

# COMBINATION OF COLLABORATIVE PROJECT AND COORDINATION AND SUPPORT ACTION

## Integrated Infrastructures Initiative project (I3) proposal Infrastructures Call 2

FP7-INFRASTRUCTURES-2007-2

### Enabling Grids for E-science-III

#### EGEE-III

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13	University of Warsaw, Interdisciplinary Centre for Mathematical and Computational Modelling	<b>ICM UW</b>	PL
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15	University Computing Centre (University of Zagreb)	<b>SRCE</b>	HR
16	Stichting voor Fundamenteel Onderzoek der Materie	<b>FOM</b>	NL
17	Stichting Academisch Rekencentrum Amsterdam	<b>SARA</b>	NL
18	Universiteit van Amsterdam	<b>UvA</b>	NL
19	Rijksuniversiteit Groningen	<b>RUG</b>	NL
20	Koninklijk Nederlands Meteorologisch Instituut	<b>KNMI</b>	NL

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21	Vrije Universiteit Brussel	<b>VUB</b>	BE
22	Technische Universität München	<b>TUM</b>	DE
23	Stiftung Deutsches Elektronen-Synchrotron	<b>DESY</b>	DE
24	Deutsches Klimarechenzentrum GmbH	<b>DKRZ</b>	DE
25	Fraunhofer-Gesellschaft zur Förderung der Angewandten Forschung e.V.	<b>Fraunhofer</b>	DE
26	Forschungszentrum Karlsruhe GmbH	<b>FZK</b>	DE
27	Gesellschaft für Schwerionenforschung GmbH	<b>GSI</b>	DE
28	Eidgenössische Technische Hochschule Zürich	<b>ETH Zurich</b>	CH
29	Verein zur Förderung eines Deutschen Forschungsnetzes (DFN-Verein)	<b>DFN</b>	DE
30	SWITCH – Teleinformatikdienste fuer Lehre und Forschung	<b>SWITCH</b>	CH
31	Centrale Recherche SA	<b>CRSA</b>	FR
32	Commissariat à l’Energie Atomique	<b>CEA</b>	FR
33	Centre National de la Recherche Scientifique	<b>CNRS</b>	FR
34	HEALTHGRID	<b>HEALTHGRID</b>	FR
35	CS Systemes d'Information SA	<b>CS SI</b>	FR
36	CGG Services	<b>CGGV</b>	FR
37	Istituto Nazionale di Fisica Nucleare	<b>INFN</b>	IT
38	Elsag Datamat SPA	<b>ED</b>	IT
39	Consiglio Nazionale delle Ricerche	<b>CNR-ITB</b>	IT
40	Istituto Nazionale di Astrofisica	<b>INAF</b>	IT
41	Università del Piemonte Orientale "Amedeo Avogadro"	<b>UNIPMN</b>	IT
42	Ente per le Nuove Tecnologie, l’Energia e l’Ambiente	<b>ENEA</b>	IT
43	Trust-IT Services Ltd.	<b>TRUST-IT</b>	IT
44	Università della Calabria	<b>UNICAL</b>	IT
45	Università degli studi di Napoli Federico II	<b>UNINA</b>	IT
46	Department of Chemistry, University of Perugia	<b>UNIPG.IT</b>	IT
47	Consortium GARR	<b>GARR</b>	IT
48	Southern Partnership for Advanced Computational Infrastructure	<b>SPACI</b>	IT
49	Helsingin Yliopisto (University of Helsinki, Helsinki Institute of Physics)	<b>UH.HIP</b>	FI
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51	UNINETT Sigma AS	<b>SIGMA</b>	NO

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52	Swedish National Infrastructure for Computing / Swedish Research Council	<b>VR-SNIC</b>	SE
53	State Research Center of Russian Federation – Institute for High Energy Physics	<b>IHEP</b>	RU
54	Institute of Mathematical Problems of Biology of Russian Academy of Sciences	<b>IMPB RAS</b>	RU
55	Federal State Unitary Enterprise “State Scientific Center of the Russian Federation – Institute for Theoretical and Experimental Physics”	<b>IITEP</b>	RU
56	Joint Institute for Nuclear Research	<b>JINR</b>	RU
57	Keldysh Institute of Applied Mathematics of the Russian Academy of Sciences	<b>KIAM RAS</b>	RU
58	Petersburg Nuclear Physics Institute of Russian Academy of Sciences	<b>PNPI RAS</b>	RU
59	Russian Research Centre “Kurchatov Institute”	<b>RRC</b>	RU
60	Skobeltsyn Institute of Nuclear Physics of Moscow State University	<b>SINP MSU</b>	RU
61	Geophysical Center of the Russian Academy of Science	<b>GC RAS</b>	RU
62	Ethnico Diktyo Erevnas Technologias AE (Greek Research and Technology Network SA)	<b>GRNET</b>	GR
63	Institute for Parallel Processing of the Bulgarian Academy of Sciences	<b>IPP BAS</b>	BG
64	ΠΑΝΕΠΙΣΤΗΜΙΟ ΚΥΠΡΟΥ (University of Cyprus)	<b>UCY</b>	CY
65	Tel Aviv University	<b>TAU</b>	IL
66	Institutul National de Cercetare-Dezvoltare in Informatica (National Institute for Research and Development in Informatics)	<b>ICI</b>	RO
67	Institute of Physics Belgrade	<b>IPB</b>	SERBIA
68	Türkiye Bilimsel ve Teknolojik Arastirma Kurumu	<b>TUBITAK</b>	TR
69	Consejo Superior de Investigaciones Cientificas	<b>CSIC</b>	ES
70	Laboratorio de Instrumentação e Fisica Experimental de Particulas	<b>LIP</b>	PO
71	Centro de Investigaciones Energéticas, Medioambientales y Technologicas	<b>CIEMAT</b>	ES
72	Institut de Fisica d'Altes Energies	<b>IFAE</b>	ES
73	Universidad Politecnica de Valencia	<b>UPV</b>	ES
74	Entidad Publica Empresarial Red.es	<b>RED.ES</b>	ES
75	Fundacion Centro Tecnológico de Supercomputacion de Galicia	<b>CESGA</b>	ES
76	Universidad de Zaragoza	<b>UNIZAR</b>	ES
77	Universidad Complutense de Madrid	<b>UCM</b>	ES
78	The Provost, Fellows and Scholars of the Holy and Undivided Trinity of Queen Elizabeth near Dublin (hereinafter called TCD)	<b>TCD</b>	IE
79	Science and Technology Facilities Council	<b>STFC</b>	UK
80	The University of Edinburgh	<b>UEDIN</b>	UK
81	Imperial College of Science, Technology and Medicine	<b>Imperial</b>	UK
82	University of Glasgow	<b>Glasgow</b>	UK

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83	The University of Manchester	UNIMAN	UK
84	The Chancellor, Masters and Scholars of the University of Oxford	UOXF.DL	UK
85	Queen Mary and Westfield College	QMUL	UK
86	Delivery of Advanced Networking Technology to Europe Ltd.	DANTE	UK
87	Inter-University Research Institute Corporation, High Energy Accelerator Research Organisation	KEK	JP
88	Academia Sinica	AS	TW
89	Korea Institute of Science and Technology Information (KISTI)	KISTI	KR
90	Chonnam National University	CNU	KR
91	The University of Melbourne	UNIMELB	AU
92	The Board of Regents of the University of Wisconsin System	UWM	USA
93	University of North Carolina at Chapel Hill	UNCCH	USA

Work programme topics addressed: e-science Grid infrastructures, ICT-based e-infrastructures, Support to existing research infrastructures.

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### Proposal abstract

A distributed computing Grid is now essential for large-scale, data intensive science. The concept has been proven viable through projects such as Enabling Grids for E-science (EGEE and EGEE-II, 2004-2008). EGEE-II is consolidating the operations and middleware of this Grid for use by a wide range of scientific communities, such as astrophysics, computational chemistry, earth and life sciences, fusion and particle physics. Strong quality assurance, training and outreach programmes contribute to the success of this production Grid infrastructure, which has spawned numerous collaborative projects, thus extending the Grid geographically and bringing in new user communities.

Built on the pan-European network GEANT, EGEE has become critical for European science, allowing researchers in all regions to collaborate on common challenges. Worldwide collaborations have extended its reach to the benefit of European science.

The proposed EGEE-III project has two clear objectives that are essential for European research infrastructures:

- To expand and optimise Europe's largest production Grid by continuous operation of the infrastructure, support for more user communities, and addition of further computational and data resources;
- To prepare the migration of the existing Grid from a project-based model to a sustainable federated infrastructure based on National Grid Initiatives for multi-disciplinary use.

By strengthening interoperable, open source middleware, EGEE-III will actively contribute to Grid standards, and work closely with businesses to ensure commercial uptake of the Grid, key to sustainability.

Federating its partners on a national or regional basis, EGEE-III will have a structuring effect on the European Research Area. Without EGEE-III, the European Grid would fragment into incompatible infrastructures of varying maturity. EGEE-III will provide a world class, coherent and reliable European Grid, ensuring Europe remains at the forefront of scientific excellence.

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### **Executive summary**

*Given the size and complexity of this proposal a concise summary of the key features of the project is provided here, outlining the transition from EGEE-II, the vision and mission of EGEE-III, expertise & resources supporting the project, the activity areas, the management structure, the proposed manpower and budget requested and the benefits for the project stakeholders.*

This proposal has two complementary objectives that are essential for European research infrastructures:

- To expand and optimise Europe's largest production Grid infrastructure, namely EGEE, by continuous operation of the infrastructure, support for more user communities, and addition of further computational and data resources; and
- To prepare the migration of the existing production European Grid from a project-based model to a sustainable federated infrastructure based on National Grid Initiatives for multi-disciplinary use.

### **Background to EGEE-III**

The grid concept involves establishing an infrastructure that allows existing IT installations to connect and share their computing power and storage capacities for a wide range of applications permitting dispersed groups of users to collaborate on common challenges. This concept has been implemented in a variety of ways, including 'Capability' grids combining supercomputers (e.g. DEISA), 'Capacity' Grids, comprising clusters of commodity computers (e.g. EGEE), 'Enterprise' Grids linking together resources of a single company, and 'Volunteer' Grids, linking individual home computers (e.g. BOINC). Of these, 'Capacity' Grids offer a general purpose, dependable, cost-effective and pervasive infrastructure, suitable for the needs of collaborative European science.

Most European countries have grid infrastructures, at varying levels of maturity. A limitation of national grids is their lack of access provision to international science communities. Beyond the national level standards become important to allow ease of connectivity and sharing of applications.

The concept of a European Grid Infrastructure started in 2000. In Framework 5, the EUDataGrid project and related initiatives proved a European Grid system was capable of supporting different user communities. In Framework 6, the EGEE project built on these results to establish a continuously available production quality Grid infrastructure. Since 2006, EGEE-II focuses on consolidating the operating procedures, expanding the resources, enlarging the Grid to more countries and attracting more user communities. EGEE-II has improved the scalability of the Grid, and its reliability in supporting a wide range of applications.

EGEE has become a critical infrastructure for a range of top European scientific undertakings. Without EGEE the European Grid infrastructure would fragment into national, thematic grid infrastructures, with less coherence at a European level. EGEE-III will provide a world class, coherent and reliable European Grid, ensuring Europe remains at the forefront of scientific excellence.

### **Details of EGEE-III**

The focus of EGEE-III is to:

- migrate the existing European Grid Infrastructure from a European co-funded project to a self-sustainable infrastructure that is under the management of national initiatives;
- ensure the continuous provision of a production quality grid infrastructure to European eScience;
- expand the usage of the infrastructure in terms of new user communities;
- simplify the usability of the system for the end user;

- provide active contributions to standardisation efforts for adoption at European and International levels;
- work closely with businesses to ensure commercial uptake of the Grid, key to sustainability.

### Expected Results and Lead Users

- Physical access to a world class Grid infrastructure for pan-European virtual research communities.
  - Lead Users: user communities and countries joining the European Grid;
- A grid that is adaptable and scalable to different uses and applications.
  - Lead Users: Research institutes, enterprises and large scale scientific groups;
- Guidelines, procedures and tools for the integration of existing and new Grids into a sustainable European Grid Infrastructure.
  - Lead Users: National Grids and cluster Grids and large scientific Infrastructures;
- Reference open source middleware that adheres to key emerging Grid standards.
  - Lead Users: National Grids and Cluster Grids and Large Scientific Infrastructures;
- Study on the commercial potential of the grid as a tool for applications and future potential products and services.
  - Lead Users: Enterprises, start-up companies, enterprise development agencies;
- Migration strategy and gap analysis identifying developments required to implement the vision of a sustainable European Grid infrastructure.
  - Lead Users: Research policy groups (EU, National and Regional)

### List of activities of the EGEE-III Project

Activity Number	Activity Title
NA1	Management of the Consortium
NA2	Dissemination, Communication and Outreach
NA3	User Training and Induction
NA4	User Community Support and Expansion
NA5	Policy and International Cooperation
NA6	Technology Transfer and Outreach to Business
SA1	Grid Operations
SA2	Networking support
SA3	Integration, Testing and Certification
JRA1	Middleware Engineering

### Consortium:

93 partners, both academic and business, organised in regional federations:

- Asia Pacific (Australia, Japan, Korea, Taiwan)
- Benelux (Belgium, the Netherlands)
- Central Europe (Austria, Croatia, Czech Republic, Hungary, Poland, Slovakia, Slovenia)
- France
- Germany/Switzerland
- Italy
- Nordic countries (Finland, Sweden, Norway)
- South West Europe (Portugal, Spain)



- South East Europe (Bulgaria, Cyprus, Greece, Israel, Romania, Serbia, Turkey)
- Russia
- United Kingdom/Ireland
- USA

**Duration: 24 months**

**EC Contribution: 36'250'000 €**

## **Proposal**

### **1. Section 1: Scientific and/or technological excellence, relevant to the topics addressed by the call**

#### **1.1 Concept and Objectives**

##### **Background**

Over recent years, science in Europe and worldwide has become increasingly reliant on high quality computing infrastructures enabling collaborative multi-disciplinary research. Grid computing technologies have been developed over the last decade to provide such a computing infrastructure.

Europe has played a leading role in this development, starting with the EU DataGrid Project and related efforts under the fifth Framework Programme. After this proof of principle demonstrating the potential impact of Grid technologies on European science, a first large scale production Grid infrastructure was deployed by the Enabling Grids for E-Science project (EGEE), and its operation was further consolidated in its second phase (EGEE-II). The EGEE programme, which builds on national and thematic Grid efforts, as well as the pan-European network provided by GEANT and the NRENs, aims to deliver Grid technology to many disparate disciplines and to users with widely varying levels of computing expertise located all over the globe. Since the beginning of EGEE-II, there has been a substantial expansion in the use of the infrastructure by a broad range of scientific applications. Scientists are clustered into Virtual Organisations (VOs) which gives them a framework to conduct collaborative research and gain access to shared computing and data resources. EGEE provides a variety of services to scientists, ranging from training and user support, through to the software infrastructure necessary to access the resources. The number of EGEE VOs supported now exceeds 200, and about 100'000 jobs/day are routinely executed worldwide in an infrastructure comprising more than 250 sites. These applications deal with more than 5 PetaBytes of data made available on the EGEE infrastructure which sees routine data transfers of more than 1GB/sec. The number of scientists benefiting from EGEE has grown to over 10'000.

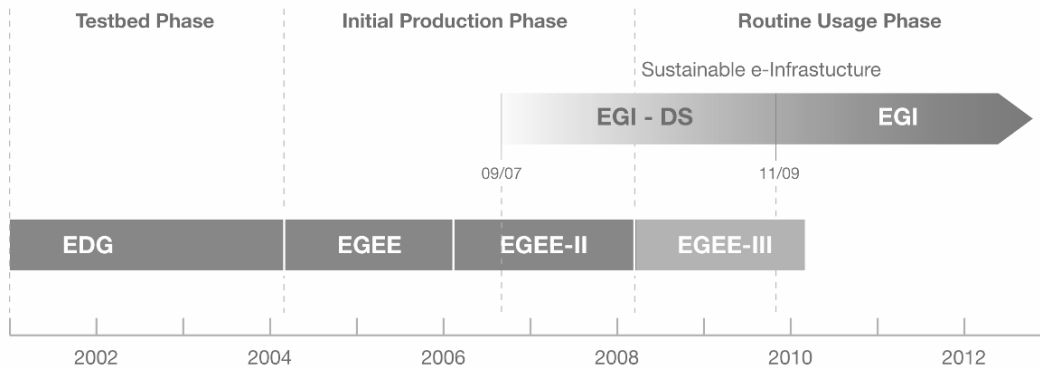
Life Sciences and High Energy Physics (HEP) now depend on the EGEE Grid infrastructure, which is an essential and crucial part of their large-scale data processing. Other disciplines, notably Astrophysics, Earth Sciences, Computational Chemistry and Fusion to name but a few, are increasingly using it for production processing. Close relations have been established with a large number of collaborating projects extending the infrastructure and applications support to a number of disciplines. With these collaborating projects and interoperability efforts with related non-European infrastructures, EGEE contributes to the establishment of a seamless worldwide computing infrastructure.

Continuous advancements of EGEE's relations with business have contributed significantly to the growing uptake of Grid technologies in the commercial sector, with first prototype service providers appearing on the market and several sectors deploying enterprise Grid infrastructures.

##### **Goals for EGEE-III**

Given the success of the EGEE programme, it is now essential to build on its achievements and prepare a transition phase towards a sustainable infrastructure. This is proposed in the present EGEE-III project, undertaken in close collaboration with National Grid Infrastructures (NGIs) and the European Grid Initiative Design Study project approved under FP7 (EGI\_DS). The goal of the EGI\_DS project is to devise a conceptual set-up of a new organisational model, based on NGIs such as the UK National Grid Service (NGS) or D-GRID in Germany, for a sustainable pan-European Grid infrastructure. EGEE-III will work closely with EGI\_DS to transfer its unrivalled experience in operating large-scale international Grid infrastructures, ensuring the development of a viable model in EGI\_DS. In addition, in its second year, EGEE-III will start implementing the required structural

changes to allow a seamless transition to the EGI model, ensuring the continued provision of the Grid service. Figure 1 below illustrates the maturing status of the EGEE infrastructure since FP5, culminating in a sustainable Grid infrastructure for science in Europe.



**Figure 1: Roadmap towards a sustainable Grid infrastructure**

A major goal of the EGEE-III project is to maintain and enhance the production quality computing infrastructure to an increasing range of researchers in diverse scientific fields, thus strengthening Europe's leading position in high quality research. EGEE-III will continue to maintain its reference open-source middleware distribution "gLite" enabling the Grid infrastructure with the goal that through continued contribution and reliance on open standards, as well as collaboration with industry, in the mid to long term industry strength components can successively become an integral part of the infrastructure. Further, by constructing the Consortium on a country level through the implementation of national Joint Research Units (a mechanism introduced by the EC in FP6 and allowing partners to organise themselves in sub-consortia), EGEE-III will strengthen the role of national Grid infrastructures, thus exercising a structuring effect on the ERA.

EGEE-III plans to achieve these goals by a two-fold approach, ensuring a continuous service to an expanding user base and in parallel implementing structural changes for a sustainable Grid infrastructure through:

- The provision of continuous Grid infrastructure operation with world-wide coverage for multi-disciplinary collaborative research, which can cope with the expected growth in resources and utilisation;
- The collaboration with strategic scientific disciplines as a primary source of innovation and interaction with user communities. In particular, the project will liaise closely with the ESFRI projects defined in the ESFRI roadmap as part of its long-term goals;
- The provision of high-quality support to a wide range of VOs by providing services comprising training, dissemination of information, application porting and online user helpdesks;
- The encouragement and establishment of best security practices across all aspects of Grid computing, namely applications, middleware, deployment and operations to increase the level of trust and confidence in the Grid infrastructure;
- The provision of reliable and performant Grid middleware foundation services, as well as key, high-level middleware services, to users with integration and deployment facilities;
- Enhanced technology transfer to business communities;
- Ensuring the overall world-wide coherence of the developments by collaboration with other Grid projects, European and worldwide networking organisations, and standards organisations;
- The implementation of structural changes in concertation with the EGI\_DS project, by collaborating with NGIs to facilitate the move towards sustainable Grid infrastructures in Europe;

- Encouraging the formation of National Grid Infrastructures (NGIs) through the use of Joint Research Unit (JRU) mechanism in countries where they are not yet initiated. These JRUs will represent nascent NGIs, and will be formed in over 20 European countries.

The following table summarises the relevance of the EGEE-III project proposal to the objectives of the Work Programme, Call and topic.

**Table 1: EGEE-III's relevance to the key objectives of the Work Programme**

<b>Key objectives of the Capacities Research Infrastructures Work Programme, call and specific topic INFRA-2007-1.2.3</b>	<b>EGEE-III's relevance to these objectives</b>
“[...] to optimise the use and development of the best research infrastructures existing in Europe [...]”	EGEE is Europe's largest Grid infrastructure spanning 45 countries, comprising over 240 sites, and serving over 200 Virtual Organisations. EGEE-III will optimize its use by the inclusion of further user communities and resources.
“[...] help to create in all fields of science and technology new research infrastructures of pan-European interest needed by the European scientific community to remain at the forefront of the advancement of research, and able to help industry to strengthen its base of knowledge and its technological know how.”	EGEE supports a number of scientific communities, including astronomy and astrophysics, computational chemistry, Earth sciences, Fusion, high energy physics, life sciences, condensed matter physics, computational fluid dynamics, computer science, civil protection, finance. EGEE-III will continue to support these communities and pro-actively reach out to new disciplines. All disciplines use a common infrastructure allowing cross-fertilisation and synergy and enabling multidisciplinary research teams to exist. The finance, pharmaceuticals and bioinformatics, aerospace and automotive, digital media, telecommunications and energy sectors are the focal point of EGEE-III's engagement with businesses.
[...] advancement of knowledge and technology and their exploitation [...] by attracting young people to science and through networking of facilities, research infrastructures help structuring the scientific community and play therefore a key role in the construction of an efficient research and innovation environment. [...] contribute to national, regional and European economic development [...]”	The EGEE-III Project will include over 1000 direct collaborators, and over 10,000 scientific users in the communities supported. EGEE-III will offer a multidisciplinary environment with annual networking events attracting over 500 participants. The Consortium includes 93 partners in 33 countries worldwide, contributing the equivalent of more than <b>35MEuro</b> in manpower and computing equipment. EGEE-III will exert a structuring effect on the ERA through the adoption of the EC's Joint Research Unit mechanism on a national level and technology transfer to nascent National Grid Initiatives. EGEE-III will provide access to a world class infrastructure for researchers in countries with varying levels of IT maturity.
“This Community action will only consider the optimisation, or emergence, of research infrastructures with a clear European dimension and added value in terms of performance and access. These infrastructures must contribute significantly to the development of European research capacities.”	EGEE-III will work with the ESFRI roadmap projects and the EIROForum organisations to establish common infrastructure across the ERA for first class science. The EGEE infrastructure provides access to more than 48'000 CPUs and 5PetaBytes of storage. The throughput of the infrastructure regularly exceeds 100'000 jobs per day.
“These e-Science Grid infrastructures should	The EGEE infrastructure described above will be

<p>provide persistent, cross disciplinary services to pan-European virtual research communities, with increased levels of trust and confidence”.</p> <p>“e-Science grid infrastructures should aim, in particular, to promote open standards and interoperability, guarantee the fast adoption of new research results and innovate and consolidate middleware technology.”</p> <p>“These infrastructures should adopt robust, reliable and scalable authorisation and authentication schemes, implement attractive mechanisms for the pooling of further resources across a very broad range of user communities and evolve towards the adoption of more sustainable organisational models for the provision of services.”</p>	<p>made continuously available across the ERA and beyond, serving in excess of 200 Virtual Organisations. These are embedded in a state of the art security framework for authentication, authorisation and access control allowing harmonious co-existence on the resources. The EGEE operation model allows an easy and flexible pooling of independently-owned resources for that purpose.</p> <p>EGEE-III will be a leader in standardisation efforts via OGF, international interoperability efforts, and the gLite middleware represents a reference open source middleware implementation.</p> <p>EGEE-III is the driving force behind the European Grid Initiative concept, and is structured to ensure the transition to this sustainable organisational model.</p>
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In order to monitor the progress of the project against these objectives, EGEE-III will implement a metrics programme as described in section 1.3.1 which will monitor:

- The scale of the infrastructure in terms of: sites connected, computing and storage resources made available to the user communities;
- The number of individual users, scientific domains and scale of their usage of the infrastructure;
- The number of users, site administrators and application developers trained in Grid technology.
- The number of outreach events attended and organised, contacts made, and media coverage;
- The number of business sectors engaged with EGEE;
- The level of user satisfaction with the services provided by EGEE;
- The quality of service provided by the infrastructure in terms of up-time, accessibility and user support.

A full glossary of terms used in this proposal is available online at:

<http://egee-technical.web.cern.ch/egee-technical/documents/glossary.htm>

## 1.2 Provision of integrated services and co-ordination of high quality research

In the last few years Grids have made the transition from early prototypes to production infrastructures as an essential tool for collaborative science. Grids provide the technical and organisational means to allow seamless access to distributed, independently managed resources (computing, data, sensors, etc.). The EDG, EGEE, and EGEE-II projects, as well as related efforts such as DEISA, OMII-Europe, BalticGrid, SEE-Grid, exploiting the pan-European network GEANT and its extensions, have propelled Europe to a world-leading position and helped spread its influence to other regions such as South America, the Mediterranean basin, Asia, India, and China. This is complemented by close interrelations with similar efforts in the US (TeraGrid, Open Science Grid) and Japan (NAREGI).

EGEE concentrates on establishing an infrastructure that allows existing clusters of commodity computers to voluntarily connect and share their computing power and storage capacities for a wide range of applications. The EGEE-III project will build on the results, competence, and proven ability of the EGEE and EGEE-II projects. It will provide a production level Grid service to a variety of application domains, incorporating national and regional Grid infrastructures, and will contribute to the creation of National Grid Infrastructures as well as to the European Grid sustainability roadmap. This will be achieved through:

- The provision of a continuous service to a wide range of applications;
- The support to new and established applications;
- The refinement of operational procedures;
- The maintenance of production-level Grid middleware.

The existing EGEE Grid service, the largest multi-science Grid infrastructure in the world, needs to be consolidated to further increase its quality and to prepare the migration to a sustainable infrastructure. The programme of activities in this project will ensure the coordination of further advances in middleware technology. It will support re-engineering and integration of existing middleware technologies, both within the EGEE-III project and from other sources to achieve and maintain production quality middleware. The programme will further refine a common operation infrastructure involving operation centres and support centres with a regional presence and centralised coordination. In addition, the programme will provide a coherent training and dissemination programme to ensure a managed and sustainable growth of the user communities benefiting from the Grid. These efforts will provide good starting points for national Grid infrastructures and directly influence the plans for the EGI. Section 1.2.1 below provides an overall project structure description to show how this will be organised.

Deployed in a coordinated way, the infrastructure aggregated in this project provides an unprecedented amount of computer power that is easily accessible to scientists from a broad range of different research disciplines. By maintaining the focus of the project on deployment of core services, while in parallel developing advanced services in liaison with strategic application areas, this project will provide the European Research Area (ERA) with a unique competitive advantage, since no other region of the globe has plans to deploy a science Grid of this size on this timescale.

Without EGEE the European Grid infrastructure would fragment into national thematic Grid infrastructures, with less coherence at a European level. National or regional groups with Grid infrastructures of varying levels of maturity have an opportunity today to access a world class, reliable Grid. Without advances in EGEE these regions would rely only on their current underdeveloped Grids.

The competitive advantage afforded by the planned EGEE-III activities will also translate into benefits for smaller, less-well resourced sites in the ERA to access computing power that would otherwise be unaffordable, thus easing the digital divide. The competitive advantage will also ensure more efficiently managed computing resources and avoid unnecessary duplication of investment in the ERA. It will also have a structuring effect in the ERA through its work with and inception of national Grid infrastructures. Finally, the dynamic allocation of unprecedented total computing power on a

pan-European Grid will provide opportunities for the scientific community to tackle unprecedented challenges in computational science, which will in turn raise awareness of Grid computing and attract an even wider community of users.

As described in section 1.1, EGEE-III will take the next steps in moving Grids to dependable and sustainable production infrastructure while providing a continuous service to its expanding user base. The goals presented will be achieved by a combination of Networking, Service and Joint Research activities. These activities will work in concert to maintain and drive the infrastructure operations, provide the necessary training, support and dissemination for existing and new user communities that use the infrastructure, and work in close collaboration to ensure the infrastructure is prepared for sustainability. A new user community (business or scientific) first makes contacts with EGEE-III through outreach events organised by the Networking Activities. Follow-up meetings by applications specialists lead to an experimental phase and a detailed deployment plan. The introduction of new applications and new user communities may lead to new requirements causing additions or modifications to be made to the Grid middleware via the Middleware Engineering Activity or collaborating projects. The Networking Activities then provide appropriate training to the community in question, so that it becomes an established user. Peer communication and dissemination events featuring established users then attract new communities. This “virtuous cycle” is depicted in Figure 2 below.



**Figure 2: The Virtuous Cycle of the EGEE-III project**

**Overall project structure and workplan**

The EGEE-III project will be carried out through a series of Networking Activities, Specific Service Activities and a Joint Research Activity. The EGEE-III Activities are listed in Table 2 below and detailed in the subsequent sections. Each major activity section (Networking, Specific Service and Joint Research) is prefaced with a summary of the aims and structure of that activity set.

The project's overall deliverables and milestones are detailed in Table 3 and Table 4, and the interactions and interdependencies between activities are described in.

All Activities will run from the start of the project (project month 1) through to the end (project month 24). Sections 1.3, 1.4 and 1.5 describe each activity in turn, broken down into tasks (equivalent of work-packages), which are in turn broken down into sub-tasks where further detail is necessary. GANTT charts and PERT charts are provided for each activity type, namely Networking, Service and Joint Research Activities.

**Table 2: List of project activities**

Activity Number	Activity Title	Type of activity	Lead participant Number	Lead Participant Short name	Person Months	Start Month	End Month
NA1	Management of the Consortium	MGT	1	CERN		1	24
NA2	Dissemination, Communication and Outreach	COORD	1	CERN		1	24
NA3	User training and induction	COORD	80	UEDIN		1	24
NA4	User Community Support and expansion	COORD	32	CNRS		1	24
NA5	International Cooperation and Policy	COORD	62	GRNET		1	24
NA6	Business	COORD	37	ED		1	24
SA1	Operations	SVC	1	CERN		1	24
SA2	Networking support	SVC	32	CNRS		1	24
SA3	Integration, testing and certification	SVC	1	CERN		1	24
JRA1	Middleware re-engineering	RTD	36	INFN		1	24

**Table 3: List of project deliverables**

Deliverable No	Deliverable name	Activity No	Nature	Dissemination level	Delivery date
DNA2.1	Production of project presentation	NA2	R	PU	1
DNA2.2	Production of project overview paper	NA2	R	PU	1
DNA4.1	Work Plans for Strategic Discipline Clusters	NA4	R	PU	1
DNA3.1	Training Plan	NA3	R	PU	2
DNA4.2	Activity Policy and Procedures	NA4	R	PU	2
DSA1.1	GGUS Plan	SA1	R	PU	2



<b>Deliverable No</b>	<b>Deliverable name</b>	<b>Activity No</b>	<b>Nature</b>	<b>Dissemination level</b>	<b>Delivery date</b>
DNA1.2	Quality Plan and Measurement Plan	NA1	R	PU	3
DNA1.3.1	Gender Action Plan	NA1	R	PU	3
DNA2.3	Dissemination, outreach and communication plan	NA2	R	PU	3
DNA6.1	EGEE Commercial exploitation plan	NA6	R	RE	3
DNA6.3	Roadmap for implementation of business-driven services	NA6	R	PU	7
DNA3.2	t-Infrastructure development and exemplar report	NA3	0	PU	8
DNA3.3	t-Infrastructure integration with NA3 online repository and services - report	NA3	0	PU	10
DNA2.4	Dissemination, outreach and communication report and revised plan	NA2	R	PU	11
DNA3.4	Training report and revised plan	NA3	R	PU	11
DNA4.3	Summary of Work Performed and Updated Work Plans for Strategic Discipline Clusters	NA4	R	PU	11
DSA1.2.1	Assessment of production service status.	SA1	R	PU	11
DSA2.1	Status of the ENOC	SA2	R	PU	11
DJRA1.1	Report on Middleware Service Engineering and plans for the second year	JRA1	R	PU	11
DSA3.1.1	Releases produced in the first year	SA3	R	PU	12
DSA1.3	Report on the status of the ROCs and national/regional Grid integration	SA1	R	PU	14
DSA3.2	Report on status of multi-platform support	SA3	R	PU	14
DSA1.4	Progress report on SLA implementation.	SA1	R	PU	16
DSA1.5	Operations Cookbook	SA1	R	PU	18
DNA1.7	Status of transition to a sustainable infrastructure	NA1	R	PU	19
DSA2.2	Assessment of the ENOC	SA2	R	PU	20
DNA1.3.2	Report on Gender Action Plan	NA1	R	PU	22
DNA3.5	Final training report	NA3	R	PU	22
DSA1.2.2	Assessment of production service status.	SA1	R	PU	22

Deliverable No	Deliverable name	Activity No	Nature	Dissemination level	Delivery date
DSA3.1.2	Releases produced in the second year and update on operation and multi-platform support	SA3	R	PU	22
DJRA1.2	Report on EGEE-III Security	JRA1	R	RE	22
DNA2.5	Final Dissemination, outreach and communication report	NA2	R	PU	23
DNA4.5	Summary of Work Performed by Strategic Discipline Clusters	NA4	R	PU	23
DJRA1.3	Final report on progress of middleware engineering	JRA1	R	PU	23
DNA4.4.1-2	Utilisation of EGEE Support Services and Infrastructure	NA4	R	PU	11, 23
DNA5.1.1-2	EGEE Annual Report on International Cooperation Activities, Policy and standardisation	NA5	R	PU	11, 23
DNA6.2.1-2	Annual report on dissemination and Business uptake results	NA6	R	RE	11,22
DNA6.4.1-2	Report on business-driven services implemented: Software/Infrastructure	NA6	R	PU	11,22
DNA1.4.1-2	Annual Report on quality status	NA1	R	PU	11,23
DNA1.5.1-2	Summary report of the federation reviews	NA1	R	PU	11,23
DNA1.6.1-2	Periodic report	NA1	R	CO	12,24
DNA1.1.1-6	Quarterly Report	NA1	R	CO	3,6,9,15,18,21

Table 4: List of project Milestones

Milestone No	Milestone name	Activity	Expected date	Description and means of verification
MNA1.1	QA website with document templates and processes	NA1	1	The QA website will be documented and updated with all QA tools for the activities.
MNA2.1	Prototype of public website available for review	NA2	1	Designing the website to create a user-friendly site that delivers information intuitively and efficiently. The new website will comprise both the EGEE-II public and technical sites in one.

Milestone No	Milestone name	Activity	Expected date	Description and means of verification
MSA1.1	Operations Automation Strategy	SA1	1	Mandate, charter, and composition of Operations Automation Team: to provide strategy and oversee implementation towards operations automation, including coordination of tool developments. The milestone should set out the roadmap. Plan for monitoring tools and requirements for increasing automation of alarms etc. with goal of reducing operations effort level for the future, tools needed to support operations, improve reliability, verification of SLAs
MSA1.2	Operations procedures in place	SA1	1	Set of procedures for operating the EGEE infrastructure - UPDATE, GGUS, Security...
MJRA1.1	Middleware support web page	JRA1	1	Deploy a web site with the relevant information needed by middleware users (including other project activities). It should include links to support contacts to be kept up to date during the life of the project.
MNA2.2	Activity Quality Assurance and measurement plan	NA2	2	Definition of the activity-internal QA measurements and procedures. This will provide input to DNA1.3.
MNA5.1	Activity Quality Assurance and measurement plan	NA5	2	Definition of the activity-internal QA measurements and procedures. This will provide input to DNA1.3.
MNA6.1	Activity Quality Assurance and measurement plan	NA6	2	Definition of the activity-internal QA measurements and procedures. This will provide input to DNA1.3.
MSA1.3	Activity Quality Assurance and measurement plan	SA1	2	Definition of the activity-internal QA measurements and procedures. This will provide input to DNA1.3
MSA1.4	Security Assessment plan	SA1	2	Plan for the ongoing assessment of operational and middleware security
MSA2.1	Activity Quality Assurance and measurement plan	SA2	2	Definition of the activity-internal QA measurements and procedures. This will provide input to DNA1.3.
MSA3.1	Activity Quality Assurance and measurement plan	SA3	2	Definition of the activity-internal QA measurements and procedures. This will provide input to DNA1.3.
MJRA1.2	Activity Quality Assurance and measurement plan	JRA1	2	Definition of the activity-internal QA measurements and procedures. This will provide input to DNA1.3.
MNA2.3	Reviewed public website goes live	NA2	3	Deployment of design defined in MNA2.1
MSA1.5	SLA Roadmap	SA1	3	Define the set of SLAs required, implementation plan, and tools required for verification.
MSA3.2	Strategy and roadmap of the EGEE multi-platform support	SA3	3	This includes the support for additional batch systems

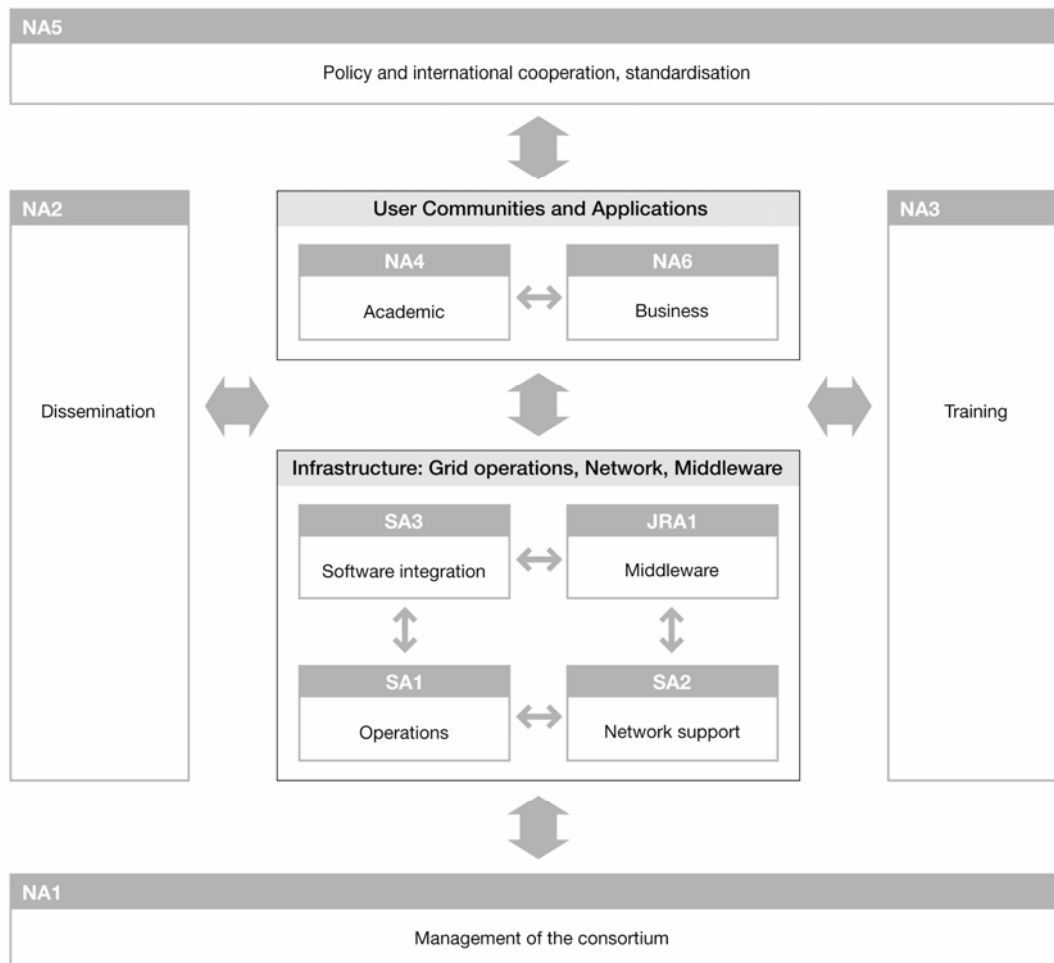
<b>Milestone No</b>	<b>Milestone name</b>	<b>Activity</b>	<b>Expected date</b>	<b>Description and means of verification</b>
MJRA1.3.1	Functional Description of Grid Components and associated Work Plan	JRA1	3	Functional description of services reengineered by JRA1 in response to TCG requirements including initial design and associated work plans. A live version of the work plans have to be maintained on the Middleware web page.
MNA4.1	Featured Demos and Presentations	NA4	4	This milestone consists of featured demonstrations or presentations from the AA, CC, ES, and Fusion clusters at the EGEE Conference.
MSA1.6	Assessment of the status of user support.	SA1	4	An assessment of the status of user support, including input from stakeholders in NA4 and SA1. It will include the plan for user support for the remainder of the project and indicate strategies for support in an EGI/NGI model.
MSA3.3	Strategy and plans for Interoperability with other Grid infrastructures	SA3	4	This includes identification of applicable standards and areas where standardisation efforts are still required. It will also feature an analysis as to what extent the gLite distribution adheres to these standards.
MSA3.4.1	Definition and documentation of the revised software life-cycle process	SA3	4	In EGEE-III components will be integrated when they are closer to production readiness than in EGEE-II. This requires modifications to the release process. This includes the definition of the testing process.
MJRA1.4	gLite Security Architecture	JRA1	4	Overall (global) security architecture of the gLite middleware. It should summarize the current situation and describe the evolution during the lifetime of the project.
MNA2.5	EGEE in 2008 Brochure	NA2	5	This brochure, designed for decision makers, will present the EGEE-III project and its potential impact.
MNA3.1	Activity Quality Assurance and Measurement plan	NA3	6	Definition of the activity-internal QA measurements and procedures. This will provide input to DNA1.3.
MSA1.7	Assessment of infrastructure reliability.	SA1	6	Assessment of the reliability of the infrastructure (sites, middleware, services) with implications on other activities (JRA1, SA2, NA3) and plan for what SA1 can do to improve the reliability.
MSA3.5.1	Deployment guide	SA3	6	EGEE middleware can be deployed in a multitude of different scenarios. However only a subset is meaningful. This guide describes the most common setups and their limitations (can be seen as a user guide for sysadmins).
MSA3.6	Developers' guide	SA3	6	Production of a guide for use by developers

Milestone No	Milestone name	Activity	Expected date	Description and means of verification
MNA1.2	Plan for transition to a sustainable infrastructure	NA1	7	Plan detailing the necessary organisational changes to arrive at a sustainable infrastructure as being defined by the EGI_DS project. This plan may result in a modified Description of Work for EGEE-III.
MSA3.7	gLite Roadmap	SA3	7	High level roadmap on the future evolution of gLite during the lifetime of EGEE-III. This will take into account the detailed roadmaps of JRA1 (MJRA1.3.1, MJRA1.4), NA4 (DNA4.1) and interoperability and standardisation work (MSA3.2 and MSA3.3). It will be jointly developed by these activities within the TMB.
MNA3.2	Report on Trainer accreditation	NA3	10	A report on the trainer accreditation process in the EGEE-III project. This includes how many trainers have been accredited and how active they have been in contributing to the EGEE training programme.
MNA4.3	Featured demos at EGEE User Forum (GO, HEP, LS)	NA4	10	This milestone consists of featured demonstrations or presentations from the GO, HEP, and LS clusters at the EGEE Conference.
MSA1.8	Status report on Interoperations.	SA1	12	Report on the status of interoperation activities with other Grid infrastructures
MNA3.3	Index of available eLearning modules and t-Infrastructure integration	NA3	13	The set of reviewed slides, handouts, practical exercises for each of the courses defined in DNA3.1 will be made available on the training repository, online.
MSA1.9	Grid Security Vulnerability and Risk Analysis: Grid Security Vulnerability detection, Risk Assessment, Handling, and Prevention strategies.	SA1	13	In EGEE-II GSVG produced a deliverable which described a strategy for processing vulnerabilities issues. In EGEE-III an update of this strategy as a result of experience will be provided, and describe some of the problems encountered in handling issues and how they were resolved. A description of which strategies for the prevention of the introduction of vulnerabilities were effective will also be made.
MSA2.4	Status of the use of advanced network services	SA2	13	This milestone will describe the status of advanced network services as provided by the NRENs and GÉANT2 from the point of view of EGEE.
MJRA1.3.2	Update of Functional Description of Grid Components and associated Work Plan	JRA1	13	Update of Grid Components functional description and associated Work plan.
MNA4.4	Featured demos at EGEE Conference (GO, HEP, LS)	NA4	16	This milestone consists of featured demonstrations or presentations from the GO, HEP, and LS clusters at the

Milestone No	Milestone name	Activity	Expected date	Description and means of verification
				EGEE Conference.
MSA1.10	Grid Computer Security Incident Handling	SA1	16	OSCT: Computer security incident handling in a Grid environment: prevention, detection, containment & resolution. Should include a report on the issues to be addressed to improve operational security in a Grid environment, or barriers to achieving this.
MNA3.4	List of eLearning courses provided	NA3	18	A list of eLearning courses provided during the first 15 months of the project
MSA3.5.2	Update of the deployment guide	SA3	18	Revision of the deployment guide produced at PM6 (MSA3.5.1)
MSA2.5	Status of IPv6 support for EGEE	SA2	19	In this milestone, the IPv6 status in EGEE will be assessed in both the middleware and the infrastructure. An analysis of the advantages and drawbacks of the the migration to IPv6 will be also given.
MSA1.11	Security Policy Integration	SA1	20	JSPG: Security Policy integration between EGEE and other national and international Grid infrastructures
MSA3.4.2	Updated software life-cycle process	SA3	20	During EGEE-III it is expected that the software will mature considerably, therefore modifications to the process will be required.
MNA4.5	Featured demos at EGEE User Forum (AA, CC, ES)	NA4	22	This milestone consists of featured demonstrations or presentations from the AA, CC, ES, and Fusion clusters at the EGEE Conference.
MNA2.4.x	EGEE Newsletter	NA2	1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23	Regular internal project newsletter summarising recent activity, and collating EGEE related articles from iSGTW.
MNA4.2.1-2	User Forums	NA4	10, 22	Two major events will be planned to bring together the full EGEE user community. These will be scheduled between the EGEE Conferences.
MNA1.4.1-2	Federation review reports	NA1	11, 23	Report on the outcome of the federation reviews performed during project year 1, assessing all partners in given activities and highlighting any issues that need to be addressed by the Project Management Board. It will also include procedural improvements identified for year 2.

<b>Milestone No</b>	<b>Milestone name</b>	<b>Activity</b>	<b>Expected date</b>	<b>Description and means of verification</b>
MNA6.4.1-2	Report on effectiveness of standardisation effort	NA6	11,22	These reports will serve to gauge the progress made, define the current status and lay out the necessary future actions in regards to the NA6 aim to foster emerging business-driven potential standards and work towards selected standardisation groups. It will serve as a collating document for all material produced such as the "Market of Grid middleware sold/used in business contexts Survey", "Business models behind ISV solutions analysis" and "Comparative SWOT analysis of gLite". It will provide essential information to not only NA6 activity members but to all activities involved in the development of gLite and guide management and dissemination activities to meet the needs of the market and conform to defined standards.
MNA6.5.1-2	Report on user support and services	NA6	11,22	Report on the effectiveness of support to Business user and recommendations for the future.
MNA5.5.1-2	EGEE standardisation Website	NA5	12, 24	The EGEE standardisation website, indicating EGEE's contributions to standardisation efforts will be updated.
MNA6.2.1-2	Survey on the Grid middleware	NA6	3,22	Results of survey the market of Grid middleware that are sold/used in business contexts
MSA2.2.1-4	TNLC meetings	SA2	4, 10, 15, 22	Technical meetings between EGEE and the NRENs about network requirements, new advanced services, etc.
MSA2.3.1-2	Status and plans for the ENOC procedures & tools	SA2	5, 17	These milestones will describe the current status and plans for the ENOC, in terms of procedures updates and operational tools improvements. As such it will also describe the metrics and indicators that are to be used in the DSA2.1 and DSA2.2 deliverables.
MNA6.3.1-2	Requirements analysis report	NA6	5,18	Status of business-oriented requirements analysis also in relation with the business-driven services implementation roadmap (M5) and status of implementation and integration (M18)
MNA1.3.1-2	EGEE annual conference	NA1	6,18	5 day annual conference involving EGEE-III and collaborating projects at a location decided by the Project Management Board.

Milestone No	Milestone name	Activity	Expected date	Description and means of verification
MNA5.2.1-2	RPLO Website	NA5	7, 19	The RPLO website, indicating EGEE's relations with each collaborating project, will be updated based on the concertation results of the EGEE'08 conference (PM6) and EGEE'09 (PM18).
MNA5.3.1-2	NGI Workshop on EGEE Sustainability, in cooperation with the EGI Design Project, in the context of the EGEE Conference	NA5	7,19	Concertation with the EGI Design Project and the NGIs, ensuring EGEE input to the EGI Design Project
MNA5.4.1-2	EGEE Related Projects Concertation Event, in the context of the EGEE Conference	NA5	7,19	Concertation with related projects





**Figure 3: PERT chart of the EGEE-III project Activities**

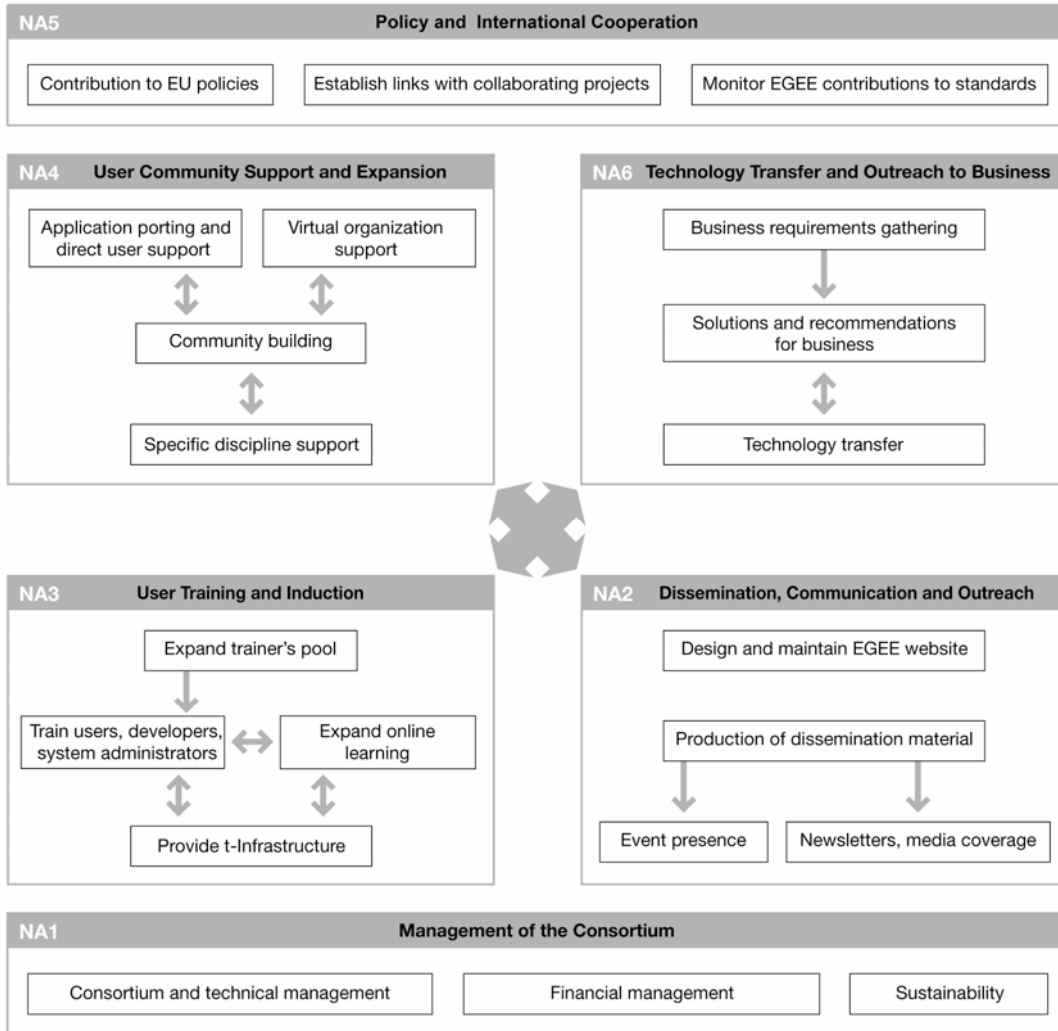
### 1.3 Networking Activities and associated work plan

The Networking activities presented in the following sections are designed to:

- Ensure the management of the project and its consortium;
- Provide appropriate dissemination of EGEE-III's goals and achievements throughout the course of the project, ensuring the project is made attractive to potential users of the Grid infrastructure;
- Provide an effective training service to new user communities and guide them in their use of the infrastructure;
- Work closely with the user communities, established and new, to ensure their requirements are addressed in a timely and effective manner; helping applications to get started and bridge towards a sustainable model with education and training;
- Coordinate internal cooperation efforts, standardisation and policy work with similar projects and initiatives;
- Provide an effective business programme to attract commercial users and ensure appropriate technology transfer.

These activities will work in concert to increase and expand the user base and the uptake of Grid technology in the European Research Area. Work on the long term sustainability of the Grid infrastructure will be carried out through this programme covering dissemination, training, application support, policy work and related efforts both in Europe and worldwide and via interactions with business.

EGEE's networking activities play an important role in the virtuous cycle described in Section 1.2.1. New user communities are being attracted by NA2, trained by NA3 and supported by NA4 to ensure their successful exploitation of the EGEE infrastructure. This is complemented by policy work and coordination with collaborating projects as well as the technology transfer programme that will attract business users. The interactions and interdependencies between the NA activities are illustrated in Figure 4 below.



**Figure 4: PERT chart of the NA activities**

EGEE’s business outreach programme, that has been part of the dissemination activity (NA2) in the EGEE-II project, is reinforced in EGEE-III through a separate activity, NA6, taking into account the different approaches required when interacting with businesses as compared to academia. This will particularly boost EGEE’s technology transfer activities already started in EGEE-II through the EGEE Business Associate (EBA) programme that attracted companies such as GridwiseTech, NICE, and Platform Computing. Negotiations with other companies (Avanade, Excelian, Hitachi) are underway. EGEE will continue to collaborate with CERN’s openlab programme, a collaboration between CERN and IT vendors to develop data-intensive Grid solutions, which also provides an excellent forum for technology transfer.

Close relations with the EGI\_DS project will be fundamental to fulfil EGEE-III’s goal of moving towards a sustainable infrastructure. This requires in particular close interactions with the EGI\_DS project through the NA1 and NA5 activities, as well as joint planning for transition of the outreach, training, and user support programmes.

The following main risks have been identified for the networking activities:

<b>Risk</b>	<b>Impact</b>	<b>Occurrence Probability</b>	<b>Mitigation</b>
Partner(s) fail to complete their tasks	This might cause parts of the EGEE-III programme of work not to be delivered.	High	This will be addressed by a strong and clear Consortium Agreement governing the roles and responsibilities of all actors in the project, by the regular progress monitoring through the AMB and TMB, as well as a federation-based review process whereby all partners will be reviewed during the lifetime of the project in all activities to monitor their progress.
EGEE fails to provide the functionality needed by some of its potential applications	This would cause applications not to use the EGEE infrastructure.	Medium	This will be addressed by an application driven evolution of the EGEE infrastructure governed by the TMB. Close collaboration with specific disciplines, as outlined in Section 1.3.4.1 below, as well as with the NA4 support structures will ensure their requirements are appropriately taken into account. In addition, the functionality provided by EGEE is expected to be complemented by 3 <sup>rd</sup> party components available via the RESPECT programme (cf. Section 1.3.4.3). Expectations will be managed with new user communities to avoid such situations.
Mis-alignment of strategy and implementation with collaborating infrastructure projects	This would result in interoperation problems hampering applications which require multiple infrastructures.	Medium	This will be addressed by regular concertation events with collaborating EU projects at the EGEE conferences and User Forums as well concertation with relevant international efforts at OGF. In addition, EGEE will continue to provide input to the eIRG to ensure its alignment with EU policies.
Dissemination of incorrect information	The EGEE-III dissemination activity (NA2) depends on timely and correct information from the other activities. There is a risk that some information might be misinterpreted and wrongly communicated. In particular, in the event of a major incident, this could be quite damaging to the project and Grids in general.	Medium	This risk is mitigated by the establishment of close links between NA2 and the other EGEE activities via the AMB including a fact-checking process. In addition, communication strategies for potential major problems such as security incidents will be prepared in advance in order to react quickly.
Fail to attract suitable trainers	The EGEE-III training activity (NA3) depends on the recruitment of high quality personnel in particular in the	Low	This risk will be mitigated by close collaboration with the strategic discipline clusters of NA4 ensuring the recruitment of the appropriate personnel.

Risk	Impact	Occurrence Probability	Mitigation
	application domains. Without this personnel the EGEE-III training activity would be less effective and limited in reach.		
Low business uptake	Without appropriate business uptake the long term future of Grids is endangered.	Medium	This risk will be mitigated by focussing the EGEE-III efforts on target business areas with high and immediate potential for uptake of Grid technology.
Failing to implement changes necessary for the transition to a sustainable infrastructure while continuing to provide a stable service.	This would affect EGEE-III reaching its goal of a smooth transition towards a sustainable infrastructure.	Medium	The procedures, processes and governance of a future sustainable European Grid Infrastructure are currently being worked out by the EGI_DS project. Close links with this project will be set up mainly through NA1 and NA5 and specific deliverables and milestones have been identified to monitor progress (MNA1.2 and DNA1.7). Yet there is still the risk that a smooth transition will not be possible in the lifetime of EGEE-III either because the final structures are not specified well enough or not enough support from the National Grid Infrastructures (NGIs) has been secured. In this case EGEE-III will continue to provide its service unchanged and prepare for future transitions that will occur after EGEE-III's lifetime. Funding must be secured to allow operations in this transition period.

**Table 5: GANTT Chart of the NA Activities**

		WORKPLAN																							
Month		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
<b>IIA1</b>	<b>Project Management</b>																								
TNA1.1	Management of the NA1 activity			DNA1.3.1																			DNA1.3.2		
TNA1.2	Project and Consortium Management			DNA1.1.1			DNA1.1.2			DNA1.1.3			DNA1.6.1			DNA1.1.4			DNA1.1.5			DNA1.1.6			DNA1.6.2
TNA1.3	Technical Management			DNA1.1.1			DNA1.1.2			DNA1.1.3			DNA1.6.2			DNA1.1.4			DNA1.1.5			DNA1.1.6			DNA1.6.2
TNA1.4	Quality Assurance	MNA1.1		DNA1.2								DNA1.4.1 DNA1.5.1 MNA1.4.1												DNA1.4.2 DNA1.5.2 MNA1.4.2	
TNA1.5	Sustainability							MNA1.2													DNA1.7				
TNA1.6	Organisation of key EGEE events and meetings						MNA1.3.1													MNA1.3.2					
<b>IIA2</b>	<b>Dissemination, Outreach &amp; Communication</b>																								
TNA2.1	Webpages and design	MNA2.1		DNA2.3 MNA2.3		MNA2.5					DNA2.4													DNA2.5	
TNA2.2	Materials and publications	DNA2.2 MNA2.1		DNA2.3 MNA2.3		MNA2.5					DNA2.4													DNA2.5	
TNA2.3	Media, Public relations and events	DNA2.1 MNA2.1		DNA2.3 MNA2.3		MNA2.5					DNA2.4													DNA2.5	
TNA2.4	Regional effort			DNA2.3								DNA2.4												DNA2.5	
TNA2.5	Management, admin and coordination	DNA2.1 DNA2.2 MNA2.4.1	MNA2.2	DNA1.1.1 DNA2.3 MNA2.4.2		MNA2.4.3 MNA2.5	DNA1.1.2	MNA2.4.4		DNA1.1.3 MNA2.4.5		DNA2.4 MNA2.4.6	DNA6.1.1	MNA2.4.7		DNA1.1.4 MNA2.4.8		MNA2.4.9	DNA1.1.5	MNA2.4.10		DNA1.1.6 MNA2.4.11		DNA2.5 MNA2.4.12	DNA1.6.2
<b>IIA3</b>	<b>User Training &amp; Induction</b>																								
TNA3.1	Course content creation, scheduling, organisation and delivery		DNA3.1				MNA3.1				MNA3.2	DNA3.4			MNA3.3					MNA3.4				DNA3.5	
TNA3.2	e-learning development and maintenance								DNA3.2		DNA3.3				MNA3.3					MNA3.4				DNA3.5	
TNA3.3	Translation of training material		DNA3.1								MNA3.2	DNA3.4								MNA3.4				DNA3.5	
TNA3.4	Activity management and partner coordination			DNA1.1.1			DNA1.1.2			DNA1.1.3			DNA6.1.1			DNA1.1.4			DNA1.1.5			DNA1.1.6			DNA1.6.2

		WORKPLAN																																
Month		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24									
<b>IIA4</b>	<b>User Community support and Expansion</b>																																	
TNA4.1	VO, Application and direct user support		DNA4.2									MNA4.2.1	DNA4.4.1												MNA4.2.2	DNA4.4.2								
TNA4.2	Strategic application clusters	DNA4.1			MNA4.1							MNA4.3	DNA4.3					MNA4.4						MNA4.5	DNA4.5									
TNA4.3	Activity Management	DNA4.1	DNA4.2	DNA1.11	MNA4.1			DNA1.12			DNA1.13	MNA4.3	DNA4.3	DNA4.4.1	DNA6.1.1			DNA1.14	MNA4.4			DNA1.15			DNA1.16	MNA4.5	DNA4.4.2	DNA4.4.5	DNA1.6.2					
<b>IIA5</b>	<b>Policy &amp; International cooperation</b>																																	
TNA5.1	Contributions to the policy work of eIRG												DNA5.1.1														DNA5.1.2							
TNA5.2	Establish links with other projects and initiatives												MNA5.2.1	MNA5.3.1	MNA5.4.1												MNA5.2.2	MNA5.3.2	MNA5.4.2		DNA5.1.2			
TNA5.3	Monitor EGEE contributions to EGEE standardisation activities												DNA5.1.1		MNA5.5.1															DNA5.1.2	MNA5.5.2			
TNA5.4	Activity Management		MNA5.1	DNA1.11				DNA1.12			DNA1.13			DNA6.1.1				DNA1.14				DNA1.15					DNA1.16				DNA1.6.2			
<b>IIA6</b>	<b>Technology Transfer and Outreach to Business</b>																																	
TNA6.1	Technology Transfer and potential commercial exploitation			DNA6.1	MNA6.2.1									DNA6.2.1	MNA6.4.1															DNA6.2.2	MNA6.2.2	MNA6.4.2		
TNA6.2	Dissemination and outreach to communities													DNA6.2.1																DNA6.2.2				
TNA6.3	Support and prototyping activities						MNA6.3.1							DNA6.4.1	MNA6.4.1	MNA6.5.1													MNA6.3.1			DNA6.4.2	MNA6.4.2	MNA6.5.2
TNA6.4	Activity Coordination		MNA6.1	DNA1.11				DNA1.12			DNA1.13				DNA6.1.1				DNA1.14				DNA1.15					DNA1.16					DNA1.6.2	

### **1.3.1. Activity NA1: Management of the Consortium**

The EGEE-III project is the third in the EGEE programme which started under the European Commission's Sixth Framework Programme in 2004. The EGEE programme has seen a constant increase in the number of user communities supported, countries and sites connected to the infrastructure, collaborating projects and partners in the consortium. The Management Activity of the project will build on the experience gained by its predecessors to ensure it can cope with these increases while remaining lean in terms of resources required and efficient in its decision-making processes.

The overall management structure, including relevant boards, composition and information flow, is described in further detail in section 2.1. The NA1 activity will provide the necessary support to allow for an effective technical/strategic, administrative and financial management of the project. In order to effectively work with non-European members of the Consortium, which are participating without any EC contribution, travel funds (177'000€, as described in section 2.3), covering all participating countries from Asia, the Americas, and Ukraine have been foreseen to cover the costs of inviting key collaborators from these regions to attend EGEE events. These will be managed by NA1, according to the schedule of EGEE events and the project's requirements.

The lead partner, CERN, will appoint a dedicated overall Project Director. Dr. Robert Jones has demonstrated his considerable experience and skills in organizing and running the EGEE and EGEE-II predecessor projects and has been entrusted with this role. He will chair and manage the Activity Manager's Board (AMB). He will be assisted by a Technical Director, Dr. Erwin Laure, who has also been a member of the project management team in EGEE and EGEE-II. The Technical Director will also act as Deputy Project Director, and will chair and manage the Technical Management Board (TMB). The management team is completed with a Quality Assurance coordinator who will lead Quality Assurance activities in the project, which are detailed further below.

The Project Management will receive assistance from the CERN legal and financial services during the project negotiation and execution. The management team will be supported by a dedicated Project Office (PO), which has successfully administered the EGEE and EGEE-II projects and will form a solid basis on which the management can rely. It will be composed of a project secretary, a financial officer and two administrative assistants. The PO will be responsible for setting up and maintaining the tools necessary for the smooth-running of the project administration, notably with the Project Progress Tracking tool for effort monitoring, email lists and document repositories. Further, the PO will coordinate the Gender Action Plan activities, using aforementioned tools to collect statistics on the composition of the workforce and devising suitable mechanisms for raising awareness of gender issues among project partners.

The Project Director and Technical Director of the project will interact closely with the EGI-DS project management team to check the progress of the parallel goals and ensure carefully timed milestones are met to ensure the progress of the projects towards a sustainable model. These milestones, agreed with the EGI\_DS management, are illustrated in Figure 5 below. In a series of joint workshops EGEE will provide input to EGI\_DS, such as deliverable DSA1.6 of EGEE-II (WS1), the status of National Grid Operating Centers (gNOC) will be reviewed (WS2), and the EGI\_DS blueprint document will be discussed (WS3). This blueprint document will form the basis of the draft transition plan (MNA1.2) EGEE-III will develop and discuss at its annual conference, EGEE'08. The implementation of this transition plan will start in project year two and might require a modification to the EGEE-III description of work. The status of the transition will be reviewed at the EGEE'09 conference which will probably also see the EGI launch workshop. This interaction is paramount for the overall coherence of plans, both technical and strategic. In addition to the technical work outlined above, EGEE-III's enforcement of JRUs will provide the necessary legal and organisational groundwork for EGI as discussed in Section 3.1.



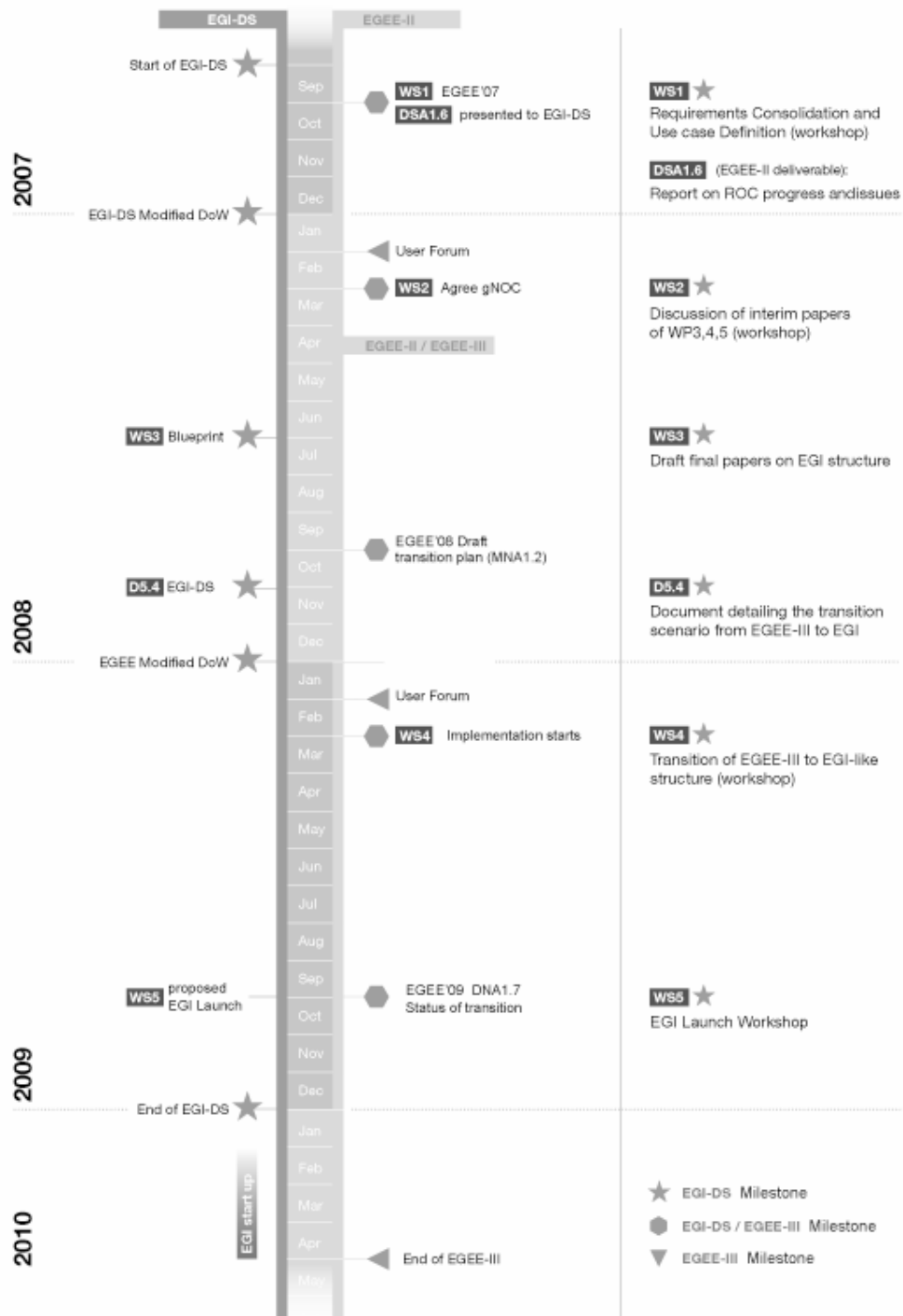


Figure 5: Timelines of the EGEE-III and EGI-DS projects

**Quality Assurance**

NA1 will host the Quality Assurance (QA) coordinator to coordinate the overall QA aspects of the project and ensure its processes, services and deliverables are of high-quality. This work will build on

the QA approach established in predecessor projects and will expand the metrics programme with federation reviews, described below. The Quality Assurance coordinator will also advise the Project Director in the AMB.

#### *Quality Assurance organisation*

Quality Assurance (QA) will be pervasive throughout all EGEE-III activities and each activity will plan for their QA measures as part of the activity tasks. A Quality Assurance Group (QAG) overseeing QA across the project will be established, composed of representatives from all activities, chaired by the QA head and will meet on regular basis. The main role of the representatives is first to provide activity specific QA plans (Quality Plan and Measurement Plan) and then to make sure that agreed quality measures are applied, verified and tested inside their activity. The QA head will continue to monitor the project-wide adherence to the overall quality plans, in particular to the metrics programme and the federation review process.

In particular, the Quality Assurance activities will focus on:

- Defining the quality criteria by which the Grid related services provided by EGEE-III can be evaluated and measured by drawing up the project's quality and quality measurement plan. The overall quality plan is supported by specific activity quality plans, describing how they are applied inside each activity, as well as defining specific QA measures related to each activity. Overall project metrics are defined in the proposal with targets to measure the uptake and impact of activities, as well as to measure the quality and scale of services provided. The QA website will act as a knowledge-base and access point for the all adopted procedures and tools, and as an archive of measurements taken via the metrics programme. The QA knowledge base will be made available to other groups and projects in a similar (the QA tools and procedures of the predecessor project, EGEE-II, were adopted by at least three other projects).
- Monitoring federation reviews: the EGEE-III consortium is notable by its size (number of partners) and the inclusion of Joint Research Units facilitating the evolution to national structures. In order to monitor the progress of the programme of work in each country and the involvement of individual partners, the federation reviews, introduced in the predecessor project EGEE-II for key activities, will be used systematically across the whole project. These reviews will provide a forum to discuss issues, examine progress and contribution and establish better communication between individual partners, the activity managers and project management. They are also foreseen as a good opportunity to identify and promote regional successes and initiatives for re-use in other countries. The output of these reviews will be reports providing an overview of the state of national Grid structures in each country which can be used to refine the programme of work and migration to a sustainable model.
- Follow up of deliverables and milestones: this covers the regular monitoring of the deliverables & milestones schedule according to the deliverables and milestones review procedure, whereby given activities are involved in the review of other activity reports. The result is that the quality and timeline for deliverables and milestones is achieved. The QA website provides the follow-up for deliverables and milestones according to the deliverables and milestones review procedure.
- Following up industry standards and best practices for IT service management, such as ISO/IEC 20000-1/-2:2005 and ITIL: the result of the task is the presentation of those standards to the project and identification of best practices that should be adopted by the project.

#### **1.3.1.1. Task description**

The management activity will carry out the following tasks to ensure the project runs efficiently to meet all targets, deliverables and milestones:

##### **1.3.1.1.1. TNA1.1: Management of the NA1 activity and the work of the Project Office.**

This includes the provision of all the tools and procedures used in the execution of the project. It also includes effort monitoring (PPT) and Gender Action Plan statistics. The Project Progress Tracking tool (PPT) was devised during EGEE to monitor effort consumption through the collection of timesheets.

This tool improved the reporting cycle efficiency and provided an excellent means for collecting information about participants for the Gender Action plan. Continued funding for the use and support of the PPT tool is essential to monitor and produce effort reports for the periodic management reports, and obtain statistics on the EGEE-III workforce for the Gender Action Plan.

#### **1.3.1.1.2. TNA1.2: Project and Consortium management.**

This covers all reporting, cost statement collection and analysis, interim payment coordination and transfer, budget follow-up, management-level liaison with partners, related projects and other Grid initiatives, and relations with the European Commission. This task includes the running and leadership of the AMB. The AMB will document its work in summaries of meetings with a decision list which will be reported in the Quarterly and Periodic Reports (DNA1.1.1-6, and DNA1.2.1-2).

#### **1.3.1.1.3. TNA1.3: Technical management.**

This covers the running and leadership of the TMB, in collaboration and liaison with the AMB. The TMB will document its work in summaries of meetings with a decision list, which will be reported in the Quarterly and Periodic Reports (DNA1.1.1-6, and DNA1.2.1-2). This will include technical liaison with partners, related projects and other Grid initiatives.

#### **1.3.1.1.4. TNA1.4: Quality assurance coordination.**

This task will ensure the Quality Assurance inside EGEE-III, as described above. This includes in particular the Quality Group coordination and QA follow-up, federation review coordination, deliverables and milestones coordination, follow-up on industry standards and best practices for IT service management.

#### **1.3.1.1.5. TNA1.5: Sustainability.**

This task will involve close collaboration with NA5 and the EGI-DS project to follow the development of the sustainability plans and of the schedule of the transition from EGEE-III to EGI.

#### **1.3.1.1.6. TNA1.6: Organisation of key EGEE events and meetings.**

These events are crucial to the project as they enable effective cross-interaction between activities, with other projects, etc. These events cover meetings of all the relevant project bodies described in section 2.1 and project reviews. This task will in particular cover the organisation of User Forums (once per year) and the Project Conferences, also organised once per year, all in conjunction with NA4, NA2 and other project activities. Both the User Forum and the Project conference involve work to find sponsors and to establish contacts between the sponsors and the local organisers of the event. After the events, an evaluation will be performed together with the local organisers.

#### **1.3.1.2. Activity summary and manpower**

<b>Activity Number</b>	NA1	<b>Start date or starting event:</b>	01.04.2008
<b>Activity title</b>	Project Management		
<b>Activity Type</b>	MGT		
<b>Participant number</b>	1	34	
<b>Participant short name</b>	CERN	CS SI	
<b>Person-months per participant</b>	144	24	

#### **Objectives:**

The objective of this activity is provide:

- Overall project management and reporting to the European Commission;
- Daily management of the project activities, resource allocation and monitoring;

- Conflict resolutions and corrective actions;
- Overall Quality Assurance for the project;
- Establish and maintain relations with key external bodies and projects;
- Collaborate with EGI-DS and NA5 to ensure long-term sustainability plans are successful.

**Description of work and role of partners**  
 All tasks described below will be accomplished by the coordinating partner, CERN, with the exception of the Quality Assurance which is the responsibility of the partner CS SI.

- **TNA1.1: Management of the NA1 activity and the work of the Project Office**  
 Internal activity management: This task will cover all administrative aspects in and around the lead partner, CERN, interaction with its management, and will be fundamental to the operation of the activity.  
 The effort required for this task is 60 PM provided by CERN.
- **TNA1.2: Project and Consortium management**  
 This covers all reporting, cost statement collection and analysis, interim payment coordination and transfer, budget follow-up, liaison with partners, related projects and other Grid initiatives, relations with the European Commission.  
 The manpower required for this task is 36PM provided by CERN.
- **TNA1.3: Technical management.**  
 This covers the running and leadership of the Technical Management Board (TMB), in collaboration and liaison with the Activity Management Board (AMB). This will include technical liaison with partners, related projects and other Grid initiatives.  
 The manpower required for this task is 24PM provided by CERN.
- **TNA1.4: Quality assurance coordination**  
 This task will ensure the Quality Assurance inside EGEE-III, by defining appropriate procedures, tools and metrics as well as monitoring their implementation. It includes the Quality Group coordination and QA follow-up, federation review coordination, deliverables and milestones coordination, follow-up on industry standards and best practices for IT service management.  
 The manpower required for this task is 24PM provided by CS SI.
- **TNA1.5: Sustainability.**  
 This task will involve close collaboration with NA5 and the EGI-DS project to follow the development of the sustainability plans and of the schedule of the transition from EGEE-III to EGI.  
 The manpower required for this task is 12PM provided by CERN.
- **TNA1.6: Organisation of EGEE events and meetings.**  
 This task includes all aspects of the organisation of all project Board meetings, and major events such as the User Forum and the Conference.  
 The manpower required for this task is 12PM provided by CERN.

**NA1 Deliverables**

Deliverable No	Deliverable title	Delivery date	Nature	Dissemination level	Deliverable description
DNA1.2	Quality Plan and Measurement Plan	3	R	PU	This report will outline the QA process and metrics devised for the project to monitor progress of the activities and of the project as a whole. This plan will also include the procedures and initial

Deliverable No	Deliverable title	Delivery date	Nature	Dissemination level	Deliverable description
					schedule for the federation reviews.
DNA1.3.1	Gender Action Plan	3	R	PU	Report on the activities planned to raise gender awareness in the project
DNA1.7	Status of transition to a sustainable infrastructure	19	R	PU	This report will give an update of the progress made and list of outstanding issues in adopting the sustainable organisation structure as proposed by the EGI-DS project
DNA1.3.2	Report on Gender Action Plan	22	R	PU	Report on the GAP activities throughout the project.
DNA1.4.1-2	Annual Report on quality status	11,23	R	PU	This report will provide an annual review of the QA status of the project
DNA1.5.1-2	Summary report of the federation reviews	11,23	R	PU	These reports will provide a summary of the outcome of the reviews by country and by activity in each federation.
DNA1.6.1-2	Periodic report	12,24	R	CO	Report on the periodic progress and financial status of the project covering each activity and the project overall technical, financial, administrative and strategic aspects.
DNA1.1.1-6	Quarterly Report	3,6,9,15,18,21	R	CO	Report on the quarterly progress of the project, covering each activity and the project overall technical, financial, administrative and strategic aspects.

### NA1 Milestones

Milestone No	Milestone title	Delivery date	Description and means of verification
MNA1.1	QA website with document templates and processes	1	The QA website will be documented and updated with all QA tools for the activities.
MNA1.2	Plan for transition to a sustainable infrastructure	7	Plan detailing the necessary organisational changes to arrive at a sustainable infrastructure as being defined by the EGI_DS project. This plan may result in a modified Description of Work for EGEE-III.
MNA1.4.1-2	Federation review reports	11, 23	Report on the outcome of the federation reviews performed during project year 1, assessing all partners in given activities and highlighting any issues that need to be addressed by the Project Management Board. It will also include procedural improvements identified for year 2.
MNA1.3.1-	EGEE annual conference	6,18	5 day annual conference involving EGEE-III

<b>Milestone No</b>	<b>Milestone title</b>	<b>Delivery date</b>	<b>Description and means of verification</b>
2			and collaborating projects at a location decided by the Project Management Board.

### 1.3.2. Activity NA2: Dissemination, Communication and Outreach

#### 1.3.2.1. Activity description

During EGEE-III the project will consolidate the use of the infrastructure by a wide variety of scientific communities and using technology transfer, strengthen its outreach to business users (see also NA6). The Dissemination, Communication and Outreach activity will play a key role in reaching out to current and new adopters of the infrastructure as well as preparing for a sustainable infrastructure to follow after EGEE-III. Professional communicators with experience in different fields will provide potential user groups with the information they need to understand the benefits of adopting Grid technology, but also its limitations, to create realistic expectations of what the technology can offer.

The project will continue to broadcast the benefits and possibilities of using the EGEE infrastructure and services to both existing and new user communities. For existing communities, such as Life Sciences or Particle Physics, EGEE will strengthen its user base by attracting a wider range of applications and user groups, expanding from the early adopters and single users currently using the infrastructure. In addition, EGEE-III will reach out to new fields, which at present do not use Grids, using success stories from current Grid users in fields such as Astrophysics, Earth Science or Fusion to show them the potential of the Grid for solving their computing problems. There are many new areas such as Social Sciences, Environmental or Material Sciences that could benefit from using the Grid.

The most effective and common tool for presenting the project, its goals and achievements throughout its lifetime is through a well-structured, accessible and easy to navigate website. NA2 will hold the responsibility of designing and maintaining this website, which will also host all activity webpages.

Further, NA2 will raise Grid awareness and knowledge through a widely differing range of channels, including specialist and non-specialist media, and in particular will have a notable presence at both user and IT events, working together with other activities to define the most important and promising conferences and meetings to reach out to new users. iSGTW (international Science Grid This Week), a collaborative weekly web-based newsletter will publish articles about advances in the project, new applications, new uses in industry and business and general Grid news to a constantly increasing audience.

To ensure that the Dissemination Activity is informed well in advance about newsworthy events happening inside the project and with the applications using the EGEE infrastructure, clear communication channels with each activity will be defined to share this type of information with each other and the central dissemination office. There will be close collaboration between NA2 and the other networking activities in the provision of up to date information to users.

For most effective dissemination, EGEE will rely strongly on existing “killer applications”, i.e. applications that rely on the Grid for getting results. An excellent example of such an application is the WISDOM initiative, which uses the Grid to screen millions of potential drug components against neglected diseases. This *in silico* drug discovery application has already been used for Malaria and Avian Flu and requires the power of the Grid to be a success. In the area of High Energy Physics, when the LHC is switched on at CERN in 2008, the sheer volume of data that needs analysing will provide an excellent dissemination opportunity to attract and convince new audiences of the Grid’s capability.

Building on the experience of EGEE-II, which saw the activity represented in each country connected to the EGEE infrastructure at often too small a level of manpower to be truly effective, the NA2 activity has favoured a model whereby a small number of “competence clusters” would be set up, which will be responsible for leading and coordinating the effort in that task for the whole activity. There will be a cluster focussed on the website and design, headed by HEALTHGRID, a cluster whose main responsibilities will be promoting the project to the media and new users, headed by the UK partners, and a cluster based at CERN which will concentrate on the activity management and content production. This model will ensure concentrated effort on the activity’s key tasks, however a specific task is assigned for specific regional effort to ensure some manpower is available for dissemination

and knowledge transfer to all the countries in their different regions, translation, communication with local press, local website support, etc. The Press Offices of the EGEE-III partner institutes will be requested to support these regional dissemination centres to spread the word about the project, provide contacts and distribute press releases, etc. The same applies to Technology Transfer offices at EGEE-III partner institutes (where existing), who will be requested to support the business activities of EGEE-III. This regional structure would also serve in the preparation of a sustainable infrastructure to follow after EGEE-III.

### **1.3.2.2. Activity management structure**

The activity will be managed by an activity manager, a deputy and a support officer. Its programme of work will be divided into five key tasks, as described in the summary table of the activity at the end of this section.

The management will be responsible for coordinating and monitoring the overall activity programme of work, quality assurance, reporting and partner contributions.

With the formation of the competence clusters, it is imperative that the management team has close links with all of the partners. Each cluster will need to work closely with the others, and these relationships and joint workloads will need to be coordinated and overseen by the management team.

The management team will also be responsible for ensuring that the other project activities gets the necessary support from NA2, including providing and managing the overall project website and website support for events (in TNA2.2), editorial support for activity websites and other related literature (TNA2.3) and providing publicity for events (TNA2.4).

In order to determine the success of the activity a selection of metrics will be collected via an online tool and included in the activity's Quarterly Reports as well as the NA2 deliverables. This will provide a snapshot of the activity from the regional partners, and also act as an alert for any potential issues.

NA2 will work closely with all activities in the project, with especially close links with:

- NA6: The business activity

Business activities of the project have grown considerably over the last year, and now require dedicated effort with in-depth knowledge of the sectors involved. A committed team, in the form of the NA6 activity, will be able to address this audience at precisely the right level. There will be a significant overlap with NA2, as the messages will be very similar, and much of the promotional material will be of common use to both activities.

- NA3: The training activity

NA2 will work closely with the training activity to ensure that potential users, with diverse backgrounds and varying IT skills, become established users.

This could include that training registration etc. is done through the public website/community area, which will also boost the membership there and ensure that people would automatically be added to the newsletter lists and other communication means.

- NA1: The project management activity

NA2 will provide support to NA1 in the form of content for events promotions, branding, the production of web-pages for EGEE Events, and attendance at events.

- NA4: the applications activity

The main source of stories for press releases and other dissemination material throughout EGEE-III will be the applications using the grid, so it is imperative that there are strong links between NA2 and NA4. Communication flow will be ensured in both directions, as the materials provided by NA2 will be vital to attract new applications.

In addition to the manpower required to run the activity, the Dissemination activity has foreseen non-personnel budget to cover:

- printing materials and producing PR items
- distribution costs
- stands at events (fee plus equipment costs)

This budget is foreseen to be of the order of 135,000 € as detailed below:



Item	Cost in 1000€
Printing costs	60
Stands at events (estimating 1 major event and 5 smaller ones, inc shell schemes, electricity, display stands)	62
Promotional materials (pens, bags, etc)	3
Students (1 per year for material production)	10
<b>TOTAL</b>	<b>135</b>

### 1.3.2.3. Activity summary and manpower

Activity Number	NA2		Start date or starting event:	01.04.2008			
Activity title	Dissemination, Communication and Outreach						
Activity Type	COORD						
Participant number	1	2	3	8	10	11	13
Participant short name	CERN	JKU	BME	CESNET	II SAS	JSI	ICM UW
Person-months per participant	84	5	12	6	6	6	6
Participant number	15	21	26	34	37	43	56
Participant short name	Srce	VUB	FZK	HEALTHG RID	INFN	TRUST-IT	JINR
Person-months per participant	6	12	12	36	6	12	6
Participant number	60	62	63	65	66	67	68
Participant short name	SINP MSU	GRNET	IPP BAS	TAU	ICI	IPB	TUBITAK
Person-months per participant	6	12	6	6	6	6	6
Participant number	69	70	80	81	83	85	88
Participant short name	CSIC	LIP	UEDIN	Imperial	UNIMAN	QMUL	AS
Person-months per participant	6	6	6	12	12	18	36
Participant number	91						
Participant short name	UNIM ELB						
Person-months per participant	12						

#### Objectives

The objective of the NA2 activity is to spread the word about the project's achievements, reach out to current and new adopters of the infrastructure and prepare for a sustainable infrastructure to follow after EGEE-III through a clear dissemination plan by:

- Designing and keeping the project's website up to date (it will also host the activity webpages);
- Increasing Grid awareness and knowledge through a wide range of specialist and non-specialist media and presence at both user and IT events;
- Contributing to the edition of up-to-date information to users in conjunction with other activities;
- Producing and distributing written material about the project;
- Producing the project internal newsletter and providing contributions to the online iSGTW newsletter;
- Ensuring journalistic and media coverage of EGEE and its activities;
- Identifying key events the project should attend and coordinate consequent presence (stands, talks, material, presentations, etc.);
- Liaising closely with the project management, training and business activity to coordinate dissemination tasks.

#### Description of work and role of partners

The NA2 activity will fulfil its proposed programme of work through six core tasks as follows:

- TNA.2.1: WebPages and design

During EGEE-II it was decided that integrating the existing public and technical websites to form on an extended public, outside-facing website would be a more effective means of serving the wider user community. Some preparatory work has already been carried out in EGEE-II to prepare for this, and in EGEE-III a complete structure re-design is foreseen to integrate the existing information on different levels. Ideally all design work will be completed by a project-internal designer with dedicated resources, and in the event that such expertise cannot be found within the project, it will be outsourced to a professional designer. The day-to-day administration and maintenance of the extended public website will be covered by the activity. Some effort is therefore required to ensure that the content is up-to-date and regularly refreshed as well as to work together with other activities and groups inside the project to ensure a coherent web-presence of the project overall, including production of websites for events (organised by NA1). The community area on the public website will be further developed and expanded according to the experiences and comments received during EGEE-II.

This task will also be responsible for the design for any print graphics, including posters, leaflets and brochures, with content provided from TNA2.3 Any regional effort for the local area will form part of this task.

The manpower required for this task is 36 PMs provided by HEALTHGRID.

- TNA.2.2: Materials, Publications

This task addresses the production and distribution of written and multimedia material about the project, including PR material (information sheets, brochures, video), support for writing scientific papers and conference contributions for the project management, and providing content where necessary for other activities, such as the events organised by NA1. This will require working closely with TNA2.2, which will cover the design aspect. iSGTW is a weekly e-newsletter promoting grid computing around the world, published in collaboration with OSG. Effort will be reserved within TNA2.3 to edit iSGTW and provide articles, alongside the production of the EGEE internal newsletter.

To identify stories, and ensure the information being disseminated is correct this task requires close relationships with all the other activities, in equal partnership.

The manpower required for this task is 36PMs (24PM for material production and 12PM for the iSGTW editor) provided by CERN.

- TNA.2.3: Media, Public relations and Marketing to New Users

To spread the word about the project to a wide audience, it is essential that the project forges and maintains good relationships with journalists and publications. In combination with regular press releases and media invitations this will ensure coverage of EGEE events and activities. To identify and enlist new users of both the infrastructure and services EGEE needs to be present at user and scientific events. The dissemination activity will therefore identify possible events, coordinate the project's presence at these events, both with stands and with talks and presentations, as well as organise visits to these groups on their own ground to find out about their needs and expectations. This task will also deal with general inquiries about the project and ensure that EGEE can be clearly and concisely presented to general audiences. Inside this task, NA2 will also coordinate contributions to specialist and non-specialist media outlets, as well as national and international press. This task needs to co-ordinate with other activities, particularly NA4, not only to identify suitable events, but to source technical staff to attend. It will also be essential to co-ordinate with partners in TNA2.4 to provide local NA2 staff to attend events, and organise the local effort.

48PMs provided by the UK partners.

- TNA.2.4: Regional Effort

In order to cover as many regions as possible the cluster structure needs to encompass additional regional effort involved in coordinating with local press offices and the other EGEE partner institutes for making local contacts, tailoring content to the regions, developing local websites and coordinating translations of key material, e.g. press releases. We expect and invite this effort to be complemented and supported by NGIs where existing.

The manpower required for this task is 192 PMs provided by UNIMELB 12 PM, BME 12 PM, CESNET 6 PM, CSIC 6 PM, FZK 12 PM, GRNET 12 PM, ICI 6 PM, ICMUW 6 PM, IISAS 6 PM, IPB 6 PM, IPP-BAS 6 PM, JINR 6 PM, JKU 5 PM, JSI 6 PM, LIP 6 PM, SINP MSU 6 PM, SRCE 6 PM, TAU 6 PM, AS 36 PM; TRUST IT 6 PM, TUBITAK-ULAKBIM 6 PM, ULB 12 PM

- TNA.2.5: Management, Admin & Coordination (move this to end so management activity is the last task)

This task includes the general oversight and management of the activity as well as administration and reporting. The general management should be close to the overall project management (either also at CERN or with regular visits) since this proved to be the most effective way to ensure that the activity is aware of developments within the project in a timely fashion.

The manpower required for this task is 60 PM provided by CERN and Trust-IT (12 PM for the Activity Deputy)

### NA2 Deliverables

Deliverable No	Deliverable title	Delivery date	Nature	Dissemination Level	Deliverable description
DNA2.1	Production of project presentation	1	R	PU	This deliverable will provide a Powerpoint presentation that can be used by the Commission. It will also be used as the basis for project presentations given by staff members at events.
DNA2.2	Production of project overview paper	1	R	PU	This paper is intended to form a basic description of the project, its rationale and objectives, suitable for publication. It is intended to be used as a paper contribution to conferences to supplement talks by senior staff where necessary. This paper will be updated regularly, and will be available for publication with the understanding that sections of it may be reprinted elsewhere.
DNA2.3	Dissemination, outreach and communication plan	3	R	PU	This document will form the basis for the Dissemination, Outreach and Communication strategy in EGEE-III and will include: review of dissemination in EGEE-II and transfer of knowledge to EGEE-III; plans for media, industry and governmental relations; plans for producing dissemination material; plans for the project conferences, list of events to be supported, and attending at least one significant event per application domain per year; plans for the website; plans for local dissemination effort; measurements of success.
DNA2.4	Dissemination, outreach and communication report and revised plan	11	R	PU	This revision of DNA2.3.1 at PM11 will provide an opportunity for a report on the progress of the NA2 activity (complementing contributions to the Quarterly and Periodic Reports), and the lessons learned will feed into a revision of the overall strategy of the activity.
DNA2.5	Final Dissemination, outreach and communication	23	R	PU	This document will constitute a detailed report on the NA2 activities over the course of the project, along with a plan on how

<b>Deliverable No</b>	<b>Deliverable title</b>	<b>Delivery date</b>	<b>Nature</b>	<b>Dissemination Level</b>	<b>Deliverable description</b>
	report				the results can be exploited in the future by the participants as well as other projects and the public.

**NA2 Milestones**

<b>Milestone No</b>	<b>Milestone title</b>	<b>Delivery date</b>	<b>Description and means of verification</b>
MNA2.1	Prototype of public website available for review	1	Designing the website to create a user-friendly site that delivers information intuitively and efficiently. The new website will comprise both the EGEE-II public and technical sites in one.
MNA2.2	Activity Quality Assurance and measurement plan	2	Definition of the activity-internal QA measurements and procedures. This will provide input to DNA1.3.
MNA2.3	Reviewed public website goes live	3	Deployment of design defined in MNA2.1
MNA2.5	EGEE in 2008 Brochure	5	This brochure, designed for decision makers, will present the EGEE-III project and its potential impact.
MNA2.4.x	EGEE Newsletter	1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23	Regular internal project newsletter summarising recent activity, and collating EGEE related articles from iSGTW.

### **1.3.3. Activity NA3: User Training and Induction**

#### **1.3.3.1. Activity Description**

The overall goal of NA3 in EGEE-III will be to stimulate and support the development of local training resources in the federations with the aim of moving towards an established European e-Infrastructure, which is supported by National Grid Organisations each of which provides the training required for their local user communities. In this vision there will still be a requirement for a coordination activity provided by the linking e-Infrastructure provision organisation which coordinates and disseminates information and best practices as well as providing a support mechanism for trainers giving them access to materials and systems which are not available locally and would be prohibitively expensive to duplicate in every region.

The NA3 activity of the EGEE programme will develop the sustainable training capacity of the Member States by encouraging recruitment of trainers, training trainers, supporting those trainers as they start to work independently and by developing a pool of shared best practice, materials and resources. This will build on the considerable successes in these tasks established in EGEE and EGEE-II. Thus consolidating the achievements of the previous projects and moving towards a mature, self sustaining model in parallel with the overall development of the e-Infrastructures in Europe.

NA3 also provides training resources and organises training courses for potential and actual grid users who are involved in the project as well as for those outside the project who make use of the EGEE infrastructure. These training events serve two purposes:

1. To develop and validate the shared pool of best practice, training material and resources, and
2. To directly meet user, developer and systems administration communities requirements. It is recognised that this second function, the direct provision of training by EGEE-III, is not sufficiently scalable and sustainable. Hence, as EGEE-III progresses there will be a growing emphasis on developing local and federated training capabilities.

The courses offered cover a wide range of competences and abilities from induction-level courses focused on newcomers to grid computing to more advanced courses aimed at application developers providing them with the required skills to successfully port and implement applications on EGEE. Other courses are designed for site administrators to provide them with the necessary skills to operate a reliable EGEE site. The provision of commercial grid training is likely to increase in significance as uptake of grid technologies by industrial concerns grows. NA3 will contribute to the development of such training events together with NA6.

Continued development and update of these courses are required to track the continued development of middleware, applications and operational services.

Each NA3 partner site will proactively organise and recruit to a programme of “train-the-trainers” events to build local, regional and discipline-oriented training communities. They will support those communities through the NA3 federation and pool of resources. Other training courses are arranged in response to requests submitted via the NA3 webpages. The activity management responds to such requests, where appropriate, by scheduling events and providing trainers and support from the validated pool of resources, the graduates of the “train-the-trainers” programmes, the training team or from activity members in the same or nearby federations as the institution requesting the training. Priority is given to institutions, which are new to the project or to the EGEE grid infrastructure. Courses will be scheduled at major EGEE events, such as the EGEE User Forums or Conferences. NA3 maintains a directory of accredited trainers that organisers of courses can draw upon. These trainers are members which have followed the “train-the-trainers” programme, members of NA3 and experts from other activities. This process naturally develops the regional training support in collaborative and mutually supportive environment for trainers.

By its nature, training provision is a highly dispersed activity in which many EGEE project partners have historically participated. Course materials are archived in the EGEE digital library, enabling organisers of future training courses to make use of repurposed archived resources, some of which have been identified as exemplars by an Editorial Task Force, which is composed of key members of the NA3 activity. During EGEE-III this library should be developed as a federation of digital repositories and integrated with the teaching infrastructure (t-Infrastructure) to provide a pool of resources and a framework for collaboration that can be used to continue the ERA-wide training programmes. Provision of localised clients for this library will allow the development of specialised resources to meet individual requirements.

Experience has shown that the demand for training will continue to increase as the grid infrastructure expands and new user communities become involved in grid applications. The most effective way of providing training effort is by focusing on “training the trainers” to enable such communities, whether delineated by geographic location or subject-area, to become self-sufficient in training provision and thus stimulate the development of training plans in support of the emerging National Grid organisations. This will be one of the areas of increased activity for the training provisioning in EGEE-III.

Another area of anticipated expansion will be in provision of more remote learning resources, including a wider range of online modules covering the more diverse subject areas of new user communities.

These two activities are expected to become the cornerstones of the NA3 sustainability efforts that are aimed to transfer training knowledge into national or regional efforts thus reducing the load on the dedicated training teams. Similarly, the online resources will make the training programme more easily accessible to a wide range of trainees.

The provision of reliable and robust t-infrastructure to support training courses is vital to the successful staging of training events to meet the needs of new user communities. NA3 will rely on the established t-infrastructure (based on GILDA) for delivering hands-on training and on a specific training Virtual Organisation on the production infrastructure (see SA1 section) for developing more specialised training courses for new application areas which often requires access to third-party software or middleware components available only to the VO.

GILDA needs to cover the growing number of requests for tutorials and grid demonstrations, giving at the same time a realistic view of EGEE’s potentials to new users from business and academics alike.

The short response times needed, both in terms of support and system response during training and demonstration events as well as relaxed rules for user authentication allowing basically anonymous usage, ask for a t-infrastructure separated from the production infrastructure. Similarly, one needs to avoid that chaotic usage at training events negatively impacts the stability of the production infrastructure. This is particularly important given the past usage profile of GILDA that basically shows continuous usage for up to 6 concurrent training events and these numbers are expected to increase in EGEE-III and in the context of the EGEE Collaborating Projects which also rely on GILDA for their training events.

The EGEE-III t-Infrastructure will act as resource to support the emerging regional training efforts and subsequently to act as a nucleus and exemplar for the implementation of regional t-Infrastructure developments. To encourage this, the t-Infrastructure task will continue to develop “grid in room” and virtualisation technologies to provide alternative modes of implementing t-Infrastructure depending on available resources. In addition, the t-infrastructure will allow scientists that have been trained through the NA3 programme to continue experimenting with EGEE before moving to the production infrastructure. NA3 will ensure that this transition as smooth as possible in close collaboration with NA4 which will eventually take over the support. Similarly, it will act as a showcase for business-related prototyping activities under NA6.

The overall objective in training provision for EGEE-III will be to concentrate resources where they will be most effective and provide the best return on investment and to stimulate, rather than provide,

regional support. In general these correspond to localities which have been highly active and productive in EGEE and EGEE-II and therefore are well positioned to establish their own local training within in their federation. In particular, two well-resourced clusters of competence are created the U.K. and Italy where well established training organisations exist. In other areas (notably Russia, South East Europe, South West Europe and Central European federations) a more federated structure has been established through EGEE and EGEE-II and these will continue to develop and provide local mutual support. These federated structures will also take responsibility, through their partner coordinators (IHEP, GRNET, RED.ES, MTA SZTAKI) in managing and coordinating their federated effort.

#### **1.3.3.2. Management structure**

The management structure of the NA3 activity consists of an activity manager responsible for the overall execution of the NA3 programme of work, quality assurance, reporting, and partner coordination, who will be supported by a Deputy Activity Manager. The partner coordinators will coordinate the training effort of individual NA3 partners and via coordination with the Activity Manager to ensure a coherent execution of the NA3 programme of work. Partner coordinators are essential to coordinate regional training efforts and to transfer training knowledge to the regions. Activity management is supported and implemented by regular mail contacts to partners, augmented by teleconferences and group meetings at EGEE conferences.

A rigorous quality assurance programme is essential to maintain and enhance the quality of training provision established in previous phases of the EGEE programs. NA3 will refine the quality assurance plan in coordination with the Quality Head (NA1), specifically by further enhancing the established event feedback reporting and partner metrics systems, augmented by staging increased numbers of “Training the Trainers” events and further development of the system of trainer accreditation.

It will be expected that this quality assurance mechanism will be the basis for similar quality mechanisms to be implemented by developing national grid training. Providing a mechanism for sharing and verifying federated quality assurance will be a major role which requires the continued existence of a coordinating training activity as grid provision moves towards a model based on national and regional provision.

As part of the overall quality assurance programme of EGEE, feedback to the technical activities of EGEE, in particular SA1, SA3, and JRA1 will be regularly provided via summary reports to the AMB. In addition, NA3 will establish close links with the user documentation team of NA4 to ensure the best quality of both, user documentation and training material. Similarly, close interactions with NA6 will be established for commercial training.

The t-Infrastructure task of NA3 will provide limited support to NA4 in establishing applications which are providing training exemplars on the infrastructure. Similarly, coordination is expected between NA3 and NA6 in supporting industrial activities to engage with the infrastructure, again with particular reference to applications which provide training exemplars of use to NA3.

Again these tasks require the existence of a coordinating activity which can provide communication channels, specific to information gathered during training and to information relating to training requirements, which it can facilitate by collating and summarising the information in either direction.

### 1.3.3.3. Activity summary and manpower

<b>Activity Number</b>	NA3		<b>Start date or starting event:</b>			01.04.2008	
<b>Activity title</b>	User Training and Induction						
<b>Activity Type</b>	COORD						
<b>Participant number</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>12</b>
<b>Participant short name</b>	JKU	BME	MTA SZTAKI	CESNET	UIBK	II SAS	PSNC
Person-months per participant	8	11	69	8	8	22	10
<b>Participant number</b>	<b>13</b>	<b>15</b>	<b>21</b>	<b>28</b>	<b>33</b>	<b>37</b>	<b>53</b>
<b>Participant short name</b>	ICM UW	Srce	VUB	ETH Zurich	CNRS	INFN	IHEP
Person-months per participant	18	12	12	12	24	144	9
<b>Participant number</b>	<b>56</b>	<b>58</b>	<b>62</b>	<b>63</b>	<b>64</b>	<b>65</b>	<b>66</b>
<b>Participant short name</b>	JINR	PNPI RAS	GRNET	IPP BAS	UCY	TAU	ICI
Person-months per participant	15	59	30	22	12	12	20
<b>Participant number</b>	<b>67</b>	<b>68</b>	<b>69</b>	<b>70</b>	<b>74</b>	<b>80</b>	<b>88</b>
<b>Participant short name</b>	IPB	TUBITA K	CSIC	LIP	REDES	UEDIN	AS
Person-months per participant	22	20	18	9	20	108	24
<b>Participant number</b>	<b>91</b>						
<b>Participant short name</b>	UNIM ELB						
Person-months per participant	18						

#### Objectives

NA3 will deliver a comprehensive training programme for EGEE users and resource providers alike. A special focus is laid on making training sustainable by transferring the knowledge in the “train the trainers” programme and via a comprehensive online learning programme.

The overall objective of NA3 in EGEE-III is to stimulate and support the development of training provision mechanisms associated with the emerging national and region grid organisations which will form the future structures to support local training provision.

This will require a number of sub-tasks to implement and these are listed below:

To further expand and refine the portfolio of training material and courses, to provide training resources for an ever-widening range of grid applications.

- To train a wide variety of users, both those within the EGEE consortium and those from outside the project who make use of the EGEE grid infrastructure.
- To further develop effective mechanisms for passing on knowledge to end-users of EGEE related projects.
- To expand the online learning services within EGEE-III, to meet the needs of an expanded project and larger user-base.
- To support and complement the provision of t-infrastructure on the GILDA testbed by developing and maintaining an expanded range of training resources to cover an increasingly diverse range of application scenarios.

#### Description of work and role of partners

##### TNA3.1: Course content creation, scheduling, organisation, and delivery

The purpose of this task is to maintain and enhance the training resources and knowledge developed during the previous phases of the EGEE project. Particular attention will be devoted to developing more advanced course materials for application developers and site administrators as well as resources for running “Training the Trainers” courses. At the same time existing material, in particular course



exemplars, need to be maintained to reflect the development of the infrastructure.

A further purpose of this task is to schedule and organise an appropriate and varied programme of courses to support the development of applications on the EGEE infrastructure, in order to expand the user base of the EGEE infrastructure. This task is performed partly by the lead partner, who maintains an events database and archive of agenda material and event feedback, and partly by activity partners, who draft the course agenda and submit course materials for inclusion in the events database and advertising on the NA3 webpages. Close links will be established to ensure proper t-infrastructure support for hands-on training. The manpower required for this task is 480PMs, provided by:

INFN 60PM, LIP 9PM, CSIC 18PM, RED.ES 17PM, IHEP 3PM, JINR 15PM, PNPI 18PM, MTA SZTAKI 39PM, BME 3PM, CESNET 8PM, JKU 8PM, UIBK 8PM, II SAS 16PM, PSNC 4PM, ICM UW 18PM, Sree 6PM, VUB 12PM, UEDIN 36PM, ETH Zurich 12PM, GRNET 12PM, IPP BAS 12PM, UCY 12PM, TAU 6PM, ICI 20PM, IPB 22PM, ULAKBIM 20PM, CNRS 24PM, UNIMELB 18PM, AS 24PM.

### **TNA3.2: Coordinated support mechanisms**

#### **TNA3.2a Coordinated trainer support systems**

The EGEE online training support framework has been developed by provision of a digital library with a service-oriented architecture so that localised clients and services can be created at any level within the organisation. This library already contains a wealth of course material and documentation; exemplars of archive course material have been identified by the Editorial Task Force as particularly suitable for re-use in future training events and as the basis for specialised development.

In addition, it is recognised that true e-Learning provision involves the creation of online learning modules to which users can subscribe in order to participate in regular timetabled distance learning courses, featuring individual and group exercises. Such courses should also include forum-based group discussions of learning objects, goals and outcomes regulated by an e-Moderator, and intra-course and end-of-course assessments, possibly resulting in a certification process.

The infrastructure and manpower required to create and run such online training will be significantly greater than that historically devoted to the development of the EGEE digital library. This task will turn the prototype of such courses to be developed in EGEE-II into a regular activity of EGEE.

#### **TNA3.2b Training-Infrastructure provision**

The purpose of this task is to perform the day-by-day operation of GILDA. This includes the deployment of updates to the gLite middleware releases in synchronisation with SA1 as well as the deployment of user level services and tools for new user communities, the operation of core services (Workload Management System, VO Management System, File and Metadata Catalogs, Certification Authority etc), and certification of new sites joining GILDA.

This task will also perform the monitoring of the t-Infrastructure and provide first level support to its users. For monitoring the infrastructure the procedures and tools developed by SA1 will be used and problems encountered pro-actively resolved. Quick response times are particularly needed during training and dissemination events. First line user support will be provided by integrating GILDA support structures into the GGUS support system. This task will also maintain the online booking system for GILDA.

The manpower required for this task is 201PMs, provided by:

INFN 72PM, IHEP 3PM, MTA SZTAKI 24PM, BME 8PM, II SAS 6PM, PSNC 6PM, Sree 6PM, UEDIN 48PM, GRNET 12PM, IPP BAS 10PM, TAU 6PM.

### **TNA3.3: Activity management and partner coordination**

The purpose of this task is to manage the training activity and coordinate the effort of activity partners in order to maintain and enhance the successful Training and Induction Activity developed during earlier phases of the EGEE projects. As explained above, the activity will be managed by an Activity Manager, a Deputy Activity Manager and 6 Partner Coordinators, who contribute part of their time to local training management and in particular to local knowledge transfer. This task also covers the necessary quality assurance activities (see above) as well as contributions to EGEE's standardisation, policy and sustainability work.

The manpower required for this task is 54PMs, provided by:

INFN 12PM, MTA SZTAKI 6PM, UEDIN 24PM, GRNET 6PM, RED.ES 3PM, IHEP 3PM
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**NA3 Deliverables**

Deliverable No	Deliverable title	Delivery date	Nature	Dissemination Level	Deliverable description
DNA3.1	Training Plan	2	R	PU	A plan defining the processes and mechanisms by which training within EGEE-III will be delivered, including e-learning. This will include description of the different kinds of courses offered, as well as an initial schedule, and procedure for trainer accreditation.
DNA3.2	t-Infrastructure development and exemplar report	8	0	PU	A report detailing the new developments of t-Infrastructure, how these support national and regional training development and a report on the work to develop specific training exemplars based on real applications
DNA3.3	t-Infrastructure integration with NA3 online repository and services - report	10	0	PU	A report detailing the integration of t-infrastructure with the other resources of NA3 provided online.
DNA3.4	Training report and revised plan	11	R	PU	A report detailing the achievements of EGEE-III training, including e-learning (Index of e-learning modules available and list of e-learning events held) in the first 9 months of the project, including any changes proposed to the original training plan.
DNA3.5	Final training report	22	R	PU	A report detailing the achievements of EGEE-III training, including e-learning (Index of e-learning modules available and list of e-learning events held) in the first 20 months of the project.

**NA3 Milestones**

Milestone No	Milestone title	Delivery date	Description and means of verification
MNA3.1	Activity Quality Assurance and Measurement plan	6	Definition of the activity-internal QA measurements and procedures. This will provide input to DNA1.3.
MNA3.2	Report on Trainer accreditation	10	A report on the trainer accreditation process in the EGEE-III project. This includes how many trainers have been accredited and how active they have been in contributing to the EGEE training programme.
MNA3.3	Index of available eLearning modules and t-Infrastructure integration	13	The set of reviewed slides, handouts, practical exercises for each of the courses defined in DNA3.1 will be made available on the training repository, online.

<b>Milestone No</b>	<b>Milestone title</b>	<b>Delivery date</b>	<b>Description and means of verification</b>
MNA3.4	List of eLearning courses provided	18	A list of eLearning courses provided during the first 15 months of the project

### **1.3.4. Activity NA4: User Community Support and Expansion**

#### **1.3.4.1. Activity description**

The overall goal of this activity is to ensure that Grid technology and the EGEE infrastructure are used successfully by a broad spectrum of scientific collaborations. To build on the successes of the previous EGEE projects, this activity focuses its efforts in three areas: firstly, key aspects of general user and virtual organisation support; secondly, work with strategic disciplines; and lastly, the building of new and existing user communities.

**Support** for virtual organisations (VOs) and for their users is vital for ensuring high levels of satisfaction with the EGEE infrastructure. “Support” is a broad term that includes several different activities each requiring different expertise. Three distinct teams will provide:

3. Virtual Organisation Support aimed at easing the management of users within a VO as well as the large and growing number of VOs using EGEE,
4. Application Porting Support to aid developers in effectively porting a VO’s applications to the Grid, and
5. Direct User Support to help users with day-to-day problems when using the Grid.

These teams provide managerial support, technical consulting, and operational support, respectively, for all users of the EGEE infrastructure. Each team will interact strongly with existing support teams of national or regional Grid initiatives through liaisons funded by EGEE. Similarly, they will interact with identified support teams from the larger and more established virtual organisations, such as the integration team (EIS) for the LHC community.

**Strategic Discipline Clusters** are central to the development of the services provided by the infrastructure. Scientific areas have been chosen based on their scientific merit and on the potential value to the advancement of Grid technology by their intensive use of existing services and the development of new high level application oriented services. The mature areas chosen for such work are High Energy Physics, Life Sciences, Earth Sciences, Computational Chemistry, Astronomy and Astrophysics, and Fusion. In addition we propose a new area which aims to research on the implementation of a Grid Observatory, to develop a scientific view of the patterns of Grid usage, problems and recovery.

**Community building** aims to minimize the effort required to support the numerous virtual organisations and users exploiting the EGEE infrastructure by making them as self-reliant as possible. First, EGEE-III will bring users from different scientific disciplines together to share their experiences and techniques and help support one another. Second, the project will encourage adoption of Grid technologies and coordinate use of common resources and services within particular disciplines. These activities target both new and existing user communities.

The technical issues and critical disciplines will shift significantly over the lifetime of the project. Similarly, we expect the users most involved with EGEE to change dynamically as their experience develops and their needs change. To address this fluid situation, we consequently propose to fund travel and participation in interdisciplinary, intra-disciplinary, and topical meetings to achieve the community building goals, rather than funding the salaries of participants.

This activity does not operate or manage any Grid services or computational resources for the virtual organisations using the EGEE platform. As a rule EGEE federates distributed resources; consequently, virtual organisations are expected to integrate their own computational resources in the EGEE infrastructure following the procedures of, and using the support from, other EGEE-III activities. New virtual organisations may be authorized to use a pool of reserved resources to accelerate their use of the EGEE production infrastructure.

### 1.3.4.2. Task Description

#### 1.3.4.2.1. TNA4.1: Support (563 PM)

- **TNA4.1.1: Virtual Organisation Support (70 PM)**

Adopting Grid technology represents a significant shift away from current computing practices in most scientific and business domains. Consequently, virtual organisations wishing to use the EGEE infrastructure need counselling on how the EGEE Grid technology can meet their needs and what they can expect from EGEE. Once the virtual organisation has decided to proceed, their users will need to be directed to appropriate training and eventually be helped through the initial administrative procedures to access the EGEE production service (e.g. registration of the VO and deployment of initial resources). It will also provide documentation, ensure that effective VO management tools exist, and support both new and established VOs.

The VO Managers' Group will be the principal forum for VO support. All VO managers, or delegated NA4 contacts, are invited to participate in this group. This group will meet regularly and mechanisms will be put in place to allow active communication between members.

The central VO support, including a coordinator and two technical engineers, will ensure the efficient operation of the group. The team coordinator will participate in the NA4 steering committee and the main Technical Management Board, and will maintain an overview of the management and operation of VOs including the negotiation of resources for new communities. The team will interact closely with the training, t-infrastructure, and dissemination activities in the project. It will also, together with EGEE operations, ensure that initial resources are deployed for new virtual organisations.

One of the technical engineers will concentrate on the VO portal used to register VOs and to get an overview of the resource utilisation per VO. The registration is critical for the operation of EGEE. It allows NA4 to contact VOs using the infrastructure and the associated database will be used as a source of configuration information for sites and for other EGEE services, such as the accounting portal and GGUS.

The second technical engineer will interact with new VOs helping to guide them to appropriate places for support. This person will follow the progress of new VOs and proactively solve problems that arise. For new VOs that use the "Bootstrapping Resource Pool", this person will ensure that the necessary resources are allocated, following up with SA1 if not, and help VOs migrate out of this pool when their access to the pool expires.

The "Bootstrapping Resource Pool" is a pool of resources available reserved for new virtual organisations and maintained by the SA1 activity. The purpose of these resources is to allow selected new VOs to more quickly integrate their applications into the production infrastructure by decoupling porting of their applications from integration of their resources with the EGEE Grid infrastructure. New VOs will have access to these resources for six months after which they will have to integrate their own resources or migrate to other resources on the Grid. SA1 will be responsible for all aspects related to the selection of the sites and operation of the resources. The coordinator of the VO Managers' Group, in consultation with the NA4 Steering Committee, will select the VOs that can access this pool of resources based on policies defined in DNA4.2.

- **TNA4.1.2: Application Porting Support (261 PM)**

In addition to the broad, high-level support provided to new virtual organisations, detailed, technical aid to developers within the new virtual organisation is critical for successful adoption of the EGEE Grid technology. An application porting support team will consult with application developers about EGEE services and external services commonly used with the EGEE infrastructure (cf. RESPECT programme) to help them port their applications to the Grid.

*This team does not provide a "porting service"; virtual organisations must provide their own developers to do the actual, complete porting.*

The team will provide technical assistance to developers within new and existing virtual organisations. The core of the team will be co-located at one institute with close contacts with the regional NA4

support personnel. They must also collaborate strongly with any VO-specific support teams that provide similar services. Members of the core team will travel as appropriate to work directly with developers that have no regional support or to work intensively with other teams. Alternatively, people needing support may travel to the application porting support team; this task will use resources from the “Community Bootstrapping” fund to subsidize such travel.

The team will interact closely with the core middleware developers and with the application services developers to stay abreast of the current capabilities of the middleware, problems, and third-party services that work well with the EGEE software stack.

This task will take advantage of existing VO support teams, like the EIS team for the LHC VOs, who can act as mentors for other VOs wishing to form similar teams. They will provide unique know-how for building up similar groups, initially the generic support group and eventually similar groups for other VOs.

The coordinator of this activity will participate in NA4 Steering Committee; the coordinator is responsible for the overall team coordination and for liaising with other teams with related responsibilities, for example those running the t-infrastructure.

The entire team consists of approximately 10 FTEs. The core of the team (~50% of the effort) will be co-located at the same institute and are responsible for:

- Providing expert advise on porting a VO’s applications to the Grid. For optimal support application developers will visit the core team. This support will include analysis of the application, specification of the needed porting, remote support before visit, direct gridification aid during visit, and follow-up support after the visit.
- Self-training of the support team to keep abreast of new developments in the gLite middleware and in third-party packages in the RESPECT programme.
- Maintaining documentation related to application porting in coordination with the direct user support team.
- Remote support (email, phone, etc.) for those users that cannot travel to the application porting support centre.

The remaining effort will be allocated to institutes with specialized application porting experience, for example porting parallel (MPI) applications to the Grid or those capable of mentoring new VOs to provide similar support services to their members.

- **TNA4.1.3: Direct User Support (232 PM)**

Prompt, accurate resolution of problems is vital for maintaining a high level of satisfaction with the EGEE services. “Help desk” support has been provided by the GGUS system in EGEE-II. It provides an excellent basis for collecting and routing requests for help, but the quality of response fundamentally depends on the people providing the actual support. The largely voluntary basis used in the past is not adequate for the large number of diverse users EGEE now attracts.

The NA4 direct user support team will be specifically charged with providing continuous, dedicated support to individual users through the GGUS system in collaboration with other NA4 support teams and with similar teams from the Operations activity. We expect the operations team to provide support more oriented to operations-related problems and the NA4 team to provide support more oriented to problems with application-level services and integration of applications with the EGEE infrastructure. They must also be responsible for routing requests to ensure the most relevant support team treats each problem.

A vital part of the support offered to users is relevant, up-to-date documentation of the middleware and of the infrastructure. This team will maintain the Users’ Guide and example use cases as well as review the material periodically to ensure that it adequately reflects the services running on the production service. These people should be experienced technical writers to ensure that this documentation is of high quality and should have broad experience with EGEE and non-EGEE services. They will interact with other activities, notably NA3, SA3, and JRA1, to coordinate the documentation and training material.

This team will be lead from a concentration of effort in the SWE federation, but includes a relatively large number (6) of other partners to take advantage of specific experience built-up in previous

projects. Despite the distribution of the effort, this team will act as a coordinated whole to ensure quality, first-line support for Grid users.

The coordinator of this team will act on the NA4 Steering Committee and coordinate all the sub-tasks of the team itemised below:

- Provide support through GGUS for basic user problems.
- Route tickets through GGUS system that cannot be handled directly.
- Identify recurrent problems and suggest ways to remedy them.
- Maintain overview of available documentation.
- Write high-level documentation for typical use cases.
- Submit bug reports for incomplete or inaccurate documentation.

This team must actively collaborate with other activities, notably NA3 and SA1 that provide documentation.

- **TNA4.2: Strategic Discipline Clusters (1273 PM)**

The work within the clusters listed below is targeted to disciplines strategic to achieving the aims of the NA4 activity and the project as a whole. Aiding these disciplines will benefit the entire EGEE user community. Work within these clusters covers three areas:

- **Specific Support:** People participating in these clusters will be experts both in Grid technology and their respective disciplines. They will use their experience to help users concerning domain-specific software or techniques on the Grid. They will help those in other disciplines develop similar expertise.
- **Development/Evaluation of Software:** EGEE has been successful in providing a sufficiently stable, core middleware platform that provides the basic Grid functionality for many diverse communities. Maintaining production quality code and evolving it in response to new needs, while maintaining quality, takes significant effort and leaves little time to the EGEE developers to create higher-level services to address advanced or specific needs. Nevertheless, scientific applications demand sophisticated services that cannot be supplied by the core gLite middleware. In previous projects, the user community has filled the gap by developing application-level services and by evaluating and using third-party products on the EGEE infrastructure. This critical activity will continue as needed in EGEE-III. Developments will be disseminated to the general user community through the RESPECT programme.
- **Evolution of gLite and Intensive Testing:** Close collaboration between users and middleware development teams has been shown to be particularly effective in producing production-quality services that meet the needs of users. The clusters will continue these efforts thus driving the evolution of gLite to meet the stability and functionality expectations of the users.

The task descriptions below are indicative of the work that will be performed within each cluster. However needs and priorities change quickly, so the detailed programme of work for each cluster will be defined by the cluster when the project starts and will evolve over the course of the project. All of the cluster programs of work must be approved by the NA4 Steering Committee and by the TMB.

- **TNA4.2.1: High Energy Physics Cluster (336 PM)**

The High-Energy Physics (HEP) community is the largest community and the largest contributor of computing and storage resources to EGEE. Four HEP experiments, international collaborations comprising more than 4,000 scientists from throughout the world, will start using the Large Hadron Collider (LHC) facility in 2008. In addition, the LHC community is in close contact with all the other major experiments at other major international facilities, notably, DESY (Germany), FNAL (USA), and SLAC (USA). The total number of users in HEP VOs now exceeds 5,000.

The HEP community makes huge demands Grid computing in terms of the size of stored data, the number of jobs to manage, and the number of active users. LHC computing is totally dependent on the use of Grid technology. Consequently, high scalability and reliability from the middleware and the availability of application-level services are crucial for use of the Grid throughout all of its computing activities, from data collection to the final analysis.

In the previous phases of the project, this community has made key contributions in enabling users to routinely use the Grid, with a significant positive effect on other sciences through their re-use of tools developed by HEP. This essential work will continue into EGEE-III, along with the ongoing working relationships with the Life Science community and with others relatively new to Grid use. This phase will be characterised by the start up of the LHC (2008) which will put additional stress on the Grid infrastructures as well, in particular from a data storage point of view and by further increases in the active users and their usage of Grid resources (final data analysis). A success in supporting the HEP activity at these new scales will be an essential cornerstone in the future evolution and uptake of Grid technology and of the EGEE infrastructure in particular.

#### *Development/Evaluation of Software*

We describe below the three current, principal sub-tasks, emphasizing their importance for the project as a whole:

- **Expansion of the Dashboard project to other user communities:** Presently this is our flagship project. It is widely used in LHC and it is a unique tool to monitor the interaction of real applications with the Grid infrastructure. It is very natural to offer it to other communities characterized by large productions requiring bookkeeping and sophisticated monitor tools such as the Life Sciences and Fusion communities. Other EGEE partners are showing interest, for example, to monitor local VOs and also we are collaborating with other EGEE activities, notably SA1 and Quality Assurance.
- **Evolution of the concept of the analysis server:** This is a high-level service originally developed in EGEE. The prototype, used extensively in the first part of EGEE by individual users, contains an analysis server allowing automatic error recovery and several optimisation actions. The high-level components are essentially generic and could be the basis of similar tools for other communities. All this technology is being transferred to the analysis system of CMS (CRAB), presently the most used tool for final data analysis on both EGEE and OSG.
- **Evolution of the Ganga system:** Ganga is a lightweight, end-user tool for job submission and monitoring and provides an open framework for multiple applications and submission backends. This is a very successful development with the goal to serve two of the LHC experiments and support end-user analyses activities. This versatile system will be supported and offered to other user communities. Within EGEE-II, a diverse range of applications, from Drug Discovery for the avian flu virus to engineering activities such as the digital broadcasting frequency plan for the International Telecommunication Union in 2006, have used GANGA, often in conjunction with DIANE, a reliable task execution system. It is a cornerstone of our strategy to support new user communities. In 2007, over 800 users have tried the system and, for the last 6 months, around 200 have been active in any given week (25% from non-HEP VOs).

#### *Evolution of gLite and Intensive Testing*

There will be work on the development and testing of data management tools/services. This activity is of immediate benefit for the whole EGEE user community. An example is the continuing, successful collaboration of the AMGA metadata catalog for medical data management. There will also be work on gLite testing in the context of the experiment frameworks.

##### ○ **TNA4.2.2: Life Sciences Cluster (358 PM)**

The Life Sciences cluster comprises three main research areas currently using EGEE: medical imaging, bioinformatics and drug discovery. The targeted communities include tens of thousands of researchers in Europe. Presently, the EGEE “biomed” VO includes about 150 users and the main objective of the cluster is to increase the impact of EGEE-III in these strategic communities. A recent major success story has been the use of EGEE by the WISDOM drug discovery experiment. The three main research communities have similar problems regarding the integration of existing data on the Grid, secured access to that data, orchestration of complex tasks on the Grid (workflow), and the use of licensed software. The primary theme for this cluster will be advanced data management focusing primarily on secured access, encryption and data flow controls.

#### *Specific Support*



The cluster will provide support to the discipline for using the advanced data management services already available, such as AMGA for data management, and MOTEUR, for data-oriented workflow management, and for others that will be developed. The cluster will complement the present support provided almost exclusively by the developer teams that are now facing a growing pressure with the increasing adoption of the services.

#### *Development/Evaluation of Software*

The cluster will contribute to the development and maintenance of AMGA, MOTEUR, and the secured data management services. The cluster will also work on the integration of gLite and the TAVERNA workflow manager of interest to the Life Science community. Biomedical applications are making intensive use of metadata since most medical data can only be interpreted in a specific context. This effort aims at the evolution of AMGA such that it can be generally used for biomedical applications. Data encryption and fine-grained access control are also critical for many applications.

#### *Evolution of gLite and Intensive Testing*

The cluster will extensively test the data management services, especially those related to the secured data management. It will also help bring service-oriented tools to EGEE by extensively testing web service interfaces for gLite. Bridging the service-oriented architecture and the EGEE Grid infrastructure opens the door to the deployment of third-party products at a reduced cost. Among these third party products there are many e-science environments and knowledge management tools currently under deployment in a number of national and European projects. Availability of these products on the e-infrastructure is going to have a tremendous impact on its accessibility to target end users such as physicians and biologists.

#### ○ **TNA4.2.3: Earth Science Cluster (145 PM)**

The Earth Science community (ES) includes a large number of domains covering topics like the solid earth, the oceans, the atmosphere, their interfaces, space weather, and planetology. The phenomena under study are dependent on geographical coordinates, altitude and time. This community has set up active collaboration with teams on a worldwide basis and is accustomed to work in a distributed manner. It is composed of research institutes, organisations and industries. The benefits for EGEE result from its very active international collaboration and its extensive use of technology standards. For example, it has developed portals for data and metadata management based on web services such as OpenGIS.

The community has two major computing problem areas: (1) Modeling, which requires vast amounts of computational resources, and (2) the exploration and production of large, shared data sets. These data sets are combined in complex scenarios, which can be implemented by sophisticated workflow technologies. All of this work lends itself naturally to solution by the use of Grid technology, as offered by EGEE. The specific role of this cluster is to increase the impact of gLite in the ES community by demonstrating complex applications, which can only be realized on a Grid infrastructure.

#### *Specific Support*

The ES cluster will provide and support generic tools and services needed by many ES applications. Special focus will be on the following key topics:

1. The organisation of the workflow and the data models which best meet specific applications;
2. The integration of GIS (Geographical Information Services), ES data, geophysical numerical models (used in meteorology, atmospheric chemistry, atmospheric physics, and seismology) and GPS/Galileo based services;
3. The possibility to use external web service toolkits like Google maps, MS Virtual Earth or IBM's ManyEyes; and
4. Issues related to quality of service and time response in performing the specific applications.

#### *Development/Evaluation of Software*

A system for intelligent and automatic workflow management using semantic annotation of the modules and data of the application will be developed to handle complex workflows. In previous projects such technology has been used successfully in combining GIS and weather models into a workflow simulating flood scenarios. Other communities also trying to port complex workflows will profit from this technology.

#### *Evolution of gLite and Intensive Testing*

Well-established community standards, such as OpenGIS Services from the Open Geospatial Consortium, OPeNDAP, and DAIS, facilitate the development of web service interfaces for ES data discovery, access and further processing. The partners of this cluster are working successfully with web service solutions such as the ESA Earth Observation Grid Processing on Demand (G-PoD) and Intel's Grid Programming Environment (GPE). The ES cluster will provide such solutions using gLite.

#### ○ **TNA4.2.4: Grid Observatory (77 PM)**

This cluster aims to create a Grid observatory that integrates the collection of data on the behaviour of the EGEE Grid and EGEE users with the development of models and of an ontology for the domain knowledge. The availability of the data, Grid models and production of analysis are equally relevant for end-users, middleware development and system administration. This involves computer science research and development in both the Grid and the machine learning areas, with a specific impact sought to the emerging field of autonomic computing.

#### *Development/Evaluation of Software*

- **Data collection and publication:** This task will design, implement and deploy a set of tools for the acquisition, consolidation, long-term conservation, and publication of traces of EGEE activity and applications. The ontology, a conceptual schema allowing indexing and querying, will complement the resource-oriented Glue Information Model with concepts describing the Grid inputs (users, virtual organisations and applications), the Grid dynamics (lifecycles of individual jobs and the data transfers), and the semantics of the analysis methods. The concrete result of this task will be a public database of Grid traces.
- **Models of the Grid dynamics:** The general goal of this task is to provide frameworks for interpreting measurements, and to exploit them in operational contexts. The core enabling technologies are statistical machine learning, optimisation, and data mining. The most immediate goals are: firstly, the synthetic characterisations of the components such as cluster and queue loads, locality profiles, and Grid-related users networks; and secondly, assessing the effectiveness of specific Grid policies through advanced optimisation methods. Research activities will focus on the inference of the (hidden) inputs and scenarios that have led to the actual observations, and on autonomic dependability.

#### *Evolution of gLite and Intensive Testing*

It is proposed to give feedback from the research development of high-level services below to the understanding of the operations and middleware performance and system enhancement. There will be close collaboration with existing monitoring activities, such as provided by the LHC Dashboard.

#### ○ **TNA4.2.5: Computational Chemistry Cluster (138 PM)**

Chemical software is widely used by researchers from other disciplines; therefore the availability of such software on the Grid is crucial for a wider community than just the computational chemistry community. The porting of a few chemical software packages has already been accomplished (DL\_POLY by Univ. of Perugia; GAMESS and Gaussian by ACC CYFRONET AGH; Wein2k by UIBK; and Gromacs and Abinit by CESNET). The availability of these packages increased significantly the attraction of the Grid as a computational platform for chemistry; currently scientists from over thirty universities across the Europe use the Grid to conduct research. However, these packages are not sufficient for the majority of users. Constant developments in the field of computational chemistry, such as the parallelisation of existing computational methods, the development of new ones and implementation of faster algorithms, require porting other packages,

particularly commercial ones. One must address commercial license requirements in order to provide the full range of packages requires by the community.

#### *Specific Support*

- Software porting – the top “core” candidates include both, freely available packages (Dalton, CPMD, AcesII-Mainz and Orca) as well as commercial ones (Dmol, Castep, Charmm, Wien2k and Turbomole).
- Providing access to already ported software (such as Amber package ported by the Life Science community) to chemists.
- Development of solutions concerning job restarting, the saving intermediate data generated by programs, and job check pointing.
- Development of workflows for complex application control and data flow dependencies.

#### *Development/Evaluation of Software*

- Development of Grid license models: A Grid adaptation of existing license models and the development of new ones for each involved community. This will cover: direct users license compliance checking, floating-type licenses (where a pool needs to be shared by more than one centre) and usage of several licensed applications simultaneously.
- Integration of chemical software with a web portal: Development of software plug-ins integrated with one of the existing web portals for 'core' chemical software packages, also for packages already ported to the Grid by other communities and attractive for chemical purposes. On request the plug-ins for specific user-level software will be created. In parallel a GUI prototype for the Charon system and the ECCE gLite port will be extended.

#### ○ **TNA4.2.6: Astronomy and Astrophysics Cluster (123 PM)**

The Astronomy and Astrophysics (A&A) cluster combines two disciplines that address fundamental questions regarding the universe. The associated user communities both require access to vast databases and huge quantities of computational resources to analyse those data. This processing, encompassing both simulation and data analysis, has a high degree of parallelism and lends it-self to Grid processing. The community encompasses existing international projects such as PLANCK, MAGIC, and AUGER.

Many A&A applications are challenging from the point of view of resources, both in terms of computation and of data storage, and they are appropriate for porting to the Grid infrastructure. Moreover, they require advanced functionalities, namely access to astronomical databases and remote monitoring and control of astrophysical applications. Control developments would make the EGEE infrastructure able to support interactive applications, functionality interesting to the whole user community.

#### *Specific Support*

Ongoing support will be provided for the porting of key user application within the A&A community.

#### *Development/Evaluation of Software*

This subtask aims to identify third-party software that meets the requirements of the A&A applications not met by the core EGEE middleware. If the core EGEE middleware and existing third-party software cannot meet these needs then this cluster will develop new tools or services as necessary. Developments will be focused on this community but with an eye towards services also applicable to other scientific disciplines. This activity will be carried out in close collaboration with other EGEE teams and NA4 clusters.

#### *Evolution of gLite and Intensive Testing*

This subtask verifies that gLite, third-party, and developed services completely meet the needs of the astronomy and astrophysics applications. The testing will be planned by people within the cluster, but taking advantage of the experience within the community as a whole. This group will also provide the support for what concerns tools and services developed within the A&A cluster and work to make

them beneficial for the whole EGEE community. Clearly this will require close collaboration with the other NA4 clusters and transversal EGEE teams.

○ **TNA4.2.7: Fusion Cluster (96 PM)**

The construction of ITER through a joint international research and development project, whose partners are the European Union (represented by EURATOM), Japan, the People's Republic of China, India, the Republic of Korea, the Russian Federation and the United States of America, aims to demonstrate the scientific and technical feasibility of fusion power.

The ITER project will have a strong impact on all fusion-related activities and generate a major focal point to which the EGEE-III project will be linked through tasks assigned to Russian Federation partners. It is also important for EGEE-III to maintain complementary links to pre-existing organisations in Europe, such as the European Fusion Development Agreement (EFDA), as well as new projects targeted to fusion, such as EUFORIA. These links will be achieved through tasks assigned to Spanish partners in the SouthWest Europe Federation.

The fusion community was an important community within the EGEE-II project and will continue to be important for EGEE-III. This community is especially interesting because it has some applications that are trivially parallelizable and others that require MPI on large supercomputers. Moreover, a full analysis often requires running many applications in stages. Consequently, this field is ideal for "bridging" different Grid infrastructures, as proposed, for example, by the EUFORIA project which aims to interface fusion researchers and ITER activities to Grid and HPC technologies. Thus, the work planned in EGEE-III is based on two complementary lines: a technical liaison with EUFORIA on one hand, and involvement with fusion communities to prototype the international ITER Grid infrastructure based on the EGEE achievements.

The EGEE FUSION VO will serve as a common focal point for these two complementary lines of work, as well as other activities in EGEE-III and other projects, such as the deployment in production of visualisation applications and other developments performed in the frame of the EU Interactive Grid project, and the support and further development of current fusion applications ported to EGEE.

### 1.3.4.3. Management of the Activity

• **TNA4.3: Activity Coordination (354 PM)**

To minimize management overhead and to increase efficiency, the NA4 effort is grouped into teams or "clusters of competence" as much as possible. People working on a particular task are physically co-located at a particular institute (or at a small group of institutes, if they have a strong history of collaboration) that has experience related to the task. Ideally, the chosen institute(s) will also participate in other EGEE-III activities to enhance the synergies between activities and further strengthen their NA4 participation.

To ensure efficient collaboration with national or regional Grid initiatives, NA4 will fund a number of regional contacts who act as liaisons between EGEE NA4 support teams and similar teams within their regions.

○ **TNA4.3.1: Activity Management (92 PM)**

The activity management consists of a full-time activity manager, full-time deputy, a full-time administrative assistant, and an additional half-time person to ensure that technical issues are handled expediently during the stressful periods around the EGEE Conferences and User Forums. The administrative assistant is required to help with periodic reporting and preparation of milestones and deliverables. The full time deputy has specific responsibility for all community-building activities.

The NA4 activity will be managed by a **Steering Committee** that includes the coordinators from each major task. The members of this committee along with their responsibilities are listed below.

- NA4 Activity Manager is responsible for overall coordination and reporting for the activity. Specific responsibilities include quality assurance, coordination between the strategic discipline clusters, and liaison with the regional management.
- NA4 Activity Deputy is responsible for all aspects of community building and the activity leader when necessary.

- Direct User Support Coordinator coordinates the direct user support team.
- VO Managers' Group Coordinator coordinates the VO Managers group and represents them in all cross activity groups, such as the TMB.
- Application Porting Support Coordinator coordinates the application porting team and liaises with similar support efforts in other EGEE-II activities.
- Coordinator of each Strategic Discipline Cluster will coordinate all tasks with the cluster, and be responsible for all reporting and dissemination of results, including the provision of demonstrations as milestones. Each coordinator will act on the TMB.

The NA4 Steering Committee will meet regularly (at least every two weeks) to effectively track progress, quickly identify any problems, and develop plans of action for the activity. At the discretion of the activity manager, "extended" steering committee meetings may be held that include regional liaisons.

The RESPECT (Recommended External Software Packages for EGEE Communities) programme was initiated within the EGEE-II project. Its goal is to highlight software packages produced outside of the gLite development team that are genuinely useful for members of the EGEE community and that are proven to work well on the EGEE infrastructure. This saves our users from exhaustive searches for interesting packages and gives them some assurances that those packages work.

The Steering Committee maintains the list of packages listed in the RESPECT programme, including approving new packages and removing irrelevant ones. The Steering Committee must actively manage this process and also ensure that the integration and operation activities are aware of the identified packages.

The deputy activity manager, in consultation with the Steering Committee, has special responsibility for the allocation of funds for the building of new VO communities. This will be distributed in the following manner:

*Bringing communities together (35'000€)*

Funding for the User Forum invited speaker expenses and to organize disciplinary meetings between two User Forums events. The costs will cover expenses for logistics (rooms, equipment) and for invited attendees.

*Coordinating community effort (30'000€)*

The NA4 activity will identify and support major (and strategic) disciplines by appointing a coordinator. (For disciplines represented in the Strategic Discipline clusters, the coordinators of those clusters are expected to act in this role.) These coordinators will work to organize appropriate sessions at the major EGEE events, but also plan smaller scale meetings and workshop matched directly to the needs of that particular scientific discipline. These people are expected to interact frequently with the regional contacts and the members of the NA4 management to ensure appropriate coordination within the NA4 activity as well as within the supported discipline.

*Community bootstrapping (15'000€)*

These funds are intended to help members of new communities (not otherwise funded by EGEE) travel to the application porting support team. Recipients will be selected based on input from the VO Managers' Group coordinator, the Application Porting Support Coordinator, and the NA4 Deputy.

○ **TNA4.3.2: Regional Coordination (262 PM)**

To ensure effective two-way communication with national and regional Grid initiatives, this activity will fund regional personnel to act as liaisons between EGEE and regional Grid activities. The regional liaisons will report to the activity manager and participate in "extended" Steering Committee meetings.

The regional coordinator (0.5 FTE) will be responsible for:

- All administrative coordination and reporting within the region.
- Liaison with the NA4 management (through NA4 Activity Manager).

- Liaison with regional application communities.
- Participation in “extended” NA4 Steering Committee meetings.

In addition to the liaison, an additional regional technical effort will be provided (up to 1 additional FTE depending on the region). This additional person is expected to provide and coordinate support within the region. The technical contact will be responsible for:

- Providing direct user and application porting support where possible.
- Help regional users find appropriate EGEE support personnel.
- Coordinate EGEE support activities within the region including support provided by regional ROCs.

The regional personnel will be preferentially co-located at institutes that have other EGEE responsibilities, for example at ROCs (SA1) or at Strategic Discipline Clusters (NA4) to increase synergies with other EGEE participants. The varying effort depends on the size and complexity of the regions as well as the amount of funding received in other NA4 tasks. The following table lists the defined regions.

Region	Effort (PM)	Partners
Asia/US	42	AS Taiwan, CNU Korea
Benelux	17	SARA
Central Europe	21	CESNET, JSI
CERN/Germany/Switzerland	23	DKRZ
France/UK/Ireland	35	Glasgow, STFC
Italy	31	INFN
Northern Europe	16	VR-SNIC, SIGMA
Russia	12	SINP MSU
South East Europe	32	GRNET
South West Europe	33	UCM

#### 1.3.4.4. Activity summary and Manpower

Activity Number	NA4		Start date or starting event:				01.04.2008	
Activity title	User Community Support and Expansion							
Activity Type	COORD							
Participant number	1	4	8	9	10	11	14	
Participant short name	CERN	MTA SZTAKI	CESNET	UIBK	II SAS	JSI	CYFRONET	
Person-months per participant	240	126	21	28	33	10	68	
Participant number	17	19	20	21	24	25	26	
Participant short name	SARA	RUG	KNMI	VUB	DKRZ	Fraunhofer	FZK	
Person-months per participant	17	12	21	12	23	33	21	
Participant number	28	32	33	36	37	39	40	
Participant short name	ETH Zurich	CEA	CNRS	CGGV	INFN	CNR ITB	INAF	
Person-months per participant	10	23	341	21	161	23	25	
Participant number	41	46	51	52	59	60	61	
Participant short name	UNIP MN	UNIPG.I T	SIGMA	VR-SNIC	RRC	SINP MSU	GC RAS	
Person-months per participant	23	23	30	20	48	12	21	
Participant number	62	67	69	71	73	76	77	
Participant short name	GRNET	IPB	CSIC	CIEMAT	UPV	UNIZAR	UCM	
Person-months per participant	116	6	64	24	36	24	81	
Participant number	79	81	82	83	88	89	90	
Participant short name	STFC	Imperial	Glasgow	UNIMAN	AS	KISTI	CNU	
Person-months per participant	12	4	23	12	132	30	126	

<b>Participant number</b>	<b>92</b>
Participant short name	UNIM ELB
Person-months per participant	54

### Objectives

The overall goal of this activity is to ensure that Grid technology and the EGEE infrastructure are used successfully by a broad spectrum of scientific collaborations. The activity focuses its efforts in three areas:

1. *Support*: To ensure effective use of the Grid infrastructure, this activity provides application porting consulting, day-to-day user support including documentation, and support for virtual organisation management and managers.
2. *Strategic Discipline Clusters*: To maximize the penetration of Grid technology into selected, key scientific disciplines, seven clusters will ensure that the EGEE platform meets the scalability, reliability, and functionality requirements for their respective scientific areas through focussed support, intensive testing, and development of high-level application services.
3. *Community Building*: To encourage Grid user communities to be as self-reliant as possible, the activity will support dialog within and between user communities through topical and disciplinary meetings. The activity will also coordinate of the use of Grid technologies in a scientific area and support new user communities as appropriate.

Vigorous EGEE-III programs in each of these areas will increase the attractiveness of the EGEE infrastructure, accelerate the adoption of Grid technologies, and increase the satisfaction of those currently using the EGEE production service.

A coordination task, crucial for the success of the activity, will ensure that the provided services are well-managed in order to maximize their impact on and within user communities and ensure that virtual organisations can efficiently find the help they need at all points in their development.

### Description of work and role of partners

- TNA4.1: Support (563 PM)
  - TNA4.1.1: Virtual Organisation Support

A small team, including a coordinator and two technical engineers, will ensure the efficient operation of a VO management group. The team coordinator will participate in all committees and boards affecting VO management and resource allocation, and provide overall steering for the coherence of VO management. This team will also be responsible for technical support of the group such as the VO registration infrastructure, for example.

Total Effort: 70 PM, lead by CEA

Partners: CEA (12 PM), CNRS (34 PM), GRNET (12 PM), UNIMELB (12 PM)

- TNA4.1.2: Application Porting Support

This team will consult about EGEE services and external services commonly used with the EGEE infrastructure (cf. RESPECT programme) to help developers within the EGEE virtual organisations port their applications to the Grid. This team does not provide a “porting service”; virtual organisations must provide their own developers to do the actual, complete porting. The porting support team will provide technical assistance to developers within new and existing virtual organisations.

Total Effort: 261 PM, lead by MTA SZTAKI

Partners: MTA SZTAKI (126 PM), CEA (11 PM), INFN (36 PM), CSIC (10 PM), UCM (48 PM), UNIMELB (6 PM), AS (24 PM)

- TNA4.1.3: Direct User Support

The NA4 direct user support team will be specifically charged with providing continuous, dedicated support to individual users through the GGUS system in collaboration with other NA4 support teams

and with similar teams from the Operations activity. They will be responsible for routing requests to ensure the most relevant support team treats each problem. This team will maintain the Users' Guide and example use cases as well as review the material periodically to ensure that it adequately reflects the services running on the production service. The team will interact with other related activities, notably NA3, SA3, and JRA1, to coordinate the documentation and training material.

Total Effort: 232 PM, lead by GRNET

Partners: ULB (12 PM), CNRS (24 PM), INFN (34 PM), SIGMA (24 PM), GRNET (48 PM), CSIC (36 PM), UPV (12 PM), UNIMELB (12 PM), AS (6 PM), Korea CNU (24 PM)

- TNA4.2: Strategic Application Clusters (1273 PM)

The work within the clusters listed below is targeted to disciplines strategic to achieving the aims of the NA4 activity and the project as a whole. Aiding these disciplines will benefit the entire EGEE user community. Work within these clusters covers three areas:

- Specific Support
- Development/Evaluation of Software
- Evolution of gLite and Intensive Testing

The descriptions below only indicate the scientific discipline and how the effort will be divided between the above tasks. Please see the main text for proposed descriptions of the work for each cluster. The needs and priorities change quickly, so the detailed programme of work for each cluster will be defined by the cluster when the project starts and will evolve over the course of the project. All of the cluster programs of work must be approved by the NA4 Steering Committee and by the TMB.

- TNA4.2.1 High Energy Physics Cluster

The HEP community makes huge demands Grid computing in terms of the size of stored data, the number of jobs to manage, and the number of active users. Consequently, high scalability and reliability from the middleware and the availability of application-level services are crucial for use of the Grid throughout all of its computing activities, from data collection to the final analysis. In the previous phases of the project, this community has made key contributions in enabling users to routinely use the Grid, with a significant positive effect on other sciences through their re-use of tools developed by HEP.

Total Effort: 336 PM, lead by CERN

Partners: CERN (228 PM), INFN (60 PM), Australia (24 PM), AS (24 PM)

- TNA4.2.2 Life Science Cluster

The Life Sciences cluster comprises three main research areas currently using EGEE: medical imaging, bioinformatics and drug discovery. The targeted communities include tens of thousands of researchers in Europe. The three main research communities have similar problems regarding the integration of existing data on the Grid, secured access to that data, orchestration of complex tasks on the Grid (workflow), and the use of licensed software. The primary theme for this cluster will be advanced data management focusing primarily on secured access, encryption and data flow controls.

Total Effort: 358 PM, lead by CNRS

Partners: CNRS (161 PM), CNR-ITB (23 PM), UPV (24 PM), UNIMAN (12 PM), Taiwan (24 PM), Korea KISTI (30 PM), Korea CNU (84 PM)

- TNA4.2.3 Earth Science Cluster

The Earth Science community (ES) includes a large number of domains covering topics like the solid earth, the oceans, the atmosphere, their interfaces, space weather, and planetology. The phenomena under study are dependent on geographical coordinates, altitude and time. The community has two major computing problem areas: (1) Modeling, which requires vast amounts of computational resources, and (2) the exploration and production of large, shared data sets.



Total Effort: 145 PM, lead by FhG SCAI

Partners: KNMI (21 PM), II SAS (21PM), FhG SCAI (33 PM), CNRS (22 PM), CGGV (21 PM), GC RAS (21 PM), Taiwan (6 PM)

- TNA4.2.4 Grid Observatory

This cluster aims to create a Grid observatory that integrates the collection of data on the behaviour of the EGEE Grid and EGEE users with the development of models and of an ontology for the domain knowledge. The availability of the data, Grid models and production of analysis are equally relevant for end-users, middleware development and system administration. This involves computer science research and development in both the Grid and the machine learning areas, with a specific impact sought to the emerging field of autonomic computing.

Total Effort: 77 PM, lead by CNRS

Partners: CNRS (44 PM), UNIPMN (23 PM), Imperial (4 PM), AS (6 PM)

- TNA4.2.5 Computational Chemistry Cluster

Chemical software is widely used by researchers from other disciplines; therefore the availability of such software on the Grid is crucial for a wider community than just the computational chemistry community. Constant developments in the field of computational chemistry, such as the parallelization of existing computational methods, the development of new ones and implementation of faster algorithms, require porting other packages, particularly commercial ones. One must address commercial license requirements in order to provide the full range of packages required by the community.

Total Effort: 138 PM, lead by CYFRONET

Partners: CESNET (10 PM), UIBK (17 PM), CYFRONET (68 PM), ETHZ (10 PM), UNIPG (23 PM), VR (10 PM)

- TNA4.2.6 Astronomy and Astrophysics Cluster

The Astronomy and Astrophysics (A&A) cluster combines two disciplines that address fundamental questions regarding the universe. The associated user communities both require access to vast databases and huge quantities of computational resources to analyse those data. Many A&A applications are challenging from the point of view of resources, both in terms of computation and of data storage, and they are appropriate for porting to the Grid infrastructure. Moreover, they require advanced functionalities, namely access to astronomical databases and remote monitoring and control of astrophysical applications.

Total Effort: 123 PM, lead by INAF

Partners: RUG (12 PM), UIBK (11 PM), II SAS (12 PM), FZK (21 PM), CNRS (12 PM), INAF (25 PM), IPB (6 PM), CSIC (18 PM), AS (6 PM)

- TNA4.2.7 Fusion Cluster

The unifying scientific activity for all current fusion work is ITER, a joint international research and development project that aims to demonstrate the scientific and technical feasibility of fusion power. This community is especially interesting because it has applications that are trivially parallelizable and others that require MPI on large supercomputers. Moreover, a full analysis often requires running many applications in stages. Consequently, this field is ideal for “bridging” different Grid infrastructures.

Total Effort: 96 PM, lead by CIEMAT

Partners: RRC KI (48 PM), CIEMAT (24 PM), UNIZAR (24 PM)

- TNA4.3: Activity Coordination (354 PM)
  - TNA4.3.1: Activity Management

The activity management consists of a full-time activity manager, a full-time deputy, a full-time administrative assistant, and an additional half-time person to ensure that technical issues are handled expediently during the stressful periods around the EGEE Conferences and User Forums. The administrative assistant is required to help with periodic reporting and preparation of milestones and deliverables. The deputy activity manager has special responsibility for 'community building' and all aspects of event organisation.

Total Effort: 92 PM, lead by CNRS

Partners: CERN (12 PM), CNRS (44 PM), GRNET (24 PM), Korea CNU (12 PM)

o TNA4.3.2 Regional Coordination

To ensure effective two-way communication with national and regional Grid initiatives, this activity will fund regional personnel to act as liaisons between EGEE and regional Grid activities. There are 10 defined NA4 regions. The regional personnel will report to the activity manager and participate in "extended" Steering Committee meetings.

Total Effort: 262 PM, see table in text for partners for each NA4 region

Partners: SARA (17 PM), CESNET (11 PM), JSI (10 PM), DKRZ (23 PM), INFN (31 PM), SIGMA (6 PM), VR-SNIC (10PM), SINP MSU (12 PM), GRNET (32 PM), UCM (33 PM), STFC (12 PM), Glasgow (23 PM), AS (36 PM), Korea CNU (6 PM)

#### NA4 Deliverables

Deliverable No	Deliverable title	Delivery date	Nature	Dissemination Level	Deliverable description
DNA4.1	Work Plans for Strategic Discipline Clusters	1	R	PU	Detailed plans for the support, development, and testing activities for each strategic development cluster. The plan should include description of each task, goal of the task, expected effort, and people involved.
DNA4.2	Activity Policy and Procedures	2	R	PU	Initial formulation of the policies and procedures that will guide the activity. This report should include a description of how support can be obtained from each support team and describe criteria used to permit access to the "New Community Resource Pool". This report must clearly describe the procedures and policies for distributing the Community Building funds.
DNA4.3	Summary of Work Performed and Updated Work Plans for Strategic Discipline Clusters	11	R	PU	This deliverable must contain a summary of the work performed in the first year of the project within each development cluster and an analysis of how that work has impacted the associated application sector, and a summary of the contents of the RESPECT programme. The report must also contain work plans for each cluster, updated to reflect the experience gained in the first year of the project.

Deliverable No	Deliverable title	Delivery date	Nature	Dissemination Level	Deliverable description
DNA4.4.1-2	Utilisation of EGEE Support Services and Infrastructure	11, 23	R	PU	This report summarizes the support services offered by EGEE to its users and virtual organisations and how those services have been received. It summarizes how the EGEE infrastructure is being used by the virtual organisation (e.g. which Grid services are used, what types of applications run, etc.). This report will identify issues with the EGEE support services and infrastructure and formulate a plan of action for resolving them.
DNA4.5	Summary of Work Performed by Strategic Discipline Clusters	23	R	PU	This deliverable must contain a summary of the work performed in the second year of the project within each development cluster and an analysis of how that work has impacted the associated application sector. It will also include a summary of the contents of the RESPECT programme.

#### NA4 Milestones

Milestone No	Milestone title	Delivery date	Description and means of verification
MNA4.1	Featured Demos and Presentations	4	This milestone consists of featured demonstrations or presentations from the AA, CC, ES, and Fusion clusters at the EGEE Conference.
MNA4.3	Featured demos at EGEE User Forum (GO, HEP, LS)	10	This milestone consists of featured demonstrations or presentations from the GO, HEP, and LS clusters at the EGEE Conference.
MNA4.4	Featured demos at EGEE Conference (GO, HEP, LS)	16	This milestone consists of featured demonstrations or presentations from the GO, HEP, and LS clusters at the EGEE Conference.
MNA4.5	Featured demos at EGEE User Forum (AA, CC, ES)	22	This milestone consists of featured demonstrations or presentations from the AA, CC, ES, and Fusion clusters at the EGEE Conference.
MNA4.2.1-2	User Forums	10, 22	Two major events will be planned to bring together the full EGEE user community. These will be scheduled between the EGEE Conferences.

### **1.3.5. Activity NA5: Policy and International Cooperation**

#### **1.3.5.1. Activity description**

NA5 will deal with policy related activities, international cooperation efforts, standardisation, and the drive towards a sustainable Grid infrastructure.

Regarding policy-related activities, NA5 will promote the establishment of European policies pertaining to Research Infrastructures, especially those related to Grid technologies. NA5 will strongly cooperate with the e-Infrastructures Reflection Group (e-IRG<sup>1</sup>), of which the EGEE-III Project Director is an observer, and its support programme, currently referred to as the e-Infrastructures Reflection Group Support Programme (e-IRGSP). It will also contribute to and further support the e-IRG specific tasks, such as the white papers, roadmaps, and recommendations produced by the group. NA5 will contribute directly to these e-IRG products and coordinate the input from different EGEE-III activities.

International cooperation efforts will cover cooperation with other projects and other geographical areas. Concerning the former, NA5 will follow the progress of other projects collaborating with EGEE with a focus on the cross-impact and mutual benefits between EGEE and these projects. With respect to other geographical areas, EGEE will continue to monitor and synchronize with project extending the infrastructure to other geographical areas such as South East Europe (SEE-GRID), the Baltic States (BalticGrid), the Mediterranean (EUMedGrid), Latin America (EELA), China (EUChinaGrid), India (EUIndiaGrid), Africa, and with the major efforts in the United States such as OSG and TeraGrid and the Pacific region including NAREGI in Japan, KGrid in Korea, the efforts in Taiwan, etc.

Standardisation is an essential enabler for ubiquitous Grid infrastructures. NA5 will follow and actively monitor EGEE's commitment to engage in Grid and security-related standards. It will monitor the progress and evolution of relevant standardisation bodies such as OGF and stimulate the participation and active contribution to standards, especially from the relevant technical activities.

The EGEE programme has been a driving force for a sustainable Grid infrastructure for Europe, which will ensure the transition to permanent structures, i.e., a central organisation currently referred to as the European Grid Initiative (EGI) and national bodies (National Grid Initiatives) and continuity after the end of EGEE-III. Although this will be the subject of a separate project, namely the EGI Design Study project, EGEE must establish links and ensure that its voice is heard at the appropriate discussions and forums.

#### **1.3.5.2. Activity management**

The activity will be led by an activity manager with the support of a deputy, as well as a small team of activity members to fulfill the tasks outlined in the summary below.

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<sup>1</sup> <http://www.e-irg.org/>

### 1.3.5.3. Activity summary and manpower

<b>Activity Number</b>	NA5		<b>Start date or starting event:</b>			01.04.2008	
<b>Activity title</b>	Policy and International Cooperation						
<b>Activity Type</b>	COORD						
<b>Participant number</b>	<b>1</b>	<b>2</b>	<b>21</b>	<b>24</b>	<b>28</b>	<b>37</b>	<b>62</b>
<b>Participant short name</b>	CERN	JKU	VUB	DKRZ	ETH Zurich	INFN	GRNET
Person-months per participant	12	12	4	2	2	18	34
<b>Participant number</b>	<b>65</b>	<b>69</b>	<b>72</b>	<b>73</b>	<b>74</b>	<b>79</b>	<b>88</b>
<b>Participant short name</b>	TAU	CSIC	IFAE	UPV	RED.ES	STFC	AS
Person-months per participant	2	2	2	4	2	4	12

#### Objectives

NA5 will coordinate EGEE's policy related activities, international cooperation efforts, standardisation, and the drive towards a sustainable Grid infrastructure. Its main objectives are:

- Contribute to the e-Infrastructures Reflection Group (e-IRG);
- Cooperate with other projects and other geographical areas;
- Follow and actively monitor EGEE's commitment to actively engage in Grid and security related standards;

Establish links with the EGI Design Study Project and actively monitor the progress towards the EGI / NGI model.

#### Description of work and role of partners

- TNA5.1: Contributions to the policy work of the e-Infrastructure Reflection Group (e-IRG)

This task will involve contributing to the White Papers, Roadmaps and Workshops on e-infrastructures. NA5 will coordinate EGEE-III's contribution to the e-IRG products. A generic task on policy related work is included in each activity and NA5 will be responsible for the overall coordination. Coordination and editing of e-IRG products will be led by the e-IRG and its support programme (currently known as the e-IRGSP project) and its continuation (e-IRGSP ends in October 2007).

The effort required for this task is 36 PMs, and will be distributed as follows: INFN (8 PMs), CSIC (2 PMs), PIC (2 PMs), RED.ES (2 PMs), STFC (4 PMs), ETHZ (2 PMs), GRNET (8PMs), TAU (2 PMs), and JKU (6 PMs of purely unfunded effort).

- TNA5.2: Establish links with other projects and initiatives

EGEE will establish links with the projects providing EGEE geographical extensions in the Baltic States, China, Latin-America, the Mediterranean, South East Europe, etc., and other countries such as the US, Taiwan and South Korea. NA5 will promote the relations with sub-Saharan Africa, where we will continue to monitor the progress of e-Infrastructure developments. This will be accomplished with EGEE participation in a series of external events such as the IST Africa workshops. In addition, it will provide an update on the so-called "concertation" activities, summarising the cooperation with other EU projects. Once a year, at EGEE project conferences, NA5 will co-ordinate a "concertation type" meeting of related EU-funded Grid projects.

In order to keep track of all the Related Projects, EGEE will establish a Related Projects Liaison Office (RPLO) that tracks these projects and reports their status to the EGEE Activity Managers' Board (AMB). NA5 will staff and coordinate the RPLO in collaboration with the Project Office (NA1), dealing with policy and collaboration-related matters that arise in our interaction with the Related Projects. Table 12: EGEE Collaborating Projects (See section 3.1) lists projects and initiatives related to EGEE that will be active in EGEE-III.

TNA5.2 will also contribute to major conferences and events such as Supercomputing in the US (SC) and the International Supercomputing Conference (ISC) in Europe. It will staff the EGEE teams and booths in cooperation with NA2, so that EGEE is represented in important international events of

related communities (supercomputing, networking and business). Finally, EGEE will participate and support eConcertation activities, bringing Grid and networking projects and communities together. The effort required for this task is 26 PMs, and will be distributed as follows: UPV (2 PMs), DKRZ (2 PMs), GRNET (4 PMs), CERN (12 PMs), and JKU (6 PMs of purely unfunded effort).

- TNA5.3: Monitor EGEE contributions to standardisation activities

EGEE has been contributing to standardisation activities, and several of its members are active in standardisation bodies. NA5 will keep track of all technical activities contributions in an inventory liaising with the AMB, as well as participate in major international events taking place in Europe, America and Asia-Pacific areas, such as Supercomputing in the US.

NA5 will draw up an inventory of standardisation work performed in EGEE-III and make it available via the project's website.

EGEE will also take into account perspectives from outside the project (such as those of the different interoperability projects and those encountered during concertation meetings with Related Projects), in order to obtain a comprehensive picture of the standardisation landscape and the areas in which EGEE is active.

The effort required for this task is 14 PMs, and will be distributed as follows: VUB (4 PMs), GRNET (4 PMs), UPV (2 PMs), INFN (4 PMs).

- TNA5.4: Activity Management and General project tasks

This task relates to all management of the activity, including reporting, deliverables and milestones, quality assurance, etc. The task will also cover maintaining links with the related tasks in the other activities (for instance, the other activities' policy-related tasks referred to in TNA5.1), as well as maintaining close links with the EGI Design Study project. As NA5 represents the project to the outside world in several environments, this task will liaise closely with NA1 to ensure this happens effectively and efficiently. The effort required for this task is 24 PMs, and will be distributed as follows: INFN (6 PMs), GRNET (18 PMs).

### NA5 Deliverables

Deliverable No	Deliverable title	Delivery date	Nature	Dissemination Level	Deliverable description
DNA5.1.1-2	EGEE Annual Report on International Cooperation Activities, Policy and standardisation	11, 23	R	PU	Report on the activities coordinated by NA5 on international cooperation, policy and standardisation. This will include EGEE's contributions to eIRG, OGF and work undertaken by the RPLO.

### NA5 Milestones

Milestone No	Milestone title	Delivery date	Description and means of verification
MNA5.1	Activity Assurance and Quality measurement plan	2	Definition of the activity-internal QA measurements and procedures. This will provide input to DNA1.3.
MNA5.2.1-2	RPLO Website	7, 19	The RPLO website, indicating EGEE's relations with each collaborating project, will be updated based on the concertation results of the EGEE'08 conference (PM6) and EGEE'09 (PM18).

<b>Milestone No</b>	<b>Milestone title</b>	<b>Delivery date</b>	<b>Description and means of verification</b>
MNA5.3.1-2	NGI Workshop on EGEE Sustainability, in cooperation with the EGI Design Project, in the context of the EGEE Conference	7,19	Concertation with the EGI Design Project and the NGIs, ensuring EGEE input to the EGI Design Project
MNA5.4.1-2	EGEE Related Projects Concertation Event, in the context of the EGEE Conference	7,19	Concertation with related projects
MNA5.5.1-2	EGEE standardisation Website	11, 23	The EGEE standardisation website, indicating EGEE's contributions to standardisation efforts will be updated.

### **1.3.6. Activity NA6: Technology Transfer and Outreach to Business**

#### **1.3.6.1. Activity Description**

The Technology Transfer and Outreach to Business activity is the driving force for EGEE-III's engagement with the business community.

Grid middleware is a crucial component of Grid computing. EGEE's gLite is a best of breed middleware, combining components from Condor & Globus Toolkit with advanced features providing better security; improved interfaces for data management and job submission; and re-factored information system.

The EGEE project has developed core middleware functionalities with a range of higher level services. Grid Foundation Middleware comprises all the services needed to be deployed on a production Grid infrastructure, providing a consistent, dependable service. Grid Services comprise higher-level functionalities required by certain users and Virtual Organisations (VOs).

One of the main potential strengths of gLite is the fact that it is designed according to Service Oriented Architecture (SOA) principles, with virtualised resources, making it easy to connect the software with other Grid services which are compliant with the accepted standards for a web service foundation stack.

The potential of Grids for businesses and the limitations of current offerings have been identified by the predecessor project, EGEE-II. NA6 will analyse the challenges and issues faced by grid adopters with the aim of fostering and establishing technology transfer amongst the research, academic and enterprise users. The objectives of this activity are:

- To prepare the long-term uptake of current and future EGEE grid technology by business and facilitate its transfer;
- To foster relations between enterprises and EGEE based on a targeted approach to business;
- To gather user requirements, analyse and provide solutions or recommendations for the issues businesses are facing in Security (privacy), Software licence policy, Accounting/Billing, Service Level Agreement, etc.;
- To deploy prototype solutions on the t-infrastructure testbed operated by NA3, based on the mainstream EGEE/gLite infrastructure demonstrating selected business-driven Grid Services derived from business requirements;
- To contribute to standardisation in Grids by promoting EGEE results, as perceived from a business angle;
- To liaise with collaborating projects for dissemination and technical aspects related to business.

The activity will leverage the extensive set of business contacts and engagement models developed in the predecessor project, EGEE-II, notably the Business Task Force (formerly known as Industry Task Force), the Business Forum (formerly known as Industry Forum), Business Days and EGEE Business Associates (EBA) programme. Included within these Business Platforms will be the continuation of current involvement with specific verticals markets such as Finance (e.g. Monte dei Paschi Bank), Pharmaceuticals and Bioinformatics (e.g. WISDOM project), Aerospace and Automotive (e.g. SIEMENS), Digital Media (e.g. Darkworks) and Telecommunications (e.g. ETSI Grid Technical Committee) and Energy (e.g. TOTAL UK, CGG Veritas)

The proposed work regarding these programmes is described further in the tasks below.



### 1.3.6.2. Task Description

#### 1.3.6.2.1. TNA6.1 Technology Transfer and potential commercial exploitation

A Stage 2 Technology Market Evaluation for EGEE conducted by the PPARC Innovation Advisory Service in September 2006 showed gLite is the main commercially valuable asset of EGEE. The survey also identified a number of problems facing early adopters of Grid. One of them was a lack of the technical skills required for deployment of Grid technology.

Consequently, this task will prepare key EGEE products to facilitate their technology transfer to business and potentially develop them into commercial products and services. The main EGEE products of interest are gLite and the services for Grid deployment. This task will also coordinate relations with partners (IT companies and end-users) willing to use EGEE technology (see below).

This requires an overall plan (DNA6.1) to define a targeted approach to business and will include the strategy preparing the transfer of EGEE technology as well as preparing the commercial exploitation plan of EGEE technology. Dedicated resources are assigned to involve external experts in developing this plan. The plan and results will be updated in DNA6.2.

The first steps towards the commercial exploitation plan will be:

- Surveying the market of Grid middleware sold/used in business contexts;
- Analysing the business models behind surveyed ISV's/solutions;
- Making a comparative analysis with gLite (a Strengths /Weaknesses /Opportunities/ Threats analysis).

This will allow us to correctly position EGEE products on the market.

EGEE already supports several successful business applications, from a seismic processing solution to applications from SMEs in biotechnology and the plastic industry. EGEE-III will expand on this set of applications in the sectors represented in the Business Forum and those identified in the analysis performed for deliverable DNA6.1. Representatives of business applications from the Business Task Force will interact with the technical boards and activities of the EGEE-III project on an equal footing with representatives from scientific applications. The Business Task Force is led by partner CS SI and includes business partners, ElsagDatamat and Trust-IT, active in the NA6 activity.

This task will also manage the **EGEE Business Associates programme (EBA)** and relations with its members. EBA is a mechanism whereby businesses, who are not partners of the EGEE consortium, can engage in work of joint interest to themselves and the project. Potential EGEE Business Associates are companies that are prepared to commit resources in engaging with EGEE on collaborative work in any number of areas, from technical developments to joint promotion and dissemination. Current EBA's that have expressed their desire to continue to work with EGEE in EGEE-III include **GridwiseTech, NICE and Platform Computing**:

- **GridwiseTech** is a Grid consulting firm, providing portals to the EGEE infrastructure that integrates EGEE products with the IT infrastructure of major enterprises. They work with the project on joint dissemination to the commercial sector to increase uptake of EGEE technologies.
- **NICE** is working with EGEE to ensure that its GENIUS Grid portal and EnginFrame Framework products are compatible with EGEE's gLite middleware.
- **Platform Computing**, a leading systems infrastructure software company, is notable in the Grid field for its LSF Family software. EGEE and Platform are working on the interface between gLite middleware and LSF so that resources connected through the LSF local resources management system can be better exploited on the Grid.

EGEE-III will actively expand on the EBA programme by introducing new companies. Negotiations are underway with two candidates from the finance and systems integration sectors. Relations with EBA will be managed in close relationship with NA1 formalised in Memoranda of Understanding (MoU).

### **1.3.6.2.2. TNA6.2 Dissemination and outreach to communities**

Companies, especially SMEs, have much to gain from adopting EGEE's middleware, gLite, particularly in light of emerging standards and the future potential of Open Source. In dealing with the business area it is important to always bear in mind specific objectives, to acquire pertinent and key contacts, and to disseminate relevant information on key EGEE developments and achievements. This task is designed to facilitate these aspects to promote the uptake of EGEE's infrastructure and gLite middleware to new business communities. This business-oriented activity, through the demonstration and usage of the t-infrastructure operated by NA3, will focus on:

- Comparison of gLite with commercialised Grid middleware solutions already available on the market in order for it to be considered for industrial purposes;
- Marketing gLite commercially through publications and focused presentations;
- Organisation of Business Days events and Business Tracks at EGEE annual conferences;
- Produce dynamic material such as a gLite "lightweight" demo and high-gloss brochure, etc.
- Work through Focus Groups of the Business Forum Steering Committee (see below);
- Disseminate results from other projects of industrial interest where gLite is used.

#### **EGEE Business Forum**

The Business Forum is a continuation from the "Industry Forum" in the predecessor project EGEE-II which consisted of 120 members. This body is used as a dissemination tool that serves as the first contact between EGEE and Business. This body has proved to be effective in maintaining a consistent dialogue between current and potential Grid adopters, and has set up Focus Groups on SMEs and Start-ups, business Requirements for Grid Standardisation and Support for the Commercial Adoption of gLite.

One of the main tasks of the Business Forum is to organise Business Days as discussed below. These are organised by commercial partners within NA6. Specific resources have been set aside for their organisation. NA6 will have control of the location of each Business Day in order to effectively target a specific vertical market.

The Business Forum will increase its membership in order to:

- Bring in experts to aid in understanding market openings, benefits and top-level challenges, and the means to overcome obstacles through case studies and pro-active discussions;
- Offer a platform for those interested in Grid and Business to learn more about EGEE's Programme for Business;
- Produce the Business Forum Quarterly Newsletter;
- Organised events like Business Days and dedicated Business Tracks at EGEE annual conferences;
- Offer an opportunity to engage with a large community of business experts;

#### **Business Days**

Business Days bring together business players and decision-makers to learn how businesses can use Grid technologies and EGEE expertise and products. These events will highlight where Grid computing can create new solutions and how businesses can benefit from the sophisticated computing resources of the Grid that are currently not available in traditional IT infrastructures. Business communities will be identified prior to Business Days with the aim of promoting gLite, resulting in pilot usage. Each of the 4 proposed Business Days will cover specific verticals markets (Pharma/Bioinformatics, Telecommunications, Digital Media/Energy and Automotive and Aerospace) leveraging contacts established through events of the predecessor project, EGEE-II.

Business Day events will be organised in 'hot point' cities, with a targeted audience, familiar or not with the application area, each being identified through the Commercial Exploitation Plan (DNA6.1). To ensure Business Days are results-oriented events, both speakers and participants selected to attend targeted events will be chosen from strict guidelines and pre-market research as defined in the Commercial Exploitation Plan.

#### **On-Site Visits**

The NA6 team will organise site-visits where face-to-face meetings will be set up to specifically target enterprises. These site-visits will be selected from the user communities that have shown an interest in Grids from Business Days, Conferences and especially those already understood from the Commercial Exploitation Plan. Such on-site visits will allow EGEE to work on a one-on-one basis and specifically target the needs of each company in order to effectively ensure the up-take of EGEE in Business.

### **Multipliers**

In order to ensure that targeted messages, announcements, invitations to events, press releases and project results, etc. are heard by a large audience, NA6 plans to build on its current network of *multipliers* that allows the project to effectively promote EGEE Grid technology. A *multiplier* is a government body or private organisation which is able to pass on produced material or information to a large audience or contact database. In particular, business *multipliers* will be selected according to their ability to identify potential new customers such as Technology Transfer Offices, Chambers of Commerce, European Business and Industrial Associations, SME support organisations (i.e. UEAPME - [www.ueapme.com](http://www.ueapme.com)), etc.

### **Results**

It is essential to an activity and project that a specific set of objectives and a focused strategy is outlined to ensure results are achieved. In order to meet this goal, NA6 has put in place a series of reports that will allow to constantly evaluate its progress and adapt itself to the changes in market and technology developments. Starting with the Commercial Exploitation Plan outlined in DNA6.1, this report will be followed up with two reports (DNA6.2.1-2) compiled on an annual basis that outline all dissemination actions taken in order to motivate the uptake of EGEE technology by Business. It serves to state results achieved, lessons learned and define actions for the future. The last edition (DNA6.2.2) will mark the overall effectiveness of the activity and final results achieved to lay out the potential future for Grid and Business.

#### **1.3.6.2.3. TNA6.3 Support and prototyping activities**

This task relates to the support of business users, and to the analysis and implementation of some missing functionality/services required by real business user that are not satisfied in the available gLite middleware. This work will also be brought to the attention of standardisation bodies in support of EGEE-III mainstream standardisation activities.

Business user requirements will be gathered from members of the various business bodies organised by NA6, mainly the Business Task Force, as well as derived from the technical analysis of different business-oriented Grid solutions enveloped in the planning deliverable DNA6.1 (see also MNA6.2).

The focus in gathering such requirements will be on the following issues:

- Security/privacy;
- Software license policy;
- Accounting/Billing;
- Service Level Agreement;
- Application Grid-enabling tools;
- Enabling platforms.

Their analysis as well as the status of their implementation will be reported in MNA6.3.

It is expected the analysis will lead to the identification of a number of Business-driven higher-level services that can be deployed with gLite. An implementation roadmap will be established (DNA6.3), according to actual gLite availability and requirement priorities. This will be done in close collaboration with the Technical Management Board (TMB). A maximum of three Business-driven Grid Services will be prototyped. These prototypes will be deployed on the t-infrastructure testbed operated by NA3. NA6 partners will be in charge of deploying the Business-driven Grid Services plugged into gLite and allow business users to test them.

Together with considering new services, the porting of a reduced set of gLite functionalities on platforms other than Linux (and that would be attractive/useful for business and industrial users, e.g.

Windows) will be analysed as an option for NA6 prototyping activities. The results of this work will be presented in DNA6.4.

As part of this task, NA6 will also provide support in terms of:

- Business Users follow up - first line support to business users willing to use EGEE technology, including the support of setting up their applications.
- Collaboration with the NA4 VO managers group for supporting a Business VO through which business applications could be deployed on the production infrastructure operated by activity SA1. The Business-driven higher-level grid services prototyped by NA6 would be candidates for inclusion in the RESPECT programme (described under activity NA4).

The NA6 team will be flexible and capable of supporting a wide range of disciplines. The partners have experience with running applications on the grid. They will interact closely with the core middleware developers and with the application services developers to stay abreast of the current capabilities of the middleware, current problems, and which third-party services work well on top of the EGEE software stack.

Reports on effectiveness of this work will be given in MNA6.5.

This task will also foster emerging business-driven potential standards in collaboration with bodies such as OGF, ETSI, W3G, OASIS and DTMF when and where applicable (see MNA6.4). It plans to strengthen contribution to standardisation in Grids in support of EGEE-III mainstream standardisation activities.

#### **1.3.6.2.4. TNA6.4 Activity Coordination**

As described above the technical work of the activity is composed of 3 main tasks:

- A task dedicated to the analysis of the market focused to the preparation and the consolidation of a business plan for EGEE-III products, and this keeping a close contact with the business actors who wish to use/improve/be involved with those products (mainly the gLite middleware). They are represented by the Business Task Force members and the EGEE Business Associates.
- A task targeted at reaching the external communities at the widest extent possible, having as main instrument the Business Forum and related Business Days.
- A task focused on technical issues closely related to business-derived needs, and implementing some prototype solutions on top of the EGEE-III gLite middleware to satisfy some of those needs, and bringing at the same time such results to the attention of standardisation bodies.

The activity coordination will deal with both internal and external aspects.

The internal coordination will include:

- taking care of internal activity meetings, internal web site and workshops;
- ensuring deliverable deadlines and milestones targets are met following quality assurance and measurement plans (e.g. size of Business Forum membership, number of business applications deployed on EGEE infrastructures, number of Grid services implemented and deployed, level of involvement in standardisation bodies, etc. see MNA6.1);
- formal review of deliverables;
- cross-activity meetings, liaison with partners;
- preparation for and attendance at EGEE conferences and EC project reviews;
- contributing to EGEE-wide publications and other dissemination activities;
- preparation for and participation to training events

The external coordination will be focused on making EGEE-III collaborate with projects that have a strong enterprise community such as the SSA Challengers project, and the NESSI European Technology Platform and the newly formed NEXOF (the NESSI Open Framework, Open Reference Model, Architecture & Implementation). This collaboration will develop contacts and synergies.

### 1.3.6.3. Management of the activity

ElsagDatamat will be the lead partner responsible for NA6.

CS SI and TRUST-IT representatives will contribute to liaising with the other activities, with collaborating projects and in managing the quality of NA6 deliverables.

NA6 will work in close collaboration with other activities, including:

- NA1 and NA2 for the organisation of the Business Track at EGEE conferences and industrial presence at User Forums, similar events and overall dissemination and business contacts management;
- Collaboration with the NA4 VO managers group for supporting Business VO;
- Establishing direct channel follow-up with NA3 as NA6 will use the NA3 t-infrastructure for business-driven Grid Services deployment;
- Work in close relationship with JRA1 with regards to NA6 service prototyping activities;
- Participation to the Technical Management Board (TMB) to place business requirements on equal footing with scientific applications;
- Participation to the Quality Assurance Group (QAG) in particular to define NA6 metrics.

In addition to the personnel required to run the activity, the NA6 activity has foreseen a budget of 40'000€ to cover the attendance of key business representatives to business days and major EGEE events.

### 1.3.6.4. Activity Summary and manpower

<b>Activity Number</b>	NA6		<b>Start date or starting event:</b>				01.04.2008	
<b>Activity title</b>	Technology Transfer and Outreach to Business							
<b>Activity Type</b>	COORD							
<b>Participant number</b>	22	31	35	36	37	38	43	
<b>Participant short name</b>	TUM	CRSA	CS SI	CGGV	INFN	ED	TRUST IT	
Person-months per participant	16	10	26	6	3	48	29	
<b>Participant number</b>	XX							
<b>Participant short name</b>	TID							
Person-months per participant	6							

#### Objectives

The NA6 activity is designed to:

- Prepare the long-term take-up of EGEE and future solutions by business and facilitate the transfer of EGEE technology;
- Foster relations between enterprise and EGEE based on a targeted approach to business;
- Gather user requirements, analyse and provide solutions or recommendations for issues businesses are facing in Security (privacy), Software licence policy, Accounting/Billing, Service Level Agreement, etc.;
- Deploy prototype solutions on the t-infrastructure testbed (operated by NA3) based on the mainstream EGEE/gLite infrastructure demonstrating selected business-driven Grid Services derived from business requirements;
- Liaise with collaborating projects both for dissemination and technical aspects related to business;
- Contribute to standardisation in Grids by promoting EGEE results, as perceived from a business angle

#### Description of work and role of partners

- TNA6.1: Technology Transfer and potential commercial exploitation  
This task will prepare key EGEE products to facilitate the technology transfer to business and

potentially develop them into commercial products and services, mainly gLite and services on how to deploy Grid. This task will also coordinates relations with partners (IT companies and end-users) willing to use EGEE technology as part of the Business Task Force and EGEE Business Associates programmes.

The effort required for this task is 26 PM, provided by: CS SI 10 PM, leading the task and focusing on potential commercial exploitation plans, leading also the Business Task Force managing the EGEE Business Associates; CRSA 5 PM, to initiate and develop relations with various companies (IT or end-users) and to identify interested communities for technological transfer; TRUST-IT 3PM and ED 4 PM, supporting above activities and the management of the Business Task Force; CGGV 1PM, to support business analysis; TID 3PM for contribution to the definition of the exploitation plan.

- TNA6.2: Dissemination and outreach to communities

This task handles the dissemination of gLite to new business communities in a structured manner and identifying business communities by mean of the Business Forum programme, organising structured events to promote gLite (Business Days, Business Tracks, On-Site visits).

The effort required for this task is 47 PM, provided by: TRUST-IT 22 PM, leading the task, managing the Business Forum and organising Business Days, enterprise visits, dissemination material in conjunction with NA2; ED 6 PM, supporting TRUST-IT and organising regional enterprise visits; CRSA and CS SI 5 PM each, to follow up multipliers networking and regional Business Days as well as visiting regional enterprises; INFN 3 PM, to promote gLite in selected regional businesses especially concerned with accounting issues; CGGV 3 PM, to help improving market perception of Grid usage; ; TID 3PM Dissemination to the Telco market.

- TNA6.3: Support and prototyping activities

This task relates to the support of business users and to the analysis and implementation of some missing functionality/services according to real business user needs that are not satisfied by the available gLite middleware. This work will also be brought to the attention of standardisation bodies in support of EGEE-III mainstream standardisation activities.

The effort required for this task is 59 PM, provided by: ED 30 PM, leading the task and driving the business requirements analysis and the roadmap for business-driven services implementation; CS SI 9 PM, supporting ED on business requirements analysis and driving the Business Users support; TUM 16 PM, to implement services related to Service Level Agreement management for gLite; TRUST-IT 2 PM, to liaise towards standardisation bodies; CGGV 2 PM, to support business requirements analysis and business-driven services deployment.

- TNA6.4: Activity Coordination

This task covers NA6 activity coordination, liaison with other EGEE-III activities, collaborating projects and management of NA6 deliverables quality.

The effort required for this task is 12 PM, provided by: ED 8 PM, leading the activity and liaising with other EGEE-III activities; TRUST-IT 2 PM, focussing on external projects liaison; CS SI 2 PM, for quality assurance.

**NA6 Deliverables**

Deliverable No	Deliverable title	Delivery date	Nature	Dissemination Level	Deliverable description
DNA6.1	EGEE Commercial exploitation plan	3	R	RE	This deliverable is an overall plan to define a targeted approach to business and will include the strategy preparing the transfer of EGEE technology as well as plan preparing commercial exploitation of EGEE

Deliverable No	Deliverable title	Delivery date	Nature	Dissemination Level	Deliverable description
					technology.
DNA6.3	Roadmap implementation for of business-driven services	7	R	PU	According to the analysis of business requirements, a roadmap toward the implementation of those requirements is provided, including priorities, effort estimation and timelines.
DNA6.2.1-2	Annual report on dissemination and Business uptake results	11,22	R	RE	These reports will outline all dissemination actions taken in order to motivate the uptake of EGEE technology by Business. It will serve to state results achieved, lessons learned and define actions for the future (DNA6.2.1). These reports will also document each of the organized Business Days as well as the results and follow up actions of each of the one-to-one enterprise site visits. DNA6.2.1 will be used as a revision of the Commercial Exploitation Plan for internal use as well as to provide potentially useful information to other networking activities within the EGEE-III project, through the definition of dissemination goals and description of ways on how to achieve them. It will also serve as central point of information for case studies, trends and essential input to the development and adaptation of the EGEE infrastructure to meet Business requirements. The last edition (DNA6.2.2) will mark the overall effectiveness of the activity and final results achieved to lay out the potential future for Grid and Business.
DNA6.4.1-2	Report on business-driven services implemented: Software/Infrastructure	11,22	R	PU	This is a report on the implementation and integration in the gLite official release of business-driven services, to be issued in two versions, after first year and at the end of the project.

### NA6 Milestones

<b>Milestone No</b>	<b>Milestone title</b>	<b>Delivery date</b>	<b>Description and means of verification</b>
MNA6.1	Activity Quality Assurance and measurement plan	2	Definition of the activity-internal QA measurements and procedures. This will provide input to DNA1.3.
MNA6.2.1-2	Survey on the Grid middleware	3,22	Results of survey the market of Grid middleware that are sold/used in business contexts
MNA6.3.1-2	Requirements analysis report	5,18	Status of business-oriented requirements analysis also in relation with the business-driven services implementation roadmap (M5) and status of implementation and integration (M18)
MNA6.4.1-2	Report on effectiveness of standardisation effort	11,22	These reports will serve to gauge the progress made, define the current status and lay out the necessary future actions in regards to the NA6 aim to foster emerging business-driven potential standards and work towards selected standardisation groups. It will serve as a collating document for all material produced such as the "Market of Grid middleware sold/used in business contexts Survey", "Business models behind ISV solutions analysis" and "Comparative SWOT analysis of gLite". It will provide essential information to not only NA6 activity members but to all activities involved in the development of gLite and guide management and dissemination activities to meet the needs of the market and conform to defined standards.
MNA6.5.1-2	Report on user support and services	11,22	Report on the effectiveness of support to Business user and recommendations for the future.

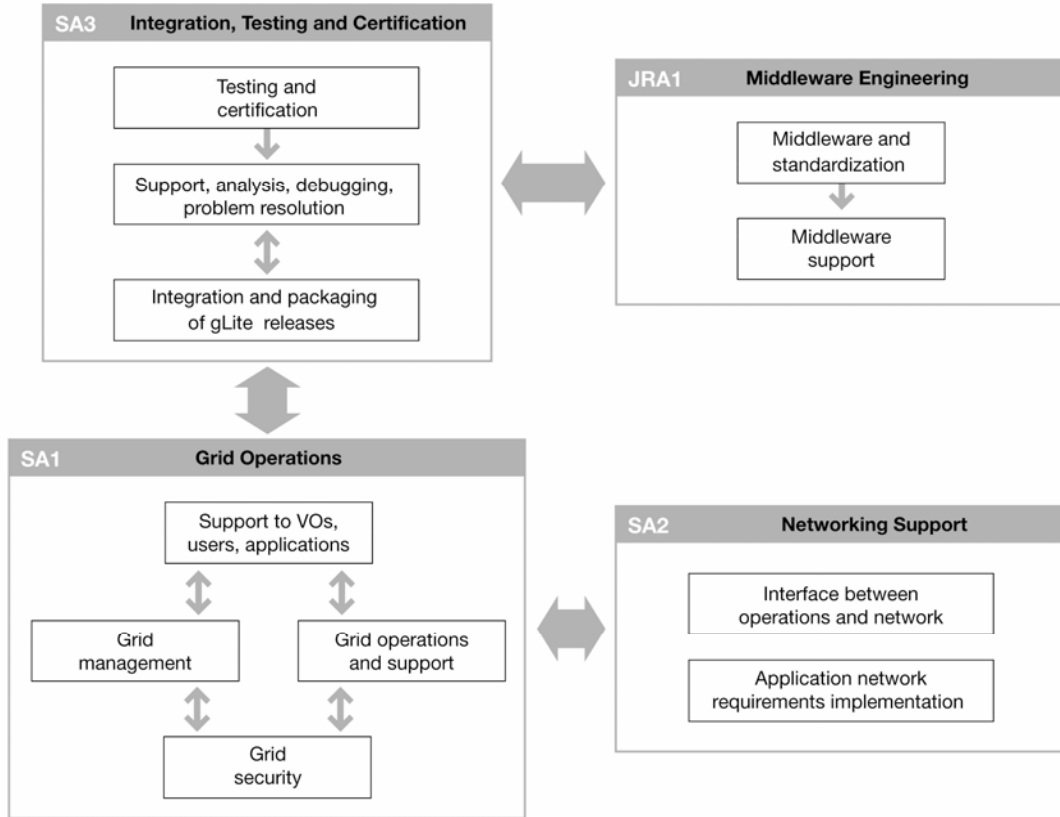


#### **1.4 Service Activities and associated work plan**

The Service activities in EGEE-III build upon the experience gained and the infrastructure deployed in the predecessor projects EGEE and EGEE-II. This infrastructure is a leading global Grid, in terms both of the scale of resources provided and the number of user communities supported.

The service activities within EGEE-III are aimed at ensuring that the Grid infrastructure delivers a service that focuses on enabling and supporting science in diverse research communities while taking appropriate steps towards a sustainable infrastructure in Europe. This will be achieved through provision of a production infrastructure (SA1), provision of networking support coordination with GEANT and NRENs (SA2), and provision of a middleware distribution to the production infrastructure as well as to related efforts worldwide (SA3). The EGEE middleware distribution (gLite) combines components from different providers, most importantly the EGEE middleware engineering activity JRA1, but also the Virtual Data Toolkit (VDT) distribution of OSG, application projects such as LCG etc. The components are chosen to satisfy the requirements of the EGEE user communities and operations. Interoperability is one of the drivers of the gLite distribution as allowing access to a diverse set of research infrastructures is a major goal of EGEE-III. These infrastructures comprise in particular related efforts such as SEE-Grid, BalticGrid, NorduGrid, and DEISA in Europe, OSG and TeraGrid in the US, NAREGI in Japan. Close collaboration with OMII-Europe will ensure the inclusion of interoperable, standards-compliant components into the gLite distribution.

The service activities are closely related and work with the Technical Management Board to ensure the middleware and services deployed and operated by SA1 are as robust, effective, and reliable as possible. SA3 provides essential second level support for the deployed services (on the production or pre-production systems), acting as triage for third level support by the middleware developers or external projects. The SA1 and SA3 activities cleanly separate the problems associated with middleware development and integration from the issues associated with deploying and maintaining a production-quality service. SA2 fulfils the role of interface between the EGEE infrastructure and the NRENs and GEANT2. The interactions and interdependencies between the Service and JRA activities are detailed in Figure 6.



**Figure 6: PERT Chart of the Service activities**

Based on the existing EGEE-II procedures, EGEE-III will provide the following infrastructures in order to carry out its mission:

- A Production Service infrastructure, with incremental growth anticipated within the existing structure, and expanded through collaborating infrastructure projects listed in Table 12 in section 3. Interoperability with other Grid infrastructures will evolve at all levels from campus to international.
- A Pre-Production Service (PPS) will demonstrate new services, or new versions of existing services before they move to production. This will provide an environment for applications to test new services and to integrate their software with grid services. The PPS has also shown itself to be invaluable for deployment testing in the Regional Operations Centres (ROC) before full distribution of new or updated services.

This is complemented by the training infrastructure and the certification test-beds as well as the needed support structures and policy groups as shown in Table 6 which also lists the responsible activity. Table 7 shows the GANTT chart of the service activities.

**Table 6: The EGEE Infrastructure**

<b>EGEE Infrastructure</b>	
<b><u>Test-beds &amp; Services</u></b>	<ul style="list-style-type: none"> <li>• Certification test-beds (SA3)</li> <li>• Pre-production service</li> <li>• Production service</li> </ul>
<b><u>Support Structures</u></b>	<ul style="list-style-type: none"> <li>• Operations Coordination</li> </ul>

	<ul style="list-style-type: none"> <li>• Regional Operations Centres</li> <li>• Global Grid User Support</li> <li>• Operational Security Coordination</li> <li>• Certification &amp; Testing (with SA3)</li> <li>• Middleware distribution release management (SA3)</li> <li>• Grid Security Vulnerability Group</li> <li>• EGEE Network Operations Centre (SA2)</li> <li>• Training activities (with NA3)</li> </ul>
<b><u>Policy Groups</u></b>	<ul style="list-style-type: none"> <li>• Joint Security Policy Group</li> <li>• EUGridPMA (and IGTF), local CA management</li> <li>• Resource Access Group (with NA4)</li> </ul>

The following main risks have been identified for the service activities in EGEE-III:

<b>Risk</b>	<b>Impact</b>	<b>Occurrence Probability</b>	<b>Mitigation</b>
Resource congestion due to LHC start-up	EGEE-III will see the start-up of LHC and the associated data transfer and analysis activities are likely to saturate the resources owned by the LHC experiments. As a consequence, other applications that were using these resources on a best effort basis might not be able to do so on the required scale.	High	This will be mitigated by encouraging existing and new communities to connect their resources to the EGEE infrastructure and by taking the predicted LHC resource usage into account in the EGEE-III resource availability planning.
Inadequate support for third components	gLite depends on various third party components. These components need to evolve to match the gLite objectives. Inadequate support for third party components will result in delays or reduced quality of service in gLite.	High	Support arrangements will be negotiated with third party providers and where possible, components which have more than one provider will be chosen.
Grid Operations remains a labour-intensive task	EGEE-III plans to reduce the effort required to operate the EGEE infrastructure by increased automation which in turn relies on better service manageability and support from the middleware providers. There is a risk that the required middleware properties will not be available. Thus automation efforts would only have a modest impact	Medium	This risk is mitigated by driving the middleware engineering as well as component selection based on application and operations requirements. This will ensure the operation requirements are taken into account in the planned work. In addition, monitoring and operational tools will continue to be enhanced.

<b>Risk</b>	<b>Impact</b>	<b>Occurrence Probability</b>	<b>Mitigation</b>
	and also impede the planned migration to a sustainable infrastructure.		
Malicious attacks on the Grid infrastructure or its supporting tools.	The EGEE Grid infrastructure might be exposed to malicious attacks which might result in partial or complete unavailability of the service. Similarly, the supporting infrastructure, like code repositories, build infrastructure etc. might be exposed to similar attacks resulting in unavailability of these services.	Medium	This will be mitigated by continuous investments in service fall-over strategies as well as improved security precautions, including security training for sites participating in EGEE. The associated communication strategy has been described in the risk analysis of Section 1.3 above. Further, the Grid Security Vulnerability Group will identify and react rapidly to potential security risks.
Un-announced network unavailability	The EGEE-III infrastructure operates on top of the NREN/GEANT provided network. There is a risk that parts of the network become unavailable without prior notice to EGEE-III.	Low	This risk will be mitigated by extending the coverage of the ENOC and the provision of network monitoring and troubleshooting tools according to EGEE-III applications and operations requirements in close collaboration with GEANT and the NRENs.

**Table 7: GANTT Chart of the Service Activities**

		WORKPLAN																							
Month		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
<b>SA1</b>	<b>Grid Operations</b>																								
TSA1.1	Grid management			MSA15			MSA17					DSA12.1	MSA18		DSA13		DSA14		DSA15					DSA12.2	
TSA1.2	Grid operations and support	MSA11 MSA12					MSA17						MSA18		DSA13				DSA15						
TSA1.3	Support to Vos, users, applications		DSA1.1		MSA16														DSA15						
TSA1.4	Grid security		MSA14											MSA19			MSA10		DSA15		MSA11				
TSA1.5	Activity management		MSA13	DNA1.11			DNA1.12			DNA1.13			DNA6.11			DNA1.14			DNA1.15			DNA1.16			DNA1.6.2
<b>SA2</b>	<b>Networking Support</b>																								
TSA2.1	ENOC running												DSA2.1											DSA2.2	
TSA2.2	Support for the ENOC					MSA2.3.1												MSA2.3.2							
TSA2.3	Overall networking coordination		MSA2.2.1								MSA2.2.2				MSA2.4	MSA2.2.3				MSA2.5			MSA2.2.4		
TSA2.4	Activity management		MSA2.1	DNA1.11			DNA1.12			DNA1.13			DNA6.11			DNA1.14			DNA1.15			DNA1.16			DNA1.6.2
<b>SA3</b>	<b>Integration, Testing &amp; Certification</b>																								
TSA3.1	Integration and packaging				MSA3.4.1		MSA3.5.1 MSA3.6						DSA3.1.1						MSA3.5.2		MSA3.4.2		DSA3.1.2		
TSA3.2	Testing and certification				MSA3.4.1								DSA3.1.1										DSA3.1.2		
TSA3.3	Debugging, analysis, support																								
TSA3.4	Interoperability and platform support			MSA3.2	MSA3.3		MSA3.5.1 MSA3.6								DSA3.2				MSA3.5.2		MSA3.4.2				
TSA3.5	Activity management		MSA3.1	DNA1.11	MSA3.3 MSA3.4.1		DNA1.12 MSA3.5.1 MSA3.6	MSA3.7		DNA1.13			DNA6.11			DNA1.14			DNA1.15 MSA3.5.2		MSA3.4.2	DNA1.16			DNA1.6.2

## 1.4.1. Activity SA1: Grid Operations

### 1.4.1.1. Activity Description

The Operations activities in EGEE-III will be firmly based on the work done in EGEE and EGEE-II, with some adjustments to improve the overall responsiveness and to address problem areas. However, no major changes in the infrastructure or basic mechanisms are anticipated.

In the EGEE-III project lifetime it will be important to set the groundwork for an eventual migration to the EGI/NGI model, which is today understood to be based on coordination at the European level of National Grid Infrastructures. This transition clearly cannot happen in one go, and the migration will need to be carefully planned and understood. It is important, therefore, that EGEE-III plans and tests possible transitional organisational structures. Here we list the organisational components that we either understand as necessary in EGEE-III or that seem to be necessary in a transition.

- **Operations Coordination.** The Operations Coordination Centre (OCC) at CERN will remain in basically the same form as in EGEE-II. The existing roles and functions will continue to be necessary.

- **Operations Centres.** The concept of the Regional Operations Centres (ROCs) has been shown to work well during the first 2 phases of EGEE. In particular, the “Operator on Duty” rotation is an essential part of the core Grid operation. This structure will be retained intact in EGEE-III. During EGEE-III we will plan a transition to an operational model based on National Grid Infrastructures. This will require also striving to reduce the effort required in daily operations activities, hence in EGEE-III there will be a strong focus on automating the tools and processes needed to achieve that. The operations activity will put strong requirements on the service management aspects of the middleware to ensure that services are as reliable and as straightforward to manage as possible.

Experience has shown that a regional operations centre should manage at least 10 sites. For less than this it is difficult to justify the setting up of the organisation and the incremental staffing required. During EGEE-III the emphasis must be on how the ROCs can manage (or coordinate) more sites with a given level of effort, with a strong emphasis on the tools available to do this.

The existing ROCs will be retained with one in each of the Federations, with the exception that the new Nordic and Benelux federations will continue to collaborate in providing a single ROC covering the Nordic and Benelux regions. Thus, although there are now 12 Federations proposed for EGEE-III, there will be 11 ROCs as in EGEE-II.

- **Security.** There are a set of existing security and policy groups that exist that will be maintained and evolved. These are: i) Joint Security Policy Group; ii) Operational Security Coordination Team; iii) Grid Security Vulnerability Group; iv) EuGridPMA/IGTF work.

In addition, it is anticipated that basic site auditing to verify security best practices, use of appropriate and adequate intrusion monitoring tools, etc. will be a task of the security groups. Overall security coordination is through the Security Coordination Group, SCG, as described further in section 2.1).

- **Support activities.** The scope of this is clear from EGEE/EGEE-II and these activities will be retained and strengthened. Much of the problems seen in support arise from a lack of experienced or trained support staff. This is a vital area to strengthen. The activities include:

- Operations support – based on the GGUS infrastructure. This will be focused by regular meetings of a user-driven advisory group and workshops to ensure that the needs of users are understood and responded to.
- User Support (helpdesk/call centre) – each ROC will provide user support effort. In addition it is important that teams in the VOs or major applications provide the front-line for their communities. This will be complimented by effort in NA4 (Task TNA4.1).
- VO Support: teams within the applications communities providing advice and help, acting as front-line user support.

- Application integration teams. These teams will be located together supporting application communities or groups of communities. These SA1 teams will collaborate and share experiences with the application support teams in NA4.
- **ENOC** – network operational coordination between the Grid and the GEANT2/NRENs. It is important that this be fully operational and functional. This is the responsibility of SA2.

The services and test-beds are supported through a full set of procedures and support organisations that have evolved and matured during EGEE and EGEE-II. These include:

- Operational support mechanisms, managed through the Operations Coordination Centre (OCC) -ROC hierarchy;
- User support mechanisms, also managed through the OCC-ROCs;
- Coordination with network support through the EGEE Network Operations Centre (ENOC, in SA2);
- Grid Security at both the operational and policy levels;
- Oversight and coordination of allocation of resources through a Resource Allocation Group (see below).

**Resource Commitments – to be moved to section 2.4**

Each Federation will commit resources to the production and pre-production services with at least the amount shown in Table 1. A certain fraction of resources, indicated in the column labelled “Seed resources” will be made available for new virtual organisations in order to attract them to use the EGEE infrastructure, to demonstrate the benefits and to later encourage them to bring their own resources to the infrastructure. In addition, if funding permits, it is proposed that pools of dedicated seed resources will be operated at a few partner sites.

**Table 8: Resource Commitments**

Region	Country/JRU/Partner	No.Sites	CPU (kSI2k)	Disk (TB)	Seed CPU	Seed Disk (TB)
Federation 1	Country 1					
	Country 2					
Total						

**The Resource Allocation Process**

The process of providing virtual organisations with access to compute and storage resources has several aspects which have evolved through the EGEE and EGEE-II project periods. Several different groups are involved. A Resource Allocation Group will oversee and coordinate this process. This group will be made up of the VO managers, representatives of the ROCs and chaired jointly by SA1 and NA4.

- Many of the regional federations, through the ROCs, provide support for a so-called “catch-all” or regional VO, which are used by new user groups to try out Grid technology and to understand the benefits to themselves, and allows them access to a reasonable set of resources on the real production infrastructure. Such regional VOs are supported and provided resources by many of the sites in the region to enable this.
- All regional federations will support any new VO that has user communities in their region. This does not require negotiation at the project level, and is provided either through the regional VO or by setting up a dedicated VO for this new community.

- All JRU's or partners in SA1 will be required to commit a certain percentage of their resources to be used by new VOs. This can be a small fraction, sufficient to allow the VO to get some real usage experience, and to encourage them to bring their own resources to the project.
- A pool of "seed resources" including storage space will be provided and will be managed by a few SA1 partners. These resources will be used to encourage new communities to join the infrastructure and to contribute their own resources, by demonstrating the value of a Grid infrastructure. This is foreseen at a level of 75'000€, to provide additional manpower to run the services on the seed resources as required by the new VOs.
- The NA4 VO manager's group will be responsible for identifying new VOs eligible for project support.
- The provision of core services for new VOs will be a responsibility assigned to a set of resource centres that contract to provide these services. The Resource Allocation Group will assign new VOs to such partners in a round-robin way, unless there is a clear relationship between the VO and a certain site willing to provide these services. These relationships will be encapsulated in SLAs.
- All VOs will be obliged to provide a complete set of information using the existing "VO ID card" template. This template will be used by tools to generate the required site configurations needed to support the VO, and will be the definitive source of operational data about the VO. Completing fully such a template is a pre-requisite for a VO to be recognized and supported in any way by the project. Of course this does not exclude local VOs that have relationships with sites and do not require project resources or support.
- During the introduction of new VOs, the users will be encouraged to make sure that the need for a new distinct VO is clear and that an existing VO cannot be used.

### **Interoperability & Interoperation**

Interoperability and interoperation (or co-operation) will be important and are likely to become more important in EGEE-III and any transition to an EGI/NGI model. It is vital that EGEE work to ensure continued interoperability of its infrastructure with other international grids. It will also be crucial to EGEE that it is able to exist side-by-side with local/campus, regional, national, grids on the same hardware. The closer together these infrastructures can be, the more likely a site will be integrated into the EGEE infrastructure.

SA1 works together with other projects on the issues related to operations and interoperation. The regular Operations Workshops act as a concertation forum for these issues, as do focussed sessions in the EGEE conferences. The weekly operations meetings have representatives from Open Science Grid specifically to address interoperation problems. Groups in SA1 such as the Joint Security Policy Group are explicitly open to members from other infrastructure projects to ensure that policy is coordinated and shared as much as possible.

EGEE-III has a well developed operational model, which can be the model for many other infrastructures. It is very important for some application communities (e.g. LCG) that common operations exist between several international grids. This covers many aspects – operational security and policies, problem reporting across grids, etc. Several of the related infrastructure projects use the EGEE operational model. As the move towards a long term infrastructure is defined SA1 will continue to work in this broad forum of infrastructure projects to agree common operational policies and procedures.

SWITCH will move the services that it developed within EGEE-II in JRA1 to production mode. They are the short-lived credential service CA and the VASH service which transfers the Shibboleth attributes into VOMS. If desired these services can also be used or adopted by other partners.

### **Service Level Agreements**



In EGEE-III it will be important to fully develop of full set of Service Level Agreements (SLA) at several levels. Mechanisms to monitor and verify these SLAs will be in place and made reliable. Prototypes of such agreements and tools are being developed in EGEE-II with the LCG MoU and the SAM site availability monitoring tools to impose levels of service at sites. Since it is still fairly labour-intensive to maintain a reliable site, we foresee a 2 class set of sites, with some able to support higher levels of service availability, reliability and support that may be required by some applications. A second class of sites would be less reliable but would be acceptable for many applications looking for CPU cycles without strong environmental requirements. These different classes could be assigned different “costs” in the future.

In addition to this view, there is a second important possible distinction between sites, based on the difference between those prepared to offer a higher level of service to a particular VO and those who offer a VO the chance to come in and use resources which are advertised. The service in the first category includes installing and supporting VO-specific software services including VO boxes, catalogues, transfer services etc. Sites may even offer call-out to specific VOs with alarms when their SAM tests fail. The second category is for VOs who are content to bring their own environment with them, install their own software and use only the generic services.

In a future EGI/NGI model, the SLAs would be with NGIs, so the site-related SLAs described here would act as models for SLAs internally within an NGI with its sites. The NGIs in turn would make agreements with the EGI.

The SLAs could also include agreements for support of applications or application communities. These should be negotiated in the resource allocation process. Ultimately the SLA will be between an application community or VO and a site, but will be brokered and monitored by the operations management (OCC and ROCs). It is vital that a full set of tools is available to demonstrate the fulfilment of the SLA.

### **Quality Assurance**

This is an inherent part of the everyday work of the activity, and aspects of Quality Assurance and management are visible in many places. These include:

- Accounting of resources through the accounting portal,
- Site monitoring through the information system, and other tools,
- Service monitoring through tools like the Site Availability Monitoring tool - SAM,
- A wide range of metrics gathered into a metrics summary portal, and used in reporting and as part of assessments of sites and services,
- The introduction of SLAs and the metrics that will be used to monitor them,
- GGUS and feedback from the user community on all aspects of the operation,
- Gathering of feedback in a range of forums – weekly operations meeting, operations workshops, etc.,
- Quarterly and periodic project reports,
- Internal review of deliverables and milestones.

In addition to these technical controls, SA1 instituted a system of partner reviews during EGEE-II in order to judge the performance of the ROCs and their partners. This process will continue during EGEE-III.

#### **1.4.1.2. Task description**

At a high level the task breakdown for Grid Operations is straightforward and covers: Overall organisational management related tasks; Support activities, covering operations, middleware deployment, and user and VO related support; and Grid security activities.

The tasks are carried out by members of the OCC and ROC teams. The amount of effort required in each ROC to fulfil these tasks can depend upon several factors, including the number of countries,

languages, organisational structure of the region, number of partners in the region, and the number of sites supported.

#### 1.4.1.2.1. TSA1.1: Grid Management

This task is the main activity providing the coordination, operation, and management of the EGEE Grid infrastructure. This includes the overall coordination (the Operations Coordination Centre – OCC), the Regional Operations Centres (ROC) in each of the regional federations, and all of the work associated with managing and coordinating the effort in SA1.

This task also includes coordination activities with applications and resource providers, other technical bodies within the project, and collaboration with other projects and interoperability activities.

The main sub-tasks include the following activities:

- a) Overall coordination of the Operations through the Operations Coordination Centre. This is provided through the management teams and processes described below.
- b) ROC Management
- c) Monitoring and enforcement of Service Level Agreements
- d) Application – Resource Provider Coordination. The Resource Allocation Group is co-chaired by NA4 and SA1. The SA1 partner involved is CNRS.
- e) Grid Accounting
- f) Interoperability and collaboration.
- g) Operation of national or regional Certification Authorities and Registration Authorities where required, including overall “catch-all” authorities for EGEE.
- h) Quality assurance

#### **Management teams and Management processes**

**Operations Coordination.** This is through the OCC at CERN. The effort allocated to the OCC includes effort from each federation for general administrative tasks for the activity, and for the overall management of the activity.

Specific technical and managerial coordination groups will include:

- **ROC Managers Group.** The ROC managers group takes responsibility for the operational tools and procedures used in the day-to-day operations of the EGEE Grid. Thus they will be ultimately accountable for the core operations tools (SAM, CIC Portal, GGUS, etc.), the Grid operators (COD) and the procedures used in all aspects of Grid operations. The ROC Managers will meet face-to-face on a frequent basis.

A mandate for this aspect of the responsibilities of the ROC Managers will include:

- Defining an acceptable service availability for the core operations services, with appropriate fail-over mechanisms;
- Agreeing on and prioritising work on the operations tools and services;
- Where necessary set up working groups to address specific issues;
- Gathering feedback from the sites on requirements for tools and on operational issues;
- Reviewing and maintaining the operations procedures.
- **SA1 Technical Team.** This is a team composed of a few (of order 5) expert site representatives (acting as such at their site) from different ROCs, with a commitment of about 20% of their time. The role of the team is to: identify common site issues; manage SA1 technical issues (related to operations, production infrastructure, middleware, etc.) identified through other SA1 areas, and propose solutions and/or escalate to the relevant teams; represent SA1 at the TCG; and attend the operations and ROC managers meetings.
- **Weekly Operations Meeting and Operations Workshops.** The regular weekly operations meeting brings together the site and ROC representatives, and the application groups to address short term operational issues. The meeting is held as a phone conference and timed to simplify participation from the US and Asia as well as Europe. This will continue in EGEE-III. The Operations Workshops are held twice a year and act as i) an all-hands meeting for SA1, and ii) a concertation point with other Grid projects for operations and support issues and processes.
- **Grid Operator on Duty Coordination.** The ROC team in CNRS will continue to take the responsibility for the tools (e.g. operations portal), scheduling of the Grid operator on duty activity.

Regular meetings are held to address issues that arise with the process and tools. In EGEE-III it is proposed to have an advisory function in the SA1 Technical Team (above) to provide guidance on evolution of this activity.

- **Resource Allocation Group.** This group is the joint NA4-SA1 activity that will manage resource allocation for new and existing VOs in EGEE-III. The process is described above.
- **User Support Advisory Group.** Chaired and organised by the OCC, this group will be composed of the VO managers (or their representatives) and representatives from other activities using GGUS. Its role is to advise GGUS on development directions both for the tools and the processes.
- **Operations Automation Team.** This team will be tasked with coordinating monitoring tools and developments, and will have a specific goal of advising on strategic directions to take in terms of automating the operation – replacing manual processes with automated ones in order that the overall level of operations effort can be significantly reduced in any long term infrastructure.
- **Coordination with related infrastructure projects.** This is a function of every ROC, but at the high level it is important that appropriate technical coordination is ensured across all the projects that EGEE works closely with. In EGEE-III this high-level responsibility will be within the OCC.

Estimated Effort: 1344 (placeholder)

- ROCs: 50 FTE/1200 PM,
- OCC: 3 FTE/72 PM,
- 3 FTE/72 PM for participation in project technical bodies
- Total 56 FTE/1344 PM

#### 1.4.1.2.2. TSA1.2: Grid operations and support

This task covers the operation and operational support of the infrastructure. The concept of a Grid operator on duty is maintained from EGEE and EGEE-II, ensuring that all ROCs participate and contribute. The task includes all associated effort related to support for the operation including managing and responding to problems reported either by the Grid operator or by users, running the required Grid services at each site as well as services provided by the ROC, and services required by virtual organisations, such as file catalogues, and other VO-specific services. The task covers this effort for both production and pre-production services.

Coexistence and interoperation with local, national, regional, and international grids is becoming more and more important, and the work to ensure this is included in this task.

Finally, the tools required to support this activity will be continually improved with developments where required. The scope of the monitoring tools covered includes local and remote monitoring of Grid and network services and all monitoring related to improving and maintaining the reliability of a Grid site, but will not cover fabric monitoring developments per se.

The sub-tasks include:

- a) Grid Operator on Duty (Coordination + Regional contributions) – coordinated by CNRS.
- b) Oversight and management of Grid operations
- c) 1st line support for operations problems
- d) Run Grid services for production and pre-production services
- e) Middleware deployment and support

The deployment of middleware distributions produced by SA3 must be coordinated within each region, and one of the important functions of the ROC is to provide that coordination and to act as the first line support for the deployment and installation of the middleware. Problems found within a region should be reported back to the SA3 team, as well as the SA1 management, in order that problems can be resolved and communicated to others. Partly this support is expressed through participation of sites in the region in the pre-production service to ensure that problems can be found before the full deployment is scheduled.

In very rare cases a region may add software to a release, in which case it can foresee some effort for certification of the modified release. However, this effort is really better devoted to participation in

early (pre-production) testing of a middleware release. If regional certification is required, this should really be done as partners in SA3, and not in SA1. We anticipate that the need for regional certification in SA1 should be justified explicitly before effort can be expended.

The sub-tasks are:

- Coordination of middleware deployment and support for problems
- Regional certification of middleware releases if needed (outside of PPS and SA3 involvement). This should be rare and should be justified.
  - f) Interoperations – local, regional, international
  - g) Monitoring tools to support Grid operations (SAM, NPM, etc). In EGEE-II a group was formed to coordinate strategy and implementation of such tools. This will be formalised in EGEE-III where it is important that the goal of automating the operations process as far as possible is given prominence. An Operations Automation Team will be responsible for the overall strategy, and will coordinate tool development. A charter and mandate for this group will be an early milestone.

Estimated Effort: 1706.4 PM (Placeholder)

- ROCs: 62.6 FTE/1502.4 PM
- 7.5 FTE/180 PM for tools,
- 1 FTE/24 PM for interoperations issues
- Total 71.1 FTE/1706.4 PM

#### 1.4.1.2.3. TSA1.3: Support to VOs, Users, Applications

User and application support is an increasingly vital area that requires sufficient effort be devoted. Experience in EGEE and EGEE-II has shown that several aspects need to be covered, and that both regional and collaborative effort is required. In addition, previous experience has shown that the regions with local/regional helpdesks and adequate effort to the overall GGUS activity (by providing TPM effort) have a better reputation for support with their users.

The core of the support effort in SA1 is the GGUS system. This support system is used throughout the project for managing problem reports and tickets, for operations, as well as for user, VO, and application support. The system is interfaced to a variety of other ticketing systems in use in the regions/ROCs in order that tickets reported locally can be passed to GGUS or other areas, and that operational problem tickets can be pushed down into local support infrastructures. In EGEE-II this system has been shown to work quite effectively, especially when real regional helpdesks are in place providing localized support. This includes multi-language support in the helpdesk, document translation, etc. The support system in the project relies upon having sufficient effort available to manage and oversee tickets. For operations support this role is part of the operator-on-duty functions, while for user/application support this effort must be drawn from a variety of teams. Each support area requires staff to oversee the tickets – to ensure that all are assigned, and followed up. This is the responsibility of the Ticket Process Manager (TPM). It is essential that all regions contribute sufficiently to this overall support in the project.

The responsibilities of the support units will be embodied in SLAs between the overall support effort and the support units. This will be part of the overall effort on SLA definitions in SA1. This will also consider issues related to ensuring the reliability of the GGUS tools, for example in the areas of back up and fail over of the service, since it is a vital part of all EGEE operations. The documentation of the system will be maintained.

In addition to these direct support activities the need for support for application integration with Grid middleware is clear. As in EGEE and EGEE-II teams are foreseen to work directly with application communities to provide help for Grid-enabling the application.

Effort for providing training to site administrators in each region has also to be foreseen. It is expected that the training is arranged in collaboration with NA3, but the expertise lies in SA1. In addition SA1 personnel are also often involved in user training activities, although again this will be organized together with NA3.

The task includes the following sub-tasks:

- a) GGUS management and tools.
  - This will be the responsibility of FZK, with direction from the advisory group.
- b) TPM and user support effort
  - This is staffed by effort from each of the Regional Operations Centres as one of their mandatory core tasks.
- c) Support for middleware related issues is the responsibility of JRA1 (Task TJRA1.1) and SA3 (Task TSA3.3).
- d) Dedicated LHC experiment support by the EIS team
- e) Regional helpdesk
- f) SA1 participation in site and user training. SA1 will work together with NA3 on developing material for on-line training for site administrators (ASGC).

Estimated Effort: 834 PM (Placeholder)

- 2 FTE/48 PM at FZK for GGUS tools,
- 32.75 FTE/786 PM for TPM, regional support and user support effort,
- Total 34.75 FTE/834 PM.

#### 1.4.1.2.4. TSA1.4: Grid security

All operational and policy-related security tasks are part of SA1. These include:

- a) A security team responsible for coordinating all aspects of operational security, including responding to security incidents,
- b) A team dealing with security vulnerabilities in the middleware and deployment,
- c) Responsibility for developing and maintaining the Security Policy and procedures jointly with other Grids,
- d) Ensuring the continued existence of a federated identity trust domain, and encouraging the integration of national or community based authentication-authorisation schemes.

#### **Operational Grid Security Coordination Team (OSCT)**

The Operational Security Coordination Team (OSCT) provides pan-regional coordination and support to respond to security threats faced by the Grid infrastructure. The primary OSCT activity is in helping Grid sites manage security risks, from prevention to containment and recovery from possible security incidents. To be effective, the team must be able to react at a Grid-wide level to any security threat, such as unpatched security vulnerabilities in software, targeted attacks, or multi-site security incidents. The OSCT will do this by providing appropriate expertise and managed procedures to co-ordinate the fast response to the threat.

Led by the EGEE Security Officer, the OSCT comprises Security Contacts appointed by each Regional Operations Centre (ROC) supplemented by additional security experts. The OSCT will participate in EGEE-III by contributing to three main activities: (i) handling security incidents by providing appropriate reporting channels, training and support to the sites; (ii) establishing appropriate communications channels to provide the sites with security best practice and relevant operational recommendations; (iii) participating in the development and distribution of security monitoring tools, to enable sites to proactively detect and prevent security incidents.

In order for the OSCT to be effective, it is essential that all the ROCs are involved in and contribute to the day-to-day activities of the team. Therefore, the OSCT Duty Contact role (OSCT-DC) mandates one ROC Security contact to actively track security operations and support issues on a weekly rota basis.

#### **The Grid Security Vulnerability Group (GSVG)**

The purpose of Grid Security Vulnerability Group (GSVG) is to eliminate Grid Security Vulnerabilities from the software and deployment and prevent new ones being introduced. The aim is to provide a high level of confidence in the security of the deployed infrastructure, thus reducing the risk of incidents. The GSVG is coordinated by the UK/I (RAL) ROC and its success depends on the

active participation of numerous security experts in the project with effort drawn from various regions. One aim continues to be "To incrementally make the Grid more secure and thus provide better availability and sustainability of the deployed infrastructure".

The largest activity of the GSVG involves the handling of specific vulnerability issues which may be reported by anyone. This includes carrying out an objective risk assessment on each issue, setting a target date for resolution according to risk, and coordinating the disclosure of information on each issue. This allows the appropriate prioritisation of the resolution of each issue.

The GSVG will work at preventing the introduction of new vulnerabilities; possible methods include improved developer guidelines to encourage the development of secure code.

**Joint Security Policy Group (JSPG)**

The Joint Security Policy Group (JSPG), coordinated by UK/I ROC (RAL), will prepare and maintain security policies and procedures for EGEE, OSG, WLCG and other Grids. All policies will be general and applicable to all Grids belonging to the group. It will also gather security requirements from sites and provide advice to middleware engineering and deployment.

Once JSPG has produced a new policy document, this will be submitted for review by a wide community, including the ROC Managers, OSCT, Site security contacts and the WLCG Grid Deployment Board. The agreed text is then subsequently submitted to the EGEE PEB for formal approval and adoption by the project as official policy.

In EGEE-III, JSPG will encourage participation by other related EU Grid infrastructure projects and National Grids with the view of harmonizing policy across the EU to assist the move towards a single sustainable Grid infrastructure. JSPG policy documents will be contributed to the EU e-Infrastructure Reflection Group to assist policy coordination across an even wider domain and the longer term.

#### **Authentication Coordination (EU Grid PMA)**

A common authentication trust domain is required to persistently identify all Grid participants. To ensure interoperability, both at the European as well as the global scale, the project will participate and support the International Grid Trust Federation (IGTF), and the EUGridPMA in particular, in line with the relevant e-IRG recommendations. Leveraging the previous investments of EGEE in this effort, and building on the successful new initiatives that EGEE-II initiated with respect to the use of national federated identities for the Grid, it is in the interest of the project to ensure that the EUGridPMA can continue to fulfil this role in the identity federation.

This task will: (i) support the continued operation of the EUGridPMA and provide authentication support to SA1 operations; (ii) bring the operational and policy requirements of the EGEE-III to the attention of the PMA; (iii) address issues raised by the PMA to the attention of the appropriate groups in the project; (iv) work with the development and deployment teams to incorporate new authentication technologies.

This task will be coordinated by the NL ROC (NIKHEF), with support from the Security Coordination Group.

Estimated Effort: 282 PM (placeholder)

- 9.25 FTE/222 PM to cover OSCT membership and participation in JSPG, GSVG,
- 1 FTE/24 PM OSCT leadership,
- 0.5 FTE/12 PM GSVG leadership,
- 0.5 FTE/12 PM EUGridPMA participation,
- 0.5 FTE/12 PM JSPG leadership
- Total 11.75 FTE/282 PM.

#### **1.4.1.2.5. TSA1.5: Activity Management**

Since the activity has a significant management component (Task SA1.1) this task deals only with the management of the activity. The SA1 activity itself is managed overall by the activity leader, a deputy, and in conjunction with the ROC managers group who meet bi-weekly to address project and activity management issues. The sub-tasks are:

- Activity management (leader and deputy)

- ROC coordination (ROC coordinator and deputy)
- Coordination with and participation in project technical bodies
- Oversight and management of specific technical tasks within SA1 (e.g. coordination of SLA group, etc.)
  - Federation reviews
  - Metrics and Quality Team. Ensures that the appropriate sets of metrics are gathered within the operation to monitor the quality of all aspects of the operation, for monitoring SLAs, and for reporting purposes. The partner reviews will be organised by this team.
  - Contributions to general project tasks (conference preparation, reviews, etc.)
  - Production, editing, reviews of milestones and deliverables

Estimated Effort: 180 PM (Placeholder)

- Activity Management: 2 FTE/48 PM
- Other tasks: 5.5 FTE/132 PM
- Total: 7.5 FTE/ 180 PM

#### 1.4.1.3. Activity summary and manpower

Activity Number	SA1		Start date or starting event:				01.04.2008	
Activity title	Grid Operations							
Activity Type	SVC							
Participant number	1	2	5	6	7	8	9	
Participant short name	CERN	JKU	KFKI RMKI	ELUB	NIIF	CESNET	UIBK	
Person-months per participant	420	21	21	11	6	58	16	
Participant number	10	11	12	13	14	15	16	
Participant short name	II SAS	JSI	PSNC	ICM UW	CYFRONE T	Srcce	FOM	
Person-months per participant	32	16	28	36.5	87.5	47	90	
Participant number	17	19	23	25	26	27	28	
Participant short name	SARA	RUG	DESY	Fraunhofer	FZK	GSI	ETH Zurich	
Person-months per participant	102	12	60	68	204	60	24	
Participant number	32	33	36	37	42	44	45	
Participant short name	CEA	CNRS	CGGV	INFN	ENEA	UNICAL	UNINA	
Person-months per participant	24	402	24	420	12	10	14	
Participant number	48	50	52	53	54	55	56	
Participant short name	SPACI	CSC	VR-SNIC	IHEP	IMPB RAS	ITEP	JINR	
Person-months per participant	12	24	120	48	24	60	52	
Participant number	57	58	59	60	62	63	64	
Participant short name	KIAM RAS	PNPI RAS	RRC	SINP MSU	GRNET	IPP BAS	UCY	
Person-months per participant	36	36	72	96	131	60	47	
Participant number	65	66	67	68	69	70	71	
Participant short name	TAU	ICI	IPB	TUBITAK	CSIC	LIP	CIEMAT	
Person-months per participant	52	57	55	66	78	100	9	
Participant number	72	74	75	78	79	81	82	
Participant short name	IFAE	RED.ES	CESGA	TCD	STFC	Imperial	Glasgow	
Person-months per participant	124	28	78	36	208	44	44	
Participant number	83	84	87	88				
Participant short name	UNIM AN	UOXF.D L	KEK	AS				
Person-months per participant	44	32	24	132				

Objectives

The principal objective of the activity is to provide a high quality set of services, with appropriate support, for certification, pre-production, production and training infrastructures. This is made possible by a number of support structures including Regional Operation Centres, A Global Grid User Support (GGUS) for user support, an EGEE Network Operations Centre (ENOC), Certification and Testing (with SA3), and groups for Grid security coordination.

### Description of work and role of partners

- **TSA1.1: Grid Management**

This task is the main activity providing the coordination, operation, and management of the EGEE Grid infrastructure. This includes the overall coordination (the Operations Coordination Centre – OCC), the Regional Operations Centres (ROC) in each of the regional federations, and all of the work associated with managing and coordinating the effort in SA1.

This task also includes coordination activities with applications and resource providers, other technical bodies within the project, and collaboration with other projects and interoperability activities

**Estimated Effort: 1344 PM**, provided by CERN 144 PM, ....., Japan 12 PM, ASGC 48 PM

- **TSA1.2: Grid Operations and support**

This task covers the operation and operational support of the infrastructure. The concept of a Grid operator on duty is maintained from EGEE and EGEE-II, ensuring that all ROCs participate and contribute. The task includes all associated effort related to support for the operation including managing and responding to problems reported either by the Grid operator or by users, running the required Grid services at each site as well as services provided by the ROC, and services required by virtual organisations, such as file catalogues, and other VO-specific services. The task covers this effort for both production and pre-production services.

Coexistence and interoperation with local, national, regional, and international grids is becoming more and more important, and the work to ensure this is included in this task.

Finally, the tools required to support this activity must be continually improved with developments where required. The scope of the monitoring tools covered includes local and remote monitoring of Grid and network services and all monitoring related to improving and maintaining the reliability of a Grid site, but should not cover fabric monitoring developments per se.

**Estimated Effort: 1706.4 PM**, provided by CERN 120 PM, ....., Australia 24 PM, Japan 12 PM, KR-KISTI 18 PM, ASGC 48 PM.

- **TSA1.3: Support to VOs, users, applications**

User and application support is an increasingly vital area that requires sufficient effort be devoted. Experience in EGEE and EGEE-II has shown that several aspects need to be covered, and that both regional and collaborative effort is required. In addition, previous experience has shown that the regions with local/regional helpdesks and adequate effort to the overall GGUS activity (by providing TPM effort) have a better reputation for support with their users.

The core of the support effort in SA1 is the GGUS system. This support system is used throughout the project for managing problem reports and tickets, for operations, as well as for user, VO, and application support. The system is interfaced to a variety of other ticketing systems in use in the regions/ROCs in order that tickets reported locally can be passed to GGUS or other areas, and that operational problem tickets can be pushed down into local support infrastructures. Each support area requires staff to oversee the tickets – to ensure that all are assigned, and followed up. This is the responsibility of the Ticket Process Manager (TPM). It is essential that all regions contribute sufficiently to this overall support in the project.

**Estimated Effort: 834 PM**, provided by CERN 36 PM, ... , ASGC 24 PM

- **TSA1.4: Grid Security**

All operational and policy-related security tasks are part of SA1. These include:

- a) A security team responsible for coordinating all aspects of operational security, including responding to security incidents,
- b) A team dealing with security vulnerabilities in the middleware and deployment,
- c) Responsibility for developing and maintaining the Security Policy and procedures jointly with



<p>other Grids,</p> <p>d) Ensuring the continued existence of a federated identity trust domain, and encouraging the integration of national or community based authentication-authorisation schemes.</p> <p><b>Estimated Effort: 282 PM</b>, provided by CERN 24 PM (OSCT lead), STFC 24 PM (JSPG lead, GSVG lead), FOM 24 PM (EUGridPMA lead), ... , Australia 6 PM, ASGC 12 PM</p> <ul style="list-style-type: none"> <li> <p><b>TSA1.5: Activity Management</b></p> <p>The overall management of the activity – activity leader, deputy; Coordination of the ROCs; Coordination with other activities and project technical bodies; oversight and management of specific technical tasks within SA1; Metrics and Quality assurance team including responsibility for partner reviews; contributions to general project tasks (conference preparation, reviews, etc); and the production, editing and reviewing of milestones, deliverables and other documentation.</p> <p><b>Estimated Effort: 180 PM</b>, provided by CERN 60 PM (including activity manager, deputy), CNRS 12 PM, INFN 24 PM, FZK 12 PM, PIC 12 PM, GRNET 24 PM, CYFRONET 12 PM, MSU 24 PM</p> </li> </ul>
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### SA1 Deliverables

Deliverable No	Deliverable title	Delivery date	Nature	Dissemination Level	Deliverable description
DSA1.1	GGUS Plan	2	R	PU	Plan for the continued development of the support infrastructure.
DSA1.2.1	Assessment of production service status.	11	R	PU	Assessment of the status of the production infrastructure, gap analysis and improvements needed. This will include the status of operations support and the connection with the ENOC for network issues.
DSA1.3	Report on the status of the ROCs and national/regional Grid integration	14	R	PU	Status report of the progress within the Regional Operations Centres, how their operation has evolved from EGEE-II and the status of interactions with national or regional Grid projects.
DSA1.4	Progress report on SLA implementation.	16	R	PU	Report on the progress of SLA implementations and verification (including analysis from stakeholders in NA4, SA1)
DSA1.5	Operations Cookbook	18	R	PU	An update to the cook book published in EGEE-II, describing the structure and operation of the Grid infrastructure, and its interactions with other Grid infrastructure projects.
DSA1.2.2	Assessment of production service status.	22	R	PU	An update and comparison of the assessment of DSA1.2.1 to show the evolution of the performance of the production service during the project, using the same set of metrics and criteria.

### SA1 Milestones

Milestone No	Milestone title	Delivery date	Description and means of verification
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<b>Milestone No</b>	<b>Milestone title</b>	<b>Delivery date</b>	<b>Description and means of verification</b>
MSA1.1	Operations Automation Strategy	1	Mandate, charter, and composition of Operations Automation Team: to provide strategy and oversee implementation towards operations automation, including coordination of tool developments. The milestone should set out the roadmap. Plan for monitoring tools and requirements for increasing automation of alarms etc. with goal of reducing operations effort level for the future, tools needed to support operations, improve reliability, verification of SLAs
MSA1.2	Operations procedures in place	1	Set of procedures for operating the EGEE infrastructure - UPDATE, GGUS, Security...
MSA1.3	Activity Quality Assurance and measurement plan	2	Definition of the activity-internal QA measurements and procedures. This will provide input to DNA1.3
MSA1.4	Security Assessment plan	2	Plan for the ongoing assessment of operational and middleware security
MSA1.5	SLA Roadmap	3	Define the set of SLAs required, implementation plan, and tools required for verification.
MSA1.6	Assessment of the status of user support.	4	An assessment of the status of user support, including input from stakeholders in NA4 and SA1. It will include the plan for user support for the remainder of the project and indicate strategies for support in an EGI/NGI model.
MSA1.7	Assessment of infrastructure reliability.	6	Assessment of the reliability of the infrastructure (sites, middleware, services) with implications on other activities (JRA1, SA2, NA3) and plan for what SA1 can do to improve the reliability.
MSA1.8	Status report on Interoperations.	12	Report on the status of interoperation activities with other Grid infrastructures
MSA1.9	Grid Security Vulnerability and Risk Analysis: Grid Security Vulnerability detection, Risk Assessment, Handling, and Prevention strategies.	13	In EGEE-II GSVG produced a deliverable which described a strategy for processing vulnerabilities issues. In EGEE-III an update of this strategy as a result of experience will be provided, and describe some of the problems encountered in handling issues and how they were resolved. A description of which strategies for the prevention of the introduction of vulnerabilities were effective will also be made.
MSA1.10	Grid Computer Security Incident Handling	16	OSCT: Computer security incident handling in a Grid environment: prevention, detection, containment & resolution. Should include a report on the issues to be addressed to improve operational security in a Grid environment, or barriers to achieving this.
MSA1.11	Security Policy Integration	20	JSPG: Security Policy integration between EGEE and other national and international Grid infrastructures

## 1.4.2. Activity SA2: Networking Support

### 1.4.2.1. Activity Description

The network infrastructure has always been one of the major building blocks of the Grid infrastructure which is often presented as an “overlay network” of sites and services which relies on the underlying network for its proper running. This activity acts as an interface with the network providers that connect all the computing and storage resource providers.

During the two first phases of the EGEE project, the role of this interface has been achieved in four ways that are proposed to be continued:

- The Technical Network Liaison Committee (TNLC) is a committee including the NRENs involved in the EGEE project plus GÉANT2. This is where the dialogue between the two communities occurs (for instance about new requirements and new services), where technical issues are discussed, and where the stakeholders propose new actions to improve the collaboration (for instance about the standardisation of trouble ticket exchanges);
- The effort made by EGEE to prepare the use of advanced network services through Service Level Agreements with the network providers enables EGEE for use such services by the applications. The expected deployment of automatic mechanisms in the network (the GÉANT2 Advance Multi-domain Provisioning System or AMPS) will be a great step forward towards an increased usage of the services and a wider adoption by application users. We expect that application developers will take advantage of advanced network services to improve their workflow.
- The EGEE Network Operational Centre (ENOC) is the dedicated entity that plays the role of the daily operational interface between its counterparts in each NREN and the operational support of EGEE. The concept of a transversal entity able to coordinate the actions of various operational groups in multiple different administrative domains has proven its usefulness and reliability. It has now been adopted by GÉANT2 with the End-to-End Coordination Unit (E2ECU) to support the various project dedicated end-to-end links provided by the European NRENs and GÉANT2.
- There is also a need for the support of IPv6 within EGEE where an expertise is needed to build and run a functional Grid IPv6 testbed and to provide IPv6 testing and certification methodologies for developers and testing & certification teams in order to validate the middleware compliance in an IPv6 environment.

In EGEE-III it is proposed to continue all of this work, and with an increased emphasis on user support and education on the use of advanced networking facilities for applications, plus advising site administrators on performance issues for end-host optimisations. The tasks associated with activity are described in the summary table below.

### 1.4.2.2. Task description

The activity will have a leader and a deputy handling all leadership and administration for the project. They will also be the main points of contact with the networking providers and the EGEE technical and administrative management, including quality assurance and policy matters.

### 1.4.2.3. Activity summary and manpower

<b>Activity Number</b>	SA2		<b>Start date or starting event:</b>				01.04.2008	
<b>Activity title</b>	Networking Support							
<b>Activity Type</b>	SVC							
<b>Participant number</b>	29	33	47	59	62	74	86	
<b>Participant short name</b>	DFN	CNRS	GARR	RRC	GRNET	RED.ES	DANTE	
<b>Person-months per participant</b>	12	96	12	6	18	6	3	

**Objectives**

For EGEE-III, the objective of the SA2 activity is to continue to play the role of an interface between the EGEE infrastructure and the NRENs and GÉANT2. More specifically, the objectives are two-fold:

- Ensure the daily operational interface between the infrastructures including notably the information exchange between the network operational entities and the Grid operations and the network user support in the EGEE operational model;
- Ensure that the applications network requirements are fulfilled and that new network functionalities (such as network Quality of Service or IPv6) are advertised to the EGEE users and provided in the EGEE infrastructure.

**Description of work and role of partners**

- Task TSA2.1: ENOC running

This task mainly consists in running on a daily basis the user support (being a support entity within GGUS), the support for the LHC Optical Private Network (OPN) and the operational interface with the NRENs (trouble ticket exchange). This effort should be hosted at a single location to insure a better efficiency.

The effort required for this task is 48 PM provided by CNRS.

- Task TSA2.2: Support for the ENOC

This task is twofold. The first part deals with operational procedures, their updates and improvements. It also deals with the many relations the ENOC maintains with the providers and the clients (LCG for instance) and the definitions and follow-up of the requirements of each entity.

The second part is about operational tools. During the first two phase of EGEE, several tools has been developed for the proper running of the ENOC to ease its daily work by the automation of the procedures and keep the load on the ENOC team at a reasonable level. These tools will need to be maintained, updated and improved and their proper running to be insured. SA2 will also need to maintain and have access to monitoring tools in order for the ENOC to troubleshoot issues in both the network backbone and the end-sites and discriminate the issues depending on where the problem lies. SA2 will dedicate effort to solve this requirement in collaboration with SA1, NRENs and GÉANT2.

The effort required for this task is 45 PM provided by CNRS (21 PM), RRC-KI (4 PM), GRNET (5.5 PM), RED.ES (2.5 PM), Dante (1 PM), DFN (9 PM), GARR (2 PM)

- Task TSA2.3: Overall Networking Coordination

This task puts together the various organisational tasks the activity has to carry out. It essentially consists in the relationships with the NRENs and GÉANT2 (TNLC meetings for instance) and the work on standardisation and interoperability (trouble ticket exchange normalisation, interface with the network service provisioning, etc.). SA2 will also coordinate the effort, within EGEE and through collaboration with external projects, to assess and leverage the IPv6 compliance in the EGEE infrastructure. This task also includes the network expertise being brought to EGEE to foster the adoption and use of advanced network services and other possible network related topics that could arise during the project lifetime

The effort required for this task is 37 PM contributed by CNRS (9 PM), RRC-KI (1.5 PM), GRNET (11 PM), RED.ES (3 PM), Dante (1.5 PM), DFN (2 PM), GARR (9 PM)

- Task TSA2.4: Activity management and general project tasks

An activity leader and deputy will handle all leadership and coordination, representation on external and internal management bodies, activity reporting, quality assurance, and policy matters.

The effort required for this task is 23 PM Provided by CNRS (18 PM), RRC-KI (0.5 PM), GRNET (1.5 PM), RED.ES (0.5 PM), Dante (0.5 PM), DFN (1 PM), GARR (1 PM)

**SA2 Deliverables**

Deliverable No	Deliverable title	Delivery date	Nature	Dissemination Level	Deliverable description
DSA2.1	Status of the ENOC	11	R	PU	This deliverable will describe the status of the ENOC according to the plans and metrics described in MSA2.3.1

<b>Deliverable No</b>	<b>Deliverable title</b>	<b>Delivery date</b>	<b>Nature</b>	<b>Dissemination Level</b>	<b>Deliverable description</b>
DSA2.2	Assessment of the ENOC	20	R	PU	This deliverable will assess the status of the ENOC according to the plans and metrics described in MSA2.3.1 and MSA2.3.2

### SA2 Milestones

<b>Milestone No</b>	<b>Milestone title</b>	<b>Delivery date</b>	<b>Description and means of verification</b>
MSA2.1	Activity Quality Assurance and measurement plan	2	Definition of the activity-internal QA measurements and procedures. This will provide input to DNA1.3.
MSA2.2.1-4	TNLC meetings	4, 10, 15, 22	Technical meetings between EGEE and the NRENs about network requirements, new advanced services, etc.
MSA2.3.1-2	Status and plans for the ENOC procedures & tools	5, 17	These milestones will describe the current status and plans for the ENOC, in terms of procedures updates and operational tools improvements. As such it will also describe the metrics and indicators that are to be used in the DSA2.1 and DSA2.2 deliverables.
DSA2.1	Status of the ENOC	11	This deliverable will describe the status of the ENOC according to the plans and metrics described in MSA2.3.1
MSA2.4	Status of the use of advanced network services	13	This milestone will describe the status of advanced network services as provided by the NRENs and GÉANT2 from the point of view of EGEE.
MSA2.5	Status of IPv6 support for EGEE	19	In this milestone, the IPv6 status in EGEE will be assessed in both the middleware and the infrastructure. An analysis of the advantages and drawbacks of the the migration to IPv6 will be also given.
DSA2.2	Assessment of the ENOC	20	This deliverable will assess the status of the ENOC according to the plans and metrics described in MSA2.3.1 and MSA2.3.2

### 1.4.3. Activity SA3: Integration, testing and Certification

#### 1.4.3.1. Activity Description

The goal of the SA3 activity is to continue to manage and coordinate the process of building deployable and documented middleware distributions, called gLite, starting with the integration of middleware packages and components from a variety of sources. The activity will refine the criteria for accepting components which have been defined and documented in EGEE-II, and will run an integration and build infrastructure using as much as possible results of the ETICS project and will cooperate with potential projects providing adequate services or tool sets.

To ensure that the middleware is reliable, robust, scalable, and as usable as possible, a testing and certification activity will be run. SA3 will focus the effort on foundation middleware, essential core components on which complex higher level services are constructed (see also the discussion in JRA1). Following the successful component based release model, the goal of each update will be the provision of a deployable gLite distribution focusing on making the components in the distribution work effectively for users when deployed. This versioned middleware distribution will be, as before, available for other interested parties, especially for related projects, such as SEEGrid, Baltic-Grid, EELA, Grid-IT and several others.

These related projects often adapt the gLite middleware releases to meet their specific local needs. To ease this it is important that the releases are as modular as possible. In addition, support for multiple platforms and operating systems is essential. Apart from the currently supported Scientific Linux (a RedHat Enterprise variant) other versions of Linux and other operating systems need to be supported on both 32 and 64 bit platforms. The selection of platforms to be supported and the prioritisation has to be driven by users and infrastructures via the TMB. Given the different role of different platforms and the overall resource level of SA3 and JRA1 the project will focus on providing adequate subsets of components for a given platform.

The SA3 activity decouples the production of deployable middleware distributions from the middleware developments as far as necessary to ensure an effective certification and allow the integration of best matching components, independent of their origin. This is crucial at this point in the project, as the focus must be on making the infrastructure that now exists as reliable and robust as possible. Further middleware and services development will be driven by need and utility as determined by the users and operations group via the TMB which has been driving the functional development already during EGEE-II and has proven to be superior to a formal classical requirements gathering process.

SA3 will have developers who work within the team in order to provide sufficient capacity and competence identify complex bugs, develop extensive tests for scalability. It is expected that these developers will undertake small development efforts to “glue” together middleware components, provide missing minor tools or temporary solutions, carry out small modifications and link with external developers. Larger developments will be negotiated with the JRA1 activity and with other middleware providers (such as Open Science Grid, VDT, OMII-EU, etc.) under the supervision of the TMB.

While in EGEE-II JRA1 and SA3 have been loosely coupled, a significant part of the testing and release preparation work in EGEE-III will be carried out by SA3 partners close to JRA1 partners, forming together Clusters of Competence. This is in line with the concept of component based releases that has been developed and applied successfully during EGEE-II. The goal is to minimize losses during times of rapid change, but ensure that the middleware fulfils high standards of deployability and usability.

The SA3 activity will apply and refine the EGEE-II defined criteria that software must comply with in order to be included in the middleware distributions. These criteria will include aspects of service management, security, documentation, installation, configuration, etc. In addition the support model for each component needs to be defined. Components may be removed from a distribution if they do not satisfy these criteria and fail the certification tests.

New middleware services and components will be considered for inclusion in the distributions if either there is a requirement for such components or services from applications or operations, or if the component has been demonstrated by the developers to provide a significant increase in useful functionality, performance, reliability, scalability or manageability to EGEE-III. SA3 will capture these requirements and the TMB will provide guidance and agreement on selection of such components and their priority.

In EGEE-III the SA3 activities have to adapt the processes, tools and approaches defined in EGEE-II to the increased maturity of the middleware and the higher demands towards the quality of new releases of middleware packages due to the more extensive usage in production and the wider spectrum of sites and platforms on which the middleware will be deployed. Interoperability with related Grid infrastructures such as the Open Science Grid (OSG), DEISA, or Naregi are another important goal and SA3 will ensure gLite evolves towards interoperability while we expect the peer projects to engage on similar efforts on their software stack. The OMII-EU project will also play an important role in achieving this goal and strong relations with OMII-EU will be established. Interoperability will be enhanced via a progressive adoption of standard methods and interfaces for resource access, where those standards are appropriate.

During the past years Grid users have produced several successful components that tailor the standard components to their needs, or provide higher level services that are not available in the gLite middleware stack. These very desirable activities suffered in the past under the lack of a place to make them available to other interested parties and a process to ensure that these packages work with the current middleware stack. The RESPECT (Recommended External Software Packages for EGEE Communities) initiative started in EGEE-II provides a first attempt in this direction and will be further developed in collaboration between NA4 and SA3 in EGEE-III.

#### **1.4.3.2. Task description**

To achieve the objectives of the SA3 activity, the execution plan consists of a series of tasks described below, together with a series of milestones and deliverables to demonstrate progress and quality. The diagram below shows the flow of work between the major tasks and how the middleware distributions from SA3 are deployed in SA1.

##### **1.4.3.2.1. TSA3.1. Integration and packaging**

The integration of the gLite distribution will be performed by a core team located in one place. This team will be led by a release manager who drives the component release process and ensures that the associated documentation is of acceptable quality and uniformity. He will be ideally supported by a technical writer for documentation. A high quality integration infrastructure (code repository, versioning, building, packaging, installation and configuration mechanisms) is essential for the success of this task. SA3 will continue using the services applied in EGEE-II, in particular CVS and savannah and will build upon and adopt the results of the ETICS project where advisable to provide a high quality integration process as well as the necessary quality assurance as part of the release process. The core team will provide the principal configuration mechanism and maintains the packaging and build frameworks. SA3 teams working close to the JRA1 teams, forming clusters of competence, will maintain and contribute elements and configurations for these frameworks.

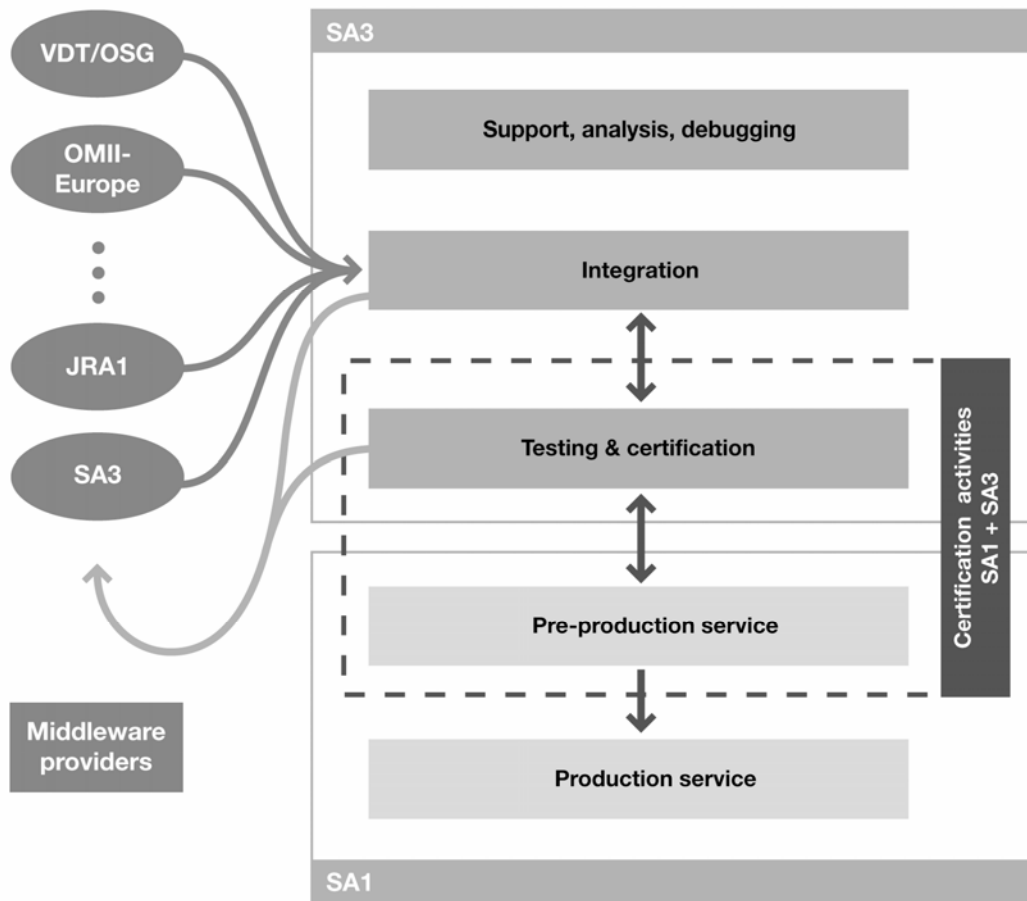


Figure 7: SA3 workflow

#### 1.4.3.2.2. TSA3.2. Testing and certification

Testing and certification are the most important tasks ensuring the released gLite distribution provides the required functionality, performance, scalability, and dependability. We distinguish between testing and certification whereby testing leads to production readiness of a component and will be carried out by SA3 teams that are closely linked with JRA1 teams and certification ensures that after modifications the components still work inside the stack and fulfill the functional and performance requirements, thus it includes regression tests, and will be carried out by the SA3 certification team.

Certification will address the full system, verifying co-existence and interoperability of all components, testing deployability, functionality, configuration, and management of the components. It will also certify the distribution on the supported set of operating systems, validate the security model and test for security vulnerabilities. The certification process will ensure that each update of the middleware distribution does not break existing functionality, and that each release improves performance and other criteria. Certain aspects of the certification can be automated to a high level. Results from the ETICS project will help to achieve this goal.

Certification requires a set of test beds at CERN and in a small set of participating partners. The central test beds have to represent most of the common deployment scenarios and several versions of services. This requires a well managed infrastructure of roughly 120 nodes and a pool of nodes to be used for specific tests. In addition, certain regions will contribute to well-defined aspects of such as certification of MPI support, specific architectures, batch systems and deployment scenarios. In addition, the certification of production readiness and deployability is best done by teams that are



engaged in the production service. The verification of individual patches by suited partners will require additional local test bed resources. The interoperability/co-existence verification tests require expertise from both teams. Thus it is important that the SA3 and SA1 teams work closely together on the same process. Eventually, the deployment of the SA3 distributions on the SA1-operated pre-production service provides the final essential validation by real users before moving to production.

Testing will be performed component-wise by dedicated SA3 teams, as much as possible co-located with the component re-engineers from JRA1. Apart from executing the tests and analyzing the results this activity will also develop test cases. Not only the expected usage of a component will be tested but also deviations from this, in particular erroneous input parameters, wrong call sequences etc. The testing activity will lead into certification once components are considered for inclusion in the gLite distribution. These test activities will carry out their work according to common standard processes which are tracked by the central SA3 team.

These tests will be executed on a distributed testbed with a core component located at CERN and other sites contributing to the coverage for common deployment scenarios. Synergies with the certification testbed will be exploited as much as possible.

The existing collaboration with the CERN openlab will be intensified to gain early access to new architectures and to exploit openlab's expertise on virtualisation techniques. The testing frameworks used in EGEE-II will be further developed also drawing on the results of the ETICS project. For large scale testing required for certain component, pilot services will be deployed on the production infrastructure as successfully initiated in EGEE-II. A formal process that tracks progress and results will be defined at the beginning of the project.

SA3 will coordinate all testing activities across the project, including the efforts in SA3 itself, JRA1, and NA4. The testing coordinator in SA3 will organise and coordinate these activities in order that a full and comprehensive test suite can be built within the project, avoiding duplication of effort and ensuring good coverage of issues.

#### **1.4.3.2.3. TSA3.3: Debugging, analysis, support**

SA3 will host a team specialised in providing in depth technical support for the middleware distributions provided. This team is involved in the certification process, but also provides debugging and analysis for problems found in production or pre-production. They may provide solutions themselves, or once the problem is understood, they will negotiate with the middleware providers, through the TMB, to resolve the issue. The team may also, with the agreement of the TMB, themselves provide solutions to issues raised, such as building stop-gap solutions to missing services in the manner of prototypes, providing tools to help in the access and usage of existing services, etc. The ultimate role of this team, is to make the distribution work in a stable, robust, reliable, and effective way.

#### **1.4.3.2.4. TSA3.4. Interoperability & Platform support**

SA3 will collaborate with middleware providers both inside and external to the project to work towards standard solutions to common problems and to strive towards true interoperability of middleware services. In particular the collaboration with and contributions of OMII-EU will be instrumental for fulfilling this task. This work will contribute to international standardisation efforts, for instance via OGF. In addition, support for multiple platforms and porting to these as well as support for a broad range of batch systems (torque/PBS, LSF, SGE, and Condor) are essential for the uptake and deployability of gLite. SA3 will host dedicated teams dealing with these issues.

#### **1.4.3.3. Management of the activity (Task TSA1.5)**

The SA3 activity will be managed by an activity manager responsible for the overall execution of the SA3 programme of work, quality assurance, reporting, and partner coordination, who will be supported by a Deputy Activity Manager. The gLite release manager will be responsible for the integration, packaging and release of the gLite distributions and will also chair the Engineering Management Team (EMT – see below). Coordinators for interoperability, multi-platform support,

batch system support, and testing complement the SA3 management structures. Activity management is supported and implemented by regular mail contacts to partners, collaborative tools like wiki, augmented by teleconferences and group meetings at EGEE conferences.

SA3 will closely collaborate with JRA1 and SA1 through the testing teams co-located with JRA1 teams and certification teams co-located with SA1 teams; regular interactions (twice a week) with these activities occur through the EMT that manages the short-term release priorities for the gLite middleware distribution. This involves managing updates, scheduling changes and defining short-term developer priorities. It is composed of members of SA3, JRA1, and SA1 and receives its guidance from the TMB. Two areas where close collaborations are required are worth highlighting:

- The security model and its implementation. This requires coordination with JRA1 to ensure the appropriate security middleware is available and with SA1 to make sure that the model can be deployed. In addition, the SA3 certification process must include security controls. The security code and vulnerability task foreseen in SA1 will be coordinated with SA3 and result in code reviews and specific tests as part of the certification process;
- Evolving the operations tools. Coordination with SA1 is needed to ensure the software integrated by SA3 meets the needs of SA1 and that there is appropriate and rapid feedback.
- The EMT meets twice a week.

SA3 will also closely collaborate with NA4 through the TMB and user related events, like User Fora, to ensure appropriate requirements capturing and feedback from applications as well as coordination on the RESPECT programme. Close links with the documentation task of NA4 will be established to provide good quality end-user documentation.

SA3 operates a quality process integrated in its procedures mainly via the integration and testing processes that ensure appropriate test coverage etc. In addition, SA3 monitors the quality of its work internally via partner reviews that are carried out on a yearly basis.

#### 1.4.3.4. Activity summary and manpower

<b>Activity Number</b>	SA3		<b>Start date or starting event:</b>				01.04.2008	
<b>Activity title</b>	Integration, Testing and Certification							
<b>Activity Type</b>	SVC							
<b>Participant number</b>	<b>1</b>	<b>8</b>	<b>12</b>	<b>16</b>	<b>37</b>	<b>49</b>	<b>56</b>	
<b>Participant short name</b>	CERN	CESNET	PSNC	FOM	INFN	UH.HIP	JINR	
Person-months per participant	396	24	24	24	96	12	10	
<b>Participant number</b>	<b>58</b>	<b>60</b>	<b>62</b>	<b>64</b>	<b>69</b>	<b>72</b>	<b>75</b>	
<b>Participant short name</b>	PNPI RAS	SINP MSU	GRNET	UCY	CSIC	IFAE	CESGA	
Person-months per participant	10	10	30	12	8	12	12	
<b>Participant number</b>	<b>78</b>	<b>79</b>	<b>88</b>					
<b>Participant short name</b>	TCD	STFC	AS					
Person-months per participant	36	36	40					

#### Objectives

SA3 will manage the process of building deployable and documented gLite middleware distributions.

Its main objectives are :

- Produce well-tested and documented gLite releases together with associated configuration tools;
- Improve the multi-platform support of gLite;
- Increase interoperability of different Grid infrastructures by working towards best practices and established standards and provide input to standardisation bodies.

#### Description of work and role of partners

- **TSA3.1: Integration and packaging**

The purpose of this task is to select middleware components from inside and outside the project, following the

strategy of the TMB, integrate the components into a working system by actively managing the dependencies and operating the integration infrastructure and produce public distributions of gLite. These distributions will include all associated documentation (changes, known issues, deployment and configuration instructions, and end-user documentation). The distribution will be packaged in a uniform way for deployment and the configuration and deployment tools will be maintained and evolved.

The effort required for this task is 202 PM (178 PMs + 24PM AS ( Taiwan)), provided by:

- CERN 138 PMs

Coordination of the activity, development and tracking of the process for integration and release management, maintenance, evolution and operation of integration tools, configuration tools, repositories, process tracking tools. Integration and packaging of the overall distribution. Interaction with SA1. Collection and maintenance of documentation

- INFN 24 PM

Integration and packaging work related to gLite WMS, CE components, VOMS/VOMS –Admin, DGAS, authorisation and prioritisation frameworks.

- TCD 4 PM

Integration and packaging of security infrastructure middleware, tools for interoperation

- STFC 6 PM

Integration and packaging of service discovery and information system APIs

- CESNET 6 PM

Integration and packaging for logging and book keeping components and Job Provenance services

- AS Taiwan 24 PM

Join the CERN team and work integrated in the team on the overall tasks.

- **TSA3.2: Testing and certification**

This task will test and certify the gLite middleware stack, develop the necessary test suites, and operate the distributed test and certification testbeds. Apart from standard functional and performance tests, interoperation, security, and vulnerability testing will be included. Pilot services will be set up for large scale tests on the production infrastructure if necessary.

The effort required for this task is 323 PM (311 PM + 12PMs AS (Taiwan)), provided by:

- CERN 146 PM

Coordination of the activity, development and tracking of the process for testing and certification, maintenance, evolution and operation of testing tools, virtualized testbeds, operation of a large scale testbed (120+ nodes), coordination and tracking of partners test activities, coordination of testes with SA1 for PPS and pilot services, coordination and participation in patch certification, driving the regression tests.

- INFN 48 PM

Testing up to production readiness of the components integrated by INFN. This includes participation in patch verification and test case development.

- CSIC 8 PM

Operating a test bed used for local and integrated patch certification, contributing to stress testing.

- IFAE (PIC) 6 PM

Operating a test bed used for local and integrated patch certification, contributing to stress testing.

- CESGA 6 PM

Operating a test bed used for local and integrated patch certification, contributing to stress testing.

- TCD 8 PM

Testing of security infrastructure and accounting components, testing for interoperation

- STFC 24 PM

Testing of service discovery components and new information system APIs, including contributions to stress tests for the EGEE information system

- GRNET 19 PM

Operating a test bed used for local and integrated patch certification. Very active contribution to configuration testing and in depth testing of job submission and batch system related components.

- UCY 6 PM

Operating a test bed used for local and integrated patch certification, contributing to stress testing.

- CESNET 6 PM

Testing for logging and book keeping components and Job Provenance services

- JINR 6 PM, PNPI 6 PM, SINP MSU 10 PM

Development of test suites for various components as agreed with activity coordination. Integration of test code into the common framework for testing and certification.

- UH.HIP 12 PM

Testing of medical data management components

- AS Taiwan 12 PM

Stationed at CERN and contributing to the overall test activity. Contributing to framework development and maintenance.

- **TSA3.3: Support, analysis, debugging, problem resolution**

In this task problems seen in production will be addressed by providing problem analysis and debugging; coordinate solutions within SA3 or with middleware providers.

The effort required for this task is 112 PM (100 PM + 12PMs AS (Taiwan)), provided by:

- CERN 46 PM

Coordination of the activity, analyzing especially scalability issues and information system related problems. Further work with SA1 on operational problems such as VO integration and long term stability of services.

- INFN 12 PM

In depth analysis and debugging support for the components integrated by INFN in TSA3.1.

- STFC 6 PM

In depth analysis for new information system APIs, contribution to standardisation efforts (including implementation of standards for the information system APIs).

- UCY 6 PM

Working on workarounds for problems found in operations and during integration

- CESNET 6 PM

In depth analysis of problems related to job tracking systems, especially in combination with the workload management system.

- PSNC 16 PM

Focus on security related problem analysis, code and security design analysis. Development of security tests

- JINR 4 PMs, PNPI 4 PM

Based on the local experience with gLite middleware components perform in depth analysis on specific aspects and minor development to support specific deployment scenarios

- AS Taiwan 12 PM

Stationed at CERN and contributing to the overall analysis and development activity. Contributing to framework development and maintenance.

- **TSA3.4: Interoperability & Platform support**

Through this task SA3 will work with other Grid infrastructure projects to agree on practical common standards, with the goal of strengthening interoperability of middleware and services where appropriate. The results of this work will be provided as input and guidance to international standardisation bodies such as OGF.

In addition, this task will coordinate and support the effort to provide the gLite distribution on a wider range of platforms, including operating systems, batch systems, and hardware.

The effort required for this task is 141 PM (117 PM + 24 PM AS (Taiwan)), provided by:

- CERN 24 PM

Coordination of the activity, focus on standardisation in the area of information systems and schemata. Interoperation with other Grid infrastructures, such as OGF.

- INFN 12 PM

Support for batch system integration with BLAH providing expertise to partners developing interface code to specific batch systems.

- IFAE (PIC) 6 PM

Condor batch system integration and support

- CESGA 6PMs

Sun Grid Engine batch system integration and support

- TCD 24 PM

Platform porting coordination and strategy, platform porting.

- CESNET 4 PM

<p>Standardisation of job tracking systems and interoperation with similar services in other Grid infrastructures.</p> <ul style="list-style-type: none"> <li>○ PSNC 8 PM</li> </ul> <p>Platform porting and support for tests on Opteron architectures</p> <ul style="list-style-type: none"> <li>○ FOM 24 PM</li> </ul> <p>Coordination of the efforts to integrate with different batch systems. FOM will support directly Torque and Maui.</p> <ul style="list-style-type: none"> <li>○ AS Taiwan 24 PM</li> </ul> <p>Focus on SRM – SRB interoperation. Develop tools and components to allow seamless interoperation</p> <ul style="list-style-type: none"> <li>• <b>TSA3.5: Activity Management</b></li> </ul> <p>The purpose of this task is to manage the SA3 activity and coordinate the effort of activity partners in order to continue to produce quality releases of the gLite distribution. As explained above, the activity will be managed by an Activity Manager, a Deputy Activity Manager, a Release Manager as well as Coordinators for interoperability, multi-platform support, batch system support, and testing. This task also covers the necessary quality assurance activities (see above), coordination with other activities, in particular JAR1, SA1, and NA4 through the EMT and TMB, as well as contributions to EGEE’s policy and sustainability work.</p> <p>The effort required for this task is 46 PM, provided by:</p> <ul style="list-style-type: none"> <li>○ CERN 42 PM</li> </ul> <p>See above description of the task</p> <ul style="list-style-type: none"> <li>○ CESNET 2 PM</li> </ul> <p>Contribution to organisation of activity events</p> <ul style="list-style-type: none"> <li>○ GRNET 2 PM</li> </ul> <p>Contribution to deliverables and review preparation</p>
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### SA3 Deliverables

Deliverable No	Deliverable title	Delivery date	Nature	Dissemination Level	Deliverable description
DSA3.1.1	Releases produced in the first year	12	R	PU	Report on the releases produced in year 1 of the project
DSA3.2	Report on status of multi-platform support	14	R	PU	Including the support of different batch systems
DSA3.1.2	Releases produced in the second year and update on operation and multi-platform support	22	R	PU	Report on the releases produced in the second year of the project with an update on operation and multi-platform support

### SA3 Milestones

Milestone No	Milestone title	Delivery date	Description and means of verification
MSA3.1	Activity Quality Assurance and measurement plan	2	Definition of the activity-internal QA measurements and procedures. This will provide input to DNA1.3.
MSA3.2	Strategy and roadmap of the EGEE multi-platform support	3	This includes the support for additional batch systems

<b>Milestone No</b>	<b>Milestone title</b>	<b>Delivery date</b>	<b>Description and means of verification</b>
MSA3.3	Strategy and plans for Interoperability with other Grid infrastructures	4	This includes identification of applicable standards and areas where standardisation efforts are still required. It will also feature an analysis as to what extent the gLite distribution adheres to these standards.
MSA3.4.1	Definition and documentation of the revised software life-cycle process	4	In EGEE-III components will be integrated when they are closer to production readiness than in EGEE-II. This requires modifications to the release process. This includes the definition of the testing process.
MSA3.5.1	Deployment guide	6	EGEE middleware can be deployed in a multitude of different scenarios. However only a subset is meaningful. This guide describes the most common setups and their limitations (can be seen as a user guide for sysadmins).
MSA3.6	Developers' guide	6	Production of a guide for use by developers
MSA3.7	gLite Roadmap	7	High level roadmap on the future evolution of gLite during the lifetime of EGEE-III. This will take into account the detailed roadmaps of JRA1 (MJRA1.3.1, MJRA1.4), NA4 (DNA4.1) and interoperability and standardisation work (MSA3.2 and MSA3.3). It will be jointly developed by these activities within the TMB.
MSA3.5.2	Update of the deployment guide	18	Revision of the deployment guide produced at PM6 (MSA3.5.1)
MSA3.4.2	Updated software life-cycle process	20	During EGEE-III it is expected that the software will mature considerably, therefore modifications to the process will be required.

## 1.5 Joint Research Activities and associated work plan

The EGEE programme has developed an open source middleware distribution, named gLite, which comprises security services, information and monitoring services, data services, job management services and helper services. In EGEE-III, the JRA activity will maintain the middleware and evolve the key services needed for running the infrastructure focusing on standards set by the Open Grid Forum (OGF), and production needs. This will require the parallel drive towards middleware which meets the needs of both the production service and the applications. The JRA activity is closely linked to the EGEE-III service and networking activities, providing middleware components to SA3 for inclusion into the gLite middleware distribution, to be deployed by SA1. The application requirements provided by NA4 drive the functional evolution of the middleware. Standardisation efforts as well as collaborations with software industry are of particular importance as this will allow, in the mid-term, to enrich EGEE's middleware with industry strength components. For instance, the EGEE-II Business Associates programme attracted Platform Computing as a member and has spawned productive discussions with The Mathworks and Hitachi. These interactions will be continued in EGEE-III. The interdependencies of the JRA activity with all other activities in the project are shown in Figure 3, and more particularly with the service activities, are shown in Figure 6. The GANTT chart of the JRA activity is shown in Table 9 below.

The following main risks have been identified for the EGEE-III JRA activity:

<b>Risk</b>	<b>Impact</b>	<b>Occurrence Probability</b>	<b>Mitigation</b>
Slow standardisation and industry uptake	There is a risk that standardisation efforts progress slowly and thus impede interoperability as well as industry uptake. This will require EGEE-III to spend more effort on required interoperability and will hamper the inclusion of industry strength components.	Medium	This risk will be mitigated by continued contribution to standardisation activities, continued work with industrial software providers, and the continuation of the middleware engineering programme in EGEE-III itself.
Delays in the development roadmap	Delays in middleware development will affect application planning and implementation.	Medium	The development roadmap will be jointly developed by JRA1 and other stakeholders via the TMB which will also closely monitor the progress and take corrective measures. In addition, JRA1 components depend on various third party components and appropriate support arrangements will be negotiated to meet the gLite objectives.

**Table 9: GANTT Chart of the Joint Research Activity**

		WORKPLAN																								
Month		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
<b>JRA1</b>	<b>Middleware Re-engineering</b>																									
TJRA1.1	Middleware support	MJRA1.1		MJRA1.3.1								DJRA1.1		MJRA1.3.2										DJRA1.2	DJRA1.3	
TJRA1.2	Research & Development and standardisation											DJRA1.1												DJRA1.2	DJRA1.3	
TJRA1.3	Platform support and interoperation		MJRA1.2		MJRA1.4							DJRA1.1												DJRA1.2	DJRA1.3	
TJRA1.4	Activity Management			DNA1.1.1			DNA1.1.2			DNA1.1.3		DJRA1.1	DNA1.6.1			DNA1.1.4			DNA1.1.5				DNA1.1.6	DJRA1.2	DJRA1.3	DNA1.6.2



## 1.5.1. Activity JRA1: Middleware Re-engineering

### 1.5.1.1. Activity Description

The overall goal of JRA1 is to provide and maintain selected middleware services of the gLite distribution satisfying the basic requirements of users in terms of functionality and performance as well of operations in terms of manageability and deployability. While pursuing this goal emphasis will be laid on evolving the services towards interoperable solutions, wherever possible by adhering to established standards. To this end, active collaborations with related research projects, in particular OMII-EU, will be established and active participation to standardisation processes, in particular via the OGF, will allow the feed back the experiences of EGEE into and to guide the process. The services will also evolve with respect to multi-platform support according to the decisions of the Technical Management board (TMB) in close collaboration with SA3.

Middleware is typically structured into application independent Grid Foundation Middleware, covering the security infrastructure, information, monitoring and accounting systems, access to compute resources (compute element) and access to storage resources (storage element). These foundation services are complemented by higher level Grid Services such as resource brokers, data catalogs, replication systems, Grid economies, etc. The focus of JRA1 will be laid on providing the essential Grid foundation services needed for the operation of EGEE as well as a few selected higher level services that have been identified essential for EGEE's user communities in the previous phases of the EGEE programme.

JRA1 will specifically deal with the following services:

#### **Foundation services**

##### *Security infrastructure*

The security middleware comprises all the necessary components to define and enforce policies within VOs as well as those needed by the resource provider (i.e. between VOs). In particular, resource access control, resource access auditing and VO membership management will be provided as part of an integrated security infrastructure. Existing gLite components that in some cases are also included in other middleware toolkits will be further developed and hardened. The work will focus the development of authorisation services, to provide a unique framework for policy definition and enforcement, dynamic connectivity, auditing, and interoperability with other authentication and authorisation infrastructures. This work will be based on the experience developed with current gLite components. Support for SAML-based attributes will be progressively extended to more services.

##### *Information system, monitoring and accounting*

Information published by the various services on the resources they control must be accessible to other services in a dependable and timely manner. This includes the definition of the schema of the information and a simple interface for service discovery. The work will concentrate on the services currently in use on the EGEE production infrastructure and that will be further hardened and provided with interfaces harmonized across different information systems to allow free information flow across different Grids.

The SA1 activity has developed tools for infrastructure monitoring; it is thus not strategic any more to provide a basic monitoring and messaging/notification infrastructure. Nevertheless the tools developed for this purpose during the previous phases of the project may be useful to certain applications and will be supported if unfunded effort will be provided.

Accounting is concerned with collecting the relevant information locally at the resources and making it available with the needed granularity at a global or VO level (in a secure manner) for statistical, billing, or scheduling purposes. The accounting tool currently available needs to be further hardened and harmonised with the mechanisms deployed on the production infrastructure.

*Compute Element*

The Compute Element is a set of services that provide homogenous, managed, and secure access to heterogeneous, remote computing fabrics. It provides structured and secure mechanisms to allow higher level services or application clients to submit and control jobs. The activity will concentrate on the WS-I based compute element developed during the previous phases of the project. A significant amount of work will be devoted to standardisation and interoperation with other infrastructures also through the continuation of the collaboration with Condor and Globus.

*Storage Element*

The Storage Element is a set of services that provide access to storage resources. While relying on externally provided storage systems offering an SRM interface, POSIX-like I/O and mechanisms for the management of the service have to be provided. Particular attention will be paid in the management of storage classes (disk-based, tape-based or hybrid) and of data persistency (temporary, semi-permanent, permanent).

**Higher level Grid services***Job services*

Even though jobs may be submitted directly to compute elements, a general purpose workload management system is provided as part of the gLite distribution. It includes the ability to do resource brokering, input and output handling, automatic resubmissions on behalf of the users in case of failures; tools to track the status of the jobs during their life and a system that provides a long term archive of job information with data mining capabilities.

*Data Management services*

In addition to basic data management client tools and libraries, higher level tools are provided as part of the gLite distribution. This includes a reliable asynchronous file transfer system, a simple file and replica catalogue and support for secure data management and data encryption.

**1.5.1.2. Task description**

The work performed by JRA1 on these services can be clearly separated into two main tasks: middleware support, and research & development and standardisation. In terms of effort, the engineering and R&D tasks will have a ratio of approximately 2 to 1.

**1.5.1.2.1. TJRA1.1 Middleware support**

This is an engineering task to maintain and gradually improve the reliability, performance, usability, and manageability of the existing services. This is the core task for the middleware activities, which comprises several aspects:

- Address the bugs as found on the EGEE Production and Pre-Production Systems and provide patches.
- Act as second line support to the Global Grid User Support (GGUS).
- Address the short/medium term requests of the applications as decided by the TMB.
- Address the needs of the infrastructure by improving the manageability of the middleware in terms of deployability, reliability and usability.
- Provide the internal testing of new or modified software.
- Participate in the definition of the gLite releases together with the SA3 activity.
- Maintain a web page with the relevant information needed by middleware users (including other project activities).

As explained in the SA3 description, the teams working on this task will be co-located with the relevant SA3 teams responsible for testing and certifying these services. This is expected to significantly improve the efficiency of testing and certification.

In order to improve the take-up of the gLite middleware it should be possible to deploy it on as many platforms as possible. Even though interoperability with other infrastructures should happen in the

long term through the adoption of standard interfaces, we also need to follow a pragmatic approach in providing a reasonable level of interoperability with other infrastructures on which some of the EGEE applications need to operate. Changes in the middleware may be needed in order to provide the interoperability with these other infrastructures.

Even though the coordination of both the porting to other platforms and interoperability is taken care of by the SA3 activity, a significant amount of effort is required from the middleware developers.

#### **1.5.1.2.2. TJRA1.2 Research & development and standardisation**

This task will work on possible future developments of services, standards, interfaces, and concepts. It will produce demonstration prototypes that will be exposed to users for feedback and might eventually be handed over to TJRA1.1 for turning them into products. Special focus will be laid on the management of VO policies and of the authorisation process, including an improved interfacing with existing systems as Shibboleth; an improved system for handling complex workflows; improved throughput for job management and data transfer systems.

For what concerns standardisation activities the most relevant areas are the use of XACML for VO policy management; the extension in the use of SAML-based attributes for authorisation; the standardisation of the information system tools and schemas; the evolution of the SRM interface for data access; the standardisation of the interface to the computing resources (Basic Execution Services) and job description (Job Submission Description Language); the standardisation of the usage records for accounting.

Through executing these tasks, JRA1 will:

4. ensure manageability, deployability, reliability and usability of core middleware services needed for a successful EGEE operation;
5. satisfy the increasingly sophisticated and inclusive requirements of EGEE's scientific user communities and beyond with general Grid services;
6. work towards implementation of established standards and guide standardisation processes by active participation in relevant bodies.

#### **1.5.1.3. Management structure**

The JRA1 activity will be managed by an activity manager responsible for the overall execution of the JRA1 programme of work, quality assurance, reporting, and partner coordination, who will be supported by a deputy activity manager. A security architect will ensure overall coherence of security aspects in JRA1. This will form task **TJRA1.3: Activity management**.

Each partner will have clear responsibilities for what concerns the different middleware components supported. This responsibility is assigned according to the competence demonstrated by the partners in the past phases of the project. All partners are structured into four clusters:

- INFN, with Datamat
  - with competence in the Job Management, Computing Element, Security, Accounting areas;
- CERN, with STFC
  - with Competence in the Data Management, Storage Element and Information System areas;
- CESNET
  - with competence in the Job Management and Security areas;
- UH, with CSC, FOM, UvA, SWITCH and Manchester
  - with competence in the Security and Data Management areas.

Each cluster will be responsible for the components that are supported by its partners and appoint a cluster head that will represent the cluster in the JRA1 steering group that together with the activity manager, the activity manager deputy and the security architect performs the daily management of JRA1. Given the size of the INFN-Datamat cluster, it is foreseen to have a representative for Datamat too. The steering group will meet weekly.

The internal quality assurance of JRA1 will be implemented using the integration tools and statistics provided by SA3. These will be monitored by the JRA1 steering group.

JRA1 will closely collaborate with SA3 via the co-located teams and the Engineering Management Team (EMT) that manages short-term release priorities for the gLite middleware distribution. This involves managing updates, scheduling changes and defining short-term developer priorities. It is chaired by SA3 activity and hosts representatives from SA3, JRA1 and SA1. The JRA1 members of the EMT are the members of the JRA1 steering group. The developers of the individual components are invited to the EMT according to the needs.

JRA1 will interact with SA1 and NA4 via the TMB to ensure its developments is matching the needs of operations and applications.

Security related aspects will be coordinated by the security architect via the Security Coordination Group (SCG see section 2.1). The security architect will also coordinate the MiddleWare Security Group (MWSG) that is the meeting place for security architects and security knowledgeable persons from EGEE, OSG, OMII-Europe and other Grid projects.

#### 1.5.1.4. Activity summary and manpower

<b>Activity Number</b>	JRA1	<b>Start date or starting event:</b>				01.04.2008
<b>Activity title</b>	Middleware re-engineering					
<b>Activity Type</b>	RTD					
<b>Participant number</b>	1	8	16	18	30	37
<b>Participant short name</b>	CERN	CESNET	FOM	UVA	SWITCH	INFN
<b>Person-months per participant</b>	168	96	48	12	48	348
<b>Participant number</b>	38	49	50	79	83	
<b>Participant short name</b>	ED	UH.HIP	CSC	STFC	UNIMAN	
<b>Person-months per participant</b>	72	84	12	12	24	

#### Objectives

The overall goal of JRA1 is to provide and maintain selected middleware services of the gLite distribution satisfying the basic requirements of users in terms of functionality and performance as well of operations in terms of manageability and *deployability*. While pursuing this goal emphasis will be laid on evolving the services towards interoperable solutions, wherever possible by adhering to established standards. JRA1 will particularly focus on providing robust foundation services (security infrastructure, information, monitoring and accounting systems, access to compute resources (compute element) and access to storage resources (storage element)) ensuring efficient operation of the EGEE infrastructure as well as selected higher level Grid services identified in previous phases of the EGEE programme. High potential future developments of services, standards, interfaces, and concepts will be prototyped and exposed to users in order to improve the EGEE infrastructure.

#### Description of work and role of partners

- TJRA1.1: Middleware support

This is the core task for JRA1 specifically focusing on maintaining the services deployed on the production infrastructure and on all platforms defined by the TMB by addressing bugs, providing patches, and act as second line support to GGUS. It will also address the short and medium term development requests formulated by the TMB focusing on the needs of applications and operations alike. In addition, pragmatic changes needed for interoperation with other infrastructures will be implemented. All developments will be appropriately tested

before released to SA3. The effort needed for this task is 603 PM, provided by: CERN 129 PM (with lead in Information System, Storage Element and Data management); CESNET 63 PM; STFC 6 PM; ED 48 PM; INFN 234 PM (with lead in Compute Element and Job Management); UNIMAN 21 PM; SWITCH 18 PM; UH.HIP 42 PM (with lead in Security); CSC 3 PM; FOM 30 PM; UvA 9 PM.

- TJRA1.2: Research & development and standardisation

This task will work on possible future developments of services, standards, interfaces, and concepts. It will produce demonstration prototypes that will be exposed to users for feedback and might eventually be handed over to TJRA1.1 for turning them into products. Special focus will be laid on the management of VO policies and of the authorisation process, including an improved interfacing with existing systems as Shibboleth; an improved system for handling complex workflows; improved throughput for job management and data transfer systems. The effort needed for this task is 243 PM, provided by: CERN 33 PM (with lead in Information System, Storage Element and Data management); CESNET 27 PM; STFC 6 PM; Datamat 18 PM; INFN 84 PM (with lead in Compute Element and Job Management); UNIMAN 3 PM; SWITCH 18 PM; UH.HIP 24 PM (with lead in Security); CSC 9 PM; FOM 18 PM; UvA 3 PM.

- TJRA1.3: Activity Management

The purpose of this task is to manage the JRA1 activity and coordinate the effort of activity partners in order to fulfil the JRA1 programme of work. As explained above, the activity will be managed by an Activity Manager, a Deputy Activity Manager, and a Security Architect. These persons plus the heads of the four development clusters form the JRA1 steering group. This task also covers the necessary quality assurance activities, coordination with other activities, in particular SA3, SA1, and NA4 through the EMT and TMB, as well as contributions to EGEE's policy and sustainability work. The effort needed for this task is 78 PM, provided by: CERN 6 PM; CESNET 6 PM; ED 6 PM; INFN 30 PM (including activity coordination); SWITCH 12 PM (with responsibility of the Security Architecture); UH.HIP 18 PM (including activity deputy).

### JRA1 Deliverables

Deliverable No	Deliverable title	Delivery date	Nature	Dissemination Level	Deliverable description
DJRA1.1	Report on Middleware Service Engineering and plans for the second year	11	R	PU	Report on progress of engineering, services delivered to SA3, compliance with TCG requirements, standardisation and cooperation results. This includes the status of platform support and interoperability.
DJRA1.2	Report on EGEE-III Security	22	R	RE	Report on operational and middleware security in EGEE-III. This documents the achievements of the project and how this has been coordinated with other national and international grids. Proposals for future directions are presented.
DJRA1.3	Final report on progress of middleware engineering	23	R	PU	Final report on progress of engineering, services delivered to SA3, compliance with TCG requirements, standardisation and international cooperation results. This includes the status of platform support and interoperability.

### JRA1 Milestones

Milestone No	Milestone title	Delivery date	Description and means of verification
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<b>Milestone No</b>	<b>Milestone title</b>	<b>Delivery date</b>	<b>Description and means of verification</b>
MJRA1.1	Middleware support web page	1	Deploy a web site with the relevant information needed by middleware users (including other project activities). It should include links to support contacts to be kept up to date during the life of the project.
MJRA1.2	Activity Assurance and measurement plan Quality and	2	Definition of the activity-internal QA measurements and procedures. This will provide input to DNA1.3.
MJRA1.3.1	Functional Description of Grid Components and associated Work Plan	3	Functional description of services reengineered by JRA1 in response to TCG requirements including initial design and associated work plans. A live version of the work plans have to be maintained on the Middleware web page.
MJRA1.4	gLite Architecture Security	4	Overall (global) security architecture of the gLite middleware. It should summarize the current situation and describe the evolution during the lifetime of the project.
MJRA1.3.2	Update of Functional Description of Grid Components and associated Work Plan	13	Update of Grid Components functional description and associated Work plan.

## **2. Section 2: Implementation**

### **2.1 Management structure and procedures**

High quality management will be the key to the success of the EGEE-III CCPCSA (I3) project. The Management of the project will build on the experience gained throughout the first two phases of the EGEE programme (EGEE and EGEE-II Projects). The size of the Consortium and its ambitious programme of work call for a highly effective and well-structured management structure, adapted to cover all administrative, financial and technical aspects. The programme has seen a constant increase in the number of partners, of involved countries, sites, users and collaborating projects over its lifetime.

The management structure has been designed to deal with the project management challenges and problems associated with a diverse collection of scientific and business partners. Our major focus is to ensure that the management of EGEE-III provides the continuous environment to deliver production level services to a large distributed set of users and at the same time, implement structural changes to prepare for the longer term sustainable operation.

As explained in section 2.3 below, in order to manage the large number of partners, the EGEE-III consortium will be structured in federations (13 in this project) clustering countries on a regional basis. In addition, the Joint Research Unit (JRU) instrument prototyped in EGEE and EGEE-II is being expanded to all countries to prepare the ground for long term sustainability by promoting national standards.

The intricacies of the consortium relations will be governed by a detailed Consortium Agreement, drawn up with the assistance of the legal services of the coordinating partner in close collaboration with the participating institutes.

#### **Detailed structure**

The complexity of the tasks undertaken in EGEE-III, together with the broad range of activities and size of the Consortium require a flexible and effective central management organisation. It will be empowered to lead and control the overall development of the Joint Research Activities and the provision of the planned services.

The project will be led by the Project Director, supported by the relevant administrative, financial and technical support team in the management activity NA1 (as described in 1.3.1), who will report directly to and liaise with the European Commission. He will be assisted by a Technical Director who will also as his deputy. The Consortium will be represented by a Project Management Board (PMB), composed of one member per federation, which will meet quarterly with the Project Director and Technical Director, who report to this body. The chair of the PMB will be elected by its members. The PMB will also nominate individual members to work closely with one of the project activities described in section 1. These so-called “godparents” will ensure dialogue between the strategic and executive planning.

The Management of the project will interact closely with the EGI-DS project management team to check the progress of the parallel goals and ensure carefully timed milestones are met to ensure the progress of the projects towards a sustainable model. These milestones, agreed with the EGI-DS management, are illustrated in Figure 5 in section 1.4.1. This interaction is paramount for the overall coherence of plans, both technical and strategic.

The Project Management will also be advised by an External Advisory Committee (EAC), composed of internationally recognised experts in the Grid field, already active in EGEE and EGEE-II<sup>2</sup>, whose work proved invaluable in terms of an external perspective to prepare for important milestones such as

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<sup>2</sup> In EGEE-II, the EAC is composed of the following members: David Snelling (Fujitsu, U.K.), Carole Goble (University of Manchester, U.K.), Frederica Darema (NSF, USA), Phil Andrews (Oak Ridge National Laboratory, USA), Eike Jessen (DFN, Germany) and one business representative, Rolph Kubli (EDS Information Business GmbH, Zurich, Switzerland).

the Periodic Project review. They will advise on the validity and relevance of the project plans in an international and worldwide Grid context.

The plans drawn up by the Project Management will be presented and discussed annually at the Project Conferences. The Project Conferences will also host meetings of the EAC, of the Collaboration Board (CB, composed of one representative per participating institute or JRU), and of the Administrative Federation Committee (AFC), set up to monitor the administrative aspects, and in particular the reporting process (which meets on a quarterly basis).

The technical and scientific management structure draws on the activities, managed individually as described in section 1, with an overall management structure to ensure the coherence of the project. This management structure permits ongoing monitoring of the progress of the project against the work plan, with effective problem detection and resolution processes in place. It will be composed as follows:

- The Quality Assurance coordinator will be responsible for ensuring that the agreed project quality criteria are applied to all aspects of the project.
- The head of the operations activity will be responsible for continuously operating the EGEE production Grid infrastructure.
- The head of the User Community support and expansion will be responsible for guiding the application domains in their migration to the Grid infrastructure and ensure their requirements are met via the work of the Grid operations and middleware re-engineering activities.
- The managers of the middleware re-engineering and integration, testing, and certification activities will be responsible for providing the gLite middleware distribution ready for deployment.
- The security coordination group, composed of the leaders of the various security tasks of the project, will ensure a coherent security strategy and implementation throughout the project.
- The managers of the Dissemination, Outreach and Communication, and Training and Induction activities will ensure that the activity of the partners responsible for dissemination, education, training, consulting and outreach are progressing properly and are on track and in-line with the overall project plans and progress.
- The head of networking support activity will be responsible for ensuring the provision of network facilities for the Grid infrastructure and overseeing the relations with the NRENs and GÉANT.
- The manager of the business activity will be responsible for ensuring the business partners' and interested companies' requirements are processed and addressed.

All activity managers and heads will be nominated by the Project Director and approved by the Project Management Board. They will be 100% dedicated to the project.

The executive management of the project will be coordinated via two executive boards, separating the technical management (Technical Management Board) and the overall coordination of the project (Activity Managers' Board). Both boards will report to the Project Director.

#### **Activity Managers' Board (AMB)**

The AMB will oversee the progress of the project with respect to the Description of Work and will meet every fortnight (in person or by telephone conference calls). It will ensure the daily administrative aspects of the management of the project (including reporting, deliverables and milestones monitoring, key event coordination, and relations with collaborating projects). Further, the



AMB will coordinate and plan the federation reviews with the QA coordinator to ensure the active contribution of all project participants.

The Project Director will chair and manage this board and the Technical Director will deputise the Project Director in this role. The AMB is composed of all the managers of the activities described in section 1, complemented by the Quality Assurance coordinator, as well as the head of the Related Projects Liaison Office (NA5).

Issues not resolved in the AMB will be forwarded by the Project Director to the Project Management Board.

### **Technical Management Board (TMB)**

The TMB will oversee the technical coordination of the project ensuring the project provides a production-level Grid infrastructure that meets the requirements of its various user groups. It builds on the success and experience of EGEE-II's Technical Coordination Group (TCG), expanding in representation and tasks. The TMB will be chaired by the Technical Director and brings together the technical activities of the project. It is composed of:

- The operations manager (SA1);
- 2 or 3 site representatives with a background in different site characteristics;
- A security representative;
- The managers of the middleware (JRA1) and integration, testing, and certification (SA3) activities;
- The manager of the User Community support and expansion activity (NA4);
- Representatives of the strategic discipline clusters (NA4) and the business activity (NA6);
- The networking support manager (SA2).

Additional experts may be invited to the TMB based on the discussion topics.

Specifically, the TMB will:

- assess requirements from applications and operations;
- endorse and supervise the work plans for middleware re-engineering (JRA1), integration, testing, and certification (SA3), as well as strategic discipline clusters (NA4);
- determine the project's policies for adoption of and contribution to standards;
- provide the technical oversight and strategy for the overall Grid operations.

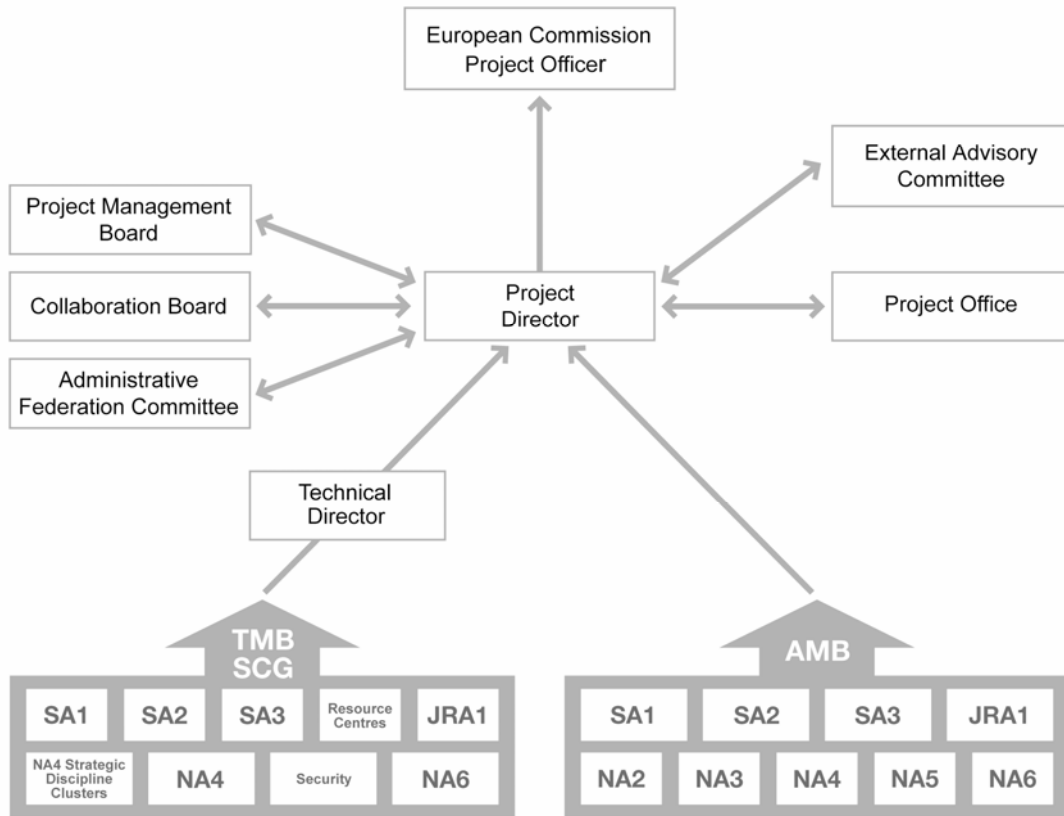
Following the EGEE-II TCG model, the TMB will create short-lived working groups to resolve specific technical issues. These working groups will closely collaborate with other projects to ensure a common approach to the respective problems.

The TMB will liaise with the Resource Allocation Group (SA1) and the direct user support group (NA4) to ensure proper resource allocation to users and the availability of quality documentation.

The TMB will meet weekly to every fortnight either in person or by phone.

The TMB will regularly inform the AMB on its progress and plans to ensure a common understanding throughout the project. Technical issues encountered in the AMB will be forwarded to the TMB by the Technical Director for resolution there. Issues not resolved in the TMB will be escalated to the PMB via the Technical Director and Project Director.

The overall management structure is schematically presented in Figure 8 below:



**Figure 8: Management structure and reporting lines of the EGEE-III project**

### Security Coordination

A Security Coordination Group (SCG) will coordinate the overall security aspects in EGEE which includes architecture, deployment, standardisation, auditing, and cross-project concertation. This task will be performed in close collaboration with other projects world-wide to ensure a common security approach which will eventually enable interoperability between different Grid infrastructures.

It is composed of the chairs of the Joint Security Policy Group (SA1), the EUGridPMA liaison person (SA1), the chair of the Grid Security Vulnerability Group (SA1), the chair of the Operational Security Coordination Group (SA1) and the chair of the Middleware Security Group (JRA1). The chair of the SCG will rotate among these persons.

The Security Coordination Group will focus on:

- Representing security in the TMB;
- Monitoring the collective project's security status and produce the related reports;
- Organising the bi-annual EU security workshops, aiming at interoperability and interoperation with other EU projects;
- Representing the security aspects of the project in other international forums and initiate collaborations with projects not yet represented in the various security groups;
- Coordinating security auditing activities;
- Develop and use an Information Security Management System (ISMS) suitable for EGEE-III and beyond, following the work of ISO/IEC (Plan-Do-Check-Act) and NIST.

### All Activity Meetings

On a quarterly basis the TMB and AMB will hold expanded meetings including all key technical project members and representatives of the major user communities. At these meetings the overall project status will be reviewed, potential changes in direction assessed, major events such as periodic

EC reviews prepared, and activity plans endorsed. These meetings will coincide with major EGEE-III events such as the User Forum or the EGEE annual Conference.

**Conflict resolution and escalation Procedure**

All Activities described in section 1 have defined a suitable management structure and quality assurance process which allows for early detection and resolution of issues within the activity. Issues that cannot be resolved within the activity will be forwarded to the TMB when of a technical nature, and to the AMB when identified as an administrative coordination issue. As described above, issues not resolvable within the TMB will be forwarded to the AMB, and should this not be sufficient, to the PMB.

## **2.2 Individual participants**

### 2.3 Consortium as a whole

The EGEE-III Consortium builds on the experience of its predecessors, EGEE (71 partners) and EGEE-II (91 partners), which saw the size of the collaboration grow steadily. The EGEE-III Consortium is an evolution of the existing EGEE-II Consortium which has proved very successful in engaging resources across the ERA. The engagement of the participants is illustrated by their provision of computational and storage resources, not funded by the project, as well as significant additional human resources to participate in this ambitious programme of work (this is detailed further in section 2.4).

In order to attain the goal of a sustainable infrastructure, the EGEE-III has committed to structuring its consortium on a national basis, taking the form of Joint Research Units. This is having a structuring effect on the ERA and provides the groundwork for the National Grid Infrastructures which will be the basis of the long term sustainable model. Table 10 below lists those Joint research Units foreseen to structure the consortium and which will form the basis of the Consortium in the Grant Agreement. The Consortium also includes commercial partners engaged in Technology Transfer to a number of business sectors, including aerospace, finance, automotive and petro-chemical. These partners will foster the outreach of EGEE-III to potential business users, as well as potential commercial Grid service providers. It will have strong links with business communities via selected companies who are active in Grid technologies, with deployment in various business sectors. This therefore represents a collaboration counting a variety of organisations involved in diverse scientific disciplines, not only IT technology. Further, it is strongly linked with the underlying GEANT network via the DANTE organisation and the National Research and Education Networks (NRENs).

**Table 10: List of the Joint Research Units which will constitute the EGEE-III Consortium**

Joint Research Unit name and country	Member institute (name, city)	Member institute short name
Uk eScience, United Kingdom	Science and Technology Facilities Council, Didcot – <b>Lead beneficiary</b>	STFC
	Delivery of Advanced Networking Technology to Europe Ltd, Cambridge	DANTE
	The University of Edinburgh, Edinburgh	UEDIN
	University of Glasgow, Glasgow	Glasgow
	Imperial College of Science, Technology and Medicine, London	Imperial
	Queen Mary and Westfield College, London	QMUL
	The University of Manchester, Manchester	UNIMAN
	The Chancellor, Masters and Scholars of the University of Oxford, Oxford	UOXF.DL
Bulgarian Grid Consortium (BGGC), Bulgaria	Institute for Parallel Processing of Bulgarian Academy of Sciences - <b>Lead beneficiary</b>	IPP-BAS
	Institute of Mechanics, Bulgarian Academy of Sciences	IM-BAS
	Faculty of Mathematics and	FMI-SU

Joint Research Unit name and country	Member institute (name, city)	Member institute short name
	Informatics, Sofia University	
CRO-GRID, Croatia	University Computing Centre, University of Zagreb, Zagreb - <b>Lead beneficiary</b>	SRCE
	Ruder Boskovic Institute, Zagreb	RBI
	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture, University of Split, Split	FESB
	National Information Infrastructure Development Institute, Budapest	NIIF
ES-GRID, Spain	Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas, Madrid	CIEMAT
	Consejo Superior de Investigaciones Científicas, Madrid	CSIC
	Instituto de Físicas de Altas Energías, Barcelona <b>lead Beneficiary</b>	IFAE/PIC
	Universidad Politécnica de Valencia, Valencia	UPV
	Entidad Pública Empresarial RED.ES, Madrid	RED.ES
	Fundación Centro Tecnológico de Supercomputación de Galicia, Santiago de Compostela	CESGA
	Universidad Complutense de Madrid, Madrid	UCM
	Universidad de Zaragoza, Zaragoza	UNIZAR
HGCC, Hungary	Magyar Tudományos Akadémia KFKI Részecske és Magfizikai Kutatóintézet (KFKI Research Institute for Particle and Nuclear Physics, Hungarian Academy of Sciences), Budapest, <b>lead Beneficiary</b>	KFKI-RMKI
	Computer and Automation Research Institute, Hungarian Academy of Sciences, Budapest	MTA SZTAKI
	Budapesti Műszaki és Gazdaságtudományi Egyetem, Budapest	BME
	Eötvös Loránd University Budapest	ELUB
	Nemzeti Információs Infrastruktúra Fejlesztési Intézet (NATIONAL	NIIF

Joint Research Unit name and country	Member institute (name, city)	Member institute short name
	INFORMATION INFRASTRUCTURE DEVELOPMENT INSTITUTE), Budapest	
Italian Grid Infrastructure, Italy	Istituto Nazionale di Fisica Nucleare - <b>lead Beneficiary</b>	INFN
	Ente per le Nuove tecnologie, l'Energia e l'Ambiente	ENEA
	Consiglio Nazionale delle Ricerche	CNR
	Istituto Nazionale di Astrofisica	INAF.
	Istituto Nazionale di Geofisica e Vulcanologia	INGV
	Università degli Studi di Napoli Federico II	UNINA.
	Università della Calabria	UNICAL
	Sincrotrone Trieste S.C.p.A.	ELETTRA
	Consorzio COMETA	COMETA
	Consorzio COSMOLAB	COSMOLAB
	Consorzio SPACI	SPACI
	Associazione "Consortium GARR	GARR
Centrale Research, France	CENTRALE RECHERCHE S.A. <b>Lead Beneficiary</b>	CRSA
	Ecole Centrale des arts et manufactures de Paris	ECP
HellasGrid, Greece	University of the Aegean, Syros	AEGEAN
	Center for Integrated Research for the Information Society, Athens	ATHENA
	Athens University of Economics and Business, Computer Science Division	AUEB
	Aristotle University of Thessaloniki, Thessaloniki	AUTH
	Center for Research & Technology Hellas, Thessaloniki	CERTH
	Research Academic Computer Technology Institute, Patras	CTI
	Hellenic National Meteorological Service	EMY
	Greek Research and Technology Network S.A. – Lead beneficiary	GRNET
	Institute of Accelerating Systems and Applications, Athens	IASA
	Institute of Communication and Computer Systems, Athens	ICCS

Joint Research Unit name and country	Member institute (name, city)	Member institute short name
	Institute of Computer Science-Foundation for Research and Technology Hellas, Heraclion	ICS-FORTH
	National Centre for Scientific Research "Demokritos", Athens	NCSR-DEMOKRITOS
	National Observatory of Athens, Athens	NOA
	National Technical University of Athens, Athens	NTUA
	University of Pireaeus, Pireaeus	UNIPI
	University of Athens, Athens	UoA
	University of Crete, Heraclion	UOC
	University of Ioannina, Ioannina	UOI
	University of Macedonia, Thessaloniki	UOM
	University of Patras, Patras	UPATRAS
	University of Thessaly, Volos	UTH
Russain Data Intensive Grid (RDIG), Russia	Russian Research Centre "Kurchatov Institute", Moscow - <b>Lead beneficiary</b>	RRC KI
	Skobeltsyn Institute of Nuclear Physics of Lomonosov Moscow State University, Moscow	SINP MSU
	Joint Institute for Nuclear Research, Dubna	JINR
	State Research Center of Russian Federation - Institute for High Energy Physics, Protvino	IHEP
	Federal State Unitary Enterprise "State Scientific Center of the Russian Federation – Institute for Theoretical and Experimental Physics", Moscow	ITEP
	Petersburg Nuclear Physics Institute of Russian Academy of Sciences, Gatchina	PNPI RAS
	Keldysh Institute of Applied Mathematics of the Russian Academy of Sciences, Moscow	KIAM RAS
	Institute of Mathematical Problems of Biology of Russian Academy of Sciences, Pushchino	IMPB RAS
	Geophysical Center of the Russian Academy of Sciences, Moscow	GC RAS



Joint Research Unit name and country	Member institute (name, city)	Member institute short name
VR-SNIC< Sweden	Vetenskapsrådet (Swedish Research Council)- Swedish National Infrastructure for Computing, Uppsala- <b>Lead beneficiary</b>	SNIC
	The Royal Institute of Technology, Stockholm	PDC
	Umeå University, Umeå	HPC2N
	Linköping University, Linköping	NSC
D-Grid, Germany	Forschungszentrum Karlsruhe GmbH, Karlsruhe - <b>Lead Beneficiary</b>	FZK
	Stiftung Deutsches Elektronen-Synchrotron, Hamburg	DESY
	Deutsches Klimarechenzentrum GmbH, Hamburg	DKRZ
	Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V., München	Fraunhofer
	Gesellschaft für Schwerionenforschung GmbH, Darmstadt	GSI
	Technische Universität München, München	TUM
	Deutsches Forschungsnetz e.V., Berlin	DFN
ROGRID, Romania	National Institute for R&D in Informatics, Bucharest - <b>Lead beneficiary</b>	ICI
	University Politehnica of Bucharest – National Center for Information Technology	UPB
	National Institute for Physics and Nuclear Engineering, Bucharest	NIPNE
	National Institute for Aerospace Research, Bucharest	INCAS
	University of Bucharest	UniBuc
	West University of Timisoara – Computer Science Department	UVT
	Technical University of Cluj- Napoca – Computer Science Department	UTCN
PL-Grid Poland	Academic Computer Centre CYFRONET AGH, Krakow - <b>Lead beneficiary</b>	CYFRONET
	Interdisciplinary Centre for Mathematical and Computational Modelling, Warsaw	ICM

Joint Research Unit name and country	Member institute (name, city)	Member institute short name
	Poznan Supercomputing and Networking Centre, Poznan	PSNC
	Wroclaw University of Technology, Wroclaw Centre for Networking and Supercomputing, Wroclaw	PWR-WCSS

The Consortium also comprises international partners from Asia Pacific, Russia and the USA to ensure the global reach of the project and to represent Europe on the international stage for Grid infrastructures. This is further detailed in section 2.3.ii below. The countries participating in the project are shown in Figure 9.



**Figure 9: Countries in the EGEE-III Consortium**

The EGEE-III consortium will be composed of partners from all European States, Asia Pacific, Russia and the USA, thus covering over 30 countries worldwide. To cope with the organisational aspects of a consortium of this scale, the concept of federations has been introduced, clustering participants on a geographical basis as follows:

- Asia Pacific
- Benelux
- Central Europe
- CERN
- France
- Germany and Switzerland
- Italy
- Nordic countries
- Russia
- South West Europe

- South East Europe
- UK and Ireland
- USA

This organisation with federations and JRUs will ensure the management and administration of the consortium is facilitated through the Project Management Board and Administrative Federation Committee (both covering all federations) described in the previous section. All partner institutes or JRUs will be represented in the Collaboration Board.

Finally, the Consortium includes partners that are involved both in the EGEE programme and collaborating Grid infrastructure and applications projects to ensure coordination between the programmes of Work and enable transfer of technology and knowledge. Section 3 provides further details of the collaborative aspects of EGEE-III.

i) Sub-contracting

No Subcontracting is foreseen in this proposal.

ii) Other countries

Given the global scope of the Grid empowered infrastructure proposed, it is essential to collaborate with Grid initiatives in so-called “third party countries”, “associated candidate countries” and “associated countries”: Australia, Croatia, Korea, Israel, Japan, Norway, Russia, Serbia, Switzerland, Taiwan, Turkey, and US institutes are proposed as partners as their collaboration is essential for the success of the project. EC funding is requested for Croatian, Israeli, Norwegian, Swiss, Serb, Turkish and Russian institutes to take on key roles in the programme of work and has been included in the overall EGEE-III project budget and specified in each activity. Modest EU funding to partially cover travel costs is requested for selected individuals from institutes in Asia Pacific, Ukraine and the Americas to encourage their participation in major EGEE events. These limited travel funds will be held by the lead partner, CERN, and released on a case-by-case basis. The EU funds requested will ensure knowledge of the EGEE-III project will be disseminated in these countries, encourage the adoption of European technology and help build bridges with e-Infrastructure initiatives in other world regions.

**UKRAINE to be added**

Asia Pacific and USA

ASGC in Taiwan, CKSC and KISTI in Korea, RENCi and the University of Wisconsin Madison in the US have been important collaborators for the EGEE-II project (application support, co-development of middleware, interoperability between infrastructures, etc.). In EGEE-III, the Consortium will expand in the Asia Pacific rim to include KEK in Japan and the University of Melbourne in Australia.

The inclusion of these non-European institutes is important for EGEE because the project supports user communities of a global scale (notably in the fields of life science, earth science, particle physics and fusion). It is therefore essential that a high-level of cooperation with related infrastructures (Open Science Grid and TeraGrid in the US, NAREGI in Japan and national Grid infrastructures in Asia Pacific) is ensured.

iii) Additional partners

The EGEE-III consortium is open to engage with institutes worldwide wishing to contribute to the programme of work. Potential candidates and the terms and conditions of their participation will be discussed at the Project Management Board level.

## 2.4 Resources to be committed

In order to achieve the ambitious programme of work of EGEE-III, the Consortium is committing significant levels of computing resources and complementary manpower. The total manpower needed to implement the programme of work is 9938 Person Months as detailed in Table 11, of which more than 4500 Person Months are contributed by the partners using their own sources to complement EC funding. With this measure, the overall financial plan is deemed adequate for the proposed programme of work. The budget defined for the project has taken into account the experience gained in the EGEE and EGEE-II projects, in which audited costs statements have been established, and from which the figures for establishing the EGEE-III budget have been drawn. The manpower plan takes into account the experience gained in EGEE and EGEE-II, and defines the strict minimum necessary to achieve the ambitious goals of the programme of work.

This demonstrates the drive and commitment towards a long term, sustainable infrastructure for Europe. EC funded and complementary human resources will together form teams which will execute the programme of work via the activities detailed in this proposal. All computing resources will be integrated in the EGEE infrastructure.

EGEE-III is requesting less EC funds than EGEE-II while operating a larger infrastructure for an increased user base and, despite inflation over the 2 years, this represents significant real-cost savings.

**Table 11: Summary of staff effort (in Person Months)**

Participant Number	Participant Short name	NA1	NA2	NA3	NA4	NA5	NA6	SA1	SA2	SA3	JRA1	Total Person Months
1	CERN	144	84		240	12		420		396	168	<b>1464</b>
2	JKU		5	8		12		21				<b>46</b>
3	BME		12	11								<b>23</b>
4	MTA SZTAKI			69	126							<b>195</b>
5	KFKI-RMKI							21				<b>21</b>
6	ELUB							11				<b>11</b>
7	NIIF							6				<b>6</b>
8	CESNET		6	8	21			58		24	96	<b>213</b>
9	UIBK			8	28			16				<b>52</b>
10	II SAS		6	22	33			32				<b>93</b>
11	JSI		6		10			16				<b>32</b>
12	PSNC			10				28		24		<b>62</b>
13	ICM UW		6	18				36.5				<b>60.5</b>
14	CYFRONET				68			87.5				<b>155.5</b>
15	Srce		6	12				47				<b>65</b>
16	FOM							90		24	48	<b>162</b>
17	SARA				17			102				<b>119</b>
18	UvA										12	<b>12</b>
19	RUG				12			12				<b>24</b>
20	KNMI				21							<b>21</b>
21	VUB		12	12	12	4						<b>40</b>
22	TUM						16					<b>16</b>
23	DESY							60				<b>60</b>
24	DKRZ				23	2						<b>25</b>

<b>Participant Number</b>	<b>Participant Short name</b>	<b>NA1</b>	<b>NA2</b>	<b>NA3</b>	<b>NA4</b>	<b>NA5</b>	<b>NA6</b>	<b>SA1</b>	<b>SA2</b>	<b>SA3</b>	<b>JRA1</b>	<b>Total Person Months</b>
25	Fraunhofer				33			68				101
26	FZK		12		21			204				237
27	GSI							60				60
28	ETH Zurich			12	10	2		24				48
29	DFN								12			12
30	SWITCH										48	48
31	CRSA						10					10
32	CEA				23			24				47
33	CNRS			24	341			402	96			863
34	HEALTHGRID		36									36
35	CS SI	24					26					50
36	CGGV				21		6	24				51
37	INFN		6	144	161	18	3	420		96	348	1196
38	ED						48				72	120
39	CNR-ITB				23							23
40	INAF				25							25
41	UNIPMN				23							23
42	ENEA							12				12
43	TRUST-IT		12				29					41
44	UNICAL							10				10
45	UNINA							14				14
46	UNIPG.IT				23							23
47	GARR								12			12
48	SPACI							12				12
49	UH.HIP									12	84	96
50	CSC							24			12	36
51	SIGMA				30							30
52	VR-SNIC				20			120				140
53	IHEP			9				48				57
54	IMPB RAS							24				24
55	ITEP							60				60
56	JINR		6	15				52		10		83
57	KIAM RAS							36				36
58	PNPI RAS			18				36		10		64
59	RRC				48			72	6			126
60	SINP MSU		6		12			96		10		124
61	GC RAS				21							21
62	GRNET		12	30	116	34		131	18	30		371
63	IPP BAS		6	22				60				88
64	UCY			12				47		12		71
65	TAU		6	12		2		52				72
66	ICI		6	20				57				83

Participant Number	Participant Short name	NA1	NA2	NA3	NA4	NA5	NA6	SA1	SA2	SA3	JRA1	Total Person Months
67	IPB		6	22	6			55				89
68	TUBITAK		6	20				66				92
69	CSIC		6	18	64	2		78		8		176
70	LIP		6	9				100				115
71	CIEMAT				24			9				33
72	IFAE					2		124		12		138
73	UPV				36	4						40
74	RED.ES			20		2		28	6			56
75	CESGA							78		12		90
76	UNIZAR				24							24
77	UCM				81							81
78	TCD							36		36		72
79	STFC				12	4		208		36	12	272
80	UEDIN		6	108								114
81	Imperial		12		4			44				60
82	Glasgow				23			44				67
83	UNIMAN		12		12			44			24	92
84	UOXF.DL							32				32
85	QMUL		18									18
86	DANTE								3			3
87	KEK							24				24
88	AS		36	24	132	12		132		40		376
89	KISTI				30							30
90	CNU				126							126
91	UNIMELB		12	18	54							84
92	UWM											0
93	RENCI											0
<b>Total</b>		<b>168</b>	<b>371</b>	<b>735</b>	<b>2190</b>	<b>112</b>	<b>138</b>	<b>4355</b>	<b>153</b>	<b>792</b>	<b>924</b>	<b>9938</b>

In constructing the budget, the project has identified a need for non-manpower funds for:

- User Community building: 80k€ is requested for NA4 building new VO communities (as described in TNA4.3.1)
  - Encouraging business users to attend EGEE events: 40 k€ is requested for NA6 to fund travel costs for business speakers to participate in industry days (as described in 1.3.6.3);
  - Ensuring adequate dissemination with stands at events, adequate printing of material, etc.; 135 k€ is requested for NA2 to cover these costs (as described in TNA2.3 and TNA2.4);
  - Seed resources for new User Communities: 75 k€ is requested in SA1 (See 1.4.1.1);
  - To encourage participation to major EGEE events by representatives from non-European countries such as the USA, Ukraine, and Asia Pacific countries: 177 k€ is requested in NA1;
  - 33 k€ is requested to cover the costs of the certificates on the financial statements for partners who must provide them.
- **Total: 540K€**

Computing resources (take table from SA1).

Partners will be committing computing and storage resources. Rely on provision of GEANT.

Ian Bird must estimate the value of the computing resources committed by partners.

### 3. Section 3: Impact

#### 3.1 Collaborative arrangements and perspectives for their long-term sustainability

Since the start of the EGEE project programme in early 2004, the project has contributed to the structuring of the European Research Area (ERA) through the creation of regional federations (see section 2.3) which aim to leverage national resources in a more effective way to achieve broader European benefit.

Structuring work to prepare the grounds for the future of Grids has been undertaken by encouraging participating countries to organise themselves on a national basis, in view of forming so-called National Grid Initiatives, or NGIs. In cases where support from ministries to ensure the creation of a Grid Initiative is not yet secured, the Joint Research Unit (JRU) model offered as a special clause in the EC agreement has provided a starting point and a basis for structuring national collaborations (see Table 10).

The structuring effects of EGEE-III will extend beyond the original participants of EGEE and EGEE-II, as it will further the work with the Virtual Organisations in selected disciplines established during EGEE-II. The project is designed to interface closely with GÉANT2, to ensure that the deployed Grid profits fully from the established high-capacity and high-speed communications networks already available for all researchers in Europe. Following the EUDataGrid project, the Enabling Grids for E-science (EGEE) project began with two major application areas, High Energy Physics (HEP) and Biomedicine, and in its second phase it grew to support other research domains in areas as diverse as multimedia, astrophysics, archaeology, and computational chemistry. It supports researchers within Virtual Organisations (VOs), allowing them to collaborate, to share resources, and to access common datasets via the EGEE Grid infrastructure. Work with the Fusion research community is further illustration of the increased reliability and usage of the infrastructure. These communities will grow in the third phase of the project, and new applications will be approached, providing further users, new requirements and resources.

From the point of view of individual computer centres in Europe, the project effectively structures the exploitation of their resources by a very large number of VOs, providing more efficient and wider-ranging use of their facilities for all types of scientific applications, and increasing the added value of these investments to science. Ultimately, the project will promote the development of a consistent and well-integrated fabric of research infrastructures of the highest quality and performance in Europe and beyond, and this will in turn help increase the mobility of individuals and ideas, both within the field of Grid computing, and in the disciplines that will benefit from the established infrastructure.

EGEE has extended its reach and coverage through established, collaborating Grid projects. These include infrastructure projects to extend geographical coverage through Europe, Asia and the Americas, and applications projects which use the EGEE infrastructure for specific scientific fields and support projects in areas such as training or security (detailed in Table 11 below). It is expected that most of these projects will continue in parallel with EGEE-III. Table 13 lists those projects proposed in FP7 with which EGEE-III will also collaborate closely.

**Table 12: EGEE Collaborating Projects**

<b>Project and end date</b>	<b>Description</b>
@neurIST End date: 12/09	@neurIST will provide an IT infrastructure for the management, integration and processing of data associated with the diagnosis and treatment of cerebral aneurysm and subarachnoid haemorrhage.
ACGT End date: 12/09	The ACGT project is developing an advanced Grid architecture allowing the analysis and comparison of both clinical and genetic results within large scale databases in order to perform a fast diagnosis and to define accurate therapeutic countermeasures.
AssessGrid End date: 12/08	AssessGrid addresses the risk awareness and consideration in Service Level Agreement (SLA) negotiation, self-organising fault-tolerant actions, and capacity planning in Grids. AssessGrid and



Project and end date	Description
	EGEE aim to collaborate in the definition of concrete guarantee terms of SLAs.
BalticGrid End date: 04/08	BalticGrid aims to bring the knowledge in Grid technologies and use of Grids in the Baltic States to a level comparable to that in EU members states with a longer experience in the development, deployment and operation of Grids, primarily focusing on extending the EGEE infrastructure to the Baltic States.
BEinGRID End date: 11/09	The BEinGRID consortium is composed of 75 partners who are running eighteen business experiments designed to implement and deploy Grid solutions in industrial key sectors.
CEDPS	CEDPS will produce technical innovations for rapid and dependable data placement within a distributed high-performance environment, and the convenient construction of scalable science services providing reliable high-performance computation and data analysis requests from many remote clients.
CoreGRID End date: 12/08	The CoreGRID project aims at strengthening and advancing scientific and technological excellence in the area of Grid and Peer-to-Peer technologies.
CYCLOPS End date: 03/08	CYCLOPS aims to bridge the gap between the Grid and the GMES (Global Monitoring for Environment and Security) communities, making Civil Protection people aware of the services provided by Grid infrastructures, while letting Grid researchers know about Civil Protection's specific requirements.
DEGREE End date: 15/08	DEGREE project aims to bridge the Earth Science and Grid communities throughout Europe, ensure that Earth Science requirements are satisfied in Grid technology, and disseminate and promote uptake of Grid in wider Earth Science community.
DEISA End date: 04/09	DEISA is a consortium of leading national supercomputing centres that currently deploys and operates a persistent, production quality, distributed supercomputing environment with continental scope. It aims to enable scientific discovery by enhancing European capabilities in the area of high performance computing.
EC-GIN End date: 10/09	A collaboration of European and Chinese partners, EC-GIN will develop tailored network technology to support Grid applications. This will be supplemented with a secure and incentive-based Grid Services network traffic management system to balance network and Grid performance demands and resource use.
Edutain@Grid End date: 08/09	Edutain@Grid aims to develop of a Grid-based framework allowing responsive and interactive applications to exploit technology that has previously been applied to "big science" projects.
EMBRACE End date: 01/10	The EMBRACE project will optimise informatics and information exploitation by pure and applied biological scientists in both the academic and commercial sectors, and will work to integrate the major databases and software tools in bioinformatics, using existing methods and emerging Grid service technologies.
EUIndiaGrid End date: 09/08	EU-IndiaGrid is the first European and Indian Grid-focused project. It supports interconnectivity between EGEE and the Indian Grid infrastructures, Garuda India Grid and Department of Atomic Energy Grid.
GÉANT2 End date: 08/08	GÉANT2 is the seventh generation pan-European research and education network, successor to the pan-European multi-gigabit research network GÉANT.
g-Eclipse End date: 06/09	The g-Eclipse project aims to build an integrated workbench framework to access the power of existing Grid infrastructures. The general middleware independent framework from the g-Eclipse project is used in the development of the gLite middleware in the EGEE infrastructure.
Go4IT End date: 04/08	The Go4IT project provides "conformance to standards" test tools and services. The Go4IT test environment is based on the TTCN-3 language that simplifies the process of translating an existing standard into "Test Cases", put together as test-suites.
Health-e-Child End date: 12/09	Health-e-Child aims to develop an integrated healthcare platform for European pediatrics, providing seamless integration of traditional and new biomedical information sources. It will use gLite, on top of which high level medical services will be developed for end-user clinicians and other medical applications.
HealthGrid	Based on the Grid technologies, the project's vision is to create an environment where information at five levels of biological structure (molecule, cell, tissue, individual, population) can be associated to provide individualized healthcare.
int.eu.Grid End date: 04/08	int.eu.Grid aims to deploy and operate an interoperable production-level e-Infrastructure for demanding interactive applications. The project is working with the MPI working group of EGEE in order to deploy a consistent middleware for parallel computing on the Grid.
KnowARC End date: 05/09	The KnowARC project aims to improve and extend the existing state-of-the-art technology found in the Advanced Resource Connector (ARC) middleware. Among other things, KnowARC is

Project and end date	Description
	also working on the interoperability between ARC and gLite middleware.
myGrid	myGrid is a suite of components designed to support in silico science, encompassing workflow design and execution, data and metadata management and provenance collection. myGrid will provide a mechanism of interoperating and integrating between these resources using Taverna workflows.
NESSI	NESSI aims to provide a unified view for European research in Services Architectures and Software Infrastructures that will define technologies, strategies and deployment policies fostering new, open, industrial solutions and societal applications that enhance the safety, security, and well-being of citizens.
NESSI-Grid End date: 10/08	NESSI-Grid's objective is to actively assist NESSI in the implementation of its mission and achievement of its goals in Grid-related areas. NESSI-Grid will investigate users' needs and ways of satisfying them in close cooperation with Grid, Service Oriented Architecture, and IT Utilities agents.
OMII-Europe End date: 04/08	OMII-Europe aims to harvest open-source, Web-Services-based, Grid software components from across Europe and to supply these Grid services in a form that will enable them to interoperate across the gLite, UNICORE, and Globus platforms
OMII-UK End date: 12/09	OMII-UK aims to provide software and support to enable a sustained future for the UK e-Science community and its international collaborators. It is working with EGEE through OMII-Europe and ETICS.
OSG End date: 10/10	The OSG is a distributed computing infrastructure for large-scale scientific research. The OSG Consortium's alliance of universities, national laboratories, scientific collaborations and software developers brings petascale computing and storage resources into a uniform shared cyberinfrastructure.
SEE-GRID-2 End date: 04/08	The goal of SEE-GRID-2 is to advance and integrate the existing South East European Grid infrastructure and services, capitalise on the existing SEE-GRID human network to further strengthen scientific collaboration and cooperation among participating SEE communities, and achieve sustainability for regional and national eInfrastructures that will endure beyond the project's lifetime.
SIMDAT End date: 08/08	SIMDAT is delivering a Grid solution portfolio that is designed to meet the needs of industry. The portfolio offers Grid technologies and Grid-enabled problem solving environments that can be used to build domain-specific Grid solutions.
TeraGrid End date: 08/10	TeraGrid is an open scientific discovery infrastructure combining top class resources at nine partner sites to create an integrated computational resource. Using high-performance network connections, it integrates high-performance computers, data resources, tools, and high-end experimental facilities in the US.

**Table 13: List of FP7 projects with which EGEE-III will collaborate**

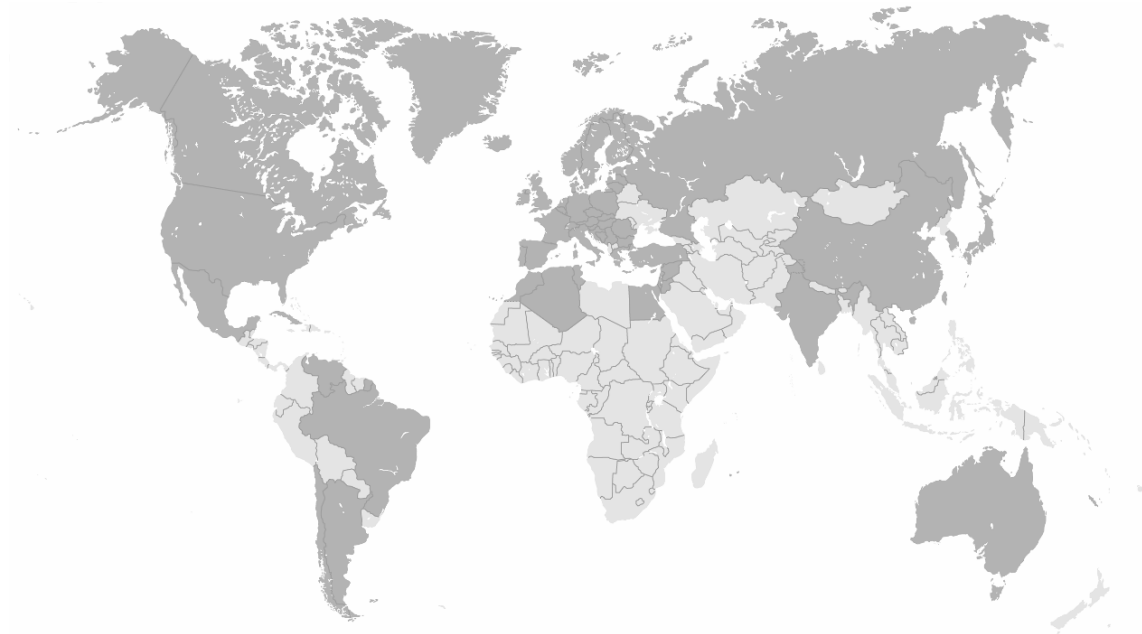
Project Name	Description	Collaboration with EGEE-III
DILIGENT for Science (D4Science)	The objective of this project is to consolidate and extend the e-Infrastructures built so far by the EGEE and DILIGENT projects in order to address the needs of scientific communities operating in Environmental Monitoring and Fisheries Resources Management areas. In particular, the project will provide such communities with facilities for creating Virtual Research Environments based on shared resources, including computational, storage, data, and service resources.	EGEE has already collaborated with the DILIGENT project in the context of FP6 for the set-up of a pre-production infrastructure based on EGEE pre-production service. With D4Science the already established collaboration will continue in FP7. D4Science will link and extend the EGEE production infrastructure and exploit gLite functionality in the context of virtual research environments, enabling repositories and services sharing in addition to computing and storage sharing of resources.

<b>Project Name</b>	<b>Description</b>	<b>Collaboration with EGEE-III</b>
Deployment of Remote Instrumentation Infrastructure (DORII)	DORII project aims to deploy e-Infrastructures for new scientific communities, relying on the integration of remote instruments in the infrastructure.	EGEE already has experiences with this kind of communities in particular via the LHC programme and is looking forward to reach out to other research communities via the DORII project. EGEE can offer access to the GILDA test bed and training courses in order for you to develop the demonstrator and access to experts. EGEE will use its funds to offer these services and hope that you will ensure your selected partner(s) have sufficient funds to visit EGEE experts and attend EGEE events.
Enabling Desktop Grids for e-Science (EDGeS)	EDGeS aims at bridging traditional Grid system (like EGEE) and desktop grids (like BOINC and XtremWeb).	EGEE can offer access to the GILDA test bed and training courses in order for you to develop the demonstrator and access to experts. EGEE will use our its funds to offer these services and hope that you will ensure your selected partner(s) have sufficient funds to visit EGEE experts and attend EGEE events.
e-NMR	The main objective is to optimise and extend the use of the NMR Research Infrastructures of EU-NMR through the implementation of an e-Infrastructure in order to provide the European bio-NMR user community with a platform integrating and streamlining the computational approaches necessary for bio-NMR data analysis (e-NMR). The e-NMR infrastructure will be based on the Grid infrastructure.	EGEE project is happy to advise on any middleware development required for the bio-NMR applications which will be available through the grid. EGEE can offer access to the GILDA testbed and training courses. We hope that you will ensure your selected partner(s) have sufficient funds to visit EGEE experts and attend EGEE events for further discussions. The eNMR proposal will give EGEE an excellent opportunity to work with a very interesting user community, and thus give us useful input on our infrastructure.
EU Fusion for ITER Applications (EUFORIA)	FUSION intends to use and build on EGEE-II infrastructure and experiences to provide grid technology for the ITER modelling activities in Europe supplementing the Fusion VO stellarator centric activities.	In collaboration with EGEE: EGEE can offer access to the GILDA test bed and training courses and we hope that your partners will visit EGEE experts and attend EGEE events in order to enhance exchange between developers and users. EGEE can also offer access to the production service, via the EUFORIA partners that are already participating to the EGEE production infrastructure. The EUFORIA proposal will give EGEE an excellent opportunity to get in contact with interesting user communities, and thus also get useful input on our infrastructure.

Project Name	Description	Collaboration with EGEE-III
SEE-GRID eInfrastructure for regional eScience (SEE-GRID-SCI)	SEE-GRID-SCI will strongly stimulate widespread Grid uptake by new cross-border user communities extending over the region, providing advanced capabilities to more researchers. The main aim is to foster scientific collaboration between various new Grid user communities in South-East-European countries, with an emphasis of strategic environmental applications such as seismology and meteorology. In parallel, other new user communities, both on regional and national level will be supported, including earth observation, bioinformatics, emergency pollution response, etc.	In collaboration with EGEE: The success of SEEGrid is crucial for achieving EGEE’s vision of extending the European Grid Infrastructure to new regions and open it for more application domains.

EGEE and collaborating efforts and initiatives are creating a global Grid infrastructure which covers a large majority of the world’s countries, as shown in Figure 10 below.

EGEE-III will build on and further foster cooperation with the regions around Europe and on an international scale. Cooperation with the US, Asia Pacific regions, including Japan and China, Latin America, and emerging areas like the Mediterranean, India and Africa, is fundamental for the future of Grids. In order to ensure that the project is visible and active in the global Grid arena and that the project can work constructively with the major Grid and Infrastructure projects and initiatives around the world, EGEE-III will pursue its work in collaboration with major world-wide players. These include the US NSF Cyberinfrastructure initiative, related projects (such as the Open Science Grid), and the Asia-Pacific region, including projects or initiatives from Japan (NAREGI, Centre for Grid Research and Development), South Korea and China.



**Figure 10: The global Grid infrastructure**

EGEE will continue to support the wider European Commission concertation efforts, working closely with GEANT2, DEISA and other major European research projects to exploit common areas of work

and promote synergies. Close collaboration with e-IRG will ensure that EGEE is able to provide effective input to policy development based on its first-hand experience of operating a Grid computing infrastructure. This input is important to guide policy in many areas such as accounting, authorisation, training and interactions between Grid and super-computing. As the e-Infrastructure landscape evolves further in FP7, EGEE's contributions here will continue to be of great importance. EGEE will also pursue its role in standards setting through participation by various EGEE-III members in global standards bodies such as the Open Grid Forum.

The European Strategy Forum on Research Infrastructures (ESFRI) has published a roadmap<sup>3</sup> including plans for 35 new major European research facilities/infrastructures. EGEE-III will engage with the ESFRI projects that are embarking on their preparatory phase, to determine how Grids could be part of their computing architecture. A first example of this engagement is the LIFEWATCH project as described in Table 14 below.

Europe has invested heavily in e-Science programmes over the past years both at national and European levels, with impressive results. Grid technology is recognised as a fundamental component of e-science, and many countries have now launched National Grid Initiatives (NGI) to establish National Grid Infrastructures. While the maturity level and the implementations are not necessarily the same, they all aim at providing a common e-Science infrastructure in support of all sciences in the long-term. With strong support from the European Commission, Europe has established itself as the world leader in the field, a fast growing number of communities are adopting Grids and many are already relying on Grids to achieve their missions.

As the Virtual Organisations (VOs) established by scientific communities move from a pilot phase of testing their applications on Grid infrastructures to a phase of more routine usage, it becomes increasingly urgent to ensure that reliable and adaptive Grid infrastructures are maintained, independent of project funding cycles. Without such continuity, scientific communities will hesitate to rely on this new computing paradigm, potentially jeopardising the large investments that have been made so far.

While national infrastructures are fundamental in providing local connectivity and resources to researchers, they need to be linked seamlessly at a world-wide level to enable global scientific collaboration. Taking the existing political structures and funding schemes into account, it is now clear that a European Infrastructure based on National Grid Infrastructures and linked to similar infrastructures outside of Europe is the correct approach.

This is being coordinated in the European Grid Initiative Design Study project, EGI\_DS for short, which, hand in hand with the NGIs, will define the governance and operational model for most of the tasks carried out today by Grid infrastructure projects such as EGEE, but also ETICS and OMII-Europe. EGEE-II was intimately linked to the preparation of this design study project whilst EGEE-III will be the stepping stone to ensure the structure, goals and perspectives are met for long term sustainability of the work achieved to date.

As the FP7 proposal guidelines indicate that annexes are not to be included, the Letters of Support received in favour of EGEE-III are therefore listed in the table below and accessible on the following web page: **To be added**. These letters demonstrate the high level of support for the EGEE-III proposal from a wide range of user communities, collaborating Grid infrastructures around the world and future scientific undertakings on a pan-European level.

**Table 14: List of Letters of Support received for the EGEE-III project**

<b>Letters of Support received</b>	<b>Description</b>
International Virtual Observatory Alliance	
EIROForum	TBC
EGI_DS	
ATLAS	
CMS	

<sup>3</sup> <http://cordis.europa.eu/esfri/roadmap.htm>

LHCb	
ALICE	
OGF	
OSG	
Teragrid	
NAREGI	
EBAs (list them)	
Asia Federation	
Openlab	
NESSI	
Imperial College, Computational Science	
ITER	
Ukraine	
Lifewatch	

### 3.2 Expected impacts from the Service activities

This principal aim of EGEE-III is to continue to build, manage, and operate the production quality international Grid infrastructure built up during the first four years of the EGEE programme. This infrastructure integrates existing national, regional and thematic Grid efforts, operating 24 hours per day and enabling access to computing, storage, instrumentation and informational resources across the European Research Area and world-wide, for a diverse range of e-Science user communities. Existing scientific and computing infrastructures and information sources are made available to a wide range of researchers, vastly increasing the interconnectivity of European research and ensuring the fullest exploitation of those resources. New collaborations, new services and new modes of interaction will arise, with the EGEE Grid infrastructure acting as the medium. This infrastructure is unique in the world, as there is no other integration of resources on this scale.

The computing resources that EGEE-III integrates will continue to be provided by a large, and growing, number of Resource Centres. These will operate over a wide scale of capabilities, ranging from a simple informational resource to large-scale computing and storage centres. These Resource Centres are not supported directly by the EGEE project, but represent one of the main contributions of the project partners.

Together, the resources and the Grid services constitute the Grid-empowered infrastructure. The partners, and indeed many non-signatories of the contract provide the resources and access to them, and the partners in SA1 provide the operation of the Grid services. It is important to recognise the contribution of resources by non signatory partners. In EGEE some 160 sites provide resources, while only 48 of these are signatories. Significant other resources are also expected to continue to be connected to the EGEE infrastructure.

The Grid services – both the basic middleware services, and the higher level services, together bind the resources into a single infrastructure that is intended to provide seamless access to computing and storage for the user communities. A user may have access to resources that would otherwise not be available to him, permitting scientific explorations that would otherwise simply not be possible. Other advantages of such a Grid-empowered infrastructure include the enabling of collaborations of geographically dispersed communities with sharing of data and resources.

X lists the services offered to the user communities. In the first part of the table are given the services available to the user communities. All of these services are available to all user communities; however access to specific resources is governed by the policies of the resource owners. These policies (which resources are available to which EGEE communities) can be seen in X. These policies are subject to negotiation and mechanisms within the project are in place to make this negotiation for new user communities as the request access to resources. The second part of X lists the basic Grid services that are deployed within the existing Grid infrastructure, which make up the services offered to the user communities. Depending upon the application some or all of these basic services will be used. Many of these are parts of the infrastructure, others, such as metadata or file catalogues, may be run by one or more ROCs on behalf of the user community. The negotiation process mentioned above, in the Operations Advisory Group (OAG) will also negotiate which ROCs will provide these services to the user communities.

The Grid infrastructure deployed, operated, and managed in the first four years of EGEE is the largest scientific Grid infrastructure in the world, bringing unprecedented levels of resources to European and international research communities. The LCG project is still by far the largest scientific enterprise making use of the EGEE infrastructure, and delivery of a reliable computing infrastructure is crucial to its success. The impact of the successful first intensive production use of the Grid infrastructure by the LHC experiments will help pave the way for adoption of this infrastructure by other major scientific disciplines and eventually industry and commerce, with potentially very large benefits for European science and technology.

During EGEE, several other projects have also based their infrastructure upon that provided by EGEE, expanding the infrastructure into new geographical regions. These projects include SEE-Grid (South

East Europe), EELA (Latin America), EUMedGrid (Mediterranean region), BalticGrid (Baltic States), EUChinaGrid (China). These will rely upon the solid foundation of EGEE. EGEE also has very strong partners in Taipei who act as a Regional Operations Centre, and support sites in other Asian countries (Singapore, Korea).

The LCG project has a strong relationship with the Open Science Grid in the U.S.A. and it is seen as strategic for significant levels of interoperation (middleware, services, operations management, security coordination) between EGEE and OSG to be attained. As well as LCG, this has the potential to open the door to many other international scientific collaborative efforts on an unprecedented scale. This collaboration is also *the* mechanism by which real, practical, Grid standardisation will arise. It is vital that these interoperation efforts are presented to the standards bodies. By the same token, it is essential for industrial partners to be involved in this work as far as possible, and the coordination of the industrial effort through SA3 will provide that crucial link.



### 3.3 Expected impacts from Joint Research Activities

EGEE has produced and deployed the necessary basic building blocks to operate a large scale production Grid infrastructure. These building blocks, while capable of serving a wide variety of user communities, still require expert knowledge of setting up a Grid infrastructure, exploiting the infrastructure efficiently, and integrating it with other systems and tools. EGEE-II will tackle these problems by reinforcing standardisation, common best-practices, usability and deployability of Grid Foundation Middleware and selected Grid Services.

The identification of application-independent Grid Foundation Middleware, and the proposed hardening of it, allows EGEE-II to build a dependable Middleware Infrastructure that can be used by a wide variety of application and also builds the basis for further research on higher level Grid Services, which will be able to exploit this infrastructure.

The continued and reinforced focus on international collaborations and standardisation will allow the building of truly interoperable world-wide solutions and standards. This will offer users seamless access to Grid resources world-wide. Standardisation efforts will be pursued through GGF and related committees.

Software reengineered by JRA1 is distributed under an open source license by SA3 and also included in other distributions, like VDT, which facilitates their use outside of Europe. This strategy will be further actively pursued in EGEE-II. The branding under the name “gLite” (pronounced “gee-lite” – see [www.glite.org](http://www.glite.org)) was very successful in EGEE and is now becoming synonymous with European best-of-breed middleware. This will be continued in EGEE-II and JRA1 will provide an open source reference implementation of Grid Foundation Middleware.

Finally, the middleware of EGEE will be available to the Grid research community and other interested parties to close the feedback loop with the originators of the technologies on which the EGEE Grid will be based. This will stimulate further development within those communities, but will also build a body of experience in production-quality Grid engineering that will strengthen the capabilities of European Grid research.

One of the most important EGEE-II aims is to maintain and extend the present, high degree of interaction between industrial and scientific partners, which is necessary to avoid “privatisation” of the expertise gained throughout the project, without jeopardising the Grid’s commercial potential.

JRA1 exploitation objectives are clearly restricted to individual and integrated middleware components which will happen via SA3. The EGEE-II proposal is characterised by the declared objective of producing a standardised middleware, or set of middleware components, which can be openly shared with the industrial world, in view of an uptake from the market. The open source license under which the middleware is released is an important part of this.

The other fundamental strategic objective is the positioning with respect to the availability of other Grid middleware components and services. The establishment of OGSA and WS related standards and the announced availability of commercially qualified solutions from main software vendors have to be carefully monitored in order to be ready to eventually re-direct project objectives towards solutions of the widest possible exploitation potential. The risk is that “disruptive” technologies could make parts of the project redundant.

The last point concerns the market potential itself of middleware, in terms of target classes of users/customers. As of today the users’ communities that have been traditionally involved in Europe in support of the specification of Grid middleware are mainly research communities, like High Energy Physics, biomedicine, earth sciences, and medical simulation and environments. Further to those, there are some experiences of other thematic disciplines, including industrial sectors such as automotive, aerospace and the pharmaceutical area, which however have been involved more in the experimentation phase using the available middleware than in issuing new requirements. It is therefore crucial, for the widest possible uptake of the middleware, to consolidate from an engineering view point what already exists, but also to consider potential priorities from these additional sectors through an important dissemination activity. Lack of adequate communication with the private sector is a further risk for the project.

In synthesis, the exploitation strategy is based on the following parallel actions:

- Defining the partners' mutual roles, obligations and responsibilities in the Consortium Agreement and further refining them according to the evolution of the project and of the external context;
- Performing those engineering activities required to qualify project results for an operational, and potentially commercial, context;
- Carefully watching technology evolution, both as an obvious driver of cost reduction, and in terms of market positioning;
- Implementing preliminary business-case analyses to understand the potential return of investment as well as the identification of a related institutional scenario among partners.

A clear activity that shall be carried out during the whole project cycle shall concern the exploitation planning. This will address the following major points:

- Business objective and its management;
- Definition of technology, products and services;
- Market and main competitors;
- Competitive business strategy;
- The exploitation plan will take into account three main stages of expansion with specific near-term, medium-term and long-term objectives:
  - Near-term shall correspond to a period between the start of EGEE-II project activities and the end of the project itself. During these 24 months (2006-2007) the main objective is to develop and validate the refined components with the key user communities, evolve it according to accepted standards, as well as the installation and operational demonstration of the resulting middleware at selected end-users test sites, and the continuous technological evolution follow-up.
  - Medium term shall correspond to a period beginning with the end of EGEE-II project and ending after 2 years (2008-2009). The main objective will be:
    - Move the support and maintenance systems into a long-term sustainable framework
    - Software components will be used by other Grid infrastructures and projects
    - The final stage shall correspond to the commercialisation of the final products to the largest possible customer community.

### **3.4 Dissemination and/or exploitation of project results, and management of intellectual property**

EGEE-III's plan for disseminating knowledge will benefit from existing national and European efforts by organisations with a track record in dissemination, just as EGEE-III services will build on and integrate national facilities. The organisations responsible for the wide dissemination of information about the project will address research and industrial organisations that may benefit from EGEE-III. The networking activities will collaborate closely to ensure that potential users in all relevant disciplines are attracted to use the EGEE infrastructure, and that existing users are satisfied. EGEE-III will engage with both the research and industrial/commercial communities and proposes a number of focussed methods to reach out to them. EGEE-III will grow both the existing EGEE user base and new sectors from academia, industry and commerce. The ability to attract new applications and new users to the Grid will be one of EGEE-III's criteria for success.

The project's dissemination plan includes support for the induction of new users, new communities and new Virtual Organisations into the EGEE-III community. It will develop and disseminate appropriate information to these groups proactively, taking into account their specific needs. The goal is to ensure that all EGEE-III users are well supported. The dissemination plan includes assimilation and evaluation of records of this work and provides input to the requirements and planning activities of the project. Further, the plan will cover the long term sustainability efforts of the project, working closely with National Grid Infrastructures and the EGI-DS project to disseminate key progress results in this field.

The project must be managed in close correlation with the deployment of the EGEE infrastructure because the rate of attracting and developing users must match EGEE-III's capacity and requirements. Information from development and operations provides the content, information gathered from users must inform EGEE-III's operations and development, and staff interaction and carefully managed staff involvement in other activities will accelerate knowledge pool development. This management may include scheduling the approach to particular potential user groups, particular research disciplines and particular geographic regions.

**4. Section 4. Ethical Issues**

This proposal does not directly raise any ethical issues. The Grid empowered infrastructure has clear analogies with communication systems such as conventional telephones and the Internet. In both cases the communication services provided are of generic and neutral value. Applications using, for example, biomedicine Grids will in some cases have to pay particular attention to ethical and confidentiality issues. As part of the EGEE-III technological development appropriate levels of security and confidentiality will be implemented and offered to the end users. However, ultimate responsibility will in these cases remain with the application communities of the end-users of the EGEE infrastructure.

**ETHICAL ISSUES TABLE**

	<b>YES</b>	<b>PAGE</b>
<b>Informed Consent</b>		
• Does the proposal involve children?		
• Does the proposal involve patients or persons not able to give consent?		
• Does the proposal involve adult healthy volunteers?		
• Does the proposal involve Human Genetic Material?		
• Does the proposal involve Human biological samples?		
• Does the proposal involve Human data collection?		
<b>Research on Human embryo/foetus</b>		
• Does the proposal involve Human Embryos?		
• Does the proposal involve Human Foetal Tissue / Cells?		
• Does the proposal involve Human Embryonic Stem Cells?		
<b>Privacy</b>		
• Does the proposal involve processing of genetic information or personal data (eg. health, sexual lifestyle, ethnicity, political opinion, religious or philosophical conviction)		
• Does the proposal involve tracking the location or observation of people?		
<b>Research on Animals</b>		
• Does the proposal involve research on animals?		
• Are those animals transgenic small laboratory animals?		
• Are those animals transgenic farm animals?		
• Are those animals cloned farm animals?		
• Are those animals non-human primates?		
<b>Research Involving Developing Countries</b>		
• Use of local resources (genetic, animal, plant etc)		
• Benefit to local community (capacity building i.e. access to healthcare, education etc)		
<b>Dual Use</b>		
• Research having direct military application		
• Research having the potential for terrorist abuse		
<b>ICT Implants</b>		
• Does the proposal involve clinical trials of ICT implants?		
<b>I CONFIRM THAT NONE OF THE ABOVE ISSUES APPLY TO MY PROPOSAL</b>	<b>YES</b>	

## **5. Section 5. Consideration of gender aspects**

Most of the partners in EGEE-III are scientific organisations with an established policy of equal gender opportunities. CERN, the leading partner, has an excellent record in this area with a long established equal opportunity programme.

Other EU-funded Grid projects count female staff in key technical and managerial positions. The EGEE-III management will strive to ensure equal opportunity, according to EU rules and guidelines, when hiring the new project staff. Grid technology has an impact on Gender issues, as it is an enabling technology that, like the Web, makes new ways of working possible. In particular, the Grid provides remote access to data and computer power and can also facilitate remote access to scientific instrumentation and enhance teleconferencing capabilities. All these benefits can contribute to help to reduce the burden of child rearing on scientifically active parents, and the aggravating effects these burdens can have in practice on equal gender opportunities in scientific careers. These benefits extend to persons with limited mobility, whatever the cause.

The success of the Gender Action Plan relies on the commitment of the partner institutes to participate in gender awareness raising efforts, and to this end, the project coordinator will undertake several measures to ensure this is being addressed. During the EGEE programme, the project made use of its major Grid events to collect data and raise awareness, and the Effort Monitoring tool used at CERN provided concrete statistics to monitor the percentage of female collaborators among the various categories of staff in all institutes. Further activities, such as web pages containing information on gender matters and specific events targeted at younger generations to showcase IT employment, will be continued and built upon to contribute to European efforts in increasing gender awareness across Europe.