



Design Study



# EGI\_DS

## DRAFT DEFINITION OF THE EGI ORGANISATION EARLY DRAFT

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#### Abstract:

Please note that the current version of this document constitutes an early and incomplete draft of the EGI\_DS deliverable 5.1. This document aims to inform the representatives of the National Grid Initiatives (NGIs) about the current status of deliberations of EGI-DS, feedback from the NGIs is most welcome in order to arrive at a generally accepted definition of the EGI.

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	<b>Name</b>	<b>Partner/ Activity</b>	<b>Date</b>	<b>Signature</b>
<b>From</b>	Jürgen Knobloch	CERN		
<b>Reviewed by</b>	Moderator and reviewers			
<b>Approved by</b>	MB			

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## 1. INTRODUCTION

### 1.1. PURPOSE

This document describes the draft definition of the European Grid Initiative (EGI) organisation as proposed by the EGI-DS team. It should be noted that this early draft will be presented to the participants of the EGI workshop in Rome and in particular to the representatives of the National Grid Initiatives (NGIs).

The conclusions presented in this document are by no means frozen. We see this document as a starting point to guide the discussions at the workshop.

The input received at the workshop and thereafter will provide input for a more final version of the deliverable D5.1.

### 1.2. DOCUMENT ORGANISATION

We describe the overall mission and scope of the organisation and its relationship with the NGIs.

We summarise the initial functions and services to be provided and draft the relationships with the NGIs as well as the relation with large global communities and resource centres. Based on the experience with grids currently in operation we estimate the resources required to execute the functions.

We describe the functions and scope of the National Grid Initiatives.

We begin to define the transition process from the current grid projects (e.g. EGEE) to the EGI/NGI based infrastructure and operations model.

We present first ideas on a possible management structure.

Concluding, we give a table summarizing the resources that would be required to fulfil the described core functions of the EGI.

In an Annex, we present some tasks currently performed in the EGEE environment which are **not** proposed to be part of the EGI.

### 1.3. APPLICATION AREA

This document will be presented to the EGI-DS Advisory Board (AB) constituted of the representatives of the NGIs. After possible modification and completion this will lead to the publication of the EGI blueprint due mid-2008.

### 1.4. REFERENCES

*This part still needs to be provided*

**Table 1-1: Table of references**

R 1	
R 2	



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### 1.5. DOCUMENT AMENDMENT PROCEDURE

Amendments, comments and suggestions should be sent to the authors.

### 1.6. TERMINOLOGY

This subsection provides the definitions of terms, acronyms, and abbreviations required to properly interpret this document.

#### Definitions


#### Glossary

ARC	<a href="#">Advanced Resource Connector</a> , Nordugrid Middleware
CAO	Chief Administration Officer
CERN	<a href="#">European Organization for Nuclear Research</a>
CIC Portal	
COO	Chief Operations Officer
CPU	Central Processing Unit
CSIRT	
CTO	Chief Technical Officer
DBMS	Data Base Management System
DEISA	<a href="#">Distributed European Infrastructure for Supercomputing Applications</a>
DESY	<a href="#">Deutsche Elektronen-Synchrotron</a>
EDG	European Data Grid Project
EGEE	<a href="#">Enabling Grids for E-scienceE</a>
EGI	<a href="#">European Grid Initiative</a>
EGL_DS	European Grid Initiative – Design Study
eIRG	e-Infrastructure Reflection Group
ESFRI	<a href="#">European Strategy Forum on Research Infrastructures</a>
EU	European Union
FTE	Full Time Equivalent
GB	Gigabyte



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GÉANT	European networking backbone interconnecting national research networks
GFAL	Grid File Access Library
GGF	<a href="#">Global Grid Forum</a>
GGUS	Grid User Support Centre
GIIS	Grid Index Information Service
gLite	<a href="#">Lightweight middleware for Grid computing</a>
GLOBUS	<a href="#">Globus Alliance</a> produces open source software toolkit for building Grid systems
GOC	Grid Operation Centre
GOCDDB	<a href="#">Grid Operations Centre Database</a>
GStat	<a href="#">Grid Statistics</a>
HEP	High Energy Physics
IGTF	<a href="#">International Grid Trust Federation</a>
ITER	<a href="#">“The way” in Latin. ITER was “International Thermonuclear Experimental Reactor”, this usage has been discontinued</a>
LB	Logging and Bookkeeping service
LCG	LHC Computing Grid
NDGF	<a href="#">Nordic Data Grid Facility</a>
NGI	National Grid Initiative
NorduGrid	A collaboration that has developed the Advanced Resource Connector (ARC) middleware
NREN	National Research and Education Network
OGF-EU	<a href="#">Open Grid Forum Europe</a>
OMII	Open Middleware Infrastructure Institute
OS	Operating System
PB	Petabyte ( $10^{15}$ bytes)
PMA	Policy Management Authority
PR	Public Relations
PRACE	<a href="#">Partnership for Advanced Computing in Europe</a>
RB	Resource Broker
ROC	Regional Operations Centre
SAM	Service Availability Monitor
SLA	Service Level Agreement



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SLAC	<a href="#">Stanford Linear Collider Center</a>
TACAR	<a href="#">TERENA Academic CA Repository</a>
TERENA	<a href="#">Trans-European Research and Education Networking Association</a>
UNICORE	<a href="#">Uniform Interface to Computing Resources</a>
VDT	<a href="#">Virtual Data Toolkit</a>
VO	Virtual Organisation (aka Application Community) is a geographically independent group of collaborating scientists.
VOMS	Virtual Organization Management System
WLCG	<a href="#">Worldwide LHC Computing Grid</a>
WMS	Workload Management System





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## 2. EXECUTIVE SUMMARY

The European Grid Initiative (EGI) Design Study represents an effort to establish a sustainable grid infrastructure in Europe. Driven by the needs and requirements of the research community, it is expected to enable the next leap in research infrastructures, thereby supporting collaborative scientific discoveries in the European Research Area (ERA).

The main foundations of EGI are the National Grid Initiatives (NGIs), which operate the grid infrastructures in each country. EGI will link existing NGIs and will actively support the setup and initiation of new NGIs. The relation between EGI and the NGIs is governed by the “subsidiarity principle” meaning that tasks that are more effectively performed at the national or regional level should be left to the National Grid Initiatives. The EGI will ensure pan-European Grid operation and coordination - aiming at standardization wherever reasonable.

A key component of the EGI vision is the provision of a large-scale, production Grid infrastructure – built on the NGIs that interoperate seamlessly at many levels. It is essential that the base functions of currently funded EU grid projects (such as EGEE) will seamlessly transit to the NGIs and EGI.

It is understood that the production hardware will be owned and operated by the NGIs and not by the EGI. EGI will coordinate pan-European operations planning and work on a common set of operations procedures and tools. EGI will provide the support and central aggregation for incident tracking, monitoring and accounting.

The regional operations functions currently assembled in Regional Operations Centres (ROCs) will be operated by the NGIs. These functions can be supported by an individual NGI or by a federation of NGIs.

The resource allocation will be the responsibility of the NGIs. For international Virtual Organisations (VOs), EGI will provide a brokering role among the NGIs. A simple entry strategy for new VOs with limited requirements is desirable.

The EGI will not provide any software development directly but may coordinate developments by software consortia if needed. It is, however, essential that middleware will continue to be funded at an appropriate level which is currently approximately 150 people for the supported middleware projects in gLite, UNICORE, ARC and OMII-EU. The role of the EGI is to ensure interoperability amongst the supported middleware stacks, ultimately leading to convergence. The NGIs are free to choose one or more of the supported and compatible middleware stacks as required by the respective user communities.

The provision and management of build and test systems is a central task that is currently not seen to be taken up by the NGIs nor by commercial providers.

The application support is generally provided at the NGI or User Community level. However some general coordination and change management for existing user communities as well as supporting emerging user communities beyond the scope of a single NGI will require a central team in the EGI.

Security will have to be implemented in a layered approach sharing the work between the NGIs, larger Grid infrastructures, middleware consortia and network communities. A core security



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group in EGI has to ensure the overall management and reporting, coordinate between the groups involved, and manage the information flow.

Training is expected to be done mostly at the national or regional level. The EGI would coordinate these local efforts and provide a central repository ensuring up to date consistency of the commonly used the general training material.

It is clear that EGI needs a central place where most of the staff would be located. The total person-power to conduct the core functions is currently estimated to about 80 people.

The location of EGI will be decided by the NGIs. The legal structure to be adopted depends on the location.



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### 3. DEFINITION OF INITIAL FUNCTIONS

In the following we give a summary of the most important functions of the EGI as identified by Work Package 3 to be published as deliverable 3.1.

#### 3.1. OPERATIONS PRINCIPLES

- 1. Reliability of Grid services and SLAs:** notwithstanding the different and evolving needs of application communities and NGIs, a key component of the EGI vision is the provision of a large-scale, production Grid infrastructure – built on National Grids (NGIs) that interoperate seamlessly at many levels, offering reliable and predictable services to a wide range of applications, ranging from “mission critical” to prototyping and research. It is understood that it will be a long and continuous process to reach this, with additional NGIs and/or application communities joining at different times, with varying needs and different levels of “maturity”. In addition, sites of widely varying size, complexity and stage of maturity must be taken into account. The EGI shall negotiate the minimal size and set of functions for an NGI to participate in a wider context, including the associated Service Level Agreements. This includes the agreement and follow-up of the associated certification processes. In some cases, these requirements may be more stringent than those used within a given NGI. That is, only a subset of sites participating within an NGI may satisfy the wider requirements at the EGI level.
- 2. Multi-level operation model:** highly centralized models – e.g. for monitoring – have been shown to be both intrusive and non-scalable. This suggests a move to a multi-level operations model (e.g. EGI/regional “cluster”/ NGI ...). Whilst building on the positive experience of today’s production Grids, these concerns must nevertheless be taken into account as part of the EGI / NGI architecture. This includes designing and deploying for low-cost-of entry and ownership, whilst maintaining sufficient flexibility to meet the requirements of the application clusters. The EGI shall foster agreement on the definition of the key operations infrastructure, its establishment and delivery. Such functions are preferably located at one or more NGIs (to offer both resilience and scalability).
- 3. EGI, NGI and ROC:** The NGIs participation to the operation of the European grid infrastructure requires a set of services to be operated in a coherent way. Currently, within EGEE, this is guaranteed by the ROCs, that either span over several countries (NGIs) or are serving one country only. The NGIs must assure that the services are operated, either at the NGI level or through associating into ROC equivalents. Regardless of the technical organization, all the NGIs need to be individually represented in an EGI operations board, where strategies and general problems are discussed.



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4. **Multiple middleware stacks:** EGI operations will be responsible for guaranteeing support to all the adopted middleware stacks in collaboration with the operations staff from NGIs.
5. **Planning, coordination and gathering of new requirements:** EGI operations team is mainly responsible for operations planning and coordination of efforts by the various NGIs and other parties. Also, EGI operations staff works towards a smooth evolution of tools and operational procedures according to the new requirements gathered.
6. **Cooperation:** EGI and NGI operations cooperate to solve problems of common interest such as: guidelines for robust services, security best practices, middleware security issues, steering of new developments, site maintenance, intervention procedures, incident response, escalation procedures and so forth. For this reason, EGI promotes and coordinates meetings, workshops, EGI and NGI joint working groups, etc.
7. **Federation, interoperability and data aggregation:** EGI must federate a variety of operational aspects – some of which are implemented by NGIs and/or component sites. Consistency of security procedures, user support, incident tracking, monitoring and accounting must be ensured. EGI ensures interoperability of operational tools/infrastructures for security, monitoring, support, accounting, etc. In order to aggregate usage information for VOs, users and NGIs, operational data such as monitoring information, availability statistics and accounting records – collected by the NGIs need to be aggregated at the EGI level for SLA monitoring in full respect of the relevant national legal constraints.

### 3.1.1. Operations Tasks and Resources

The core tasks for operations in EGI will consist of Regional Operations coordination, coordination and support for roll out of mw updates, grid security and incident response coordination, interoperations (OSG, EU related projects), weekly operations meetings and operations workshops, support from mw resident service experts, middleware release support, VO Membership Service, Service Availability Monitoring, user support coordination and the global Grid user support (GGUS), certification authority for various VOs, (service availability monitoring, overall status monitoring, Monitoring WG), pre-production coordination, triage of incoming problems and assignment of tickets to second line support units (solution of “standard” problems )

**Table 3-1: Core manpower for operations**

Regional operations coordination, software rollout coordination	6
VO support	5
General user support	2
Accounting, reporting & Monitoring	3
VO Management	1
Pre-production coordination	1
Help Desk	3
<b>Total core EGI effort</b>	<b>21 FTEs</b>

It is clearly understood that the majority of operations activities is provided regionally by the NGIs as exemplified in Annex 8.1.

## 3.2. MIDDLEWARE

### 3.2.1. The current context

The operation of a Grid infrastructure requires fully functional and stable middleware that satisfy the needs of both administrators and applications.

The currently available Grid middleware is still subject to development, addressing in particular non-functional requirements such as scalability, reliability and interoperability.

- gLite has been developed by EU supported projects (EDG, EGEE) since 2001 . It is currently deployed in 250 sites comprising more than 50,000 CPUs and very large (25 PB (Petabytes)) storage systems.
- UNICORE (Uniform Interface to Computing Resources) is the middleware for the European distributed HPC Grid infrastructure DEISA as well as in the starting PRACE initiative for European PetaFlop/s Supercomputers
- ARC (Advanced Resource Connector) has been developed by the NorduGrid collaboration since 2001. It is currently deployed in more than 60 sites, with over 20,000 CPUs. In particular ARC is adopted by the Nordic DataGrid Facility (NDGF)..

These European software stacks, which are not developed commercially, provide a large fraction of the services in use in the European e-Infrastructure together with the US based Globus. They constitute the reference middleware stacks in Europe supporting large and diverse communities with a large range of requirements. However they are not yet sufficiently mature to allow a steady and easy operation of the overall e-Infrastructure, fully satisfying the growing needs of the research communities. The different stacks implement functionally equivalent services in different and not yet fully interoperable ways, preventing today an easy full exploitation of the overall infrastructure potential by the applications. The European e-Infrastructure should consist



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of fully interoperable services built on standard implementations evolving as required by the application communities, continuing and expanding the current collaboration with Globus, Condor and other international stacks.

Currently, the EU middleware is developed by multiple teams working on components in each of the middleware stacks. In order to leverage the existing clusters of competence it is advisable to maintain this decentralized model. Strong interaction between operation, application support and middleware activities has shown to deliver the best results for a given project.

The maintenance, development and evolution towards interoperability and standardization for the three European stacks are normally co-funded by national institutions or consortia and the EU commission.

National institutions or middleware consortia cannot cover the full cost of maintenance, support and development. They rather expect continued EU co-funding for some future.

Ending such co-funding would lead to the dissolution of the current teams providing the middleware. This would be most damaging for the present e-Infrastructure, and even more so for the larger European grid infrastructure to be constituted by the EGI members.

No commercial products with required functionality and full standard compliance will be available in the foreseeable future.

Therefore it is necessary for the success of EGI to include in its mandate a development activity addressing the most fundamental open issues:

- sufficient robustness to allow a steady operation of the infrastructure;
- full interoperability between different implementations, through the adoption of standard-compliant interfaces.

The European middleware must also allow adding new functionality required by the supported user communities.

Each NGI will choose which middleware stack(s) to support provided that the services deployed adhere to the EGI defined standards and policies,

Each mw stack should be represented by a Consortium/Institution in its relationship with EGI and with the NGI's. The NGI's/Consortia will co-fund the middleware development, and the related testing, verification and integration functions. The way and sharing of the co-funding is still to be discussed and agreed within EGI and the NGI's.

The EU funding and the NGI's co-funding will cover the developments and support required by EGI.

The related integration and testing should equally be co-funded.

The EGI Organization will verify standards and interoperability while it is up to the middleware stack distributors to do full integration testing

### 3.2.2. Middleware Cost Estimation

The following is a first estimation based mainly on the projection of the present costs, of the individual stacks and their standardization/interoperability effort (presently funded in OMII, OGF-EU). The estimations need to be refined, understood and agreed in more details.



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Present costs are for gLite about 7 M€/year, and for UNICORE, ARC and OMII EU 2-3 M€/year each. These costs are for co-funding at 50% with the EU.

For EGI, only a small fraction will be in the central costs, the rest of the costs will be for the middleware Consortia/Institutions

EGI should manage the standard compliance testing, and coordination with OGF as well as common build and test systems (28 FTE)

In addition to the core costs of EGI, the middleware developments amount to an estimated sum of 14 M€/year.

A table from OMII EU summarizing the main services developed by each stack which need to continue to be co-funded in the EGI/NGI scenario is available in <http://omii-europe.org/OMII-Europe/docs/DJRA20.pdf> { to be put into reference }

### 3.3. SELECTION, VALIDATION AND DEPLOYMENT OF COMPONENTS

1. Security and interoperability can only be maintained when core components, such as the security infrastructure, data management and accounting adhere to agreed and available standards and the adherence of the middleware to the standards has been validated. This requires a foundation middleware that is interoperable and secure.
2. EGI, due to the independence of the NGIs and the huge variety of requirements of different user communities, should leave the selection of high level middleware, build on a small set of core components, to the VOs. Different NGIs can apply local acceptance criteria for these components, but a central approach is unpractical. In the remaining part the text will only deal with core middleware components.
3. A stakeholder centric process, with middleware providers, participation of VOs, resource providers and operations can lead to agreed sets of components and define the required deepness of validation. Experience has shown that the definition of a core set of middleware varies between the stakeholders as much as the requested level of validation. A central activity is needed to run the process, the tasks of this small activity, 2-3 FTEs, include: Organize the communication, maintain requirements, maintain the jointly developed process definition, maintain set of formal acceptance criteria, maintain the state of selected components in the sense that a repository with the components' state within the process is provided. EGI based activities will organize and carry out the actual evaluation of components based on the requirements and the process. In addition the NGIs provide the adaptation of the selected components to their specific environment to ensure interoperability and adherence with their local policies. The resource estimates reflect a steady state operation. During the initial phase more resources will be needed to define the processes and provide the tooling.
4. Validation in a heterogeneous environment can be very demanding. The combinatorial effect of different platforms, middleware stacks and deployment scenarios can't be handled in centrally. As stated above for a given component the level of validation can vary and can be different in different environments. The role of a central team in EGI could be to track the





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state of validation. This requires that agreed validation processes and documentation of the individual validation effort are maintained. The central activity acts in addition as a coordination point and repository to allow the NGIs to synchronize their validation activities to avoid costly duplication of work. There is no need that the central validation activity is located in one place. Different tasks can be carried out by teams within the NGIs. The total effort required for the validation coordination and tracking task depends on the amount of common middleware and diversity of environments. Assuming that EGI will operate under conditions similar to those in LCG (3 middleware stacks, 3 OS flavors) 3 FTEs, best distributed over a larger number of people, would be sufficient. The demand increases linear with the number of combinations to be tracked. A shared test infrastructure can be advantageous, but comes at the cost of additional coordination work. Within EGEE the coordination of the operation of the shared, distributed test bed requires 1 FTE.

5. Integration in a heterogeneous environment as EGI can only have a coordination role. In a minimalistic approach the EGI integration activity can maintain lists of agreed versions of external dependencies to ensure interoperability. NGIs and VO centric teams provide the required build services and repositories for their partners. This will by definition lead to a significant multiplication of work on the NGI and VO level. An approach with a stronger central integration activity that provides build system services, configuration management and repositories could be operated with 4 FTEs.
6. Deployment is under the control of the NGIs and VOs. The role of EGI would be to maintain common definitions of mandatory elements in a release package. Without this a release package cannot be transferred between different NGIs. In addition available release packages need to be advertised and the deployment support needs to be coordinated. Again the approach would be NGI centric with coordination by a small EGI team. This team would in addition create the link with operations. The effort needed for this is small and there is no need to co-locate the deployment coordination team with the any of the other teams. 1 -2 FTEs would be sufficient.
7. The EGI roles and tasks as outlined above have been designed with the goal to minimize the effort on the EGI level and maximise the independence between the NGIs and VOs. On an integrated level of the infrastructure this is not the most effective approach and there will be functional equivalent activities in each of the NGIs and within larger VOs. In addition the described approach will introduce latencies that could be avoided if a more central approach would be considered.

### **3.4. EGI / NGI USER ORIENTED ACTIVITIES – GENERAL PRINCIPLES**

The set of user-oriented activities includes Application Support, Training, and Dissemination. These will be described separately in this document, but it is understood that there are synergies and close relations between these activities which will be taken into account more in detail in the work package 3 deliverable D3.1, which will document the broader EGI/NGI scenario.

Our current hypothesis envisions the bulk of application support being handled by the NGIs, with a largely coordinating role by the central EGI in particular with respect to exploiting synergies





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between what we call “Specialized Support Centres”, which we define below. This consideration can also be applied to Training and Dissemination.

It must be understood that the proposed scope of the EGI is not intended to provide actual sustenance for the entire European e-Infrastructure. All three user oriented functions will require some form of (co-)funding at the European level in the medium term – an issue which is discussed elsewhere in this document, and which will be addressed in the context of the larger EGI/NGI scenario.

### **3.4.1. Application Support – General Principles**

The primary goal of the Grid is to act as the "ultimate application accelerator", providing a significant added value for the existing and new applications and user communities. The growing application demands have provided and will continue to provide the necessary push for development and extension of the Grid infrastructure. Therefore the active support for existing and new applications and user communities is a primordial concern for the EGI / NGI community: applications and users are the *raison d'être* of the Grid (middleware, infrastructure, operations and deployment).

The “core” EGI should be expected to provide high level coordination of the established application support and community building activities; these activities, in turn, should feed into an analytic role which we label “change management”, tasked with monitoring growth trends and new entries among the user communities and contributing to strategies for related resource provisioning.

The “extended” EGI, which would functionally include the NGIs, would collaboratively implement the community building and support functions via some cost sharing model and by means of hypothesized “Specialized Support Centres”. It is expected that a close collaboration among centres of excellence, in particular within specific application areas, would allow the NGIs to reduce the overhead of porting new applications to the Grid and provide a framework for organizing the long-term application support.

For such centres, the following considerations apply:

1. It has been demonstrated that the enabling of new applications or the support of the existing ones is feasible only if the application support team has easy access to the highest level of middleware expertise and is in close interaction with operations and deployment teams. At the same time a direct connection with the application community is essential.
2. It has also been shown that “free test drives” for new applications may be performed by a small group of technical experts, given a small investment shared between the application community and the technical team. The key is a lightweight procedure avoiding unnecessary formalities. This allows for an efficient dissemination through success stories and attracts new application communities. Such function, coordinated at the EGI level (and carried out by one or two EGI experts in collaboration with their NGI counterparts) could have a catalyzing role for smaller application communities as well as for the larger international user communities.

3. It is understood that dissemination and tutoring activities must be based on the direct experience of the application support activities (either new demonstrations or long-term support) and not be standalone activities.

Some user support falls under the operations activity, however current experience with EGEE shows that for a successful new demonstration a pilot user must be especially introduced even to the basics (VO registration, certificates, helpdesk etc). In EGI this should be probably provided by the operations. The application activities may facilitate the user feedback.

### **3.4.2. Core EGI sub-functions (tasks) for Application Support**

The tasks listed below are under consideration as “core EGI” activities. These are largely modelled on actual application support activities, but with a focus on the coordination of these activities at the European level.

#### **T1. Coordination of VO interfacing – 2 FTEs**

- T1.1. VO interface to operations
  - i. user access: VO registration, certificates, helpdesk
  - ii. service level (site services)
- T1.2. VO interface to middleware
  - i. new feature requests
  - ii. standards liaison for the user communities (convergence – esp. for core services)
  - iii. monitoring of possible divergent releases – esp. for some specialized services
  - iv. review of documentation and collaboration with training on the production of related material creation

#### **T2. Community building and support, liaison with other user oriented activities – 3 FTEs**

- T2.1. development of best practices and higher-level tools
- T2.2. dissemination and spreading of best practices and higher-level tools
- T2.3. coordination of tutorials and user forum meetings in collaboration with training
- T2.4. link to outreach and dissemination
- T2.5. where applicable: coordination of NGI application support activities
- T2.6. where applicable: provisioning of easy entry points to the grid for the users (e.g. community portals)

#### **T3. Coordination of Long term support – 2 FTEs**

- T3.1. coordination and tracking of technical support for critical Grid services used by supported applications
- T3.2. coordination and tracking of maintenance to respond to the evolution of the Grid middleware and infrastructure (and applications themselves)

#### **T4. Change management – 1 FTE**

This activity needs to liaise effectively with the rest of the application support team on the one hand, and with management and the technical committee(s) on the other, to

provide effective growth monitoring, analysis, and predictions, and if needed to trigger actions to provide resources for new VOs.

**Table 3-2: Core manpower for user support**

NAME OF TASK	RELATED EFFORT
T1. Coordination of VO interfacing	2 FTEs
T2. Community building and support, liaison with other user oriented activities	3 FTEs
T3. Coordination of long term support	2 FTEs
T4. Change management	1 FTE
TOTAL	8 FTEs

### 3.4.3. Extended EGI Model Considerations

The main practical concerns for the EGI / NGI community in the context of application support are:

1. support of current applications and user communities
2. growth strategy for new user communities.

The related core EGI model above reflects this only in part; item 1 clearly cannot be covered with the central EGI budget.

Supporting the (existing and new) large international VOs is an issue whose importance cannot be underestimated. In general – and under optimistic assumptions – it is expected that these large VOs will have their own application support teams under their own budget. Realistically, however, the extended EGI/NGI model must provide a medium-term strategy to bridge gaps in ongoing support at the end of current EU-funded projects. This latter issue requires more careful consideration than what can be given here, and will be the object of closer scrutiny in the context of the work package 3 deliverable D3.1.

### 3.5. TRAINING

The overall goal of the activity is to increase usage of the e-Infrastructures by providing users with the skills needed to access the services, increasing attractiveness of the services by encouraging the provision of applications by providing developers with the skills need to create them, and supporting usability of the infrastructure by disseminating good operations practice.

Training is required by operations centres for system operators, by application developers who are developing programs to use the system and by users to allow them to access the services. Training is also required for trainers and educators regionally to support them in disseminating



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experience of changes in the system which they must then pass on to their communities (local and in different user communities / VOs).

Training provision will be largely federated by its nature. Each NGI will be required to provide training both for users and for operations. However there will be a central role in providing coordination of the dissemination of technical changes, support to encourage sharing of teaching materials and experience, coordination of sharing t-Infrastructure resources.

The current scenario is that the majority of training provision occurs at the NGI level, gradually moving towards education being taken over by universities in their normal duties.

However, the expectation is that, especially initially, coordination and facilitation of sharing of resources and expertise will be required. Under an alternative scenario of no coordination and support, it would be expected that Europe will be unable to retain its lead in this area as other regions will be able to duplicate the process using their existing training and education infrastructures.

Estimates of staff are separated into:

1. National/regional
2. NGI Core

For 1. Estimates will depend on size, engagement of communities and maturity of local infrastructures. In general, assuming we are purely discussing resources for a NGI, we might see approximately 2 FTEs engaged in material creation, live training events and provision of web based materials; 1 FTE to maintain local repositories and online teaching environments; and 1 FTE supporting the coordination and interoperation of regional t-Infrastructure resources. Projects focussing on the extension of infrastructure and the support of new communities already fund in this area and it is expected that they will continue to do so.<sup>1</sup>

For 2. The proposed staffing is summarized in Table 3-3

**Table 3-3: Core manpower for training**

Management and coordination of training efforts in the NGIs	1 FTE
Technical information gathering and material creation	1 FTE
Support of central services such as material repository and online resources	1 FTE
Support of t-Infrastructure interoperation	1 FTE
<b>Total core EGI effort</b>	<b>4 FTEs</b>

The resources do not necessarily have to be co-located or located with any other central provision.

<sup>1</sup> Ref [e-IRG ETTF doc?]



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### 3.6. DISSEMINATION

Dissemination *per se* is not needed in EGI. What is needed is a service/networking activity for the “core” functions, consisting mainly of website maintenance / some graphics, PR/media relations, broad “scientific” publishing (e.g. SciAm), training liaison.

A Dissemination-Outreach function, especially where understood as an isolated activity and an effort to “sell a product”, is not well motivated in an EGI schema.

What is needed:

1. Basic but professional graphic services
2. Professional, dedicated web support
3. A small PR team with relevant experience
4. Support for publication activities

Graphics services should be outsourced, and a dedicated webmaster should be hired with a good prior portfolio; for (3) and (4) ideally EGI should have a content manager with experience from current grid projects, plus someone with a background in scientific journalism – or (if available) someone from a training activity with good writing skills.

The central team (excluding web support) could be small – 2~3 FTE – but augmented on a rotation by 1~2 colleagues from the NGIs (see Management function).

It is important that the PR / Publishing team remain in close contact with the other user-oriented activities, and to some extent with the technical activities.

Publishing and giving talks in broader environments gives better visibility and increases grid literacy more than expending effort (and money) on booth presence at specialized events. The related effort should be prioritized accordingly

### 3.7. SECURITY

Security spans a wide range of topics, from low level computer forensics over middleware security to the highest level policies negotiated between institutions. It ranges from immediate incident responses to adapting to advances in technology which may be years from deployment.

A layered approach will be required because security requirements will vary between NGIs, user communities and will certainly differ between different types of Grid middleware. The goal is to build on the security expertise of the NGIs and the NRENs.

The high level activities of EGI Security are thus to ensure that:

1. Incident responses are coordinated across all relevant parts of the e-Infrastructure;
2. Nothing falls “between the gaps” – that there is no security aspect of the e-Infrastructure not covered by anyone;
3. Adequate security policies are agreed across the e-Infrastructure;
4. A proactive approach is taken to security.



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The EGI security group will bring together representatives for each of

- the NGIs
- larger Grid infrastructures
- middleware consortia
- network communities (CSIRT)

The purpose is to ensure a timely response by all parts of the e-infrastructure avoiding duplication.

The currently operating CSIRT teams can serve as starting point to be extended to the needs of EGI and the participating NGIs. Ref.: [http://www.cert.org/csirts/csirt\\_faq.html](http://www.cert.org/csirts/csirt_faq.html)

The International Grid Trust Federation (IGTF) is a body to establish common policies and guidelines between its Policy Management Authorities (PMAs) members and to ensure compliance to this Federation Document amongst the participating PMAs. Member PMAs of IGTF are the European Grid PMA (EUGridPMA), the Asia Pacific Grid PMA (APGridPMA), the Americas Grid PMA and, TERENA Academic CA Repository (TACAR). The EUGridPMA coordinates the trust fabric for e-Science grid authentication in Europe.

### 3.7.1. Adequate security policies

It is necessary to have a set of security policies in place to ensure that sites collaborate with, and contribute to, the EGI security processes. These can partly be adapted from those used by existing Grid and networking communities.

- Review existing policies from projects which have done work in this area.
- Identify and agree people from sites and e-Infrastructures who can speak authoritatively for their site/e-Infrastructure – and can commit a site to operate according to the relevant policies.
- Regularly (say, once every year), and following a major security incident, review policies to see whether they need updating to cover changes.

The best security is provided through a proactive approach comprised of e.g. security training material, workshops, experience sharing and security service challenges.

### 3.7.2. Staffing and Funding

Much of the effort required for the EGI Security work needs to come from e-Infrastructure projects such as the middleware developers, Grid computing, supercomputing, etc., as well as from the security groups in NGIs and NRENs. These groups have the expertise in their areas.

It is necessary for EGI Security to fund a core group with the following responsibilities:

- Management: Overall management and reporting
- Operations: Coordination between groups, managing EGI Security-specific infrastructure.
- Information flow management: ensure that reports are classified and directed to the appropriate recipients.



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In addition, some staff will be needed with expertise to fill gaps, and to lead work in specific areas. We would expect that five full time people would be needed, ideally at the same location, to coordinate the work and to provide support and expertise to the contributing groups.

### **4. NATIONAL GRID INITIATIVE**

The present document briefly describes the main activities which fall under the responsibility of the National Grid Initiative (NGI) operations team. Four function categories are defined and detailed below, namely:

1. operation of services,
2. help desk functions,
3. ROC support and
4. accounting and monitoring.

#### **4.1. NGI RESOURCES**

The list of National Grid Initiative (NGI) is responsible of the operation of a number of services, such as:

- resource centre services (User Interface, Compute Element, Storage Element, accounting services, information services, etc.);
- a complete set of core infrastructure services and service replicas (VOMS, WMS/RB, LB, catalogues, data transfer services, top-level information services, etc.) as needed, to support the requirements of local and global VOs at a good level of availability and reliability. EGI coordination is needed to ensure that requirements of global VOs are met.
- additional optional services such as:
  - o Pre-production services for VO testing of new middleware releases;
  - o Experimental services, if requested by specific interested VOs: they are set-up and configured in collaboration with the relevant middleware development teams. They allow users to test quick fixes to critical middleware bugs, to preview the latest features released, and allows developers to collect immediate feedback.

#### **4.2. HELP DESK FACILITIES**

The NGIs operate regional Help Desks for VOs, individual users and site administrators.

In order to implement a multi-layer operations model, the regional help desk needs to be interfaced with the central one (operated by EGI or by delegated NGIs), which acts as an integration platform between the regional help desk systems and ensures a smooth transfer of trouble tickets between the NGIs, and maintains core regional operations support services, in order to be able to operate a fully stand-alone service.

The NGI can rely on central regional operations support services if available, or can maintain core regional operations support services locally if willing to operate a fully stand-alone service.

The regional Help Desk is responsible of:





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- first-level support as well as third-level support by helping in the resolution of advanced and specialized operational problems that cannot be solved by site administrators (second-level support is supplied by the teams with a higher level of competence in the relevant fields). If necessary, the regional Help Desk will propagate and follow-up problems with higher-level operational or development teams;
- ticket follow-up to ensure that sites work on tickets opened against them;
- responding to tickets from sites in a timely manner.

The central help desk ( as EGI core functionality) acts as an integration platform between the regional help desk systems and ensures a smooth transfer of trouble tickets between the NGIs, additionally it could also act as a portal for multi-NGI VOs to address general problems with the EGI infrastructure and as a fall-back helpdesk for NGIs that are not able or interested in running their own regional help desk. (this could/should be part of the EGI functions document), currently estimated to 3 FTE.

### 4.3. REGIONAL OPERATIONS FUNCTIONS

The NGI will fulfil functions currently assembled in a ROC. These functions can be supported by an individual NGI or by a federation of NGIs. In addition to the support of the regional Help Desk facilities as specified above, the functions consists of:

- operating core operations support services (e.g. GOCDB, CIC portal, GGUS, SAM, GStat, etc.), if delegated by EGI;
- coordinating the deployment of supported middleware to ensure an overall adequate level of functionality of Grid services and high availability and reliability of Grid services; and to guaranteed that specific middleware versions are deployed by sites as requested by VOs;
- registration and certification of new sites;
- registration of new VOs and cooperation with application-support teams;
- adhering to the agreed EGI operational procedures;
- raising any issues deemed necessary by the sites to the attention of the EGI operational, development, deployment, and/or certification teams, and ensuring that these issues are properly followed-up;
- adherence to security procedures for proper security incident handling;
- adherence to the SLAs negotiated. Examples of possible SLAs are: with EGI, with resource centres and supported VOs;
- participating to working groups (coordinated by EGI) for the definition, maintenance and revision of operational procedures. /\* make sure that the EGI principles and functions document mentions those procedures. \*/ Examples are: definition of security protocols; definition of accounting and monitoring tool specifications; gathering of new operational requirements from resource centres and local VOs (assuming that global VO requirements are





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collected centrally by EGI); definition of implementation rules for the improvement of the availability level of Grid services;

- gathering requirements of middleware administration tools for resource centre administrators and VOs, in agreement with EGI and the relevant middleware development teams.

### 4.4. ACCOUNTING AND MONITORING

XYZ: remember a core task taking care of monitoring tools

The NGI is responsible of resource accounting and infrastructure monitoring. It relies on tools to gather and keep information about:

- usage records of individual users (in agreement with national legislation), which can be aggregated at the user/VO/site level;
- availability and reliability of sites and individual services;
- additional performance metrics needed to assess adherence to the Service Level Agreements negotiated with 1. the supported VOs, 2. the resource centres and 3. EGI;
- status and type of resources available;
- the performance of the network infrastructure providing connectivity to the NGI resource centres and to EGI.

Monitoring and accounting data are collected and stored locally by the NGI and are also published globally as required by VOs and EGI.

For this reason, NGI monitoring and accounting tools must interoperate with tools in use at the EGI level to collect data from the various NGIs, and thus need to meet the tool specifications defined by NGIs and EGI.

Validation of the data published, needs to be performed in order to ensure correctness.

### 5. TRANSITION SCENARIO

The middleware stacks (ARC, gLite, UNICORE, Globus, etc.) discussed in Chapter 3.2 are used in an increasing number of scientific disciplines in Europe:

- Astronomy & Astrophysics
- Computational Chemistry
- Earth Sciences - Earth Observation, Solid Earth Physics, Hydrology, Climate
- Fusion
- High Energy Physics – CERN, DESY, Fermilab, SLAC
- Life Sciences - Bioinformatics (Drug Discovery, GPS@, Xmipp\_MLrefine, etc.)
- Condensed Matter Physics
- Computational Fluid Dynamics
- Computer Science/Tools
- Civil Protection

Many of the applications rely now on production quality grids and the underlying infrastructure. It is imperative that the sciences using the current grid operations supported by EGEE, DEISA



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and other EU-funded projects can transit without disruption to the envisaged EGI/NGI-based model.

Though, by the time of this writing, a more precise transition scenario has not been discussed in detail, it is clear that it must address the following issues:

- In the EGEE structure, the Regional Operations Centres (ROCs) play a major role. It is inconceivable that these centres cease to exist from one day to next without appropriate replacement.
- As mentioned in Chapter 3.2, the middleware stacks are still under development within the community and this effort is co-funded by the EU. These developments have to continue through the transition phase from the current organization to the EGI/NGI model.

Many of the developments and operational tasks are performed by staff having built up their expertise through the lifetime of the current grid projects. Care must be taken that this expertise does not get completely lost during the transition period.

## 6. MANAGEMENT

One of the obviously necessary functions for an organisation like EGI is the management of the organisation. The following description contains a rough sketch of the management levels and (within text-boxes) assumptions how the functions should be funded. It is clear that these findings have to be refined after EGI\_WP4 and EGI\_WP5 have concluded.

The EGI management will coordinate requests for EU funding, if possible within a unique “reserved call” and allocate the funding granted. This may apply for instance to components and cluster of components outside the scope of the middleware consortia as required and agreed by the EGI and the reference stacks.

### 6.1. ASSUMPTIONS ABOUT THE EGI FINANCING STRUCTURE

The first assumption is on the general budgetary structure: (a) Service provisioning, (b) Developments and (c) General central services are separate cost centres.

The second assumption is on the income side of the budget. The income is provided by three different streams: (a) service charges to be paid by those NGIs who get specific services from EGI, (b) income from project grants and (c) contributions from NGI according to an EGI-Key, which is decided by the Council.

### 6.2. EGI COUNCIL

The top level management layer in EGI is the EGI Council. The NGIs own EGI and voice their views on all EGI matters through the EGI Council. The EGI Council may in-install committees, which elaborate recommendations to the EGI Council for specific topics. It may furthermore elect an Executive; details will be determined later.

The EGI Management has to provide legwork services to the EGI Council and its committees and it is assumed that arising costs are covered from the EGI budget provided for the EGI Directorate and his staff through the NGIs.



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### 6.3. EGI DIRECTOR AND HEADS OF UNITS

The EGI Director, who works full time, provides the organisational interface to the EGI Council, to political bodies (EU etc.) and to several EGI committees on one side and to the Heads of the EGI Units on the other side. The EGI Director has to direct the group of unit heads. Within the unit heads the functions of a Chief Technical Officer (CTO), a Chief Operational Officer (COO) and a Chief Administration Officer (CAO) are implemented. The administration also covers efforts for the public relations and contains positions in the administrative and legal services. The EGI Director needs a secretariat and must have some staff which prepares policy development, the representation on European level and the legwork function for the EGI Council.

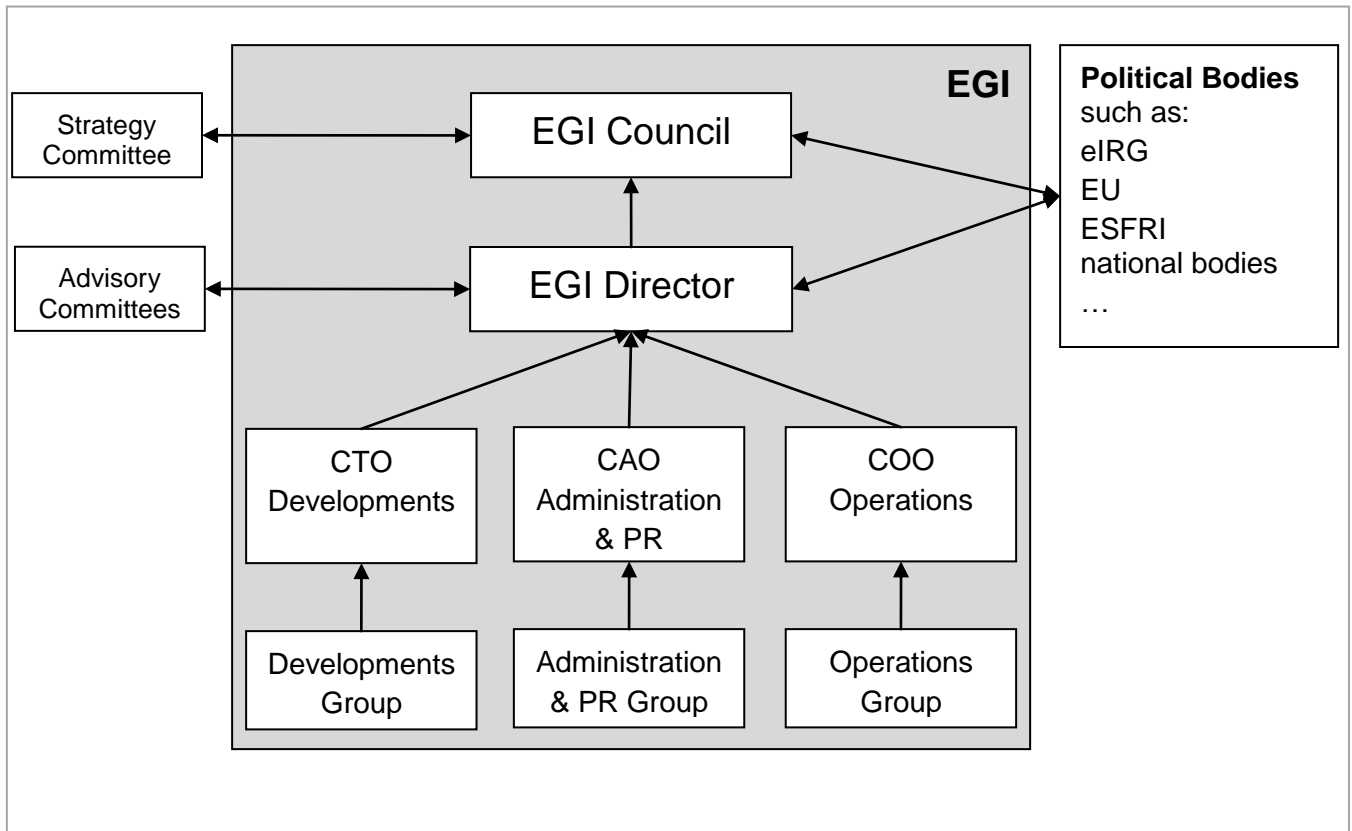
It is assumed that the positions of the Director, the CAO and the administration and PR group are paid through the EGI budget provided (only) by the NGI's contributions.

EGI should be positioned in a flexible way as far as EGI units are concerned. It seems that only three units should have a permanent basis: the Operational Unit, the Development Unit and the Administration Unit with the COO, the CTO and the CAO as head of the respective unit.

Projects may, based on EGI's findings, be embedded in these units or they may be organised as separate project oriented units within EGI, but always embedded in the organisation's structure.

This project management layer should, if possible, be paid by project grants and their complements, mostly resources organised by the NGIs.

The following graph summarizes the features of the EGI management structure:



**Figure 1: EGI management structure**

#### 6.4. SUMMARY FUNDING AND MANAGEMENT STRUCTURE

Table 6-1 summarizes the financial implications of the items mentioned above:

**Table 6-1: Core manpower for management**

<b>Position</b>	<b>FTE/a</b>	<b>Funding source</b>	
<u>Directorate:</u>		NGIs contribution	
Director	1		
Policy Development	1		
Representation on EU level	2		
Secretaries	2		
CTO	1	Project grants, if available otherwise NGIs contribution	
COO	1	Service Charges	
<u>Administration + PR:</u>		NGIs contribution	
CAO	1		
Admin. Staff	2		
Legal expert	1		
<b>Total</b> (positions paid by contributions)	<b>12</b>	NGIs contribution	

## 7. EGI RESOURCE ESTIMATION SUMMARY

In the Table 7-1 we summarize the resources required to fulfil the above mentioned EGI functions. Please note that this table is preliminary and requires further discussion.

**Table 7-1: Summary of core manpower**

<b>Core Functions</b>	<b>FTE</b>	<b>Cost</b>	
Operation of a reliable Grid infrastructure	13	€ 650,000.00	
Accounting, reporting & Monitoring	3	€ 150,000.00	
VO Management	1	€ 50,000.00	
Pre-production coordination	1	€ 50,000.00	
Help Desk	3	€ 150,000.00	
Network Co-ordination	2	€ 100,000.00	
Coordination of middleware development and standardization, liaison to OGF	6	€ 300,000.00	
Build & test systems	8	€ 400,000.00	
Components selection, validation, integration and deployment	14	€ 700,000.00	
Security	5	€ 250,000.00	
Application support	8	€ 400,000.00	
Training efforts	4	€ 200,000.00	
Outreach and dissemination	3	€ 150,000.00	
Management	8	€ 400,000.00	
Policy, Strategy, e-IRG	2	€ 100,000.00	
Representation of European Grid efforts, international cooperation, and ESFRI	1	€ 50,000.00	
Director	1	€ 50,000.00	
<b>Total</b>	<b>82</b>		<b>€ 4,150,000.00</b>
Overheads		€ 3,320,000.00	
Buildings; Light, Heat, Cool; Insurance; Maintenance; Accounts & banking; Office equipment; Taxes			
Travel Costs		€ 246,000.00	
<b>Core Total Funding</b>		<b>€ 7,716,000.00</b>	<b>€ 7,716,000.00</b>



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*We will insert here a statement on the complete picture including effort that will be taken up by other bodies outside EGI (grid infrastructure cost, middleware development, local operations costs).*

As an example, we give here the needs for middleware development:

**Table 7-2: Non-core manpower for middleware**

<b>Optional Function Middleware Development</b>		
Middleware Development	155	€ 7,750,000.00
Middleware overheads		€ 6,200,000.00
<b>Total Optinal Funding</b>		<b>€ 13,950,000.00</b>

## 8. ANNEXES

### 8.1. CURRENT TASKS FOR OPERATIONS IN EGEE

The table which follows lists the current global operations tasks and services that are carried out in the framework of the EGEE project and the corresponding *real* manpower is estimated on the basis of the real amount of work carried out by both funded and unfunded staff.

It is important to note that today most of the global tasks indicated in the table below are delegated to NGIs or ROCs in case of federated NGIs, as indicated in the Notes column. The manpower currently involved in those global tasks is provided by the NGIs.

Tasks can be *localized* or *distributed*. Tasks can be localized if it can be carried out at best by a single team of people that are co-located. Conversely, *distributed* are those tasks that can be run by number of teams geographically distributed (in this case several NGIs are delegated by the EGI to run the activity). Input from the NGIs is expected to define what tasks in the table will be considered general EGI activities to be localized or distributed.

It is clear that manpower estimates indicated in the table, are subject to revision as they depend on the size and number of user communities supported, as well as on the number of individual NGIs and NGIs federations involved.

Task	Sub-task	Manpower (FTE)	Notes
Operations Coordination Centre (OCC)	Regional Operations Centre (ROC) coordination	2	This does not include the CERN ROC related tasks, or running core Grid services, which we also consider as a task of the ROC. Examples of current monitoring tools in use in EGEE II are SAM and gridview
	Pre-production coordination	1	
	Coordination and support for roll out of mw updates	1.5	
	Grid security and incident response coordination	1	



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	Interoperations (OSG, EU related projects)	1	
	Grid Operations tools (service availability monitoring, overall status monitoring, Monitoring WG)	5	
	General: operations dissemination, conferences, weekly operations meetings and operations workshops, deliverables, EU reviews, ...	1	
<b>OCC Hosted Functions</b>	Support from mw resident service experts	0.5	Support for middleware releases currently supplied by the EGEE SA3 team.
	Support for middleware releases	0.7	
	Support for VO Membership Service, Service Availability Monitoring, etc	0.3	
<b>VO/User support</b>	Operations support to the experiments (AIS)	2	
	User support coordination with the experiments and the global Grid user support (GGUS)	1.5	
<b>Operations portal development and maintenance</b>	coding/testing	2	
	requirements gathering, prioritising, functional design, liaison with associated core services	1	
	DB Administration	0.1 FTE	

			Grid operations configuration in EGEE II, gstat for status monitoring of sites and individual Grid service instances, and SAM for service availability monitoring.
	Operations portal failover	0.1 FTE	This is done in collaboration with ROC Italy. The main work is done there. The remaining part is roughly equivalent to 0.1 FTE.
Operations oversight	Operations oversight coordination	0.3	Operations oversight coordination (“COD” in EGEE II) has been a time consuming task as the challenges evolve with time in the project - increase from 4 to 10 teams, coordination of the working groups, regionalisation of the tools. When tools and mandate are stabilized in EGI, harmonization of working habits, improving tools and metrics could be about: 0.3 FTE (supplied by ROC France) for organizing and coordinating quarterly meetings, phone conferences for COD topics leaders, weekly and monthly liaison meetings with operation, general coordination tasks, incl. scheduling and proactive work and general improvements. Please note that only a fraction of those FTEs for the COD topic leaders come from ROC France.
	Operations portal integration	0.4	
	Tool improvements for operations oversight	0.75	“TIC” in EGEE II
	Best practices	0.35	might increase to 0.5
	Operations procedure manual	0.25	
	Failover	0.4	might increase to 0.5, FTE supplied by IT ROC
	Grid core services	0.2	might increase to 0.25
	Shifts	0.5 per ROC	1 week monthly for two people, currently 11 operations oversight teams involved (CERN, FR, IT, UK/Ireland, Russia, Taiwan, Cent. EU, South EU, DE/CH, SWest EU, NDGF)

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<b>CA</b>	Certification Authority for non-HEP VOs (catch all CA)	0.5	If not associated to an existing CA, this increases to 2.5 FTEs
<b>Operations Advisory Group</b>	Co-chair	0.1	This has been a very time consuming task in the past, but became more lightweight now as the objectives changed. If no new tasks will be added, in the future (= EGEE-III) this will be about 0.1 FTE for liaison to the Applications people, and to overview the VO registration process on the Operations portal.
<b>Grid network operations centre</b>		2	This is ENOC (EGEE Network Operations Centre in EGEE II). 5x8 service (currently, EGEE SA2 activity)
<b>Global Grid user support</b>	Management of overall support infrastructure: 1. Regular Meetings with support experts from the NGIs (like EGEE - ESC) 2. Definition of support processes and oversight of their implementation and operation 3. Management of TPM	4	Global Grid user support is named GGUS in EGEE II. Tickets (rounded off): more than 33000 ticket in total (by 2008-02-21); 1800 tickets since the beginning of this year 2008; 13000 tickets in 2007; 8500 tickets in 2006. Support staff: 714 registered in GGUS support staff, 76 connected support units, 12 TPM-Teams for the rotating first line support (each consists of approx. 3 staff) Interfaces to other systems: 13 interfaces to external helpdesk systems (dech, central europe, cern, italy, russia, south east, south west, uki, osg, cic, enoc, dCache, castor) User: cannot be specified as the GGUS system is freely accessible requirement: valid Grid certification or registration at GGUS portal.
	Operation and development: 1. Change management 2. Regular releases including Interfaces to regional helpdesks		
<b>Ticket Process Manager</b>	Triage of incoming problems and assignment of tickets to second line support units (solution of “standard” problems )	3	3 FTE for service limited to normal working hours. Global first line support done by NGIs on rotational basis. Estimates to be increased in case of 24x7 service (around 12 FTE)

<b>GOCDDB</b>	operations of GOCDDB as a central service into EGI	1	
<b>Accounting</b>	Operations of the central repository	1	

**Operations configuration database:** Many aspects of operations rely on a central registry of static information: service nodes, contact details, security contacts, certification status, scheduled downtime. In EGEE, the central registry is GOCDDB, hosted at RAL in the UK while the information input is devolved to regions and sites. In order to optimize operations within an NGI it would be a good strategy to run instances of GOCDDB within each NGI so that their continuing operations is within their control. Local uses like devolved monitoring would communicate directly with their national GOCDDB and global tasks would use information cached in a central instance. The central instance would act as a catch-all for NGI who didn't run their own and allow a gradual distribution.

**Accounting:** the accounting system repository acts as a central place to store accounting data for VOs. There are a variety of collection tools in place (APEL, DGAS, SGAS, and local site systems). While it is obviously the responsibility of an NGI to collect accounting data, a VO running work across multiple NGIs needs a method of obtaining consolidated reports on demand. Since there are no examples of reliable distributed database queries across large numbers of countries we believe a central repository will be required for some time. We estimate 1 FTE to continue running the central repository with some ongoing development to distribute the service.

The APEL repository already collects data from other grids (OSG, NorduGrid, INFN) to service multi-grid VOs like the LHC experiments. The future direction should be to use OGF standards like UR and RUS to provide standard interfaces for the exchange of accounting data. When there are reliable, open source implementations of RUS that can be deployed in production for the required scale of records and queries then we would propose running these in NGIs with the data still being collected centrally for some VOs and as a catch-all repository.

### 8.1.1. Examples of ROC activities

The following sections provide examples of list of tasks currently carried out by two ROCs in EGEE II, together with the corresponding manpower estimates.

### 8.1.1.1. Italian ROC

The estimates herein specified include both funded (from various funding agencies) and unfunded **current** effort. The table below does not include global EGI tasks carried out by the ROC.

Activity	Sub-activity	Manpower (FTE)	Notes
ROC management		1	
Operate a production and pre-production service	Run essential general regional core services for the infrastructure	6.5	
	pre-production and experimental services		
	operation of VO-dedicated services		
	coordination of deployment of mw releases to the resource centres in the region, and support for the centres		
	site registration and certification		
	oversight and management of operations problems		
Help-desk	First-line and third-line support for operational problems to the resource centres in the region	6.5	For a 8x5 service (operator on-duty support: 2 people/day, 1 shift every two weeks). Manpower to be increased to around 10
	First-line and third-line support for users, VO and applications; operate a call centre		
	monitoring of operational problems to ensure that they are resolved and properly followed-up		

	regional ticketing system and GGUS interoperability		FTE for a 24x8 service
	User/site admin training in region		
Core operations support tools: 1.2 FTE	deployment of tools and collection of new requirements for monitoring, Grid service management and accounting tools. Testing of interoperability.	1	
	wiki pages, agenda system, administration of hardware monitoring tools, web portal, ...		
INFN Grid mw release	integration of INFN Grid mw components with gLite, additional certification as needed for the region	2	
Grid security and incident response 1.5	Grid incident response coordination in region	1.5	
	Grid security best practices		
Accounting coordination in region		1	
Interoperation with national and regional grid projects		0.2	
Application/resource provider coordination: negotiate access to resources in the region for new Vos		0.5	Currently no regional monitoring of SLAs with resource centres or VOs is in place
general tasks (working groups, conferences, workshops, administrative duties,		0.5	



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reviews)			
TOTAL		20.9	

### 8.1.1.2. French ROC

Global tasks are not taken into account here. This results in sensible less effort for weekly operator on duty support and for ROC management in general with respect to the EGEE-II Work Breakdown Structure.

Activities	Sub-activities	Manpower (FTE)
Operate a production and pre-production service	ROC management	2
	pre-production service	1,75
MW deployment and support	coordination and support for middleware deployment	0,25
Grid operations and support	1st line support for operational problems in region	1,5
	oversight and management of operations problems	2
	Run regional core Grid services	1
	weekly operator on duty support	1
	Grid services for infrastructure or VOs	2,5
Grid security and incident response	Grid incident response coordination in region	1
	CA management	2
VO, application and user support	Call centre, helpdesk for ROC	2
	VO support and integration support	2,5
	User/site admin training in region	1,25
GGUS tpm etc		1
Interoperation with national and regional grid projects		0,75
Application/resource provider coordination		0,25
general tasks (conferences, workshops, administrative duties, reviews)		0,5
<b>TOTAL</b>		<b>23,25</b>