

National Grid Initiatives Set-up and Monitoring Guidelines

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Abstract

This paper provides a step-to-step guide for setting up a sustainable National Grid Initiative. 9 basic steps established in the course of 3 phases of SEE-GRID project are further expanded and categorized into three areas: organizational, policy, and operational. For each of these, a set of guidelines and best practices is given. Further, a set of metrics used for assessment of the status and progress of the National Grid Initiatives in the South-East Europe region is given. The metrics are categorized in four distinct groups, covering: 1. NGI organization; 2. Infrastructure, operations and middleware; 3. User community; and 4. Sustainability and international collaboration. A cases study is used to briefly illustrate the approach – Romanian NGI, being the first NGI set up within the region.

1. Introduction

During the 3 phases of the SEE-GRID project [1][2][3] significant results have been achieved in South-East European countries in the area of set up and development of National Grid Initiatives (NGIs). In collaboration with pan-European Initiatives (eIRG, EGEE, EGI-DS), SEE-GRID has led the way in adopting the NGI philosophy as the central component of long-term sustainability of eInfrastructures. In all SEE-GRID countries NGI implementation is a priority on the agenda of Grid infrastructure development at the national level.

At the SEE-GRID project level, a clear definition of the NGI concept has been adopted: "NGI is an open consortium of legal entities or a legal entity acting on their behalf that, for the benefit of research and education community, coordinates, promotes and implements Grid activities at the National level, focusing on Grid deployment and operations, according to a National strategy / research and deployment programme for this field."

The following requirements are attached to this definition:

- It is officially recognized by the appropriate governmental entity responsible for research eInfrastructure;

- It should be unique in this position and its legitimacy should be enforced according to a national level strategic document adopted at the governmental/ministerial levels;
- Basic focus of NGI is on deployment and operations of the national research and education Grid infrastructure (NREGI);
- It represents a relevant part of the research community and is open to accept any qualified research/educational entity as its member, according to its open character;
- Both top-down and bottom-up approaches should be considered for the consortium enlargement, the former one being specific to the initial phase of NGI development;
- It closely collaborates and is mutually recognized with NREN;
- It contributes and adheres to international standards and policies;
- Sustainability is core long-term objective of NGI; achieving critical mass of interested user communities should be a high priority target on the way towards sustainability.

Set up and consolidation of NGI in all partner countries in accordance with these requirements was a central objective of all 3 phases of the SEE-GRID project. As of January 2009, NGI concept is implemented in 13 partner countries: Greece (Hellas Grid), Bosnia-Herzegovina (NGI-BA), Bulgaria (BGGC), Croatia (CRO-GRID), FYROM (MARGI), Hungary (HGCC), Montenegro (MGI), Romania (RoGrid), Serbia (AEGIS); Turkey (TR-Grid); Moldova (MDGRID); Albania (ALB-GRID); Armenia (ArmNGI).

This paper provides a summary of the step-to-step guide for setting up a sustainable National Grid Initiative, based on SEE-GRID experience. In SEE-GRID-2 deliverable D2.2 [4], three major area of interest for NGI implementation have been identified: organizational, policy and operational activities. For each of them a brief overview of relevant solutions focused on the SEE-GRID-1 project experience was given, and recommendations have been formulated for each of the three areas. As a conclusion, the following steps were proposed by the SEE-GRID project to set-up an NGI. The steps have a form of a simple-to-use NGI cook-book.

- 1.** Get in touch with diverse research institutes interested in scientific computing (i.e. HEP, Biomedical, Computational Chemistry, etc.), large computing centres, and National Research Network and get consensus towards common strategy for Grid development in the country.
- 2.** Sign a MoU (Memorandum of Understanding) within the consortium which would define your common goal in setting up an NGI and developing the Grid infrastructure and general Grid activities in the country.
- 3.** Write together a national strategy document. This would state major objectives and approach, and identify potential Grid resources and user groups in the country. This document could also define structure of the NGI and its decision mechanisms and internal organisation.
- 4.** Approach relevant ministries (e.g. Science and Technology, Development, Education, Information Technology) with the national strategy document, and try to get a ministry to support your work. This can have the form of an official letter of support for the NGI. Also a ministry can officially appoint a task force.
- 5.** Establish a legal entity or make sure an established legal entity represents NGI on behalf of the consortium.
- 6.** With the support letter from the Ministry you can have an official inauguration event of the National Grid Initiative targeted at slightly wider public.
- 7.** Seek national funding programme by proposing a national-level project. With support letters from Ministry and with proof of EU funding you have more chance with the national funding bodies to get some local funding for your Grid work.
- 8.** Consider technical aspects: choice of middleware, establishing pilot resource centres even with basic resources, aim to support core services for the pilot national VO, use the VO to establish the sharing culture. Establish a web presence visible to a wider community.
- 9.** Define and adopt the national-level policies.

These 9 basic steps established in the course of preceding projects are further expanded and categorized into three areas: organizational, policy, and operational. For each of these, a set of guidelines and best practices is given. A case study is used to briefly illustrate the approach – Romanian NGI, being the first NGI set up within the region.

2. Organisational aspects

The organisational aspects presented here follow the evolution from Joint Research Units towards stable and well organised National Grid Initiatives, which in long term present the national community at the local and the international level, and rally together for common national and international project participation and sustainable funding.

JRU

The Joint Research Unit - JRU concept was promoted in FP6 Programme as a form of implementing the “unique voice” principle when a group of entities was participating in the same project, and has been further extended in the FP7 programme. JRUs are research laboratories/infrastructures created and owned by two or more different legal entities in order to carry out research. They do not have a legal personality different from that of its members, but from a single research unit where staff and resources from the different members are put together to benefit of all. The JRU has to meet the following conditions: scientific and economic unity; last a certain length of time; recognised by a public authority [5]. Forming a JRU as a first step towards stable NGI creation is a baseline for setting up a sustainable organization at the national level, and is strongly recommended for all countries on European level and beyond. JRU agreement typically consists of the core JRU Agreement signed by all JRU members, and the JRU Letter of Support from a recognised public authority, most likely the Ministry in charge with coordination of the national research infrastructure. The JRU Agreement addresses the following issues: the purpose and strategic objectives of JRU, the resources provided by each JRU member that will be shared in order to fulfill the JRU objectives, the JRU management structure (JRU Committee and JRU co-ordinator), the duration and termination of the Agreement.

NGI

There is no unique definition for an NGI. In general terms the NGI is defined as “A governance model to guide Grid infrastructure deployment and operation at country level in an application-neutral way.” [6]. SEE-GRID consortium has adopted the following more detailed definition: “NGI is an open consortium of legal entities or a legal entity acting on their behalf that, for the benefit of research and education community, coordinates, promotes and implements Grid activities at the National level, focusing on Grid deployment and operations, according to a National strategy / research and deployment programme for this field.” [4].

NGI set-up document is an official document (Agreement or MoU) signed between the initiating body and all members of NGI. The document defines the main objectives, responsibilities and rights of NGI members, indicating mandate duration. It provides the official formal proof of the NGI establishment and NGI membership. The approval of this document at the governmental/ministerial level is key for national recognition requirement.

The NGI initiating body could be a public organization/institution or part of the public organization, a research institution or an infrastructure provider; authorized by a relevant ministry or governmental organisation. Usually, the NGI initiating body takes responsibility of NGI coordination or nominates a coordinator between NGI consortium members. The typical membership would include the national infrastructure providers, the key national large

user communities, and National Research and Education Network. The NRN collaboration is crucial since Grid and network effectively form an integrated national eInfrastructure.

NGIs should be introduced to the all grid related communities (users, developers, infrastructure providers, funding agencies, related public bodies, industry and etc.) via a set-up event.

NGI organisational model

The main organizational forms of implementing NGI are the following: task force, consortium, national project, professional association and legal entity. The *task force* is a top down solution for the initial phase of NGI set up and it may migrate to other organizational forms specific to bottom up, long term development. The *consortium* is more specific for the bottom up approach, similar to JRU organization. The main advantage of this form are the higher decision taking autonomy regarding its plan of actions and the open character of its membership. Consortium structure is the most typical. The *national project* is a top down support for national Grid infrastructure development. As a general rule it is initiated, prepared and promoted by an existing form of NGI and is approved at the Governmental level. Once approved, it becomes an effective form of NGI as it defines the objectives, main milestones and related resources including organizations in charge. The *professional association* is similar to the consortium, with the main difference that this form of organization has clearly defined rules of organization, decision making structure and way of action according to the national legislation. A *stand alone organization* is empowered by the national coordination body to deal with NGI implementation and operation tasks. For both the task force and consortium the main decision-making body is the general assembly / meeting of the representatives of member organizations.

The juridical status defines the level of compliance with the national legislation, which significantly influence the efficiency of the NGI interaction with legal entities at both national and international levels. The professional association and stand alone organization have a clearly defined juridical status. The task force is legally represented by the national level coordination bodies deciding on its set up. The national programme is a similar case, in the sense that the governmental body nominates a programme management unit as the legal authority for the programme implementation. In the particular case of the national projects the legal representative is the project coordinator, according to the contract. As the consortium has no juridical status as such, there are two main variants: (a) nominate one member organization as its legal representative, or (b) migrate towards another form of organization with a clear juridical status.

The national-level NGI recognition is decided at governmental or ministerial level and has a direct impact on NGI relevance and authority of its adopted decisions and deployed activity.

For collective forms of organization (task force, consortium) the main decision making body is the general assembly / meeting of the representatives of member organizations. The task force leader is usually nominated by the national coordination body implementing the task force set up decision, while the consortium chair is elected by the consortium coordination body or nominated according to a rotary scheme. The national programme coordination is assured by a national programme management unit designated by the national level coordination body. This body would involve independent experts representing the scientific community for programme monitoring and assessment. In case of professional associations and standalone organizations decision making mechanism and implementation responsibilities are defined by internal regulations adopted according to the specific national legislation.

NGI funding

One of the core requirements for NGI sustainability is existence of funds. International funds should be accessed in correlation with national ones, as most international research programme including the currently running EC FP7 programme put the emphasis on national co-financing. At the national level there are three main solutions to allocate budgetary resources to the NGI community: a) a *national Grid project* which is explicitly allocated to those organizations in charge with Grid infrastructure development and operation; this is in fact an organizational form of NGI mentioned before. b) a *national Grid programme* where the thematic is larger than infrastructure itself including also application deployment and user communities activation topics. The budget is allocated to projects on competition basis. c) *Grid aware research projects* funded by other national research programmes which address Grid as a support technology. The budget allocation is similar to the national Grid programme, with the main difference that these are mainly application oriented projects.

3. Operational aspects

Full establishment of an NGI includes setup and management of national Grid eInfrastructure. The technical aspects of this process can be roughly categorized in the following way:

- Planning of the national Grid eInfrastructure
- Establishment, management and monitoring of Grid eInfrastructure
- User, application, VO and operational support infrastructure

Each of these categories includes the tasks that have to be done during the setup of an NGI, as well as tasks that are of continuous nature and have to be done on a regular basis by the technical bodies established by the NGI.

Planning of the NGI

Planning of the national eInfrastructure depends strongly on the current status and deployed computing and storage resources. The outcomes of the planning stage related to operational aspects should include:

- inventory of the existing computing and storage resources contributed/shared by the members of the newly created NGI
- capture of Grid computing, storage and related requirements by the national user communities
- proposal for NGI Resource Centres (RCs), hosted by the NGI members, based on the analysis of user requirements
- proposal for new hardware purchases, based on the analysis of user requirements
- adoption of technical management, operational and policy documents
- establishment of technical coordination and management bodies
- deployment plan for RCs

The deployment plan is regularly reviewed and updated according to the development of NGI, technical solutions available, as well as the needs of user communities served by the NGI.

Management of the NGI

Most important activities related to implementation of an NGI technical deployment plan are: Establishment of a national Certification Authority (CA), accredited by IGTF/EUGridPMA. A network or Registration Authorities (RAs) could be established in institutions host NGI RCs and in institutions with multiple users in order to simplify the procedure for obtaining digital certificates.

The deployment of core Grid and VO services (BDII, WMS, LB, PX, LFC, AMGA, VOMS). Such services should be deployed at RCs with most experienced staff, taking also into account necessary distribution of services so as to ensure fault tolerance and load balancing.

Testing and monitoring of Grid services. In some cases, NGI should be able to provide operational tools that will give an overview of performance and quality of the infrastructure, as well as identify and indicate issues and problems. Depending on the size of the NGI and already existing tools on regional/continental level, some of these tools can be deployed on the regional instead of national level. The following list of types of operational/monitoring tools could be suggested for deployment to NGIs:

- Static information database that keeps grid site's crucial information example: HGSM (Hierarchical Grid Site Management) / GOCDB.
- Service availability monitoring SAM / BBmSAM.
- Information system monitoring GStat / WiatG
- The portal of collected accounting information from all NGI's sites that is able to provide different views on the data. For example: accounting by institution, application accounting, accounting by VO, etc.

The technical description of all monitoring tools used in the SEE-GRID-SCI project is available at SEE-GRID-SCI deliverable DSA1.1a [7]. NGI should aim to integrate all the deployed operational and monitoring tools in order to enable their efficient use and to simplify technical management and administrations of resources.

The establishment and operation of a national helpdesk: the tracking of operational problems is usually done through the trouble ticket support system.

Management of the national Grid eInfrastructure: this includes coordination of all Grid operations activities on the national level and collaboration with regional and other infrastructures.

User, application, VO and operational support infrastructure

Newly established NGI should provide support to its user communities, application developers, as well as to the RC administrators. In order to provide such support, the following tools could be established:

- National helpdesk, which can be used for tracking of operational, user, and application development problems, as well as for tracking of various tasks related to the management of the Grid infrastructure.
- National portal and/or user registration facility, a reference point for users and RC administrators, providing access to all relevant resources related to the use and management of Grid services, policy documents, collaboration frameworks etc.

Once in place, the support infrastructure should be also interfaced with all other relevant support systems in the country, region, and on European level. The support of user communities, application developers, VOs and RC administrators may also require a diverse set of training activities.

4. Policy issues

NGI should be defining/adopting and implementing a coherent configuration of policy documents in several domains:

- National strategy documents that state major objectives of NGI, its activities towards achieving its mission, to establish its vision and implement its authority at the national level in setting up, development and operation of the national Grid infrastructure.

- Policy documents that deal with relations between the National Grid infrastructure administrated by NGI and other entities involved in the efficient share and use of this infrastructure: NREN, other Grid infrastructures, virtual organizations, application providers, and users.
- Operational policy documents that deal with control of the operations and usage of grid resources, various aspects of security policies and incident handling, Acceptable Use Policy, quality and availability of services, accreditation of new sites and registration policies resource sharing for different VOs and similar.

National strategy document should be initially written during the establishment of the NGI, to facilitate achieving the support, national recognition and legitimacy of relevant ministries/governmental bodies. Strategy document as other policy document has continuous nature and could be subject of intermittent amendments/adoptions.

Based on SEE-GRID expertise in this domain, indicative list of items that are recommended to be tackled in this document is the following: General information; NGI presentation; Brief overview of main achievements at the national level; Main NGI strategic lines for NREGI development.

SEE-GRID and EGEE projects, e-Infrastructure Reflection Group (e-IRG) and The Joint Security Policy Group (JSPG) have established well defined set of policy documents that present a valuable source of references. NGI should review these policies and evaluate them for own usage.

These policy documents deal with relations and cooperation between the National Grid infrastructure administrated by NGI and other entities involved in the efficient use of this infrastructure: NREN, other Grid infrastructures, virtual organizations, application providers, and users. Following is a set of example documents – not all might be mandatory for efficient NRN cooperation.

- SLA between NGI and NREN [8]
- MoU between NGI and site hosting organization.
- Agreement between NGI and regional/European project Resource Allocation Policy.
- Consortium Agreements of the National Grid and Grid-related projects.

The Joint Security Policy Group (JSPG) has established several policy documents that control the operations and usage of grid resources. Furthermore the SEE-GRID and EGEE projects have established further operational policies aiming at improving the quality and availability of services offered by grid sites belonging to their infrastructures. NGIs should review these policies and evaluate their usage for the operations of their sites

- Grid Security Policy [9]
- Grid Acceptable Usage Policy [10]
- LCG/EGEE Virtual Organisation Security Policy [11]
- LCG/EGEE Incident Handling and Response Guide [12]
- Requirements for LCG User Registration and VO Membership Management [13]
- Site Registration Policy & Procedure [14]
- Approval of Certification Authorities [15]
- Grid Security Traceability and Logging Policy [16]
- ROC/Site Service Level [17]
- MoU between NGI and VOs or applications [18]

5. NGI Metrics

The metrics are categorized in four distinct groups, covering: 1. NGI organization; 2. Infrastructure, operations and middleware; 3. User community; and 4. Sustainability and international collaboration. In [19], for each metric, the metrics definition template is given, encompassing the rationale (elaborating on the meaning of the metric), its relevance for the NGI, and its relevance on a wider European level. Here we present taxonomy of the metrics.

Organizational metrics

1.a. Set-up metrics

- 1.a.1. **National-level JRU established** [Yes [Date]/No]
- 1.a.2. **NGI established** [Yes [Date]/No]
- 1.a.3. **NGI initiating body** [Name, Type]
- 1.a.4. **NGI set-up document** [Description, URL]
- 1.a.5. **NGI mandate duration** [Period/Date]
- 1.a.6. **NGI set-up event carried out** [Date, Type of event]

1.b. Organizational metrics

- 1.b.1. **Form of organization:** [task force / consortium / national programme / professional association / stand alone organization / other]
- 1.b.2. **Juridical status / Nomination of the legal representative** [Description / Name, Date]
- 1.b.3. **Establishment of the Coordination body / decision making mechanism** [Name, Description]
- 1.b.4. **NGI recognition at the national level** [Document, Date]

1.c. Membership

- 1.c.1 **Membership: number of organizations** [number]
- 1.c.2 **Membership: type of organizations** [Number of: Academic / Research / Industrial Organizations]
- 1.c.3 **Collaboration with NREN** [Yes (type of collaboration)/No]

1.d. NGI Documents

- 1.d.1. **National Strategy document existence** (Yes (URL, Date of Establishment)/No)
- 1.d.2. **Adoption of other policy and technical management documents** (Type of document, Pointer to it, Date of Adoption)
- 1.d.3. **Adoption of NREGI policies: e.g. Operational procedures, Users AUP, security policies, Operational SLAs, VO SLAs** (Type of document, Pointer to it, Date of Adoption)

Infrastructure, operations and middleware metrics

2.a. Infrastructure metrics

- 2.a.1. **Number of sites** [number]
- 2.a.2. **Number of CPU cores** [number]
- 2.a.3. **Storage size** [number in TB]

2.b. Operational metrics

- 2.b.1. **Certification authority** [Yes/No]
- 2.b.2. **User registration** [Yes (URL) / No]
- 2.b.3. **National VOs** (Number of disciplines, Number of VOs)
- 2.b.4. **List of core services deployed** (i.e VOMS, WMS, BDII, LFC, FTS, MyProxy)
- 2.b.5. **National portal** [? es/? o]
- 2.b.6. **National helpdesk** [? es/? o]
- 2.b.7. **National monitoring** [? es/? o]
- 2.b.8. **National SLA monitoring and national SLAs in place** [? es/? o]

2.c. Middleware metrics

- 2.c.1 **Middleware stacks used:** [List of Middleware Stacks, Level of Interoperability/Interoperation between them]

User community metrics

3.a. User Community Metrics

3.a.1. Number of international (European and regional) VOs supported [Number]

3.a.2. Number of international applications supported [Number]

3.a.3. Number of national applications supported [Number]

3.a.4. Number of local users [number of Users with grid certificates]

Sustainability and international collaboration metrics

4.a. Funding Metrics

4.a.1. Funding: national grid project [type: infrastructure/software/applications; total funds; total FTEs; Duration].

4.a.2. Funding: other national grid projects [type: infrastructure/software/applications; total funds; total FTEs; Duration].

4.a.3. Funding: possibility of national contribution to EGI.org or SEGI.org

4.a.4. Funding: International Grid Projects (type: infrastructure/software/applications; total funds; total FTEs: number; Duration).

4.b Metrics concerning membership in international bodies / fora:

4.b.1. EGI support letter (Yes/No)

4.b.2. eIRG membership (Yes/No)

4.c. Industrial cooperation metric

4.c.1. National Grid projects where industry is involved (Number, Names)

6. Case study: Romania

The Romanian RoGrid Consortium Agreement was signed in May 2002, by 7 organizations: 4 research institutes, two universities and one IT private company. The RoGrid was set-up according to the top-down approach. The set-up event was an International round table on Grid development in Romania, organized at ICI Bucharest, 21.04.2002, chaired by the Minister of Communication and Information Technologies and attended by outstanding experts in the field like Ian Foster and Harvey Newman. According to the conclusions of this event, the consortium was initiated by the Ministry of Communication and Information Technology and the Ministry of Education and Research. As consortium coordinator was assigned the National Institute for R&D in Informatics - ICI Bucharest.

The RoGrid Steering Committee including representatives of all member organizations plays the role of the decision making body of the consortium.

According to the Consortium agreement, RoGrid has an open structure. New applications are evaluated by the Steering Committee considering the potential contribution of the applying organization to the consortium objectives.

By the end of 2002 the RoGrid consortium proposed the first draft of the national strategy for Grid development. Starting with 2003 the highest priority on the RoGrid agenda was to activate national and international funding resources to support this objective. Several national research projects were initiated by RoGrid members. Also RoGrid played the role of JRU for Romanian participation in the EGEE and SEE-GRID projects, with the involvement of five most active and committed consortium members: ICI Bucharest, National Center for Information Technology from University "Politehnica" of Bucharest (NCIT-UPB), National Institute for Physics and Nuclear Engineering (NIPNE) Bucharest, National Institute for Aerospace Research (INCAS) and University of Bucharest (UniBuc). Although not explicitly included in the consortium, RoEdu – the operator of the Romanian network for Education and

Research was represented by UPB considering the leading role of this university in the development of RoEduNet.

An important event was the adoption by the National Authority for Scientific Research (ANCS) of the Strategic planning for the implementation of the National Grid Infrastructure (March 2006). The document was prepared by a National Task Force initiated and coordinated by ANCS, including representatives of 25 universities and research institutes. All RoGrid members were represented in this Task Force. The document was developed according to the eInfrastructure concept.

Based on this strategy, the Romanian Committee for Research Infrastructures included the National Grid Infrastructure for Research and Education (RoREGI) in the priority list of large national research infrastructure objectives for the next period (February 2008). The proposal was prepared by the RoGrid representative in this committee. As a direct consequence of this decision a dedicated national call entitles “Development of R&D centres coordinated at the national level and connected to the European and international networks (Grid, GEANT)” was launched in June 2008, in the framework of Operational Programme for the Improvement of Economic Competitiveness. All above mentioned RoGrid members are among the winners of this call.

In August 2007 two new members were accepted in the Consortium: West University of Timisoara - Computer Science Department and Technical University of Cluj-Napoca - Computer Science Department. A period of active collaboration with RoGrid member organizations in national Grid projects on Grid infrastructure administration and Grid aware application development issues preceded this decision.

On international cooperation, RoGrid is member of currently running EGEE III and SEE-GRID-SCI projects. The participation in the SEE-GRID initiative since its start in May 2004 has provided an important support in defining the development policy and in evaluating the achieved maturity level. Also Romania is member of eIRG and on the map of EGI supporting countries. The table below presents the organisational metrics for ROGrid NGI.

1.a. Set-up metrics	
1.a.1. National-level JRU established:	Yes (05/2002)
1.a.2. NGI established:	Yes (05/2002)
1.a.3. NGI initiating bodies:	Ministry of Education and Research and Ministry of Communications and Information Technology
1.a.4. NGI set-up document:	Consortium Agreement
1.a.5. NGI mandate duration:	unlimited
1.a.6. NGI set-up event carried out:	International round table on Grid development in Romania, ICI Bucharest, 21.04.2002
1.b. Organizational details:	
1.b.1. Form of organization:	Consortium
1.b.2. Juridical status / Nomination of the legal representative:	no legal status
1.b.3. Establishment of the Coordination body / decision making mechanism:	Steering Committee including representatives of member organizations and chaired by the ICI representative / Steering Committee plenary meetings
1.b.4. NGI recognition at the national level:	Letter of support signed by the Secretary of State for Research in the Ministry of Education and Research.
1.c. Membership :	
1.c.1. Membership: number of organizations:	9
1.c.2. Membership: type of organizations:	4 – Academic, 4 – Research, 1- Industrial
1.c.3. Collaboration with NREN:	Yes, synchronized development plans
1.d. NGI Documents :	
1.d.1. National Strategy document	Yes,

existence:	(http://www.mct.ro/ancs_web/index.php?action=view&idcat=363&lang=ro)
1.d.2. Adoption of other policy and technical management documents:	Acceptable Use Policy for Virtual Organization (http://www.gridmosi.ro/utilizatori/regulamente-si-ghiduri)
1.d.3. Adoption of NREGI policies: e.g. Operational procedures, Users AUP, security policies, Operational SLAs, VO SLAs:	No

7. Conclusions

There is no silver-bullet solution for optimal NGI set-up. A number of alternatives exist, and they have been described in this document in considerable detail. Some key conclusions are as follows:

- Forming a JRU as a first step towards stable NGI creation is a baseline for setting up a sustainable organization at the national level, and is strongly recommended for all countries on European level and beyond.
- The approval of the NGI set-up document (Agreement or MoU) signed between the initiating body and all members of NGI, at the governmental/ministerial level, is key for national recognition requirement.
- The typical NGI membership would include the national infrastructure providers, the key national user communities, and National Research and Education Network.
- NGIs should be introduced to the all grid related communities (users, developers, infrastructure providers, funding agencies, related public bodies, industry and etc.) via a set-up event.
- The main organizational forms of implementing NGI are task force, consortium, national project, professional association and legal entity; of which consortium is the most prevalent.
- The juridical status significantly influences the efficiency of the NGI interaction with legal entities at both national and international levels. In this sense, the professional association and stand alone organization are the most stable, while the consortium has no juridical status as such, which can be solved either by: (a) nominating one member organization as its legal representative, or (b) migrating towards another form of organization with a clear juridical status.
- One of the core requirements for NGI sustainability is existence of funds: a balance between national and international funds should be achieved.
- Detailed assessment and planning of the national Grid should be done periodically.
- Management of Grid eInfrastructure should encompass functionalities such as national Certification Authority (CA), a network or Registration Authorities (RAs), core Grid and VO services (BDII, WMS, LB, PX, LFC, AMGA, VOMS), testing and monitoring of Grid services (Static information database such as Hierarchical Grid Site Management and GOCDDB; service availability monitoring SAM / BBmSAM; Information system monitoring GStat / WiatG; accounting portal); national helpdesk / ticketing system;
- Depending on the size of the NGI and already existing tools on regional/continental level, some of the management tools can be deployed on the regional instead of national level.
- User, application and VO support is crucial for a stable NGI, supported by the National helpdesk and National portal and/or user registration facility. The support should be provided to multi-disciplinary communities
- NGI should be defining/adopting and implementing a coherent configuration of policy documents in several domains: including National strategy documents (stating major objectives of NGI, and its activities towards achieving its mission); Policy documents that

deal with relations between the National Grid infrastructure administrated by NGI and other entities involved in the efficient share and use of this infrastructure; and Operational policy documents that deal with a wide range of operational aspects.

- National strategy document should be initially written during the establishment of the NGI, to facilitate achieving the support, national recognition and legitimacy of relevant ministries/governmental bodies. Strategy document as other policy document has continuous nature and could be subject of intermittent amendments/adoptions.
- NGIs should review the policy and operational documents and evaluate their usage and necessity at the national level.

A coherent approach to capturing the attributes of the National Grid Initiatives, and for assessing their progress over time, is crucial for understanding the NGI dynamics. Moreover, a stable taxonomy for categorizing these attributes facilitates the understanding of the state and evolution of the NGIs. This paper also defined this stable taxonomy and methodology to enable the structuring, capturing and assessing the NGI metrics. A metric definition template provides a clear way for describing the features of the metrics. The metrics are further divided in four categories, focusing on core attributes of NGIs: NGI organization; Infrastructure, operations and middleware; User community; Sustainability and international collaboration. The usefulness of metrics is demonstrated through a case study of the Romanian NGI.

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