			2. - seegrid
			3. - ops.vo.egee-see.org
Bulgaria	✗	19	1. - lhcb
			2. - see
			3. - biomed
CERN	✗	10	1. - alice
			2. - atlas

Country / EIRO	Number of end-users with valid credentials	Number of VOs	Top 3 VOs by usage (logical CPU walltime)
			3. - lhcb
Croatia	55	11	1. - lhcb
			2. - biomed
			3. - gilda
Cyprus	11	10	1. - see
			2. - lhcb
			3. - atlas
Czech Republic	1500	11	1. - atlas
			2. - alice
			3. - auger
Denmark	✗	3	1. - atlas
			2. - alice
			3. - ops
Estonia	✗	6	1. - cms
			2. - balticgrid
			3. - bg

Country / EIRO	Number of end-users with valid credentials	Number of VOs	Top 3 VOs by usage (logical CPU walltime)
Finland	✗	1	1. - cms
France	1025	89	1. - atlas
			2. - cms
			3. - alice
Germany	1500	42	1. - atlas
			2. - cms
			3. - alice
Greece	✗	32	1. - see
			2. - compchem
			3. - cms
Hungary	✗	10	1. - cms
			2. - hungrid
			3. - alice
Ireland	✗	15	1. - atlas
			2. - lhcb
			3. - compchem
Israel	60	10	1. - biomed

Country / EIRO	Number of end-users with valid credentials	Number of VOs	Top 3 VOs by usage (logical CPU walltime)
			2. - see
			3. - compchem
Italy	400	50	1. - atlas
			2. - cms
			3. - alice
Latvia	✗	2	1. - balticgrid
			2. - ops
Lithuania	36	3	1. - gamess
			2. - balticgrid
			3. - litgrid
Macedonia	15	8	1. - biomed
			2. - seegrid
			3. - see
Moldova	7	7	1. - biomed
			2. - mdgrid
			3. - mdgridedu

Country / EIRO	Number of end-users with valid credentials	Number of VOs	Top 3 VOs by usage (logical CPU walltime)
Montenegro	5	5	1. - seegrid
			2. - ops
			3. - ops.vo.egee-see.org
Netherlands	✗	24	1. - atlas
			2. - lhcb
			3. - alice
Norway	✗	1	1. - atlas
Poland	✗	22	1. - atlas
			2. - alice
			3. - lhcb
Portugal	✗	22	1. - atlas
			2. - cms
			3. - auger
Romania	80	15	1. - alice
			2. - atlas
			3. - lhcb
Russia	✗	17	1. - atlas

Country / EIRO	Number of end-users with valid credentials	Number of VOs	Top 3 VOs by usage (logical CPU walltime)
			2. - alice
			3. - cms
Serbia	105	13	1. - aegis
			2. - see
			3. - desktopgrid.vo.edges-grid.eu
Slovakia	60	9	1. - alice
			2. - esr
			3. - biomed
Slovenia	✗	12	1. - atlas
			2. - gridgen
			3. - gridarc
Spain	67	57	1. - atlas
			2. - cms
			3. - lhcb
Sweden	✗	3	1. - atlas
			2. - alice
			3. - ops

Country / EIRO	Number of end-users with valid credentials	Number of VOs	Top 3 VOs by usage (logical CPU walltime)
Switzerland	✗	13	1. - alice
			2. - lhcb
			3. - atlas
Turkey	700	18	1. - atlas
			2. - trgride
			3. - cms
United Kingdom	2000	64	1. - atlas
			2. - lhcb
			3. - cms

Table 9.2.1 Research Areas. AAA = Astronomy, Astrophysics and Astro-Particle Physics; CC = Computational Chemistry; CSM = Computer Science and Mathematics; ES = Earth Sciences; F = Fusion; HEP = High-Energy Physics; LS = Life Sciences; M = Multidisciplinary

Country	AAA	CC	CSM	ES	F	HEP	LS	M	Others
Armenia	✓	✓	✓	✓	✗	✓	✓	✓	✗
Bosnia & Herzegovina	✗	✗	✗	✗	✗	✗	✗	✓	✗
Bulgaria	✗	✗	✗	✓	✗	✓	✓	✓	✗
CERN	✗	✗	✗	✗	✗	✓	✗	✓	✗
Croatia	✗	✓	✓	✗	✗	✓	✓	✓	✗
Cyprus	✗	✗	✗	✗	✗	✓	✓	✓	✗
Czech Republic	✓	✓	✓	✓	✗	✓	✓	✓	Only subset of VOs is visible in EGI, remaining are supported on national level
Denmark	✗	✗	✗	✗	✗	✓	✗	✓	✗
Estonia									
Finland	✓	✓	✓	✓	✓	✓	✓	✓	Any scientific research that is publicly funded.
France	✓	✓	✓	✓	✓	✓	✓	✓	Complex systems
Germany	✓	✓	✓	✓	✗	✓	✓	✓	✗
Greece	✓	✓	✗	✓	✗	✓	✓	✓	✓
Ireland	✓	✓	✓	✓	✓	✓	✓	✓	✗
Israel	✗	✗	✗	✗	✗	✗	✓	✓	✗
Italy	✓	✓	✓	✓	✗	✓	✓	✓	✗
Lithuania	✓	✗	✓	✗	✗	✗	✗	✗	✗
Macedonia	✗	✓	✓	✓	✗	✗	✓	✓	Biomedical sciences

Country	AAA	CC	CSM	ES	F	HEP	LS	M	Others
Moldova	✗	✗	✓	✗	✗	✗	✓	✗	Physics, Computational Fluid-Solid State Dynamics, Climate/Weather Modeling, Materials
Montenegro	✗	✗	✗	✗	✗	✗	✓	✓	✗
Netherlands	✓	✗	✓	✓	✗	✓	✓	✓	✗
Poland	✓	✓	✗	✗	✗	✓	✓	✓	✗
Portugal	✓	✓	✗	✗	✗	✓	✓	✓	✗
Romania	✗	✗	✓	✓	✗	✓	✗	✗	✗
Russia	✗	✗	✗	✗	✓	✓	✓	✗	✗
Serbia	✓	✓	✓	✓	✗	✓	✗	✓	✗
Slovakia	✓	✗	✗	✓	✓	✓	✓	✓	✗
Slovenia	✓	✗	✗	✗	✗	✓	✗	✗	✗
Spain	✓	✓	✓	✓	✓	✓	✓	✓	✗
Switzerland	✗	✗	✗	✗	✗	✓	✗	✓	✗
Turkey	✗	✓	✓	✓	✗	✓	✓	✓	✗
United Kingdom	✓	✓	✓	✓	✓	✓	✓	✓	Humanities, social sciences, arts - just about anything

Table 9.3.1 Projects

Country	Direct involvement of the NGIs as a partner	Indirect involvement through an NGIs member	ESFRI projects the NGIs is directly involved
Armenia	✗	3	✗
Croatia	0	0	✗
Cyprus	1	EGI-InSPIRE	✗
Czech Republic	EGI,EMI,Chain,Moonshot	not collected	directly none indirectly through members ESFRI road map members
France	0 - NGI is not a legal entity	0 European funded projects and many other projects	LHC experiments CTA, KM3NET ELIXIR, INSTRUCT ICOS, EPOS, LIFEWATCH MYRRHA
Germany	0	23	none directly, indirect: PRACE, CLARIN
Italy	2	10	Indirectly involved (through participation of partners' members staff) in: BBMRI ELIXIR LIFEWATCH EMSO EPOS CTA-PP INSTRUCT Euro-BioImaging KM3NeT
Macedonia	0	1	✗
Moldova	2	✗	0
Montenegro	0	0	✗
Netherlands	✗	✗	LHC, KM3NeT, CLARIN, DARIAH, LifeWatch, Elixir, WeNMR (INSTRUCT), EPI, SKA, BBMRI, ICOS.
Serbia	0	5	
Spain	✗	25	Lifewatch
Turkey	3	✗	✗

Chapter 10 - Infrastructure

Table 10.1.1 Resource Centres

Country	Resource Centres	Country	Resource Centres
Armenia	1	Lithuania	3
Belgium	3	Macedonia	2
Bosnia & Herzegovina	1	Moldova	3
Bulgaria	9	Montenegro	1
CERN	1	Netherlands	16
Croatia	8	Norway	1
Cyprus	2	Poland	9
Czech Republic	11	Portugal	7
Denmark	2	Romania	15
Estonia	2	Russia	10
Finland	9	Serbia	6
France	18	Slovakia	4
Germany	21	Slovenia	2
Greece	15	Spain	24
Hungary	4	Sweden	1
Ireland	6	Switzerland	7
Israel	3	Turkey	6
Italy	53	United Kingdom	22
Latvia	2		

Table 10.2.1 CPUs (cores) and GPUs. VMs = virtual machines

Country	Logical CPUs	Logical CPUs dedicated to run VMs	Hours of logical CPU wall clock time	Utilisation of the logical CPU capacity	Total GPUs available	Hours of GPUs wall clock time	Utilisation of the GPU computing capacity
Armenia	90	✗	38340	✗	✗	✗	✗
Bosnia & Herzegovina	16	✗	553	✗	✗	✗	✗
Bulgaria	1629	✗	547575	✗	✗	✗	✗
CERN	27334	✗	68132223	✗	✗	✗	✗
Croatia	1112	✗	✗	✗	0	0	0%
Cyprus	92	✗	105617	20%	0	0	0%
Czech Republic	6000	2800	30000000	90%	20	✗	✗
Denmark	11183	✗			✗	✗	✗	✗
Estonia	2585	✗	✗	✗	✗		✗
Finland	1512	✗	✗	✗	✗	✗	✗
France	32867	✗	161138859	✗	0	0 ✗	✗
Germany	33221	✗	182599244	✗	✗	✗	✗
Greece	1712	✗	4340502	✗	✗	✗	✗
Hungary	558	✗	4037728	✗	✗	✗	✗
Ireland	1432	32	5721648	✗	✗	✗	✗
Israel	1459	✗	4362660	✗	✗	✗	✗
Italy	33000	10000	124325843	90%	0	0	0%
Latvia	93	✗	✗	✗	✗	✗	✗
Lithuania	162	✗	141960	21%	0	0	0%
Macedonia	80	✗	7217	✗	0	0	0%

Country	Logical CPUs	Logical CPUs dedicated to run VMs	Hours of logical CPU wall clock time	Utilisation of the logical CPU capacity	Total GPUs available	Hours of GPUs wall clock time	Utilisation of the GPU computing capacity
Moldova	✗	56	✗	✗	2	0	0%
Montenegro	40	✗	68	✗	0	0	0%
Netherlands	10890	608	49488178	✗	✗	✗	✗
Norway	5334	✗	✗	✗	✗	✗	✗
Poland	28389	✗	30793635	✗	✗	✗	✗
Portugal	2126	✗	30793635	✗	✗	✗	✗
Romania	5800	280	26789056	✗	✗	✗	✗
Russia	3833	✗	28893549	✗	✗	✗	✗
Serbia	1062	✗	1395996	90%	0	0	0%
Slovakia	676	✗	2853409	✗	✗	✗	✗
Slovenia	2942	✗	10686610	✗	✗	✗	✗
Spain	15696	2000	89000000	71%	✗	✗	✗
Sweden	3241	✗	✗	✗	✗	✗	✗
Switzerland	1887	✗	8979665	✗	✗	✗	✗
Turkey	12000	1200	5177026	82%	8	0	0%
United Kingdom	28451	✗	225767013	✗	✗	✗	✗

Table 10.3.1 Disk and Tape Storage

Country	Disk (TB)	Tape (TB)	Country	Disk (TB)	Tape (TB)
Armenia	8	0	Lithuania	3	0
Bosnia & Herzegovina	1	0	Macedonia	4	0
Bulgaria	58	0	Moldova	3	0
CERN	19100	43100	Montenegro	2	0
Croatia	55	0	Netherlands	5344	6663
Cyprus	4	0	Norway	70	0
Czech Republic	1600	400	Poland	670	0
Denmark	3321	5067	Portugal	638	0
Estonia	12	0	Russia	2262	0
Finland	356	0	Serbia	67	0
France	15900	22530	Slovakia	121	0
Germany	19640	21700	Slovenia	36	0
Greece	235	37	Spain	11460	5922
Hungary	300	✗	Sweden	1500	5000
Ireland	232	0	Switzerland	1600	✗
Israel	5191	0	Turkey	1216	0
Italy	16000	10000	United Kingdom	16480	6300
Latvia	1	0			

Table 10.4.1 Availability and Ownership of NGI Resources

NGI	Number of Logical CPUs	Disk Storage (TB)	Tape Storage (TB)
Cyprus	92	4	0
Germany	✗	0	0
Israel	60	✗	✗
Italy	3500	150	0
Lithuania	✗	0	0
Macedonia	30	2	0
Moldova	12	1	0
Serbia	16	3	0
Slovakia	6	✗	✗
Spain		50	✗
Turkey	128	✗	✗

Table 10.4.2 NGI Ownership of resources for new users try-out

NGI	Ownership of resources for new users try-out
Czech Republic	All resources available for newcommers
Estonia	Owned by NGI Owned by affiliated resource centres/institutions
Finland	Mixed ownership
France	Owned by affiliated resource centres/institutions
Germany	Owned by affiliated resource centres/institutions For training and new-user-enabling sessions NGI-DE is temporarly gathering a limited number of ressoures from partners
Ireland	Owned by affiliated resource centres/institutions
Italy	Mixed ownership about 3500 granted from a 5 to 10% percent of the resource centers owned by the IGI partners + 300 owned by IGI - much more in an opportunistic way
Macedonia	Owned by affiliated resource centres/institutions
Moldavia	Owned by NGI Mixed ownership
Netherlands	Owned by NGI
Serbia	Owned by affiliated resource centres/institutions
Slovakia	Owned by affiliated resource centres/institutions
Spain	Mixed ownership
Turkey	Owned by NGI
UK	Owned by affiliated resource centres/institutions

Chapter 11 - Technology

Table 11.1.1 Middleware components.

Country	gLite	UNICORE	ARC	Globus	StratusLab	dCache	EDGI	Other
Armenia	✓	✗	✗	✗	✗	✓	✗	✗
Belgium	✓	✗	✗	✗	✗	✓	✗	✗
Bosnia & Herzegovina	✓	✗	✗	✗	✗	✓	✗	✗
Bulgaria	✓	✗	✗	✗	✗	✓	✗	✗
Croatia	✓	✗	✗	✓	✗	✗	✗	✗
Cyprus	✓	✗	✗	✗	✗	✓	✗	✗
Czech Republic	✓	✗	✗	✓	✗	✗	✗	OpenNebula
Denmark	✓	✗	✓	✗	✗	✗	✗	✗
Estonia	✓	✓	✗	✗	✗	✗	✗	✗
Finland	✗	✗	✓	✗	✗	✓	✗	NorduGrid ARC
France	✓	✗	✗	✗	✓	✓	✓	✗
Germany	✓	✓	✗	✓	✗	✓	✗	✗
Greece	✓	✗	✗	✗	✗	✓	✗	✗
Hungary	✓	✗	✗	✗	✗	✗	✗	✗
Ireland	✓	✗	✗	✗	✓	✗	✗	✗
Israel	✓	✗	✗	✓	✗	✗	✗	✗
Italy	✓	✗	✗	✗	✗	✗	✗	DGAS for accounting
Latvia	✓	✗	✓	✗	✗	✗	✗	✗
Lithuania	✓	✗	✗	✗	✗	✗	✗	✗

Country	gLite	UNICORE	ARC	Globus	StratusLab	dCache	EDGI	Other
Luxembourg	✓	✗	✗	✗	✗	✗	✗	✗
Macedonia	✓	✗	✗	✗	✗	✗	✗	✗
Moldova	✗	✗	✗	✗	✗	✗	✗	UMD
Montenegro	✓	✗	✗	✗	✗	✗	✗	✗
Netherlands	✓	✗	✗	✗	✗	✓	✗	✗
Norway	✓	✗	✓	✗	✗	✗	✗	✗
Poland	✓	✓	✗	✗	✗	✗	✗	✗
Portugal	✓	✗	✗	✗	✗	✗	✗	✗
Romania	✓	✗	✗	✓	✗	✗	✗	✗
Russia	✓	✗	✗	✗	✗	✓	✗	✗
Serbia	✓	✗	✗	✗	✗	✗	✗	✗
Slovakia	✓	✗	✗	✗	✗	✓	✗	✗
Slovenia	✓	✗	✓	✗	✗	✓	✗	✗
Spain	✓	✗	✗	✗	✗	✗	✗	✗
Sweden	✓	✗	✓	✗	✗	✓	✗	✗
Switzerland	✓	✗	✓	✗	✗	✓	✗	✗
Turkey	✓	✗	✗	✓	✗	✗	✗	✗
United Kingdom	✓	✗	✓	✓	✗	✗	✗	✗