eResearch2020

The Role of e-Infrastructures in the Creation of Global Virtual Research Communities

Final Report

ANNEXES

A study by

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Table 1-1: Problem setting and motivations

	Problem setting	**Motivations**
C3GRID	No overview of data archives of earth science existed. Different formats and structure of data from other sources, across wavelengths	• Improve access to data needed for simulations by Earth Science partners. • Use of Grid technology to solve the problem of connecting distributed data repositories. • Lack of any particular funding for e-research projects at the time in Germany. • Need of supercomputers for the simulations in earth sciences (Earth scientists are actually the largest consumer group of supercomputers) • Often even supercomputers do not offer sufficient computing power, so need to connect supercomputers (given up later)
CineGrid	Worldwide community that became aware of the opportunities of combining e-science (electronic visualization and networking) with digital media and cinema technologies	• Application of e-science developments to needs of the global media related to digital cinema. Benefit from interaction with the e-science community.
CLARIN	Community of researchers who want to link up and exploit the currently fragmented resources digital tools and technologies, and data archives available across Europe.	• Improve access to language resources across Europe • Facilitate interoperability of language resources • Share these resources with other communities of researchers • Create linked-up Humanities and Social Science resources through collaboration with DARIAH and Europeana
D4Science	Crucial barriers to multidisciplinary and data-centric research related to heterogeneity of data, sustainability and scalability	• Establishing a federated, distributed e-infrastructure which allows the integration of digital content coming from different places (successor project of DILIGENT) • Desire to provide facilities for creating Virtual Research Environments based on shared computational, data and service resources
DARIAH	Lack of a digital infrastructure in the arts and humanities. Preservation, exchange and reuse of research data, development and interlinking of national services and digitisation efforts.	• Provision of an infrastructure 'for the entire field of arts and humanities and access to [the] cultural heritage of Europe'. • Create 'a common understanding of the cultural diversity and its history in Europe'. • Trigger novel research questions that with access to cultural heritage sources dispersed over a multitude of different sites could up to now not be approached.
DEISA	Growing demands for computational resources at the highest performance levels Need of fast innovation Limitations of national approaches	• Boost in competitiveness for European science in areas where extreme performance is needed. • Combining resources across countries to overcome the fragmentation of supercomputing in Europe. • Increase system availability and necessary skills for efficient supercomputing support
DRIVER	Scattered scientific information, lack of co-ordination among national initiatives, lack of shared standard	• Bring together data that repositories have across Europe and make this accessible to a wider audience. • Federate scattered similar initiatives on the national level in several countries

	Problem setting	Motivations
		• Provide services to repository managers and to bring this community together. • Portal to access Open Access publications and research materials (non-textual information), especially enhanced publications
EELA-2	Significant European investments within EGEE on middleware and infrastructure development were limited largely to one user community (high-energy physics); in addition, participation of non-European scientists was difficult	• Extending the use of EGEE middleware and infrastructure to other countries and regions worldwide, here Latin America • Latin American HEP communities, computer scientists interested in Grid computing and other scientists and universities saw a chance to overcome their scarcity of computing resources and obtain access to more powerful computers.
EGEE	Massive amounts of data to be produced by the Large Hadron Collider required a new computer infrastructure for all aspects of handling.	• Follow-up to the EU DataGrid project (EDG) • Converting the EDG testbed of distributed computing and storage resources into a production infrastructure for handling and analysing the data produced by the Large Hadron Collider (LHC).
ETSF	Lack of an infrastructure that provides theoretical support and analysis code for experimental physicist users and connects these with theoretical phyiscists.	• Reach out in a novel way to experimental physicist users, providing theoretical services to them
GEANT	Need for European backbone research network, linking of NRENs	• Each country had their own NREN in the early 1990s. The motivation of successive projects was to build a pan-European capability to complement the national capabilities. Cooperation had also previously existed, there had been bilateral national cooperations in the 1980s. Precursors were EuropaNET (Transeuropean Network), TEN-34, and TEN-155. For the Commission a major motivation is the building of the European Research Area (ERA). GEANT is however not part of the ERA
MediGrid	Need to pilot test Grid computing technologies within the life science research community in Germany.	• Potential benefit from Grid computing in the area of medical and biomedical research in Germany
NVO	Need for standards and protocols for astronomical analysis of celestial data from disconnected astronomic instruments	• New approach to astronomy, shifting from observations of small samples of objects limited to one or a few wavelength bands, to studies based on multi-wavelength avalanche of data that consists of billions of celestial objects. As a part of other research in data Grid technologies, computer scientists were interested in NVO as an opportunity to further develop data representation and interoperability schemes.
OGF	Need for an open forum to develop standards, specifications and recommendations for distributed e-Infrastructure computer technologies	• To serve as an open forum for setting standards concerning developments in Grid computing. The OGF is a result of previous mergers with e-Infrastructure regional standardization bodies in 2000 and then with the Enterprise Grid Alliance, a commercial spin-off, in 2006
OSG	Support sharing and utilization of available compute cycles, use of distributed storage and software	• Need for worldwide distributed Grid computing infrastructure for the high-energy physics (HEP) experiment, the Large Hadron Collider (LHC); • Development of data Grid projects that focus on providing distributed data solutions for HEP
SND	Need for an academic data service for Social Sciences, humanities and parts of medicine.	• Preserve research data and make these data available for further research • Promote best practice in data conservation
SWISS	Need to pilot test Grid computing technologies within the life	• Bottom-up process

	Problem setting	Motivations
BIOGRID	science research community in Switzerland.	• Lack of “Big Science” traditions in biological sciences • Preserve efforts of individual investigators to build local computational infrastructures • Lack of infrastructure despite the use of a broad diversity of very large data repositories.
TeraGrid	Need for distributed extreme high-capability computational, data-management and visualization resources	• Access to powerful computers at this time (1999) Growing interest in Grid systems and data grids. Problem of managing, interoperating, analyzing and visualizing data from scientific instruments. • Moving toward a more holistic facility of seamless, balanced, integrated computational and collaborative environment

Table 1-2: Goals

	Goals
C3GRID	• Build a collaborative environment to facilitate data discovery, data access and data processing • Enable user to access data from simulations and observational data stored in institutionally and geographically distributed archives
CineGrid	• To build an interdisciplinary community that is focused on the research, development, and demonstration of networked collaborative tools to enable the production, use and exchange of very-high-quality digital media over photonic networks. • Realise targeted R&D projects to play, prototype, experiment and do proof of concepts with new high-quality digital media and cinema • Education and training of next-generation digital media professionals
CLARIN	• CLARIN will offer scholars tools and technologies to allow computer-aided language processing, addressing one or more of the multiple roles language plays in the Humanities and Social Sciences.
D4Science	• Establish a networked, Grid-based, and data-centric e-Infrastructure • Deploy the e-Infrastructures built by the EGEE and DILIGENT for the EM and FARM scientific communities • Develop gCube , a software that allows the access to heterogeneous, distributed technologies, services and content and guarantees interoperability • create Virtual Research Environments (VREs) based on shared computational, data and service resources • Manage and upgrade testbed infrastructure and advance it to production quality • Catalyst for cooperation among several communities • Develop applications, including domain specific applications
DARIAH	• Create an international digital infrastructure for the Arts and Humanities. • Offer researchers digital content and tools to use and interpret it • Ensure long-term preservation of data • Ensure accepted standards and best practice of research • Exchange ideas and knowledge of digital scholarship • experimentation and innovation in collaboration among other scholars and repositories • Make repository digital information known to a wider pan-European public • Provide help with digitisation, curation and preservation of data

	Goals
DEISA	• Enable scientific discovery across a broad spectrum of science and technology • Enhancing and reinforcing European capabilities in the area of high performance computing by integrating national supercomputing platforms through Grid technologies • Deploy and operate a persistent, production quality, distributed supercomputing environment with continental scope • Pooling human competences to provide first class, substantial added value services to computational sciences • Technological developments for the access to e-Infrastructures, including developments in authentication and computing use accounting technologies, as well as the standardization
DRIVER	• Develop and provide an infrastructure for digital repositories • Build European community of repositories. • Expand geographically the reach of digital repositories • Build the Software D-Net to be used in all kinds of repositories and in digital libraries. • Establish a European Confederation of digital repositories • Promote the idea (and availability) of enhanced publications • Have Enhanced Publications supported to be available in repositories
EELA-2	• Set up high capacity, production quality, scalable Grid facility for Latin American plus the corresponding human network • Promoting and supporting the creation of National Grid Initiatives (NGI) and a continent-wide federation in Latin America.
EGEE	• Refine the LHC computing Grid infrastructure of CERN to enable and encourage the access of scientist from different fields. • Build a secure, reliable, sustainable and robust Grid infrastructure to provide a production service to scientific researchers for sharing computing resources across collaborative projects; • Re-engineer a light-weight middleware solution, gLite, specifically intended to be used by many different scientific disciplines; • Attract, engage and support a wide range of users from science and industry, and provide them with a production service supported by extensive technical and training support.
ETSF	• Developing theory and methods: developing more efficient and more accurate methods and techniques • Developing scientific software: several scientific codes that translate state-of-the-art methods into tools for studying the properties of real materials • Providing training in theoretical and computational techniques • Undertaking scientific projects on demand: users can propose projects for which scientific and technical support is provided
GEANT	Main goals: • operation of the backbone • research about networking technologies (also examining the future of research networking), • support of users • close gaps in networking provision The project's objectives: • plan, build and operate a multi-gigabit pan-European backbone research network interconnecting Europe's national research and education networks (NRENs) • conduct joint research into the development of networking technologies and services, developing ideas from concept to production service • support projects and users who have advanced networking requirements

	Goals
	• pursue initiatives targeted at closing the 'digital divide', through both analysis of research networking in developing areas and the provision of direct support • examine the future of research networking, exploring the case for the sustaining of research and education networking beyond the conclusion of the project
MediGrid	• Develop a Grid infrastructure and test it through several test applications. • Develop a technical platform in which then different applications could be integrated with comparatively little effort.
NVO	• Virtual telescope: Develop and provide e-Infrastructure for integration of various astronomical digital data sources from diverse instruments. • Enable efficient processing and visualization of these massive amounts of data. • Spearheading a fundamental change in astronomy—from the study of a single to multiple wavelengths.
OGF	• Standardization body of distributed computing, i.e. e-Infrastructure • Writing technical specifications and recommendations. • Advocate uptake and diffusion of “applied distributed computing”
OSG	• Promoting and enabling a truly global Grid, a “Grid of grids.” • Stimulate new approaches to computationally based scientific discovery, • Build intellectual capital for future scientific research relying on distributed cyber-infrastructures. • Develop comprehensive e-Infrastructure fabric to transform the practice of collaborative science, making it more effective and widespread.
SND	• Ease of access to research data • A resource to science (support on organizing documentation and archiving • Preserve and maintain (document and preserve data from different sources)
SWISS BIOGRID	• Science: To achieve a set of innovative and valuable results exceeding results of what individual institutions could have produced alone. • Provide infrastructure: Test bed allowing to use resources across institutions and disciplines, delivering services for computing intensive applications and data sharing • Demonstrate feasibility of sharing existing infrastructure in Switzerland without impacting the normal use of these resources.
TeraGrid	• Advance “petascale science”: intensely high-end computational capabilities to advance computational science in multiple fields • Empowering science leaders through “science gateways” methodologies • Providing a reliable, general purpose set of e-Infrastructure services and resources. • Enable science that could not be done without distributed capabilities of TeraGrid

Table 1-3: Main contributions of the eInfrastructures

C3-Grid	1. Enabled the earth science community to gain new insights into the interaction of earth subsystems 2. Advanced new paradigm of distributed data 3. Model for a successful Grid project in Europe
CineGrid	1. Formation, growth and maturation of the CineGrid community 2. Raised trust and mutual understanding for sharing and joint use of resources 3. Raised awareness about new technologies among motion picture and other culture professionals. 4. Demonstrated the feasibility of transmitting high-resolution video data and high-quality sound over very fast optical networks
CLARIN	– (infrastructure still in early phase)
D4science	1. Established Virtual Research Environments (combining resources and field-specific tools) which facilitate complex requests 2. Initiated a dialogue between different communities
DARIAH	– (infrastructure still in early phase)
DEISA	1. Established collaboration between national supercomputing organizations 2. International projects which need supercomputer resources have become easier to set up
DRIVER	1. Developed software and established a portal and support network of digital repositories 2. Contributed to building a European community of digital repositories
EELA-2	1. Spread the practice of Grid computing in Latin America 2. Set up and runs an infrastructure that facilitates the production, mining, processing and analysis of data 3. Boost research collaboration in the Latin American Grid community
EGEE	1. Establishment of European, globally well-connected, Grid developer and user communities 2. Advancement of Grid use in science 3. Contribution to new insights in many scientific fields 4. Development of gLite, a middleware package for grid computing 5. Wide collaboration network in Grid development
ETSF	1. Proven a new way of collaboration between theorists and experimentalists 2. Sizable scientific output of publications and conference talks
GÉANT	1. Facilitated better, faster and more innovative research through providing data transmission services 2. Increased its reach gradually from Western Europe to Central Europe, then Turkey and recently Russia
MediGrid	1. Developed software and standards to be used in future projects 2. Raised participants' experience with Grid technology
NVO	1. Advanced the integration of high-quality, homogenous, multi-wavelength data in astronomy 2. Confirmed the existence of rare celestial objects with considerably superior efficiency and detected new ones 3. Enabled web-based access to astronomical data (previously not broadly accessible) 4. Collaboration support 5. Developed common data standards 6. Involved commercial partners
OGF	1. Demonstrated the effectiveness of the open model of standardization 2. Fostered an open Grid computing community with commercial and academic participants 3. Developed necessary standards for e-Infrastructure providers
OSG	1. Technological provision of robust e-Infrastructure to main stakeholders 2. Sharing and dissemination of the distributed models undergirding the practice of distributed research
Swedish	Providing access to the uniquely good Swedish datasets

Nat. Data Service	
Swiss BioGrid	1. Proof of concept of the feasibility of building bottom-up a Grid system 2. Precursor of the national Grid initiative 3. Technical achievement of bridging computers with different operating systems 4. Scientific successes in virtual screening and proteomics
TeraGrid	1. Advanced the set of technologies required to integrate distributed heterogeneous supercomputers and other high end performing computers into a cohesive and persistent fabric 2. Built the social and organizational fabric for a community that has produced important technology advancements 3. Significant improvement in computational resources for scientists relying upon advanced computational infrastructure

Table 1-4: Main contributions of the infrastructures by disciplinary scope

	Scientific	Technical	Socio-cultural	Other	None
Multidisciplinary infrastructure (>5 user fields)	C3-Grid EGEE	DEISA Driver EELA-2 EGEE Géant C3-Grid OSG SND TeraGrid	DEISA Driver EELA-2 EGEE OSG TeraGrid	Géant	
Disciplinary infrastructure (5 or fewer user fields)	ETSF NVO Swiss BioGrid	CineGrid D4Science MediGrid NVO Swiss BioGrid OGF	CineGrid D4Science ETSF NVO OGF Swiss BioGrid	NVO	CLARIN DARIAH

Table 1-5: Main contributions of the infrastructures by type of service (computing versus data)

	Scientific	Technical	Socio-cultural	Other	None
Computing	EGEE Swiss BioGrid	DEISA EELA-2 EGEE Géant MediGrid OSG Swiss BioGrid TeraGrid	DEISA EELA-2 EGEE OSG TeraGrid Swiss BioGrid	Géant	
Data and other resources	C3-Grid ETSF NVO	C3-Grid CineGrid D4Science Driver NVO OGF SND	CineGrid D4Science Driver NVO ETSF OGF	NVO	CLARIN DARIAH

Table 1-6: Main challenges for the future

C3-Grid	1. Implementation of more sophisticated data preprocessing tools to allow for wider use of the data 2. Improve interdisciplinary communication with new tools 3. Obtain follow-up research funding
CineGrid	1. Manage the growing community effectively 2. Continue to produce value for money for the community members 3. Extend the funding basis
CLARIN	1. Timely development of the resource 2. Development of a robust user community 3. Continued national and international support for the development
D4science	1. Support the user communities and attract new users 2. Better fit to user requirements 3. Achieve interoperability with other infrastructures
DARIAH	Secure sufficient funding and national support
DEISA	1. Create user interfaces which hide the complexity of the system behind it 2. Mobilize science communities to solve technical challenges and better run applications on supercomputers
DRIVER	1. Achieve sustainability 2. Establish the idea of enhanced publication
EELA-2	1. Achieve interoperability between dedicated resources and peer-to-peer Grids and different middlewares 2. Secure the funding of the infrastructure through National Grid Initiatives and a Latin American federation
EGEE	Making the EGEE infrastructure permanent through establishing the European Grid Initiative
ETSF	Obtain follow-up funding for the infrastructure
GÉANT	1. Translate national domains into offering a common service portfolio 2. Maintain solidarity-based funding system
MediGrid	1. Accommodate the sharing of patient-related data across organizations in data protection laws 2. Change the funding system from buying hardware to sharing of computing resources 3. Motivate participants to work outside of their immediate area of responsibility and on overall project objectives and requirements
NVO	Engage users with complex tools
OGF	Competition with technological alternatives such as cloud computing
OSG	1. Problems with user engagement, for instance due to immature security mechanisms 2. Ongoing competition over funding resources and mistrust among research communities and providers
Swedish Nat. Data Service	Make sure that users abide by the privacy protection regulations to maintain the high level of trust
Swiss BioGrid	None at the moment (but project may be revived)
TeraGrid	1. Without continued, persistent funding many efforts will be terminated 2. Competition with technological alternatives such as cloud computing

Table 1-7: Strengths and weaknesses of long term funding

	Strengths	Weaknesses
C3-Grid	The funding of the follow-up by the Ministry for Education and Research of the project is very likely but the final commitment remains to be made.	The funding of the project by the ministry concerns only the manpower costs. The costs for the hardware are contributed by the participating institutions. So, it is still somewhat unclear what happens, if one of the institutions should withdraw from the project.
CineGrid	The long-term funding of the CineGrid organization is secured through its membership fees.	Funding is low level. The community depends on additional funding and contributions in kind from its members for realizing the CineGrid projects. In the past it has been possible to mobilize the necessary funds, but it cannot be said to what extent this will be achieved in the future.
CLARIN	Project has already secured some national funding for the next phase of the project, so potential further investment is likely.	Long-term funding has not been secured.
D4science	The funding of the current project is secured through the support by the EU.	It is not clear if there will be a successor project.
DARIAH		Long-term funding has not been secured. Initial phase is funded by the EC; subsequent development is dependent on national funders becoming involved. An early blow to the project was felt when national funders withdrew from AHDS, the British collaborating institution.
DEISA	The long-term funding of the project is secured through the support by the EU.	It is not clear if there will be a successor project.
DRIVER		Long-term funding of DRIVER depends on funding subsequent projects
EELA-2		Long-term funding for NGIs and the LGI is still being negotiated with the Latin American governments and research and education networks.
EGEE	Guaranteed for the next years. A follow-up project is in the pipeline. Many institutions are involved in the project. If one drops out – except for CERN – this won't be a vital problem. The total investments so far have simply been too high to abandon the project.	EGEE aims to secure long-terms funding via the governments of its participating countries. Even though the investments of the participating institutions are very high yet, financial support by the EC is still essential.
ETSF		Long term funding of ETSF is not secured.
GÉANT	Being an indispensable and mission critical factor in the European research landscape, funding can be expected to be secured	Co-ordination among an ever growing number of participants.
MediGrid		Not secured, rather follow up projects
NVO	Long-term funding is secured	
OGF		Funding has gradually declined and if the OGF will not manage to connect its work to such technologies as Cloud computing, it is not likely that the organization will be viable in the long-run.
OSG	Funding until 2011 is secured.	The project is in the middle phase of its funding

		cycle. No specific plans for continued renewal were discussed. However, based on opinions on informants who are not directly associated with OSG, their model is sufficiently robust to support additional funding after the end of the current project.
Swedish Nat. Data Service	Secured. The project is fully supported until 2013.	
Swiss BioGrid	N/A Project has finished.	N/A Project has finished.
TeraGrid	Long-term funding is secured.	

Table 1-8: Strengths and weaknesses of sustainability

	Strengths	Weaknesses
C3-Grid	Since the participating institutions switched their data storage step by step from local to Grid archives it is not easily possible to switch back. Once the commitment to participate is made, it is hard or even impossible to step back.	Even though it is an integral part of the project to open the Grid for an international community, it currently still is restricted to German scientists.
CineGrid	There is no pre-defined project ending. The community is embedded in other, larger communities of networking and electronic visualization research with which it interacts to mutual benefit.	
CLARIN	Project is currently in a preparatory phase, with clear objectives for next phase (building) and beyond.	
D4science	At the moment, the e-Infrastructure is established and productive. The user communities benefit from the e-Infrastructure. The chances are good that other communities can be attracted, provided that there will be a successor project.	The project will end in 2009.
DARIAH	The project is currently in a preparatory phase, with building due to commence in September 2010	No clear plans are available for the period of building and subsequently.
DEISA	At the moment, the e-Infrastructure is established and productive. The user communities benefit from the e-Infrastructure. The chances are good that other communities can be attracted. Especially the calls seem to be effective instruments.	The project will end in 2011. It is well documented; but not all web pages are available.
DRIVER		Defined project ending by the end of 2009.
EELA-2		The project ending is scheduled for March 2010. Then, NGIs should take over and provide the infrastructure services to their scientific communities.
EGEE	The use of the e-Infrastructure coordinated by EGEE has become an integral part of the workflow of literally thousands of users and hundreds of institutions. Even if the EC would drop EGEE there would probably emerge a surrogate very soon.	
ETSF		Depending on funding
GÉANT	Being an indispensable and mission critical factor in the European research landscape, funding can be expected to be secured	Co-ordination among an ever growing number of participants.
MediGrid	Knowledge spillovers to follow-up projects	No user base beyond the project
NVO	Funding for the next round of the NVO, called Virtual Astronomical Observatory (VAO) is secured. VAO will focus more on engaging users and providing to them production facility.	

OGF	N/A	N/A
OSG	N/A	N/A
Swedish Nat. Data Service	Although funding has been invested until 2013, it is expected that the infrastructure will remain after this date.	
Swiss BioGrid	The project has now ended, but the infrastructure is still in use by some of the scientists involved.	The project has now ended, and some project staff have transferred to a new initiative, SwiNG.
TeraGrid	In 2010, TeraGrid will continue as TeraGrid Extreme Digital Resources for Science and Engineering, likely though a different mixture of participating organizations.	

Table 1-9: Strengths and weaknesses of user recruitment

	Strengths	Weaknesses
C3-Grid	Users are recruited by visits and presentations at expert conferences. Different strategies of recruitment have been tried, so it is likely that the most effective way could be found.	The strategies might work well for the German community, but it will be expensive and demanding to recruit users internationally by personal visits. New strategies have to be established.
CineGrid	CineGrid members attract with their presentations large and diverse communities. Individually CineGrid members engage in outreach activities, present projects at workshops and events, make demonstrations and performances. Thus, they raise interest, widen their individual networks and acquire contacts for future projects. The community is growing in numbers.	CineGrid does not have any users as such. Its members are researchers, developers, and professional practitioners interested in combining the technologies of research networking and electronic visualization with digital cinema technologies. The activities are experimental and pre-commercial. CineGrid does not have any dedicated activities or campaigns for increasing the community or involving potential end users beyond the CineGrid network.
CLARIN	Project is well integrated in target user communities and has a well researched user engagement plan.	Immaturity of project means that no measures have yet been tested.
D4science	The current users were recruited and trained by the project team and the mediators. In workshops further users are attracted and trained.	At the moment, there is a clear focus on two user communities. The communities have differences but also commonalities; they already attempt to share data and tools. It is unclear of totally different communities can be integrated by implication.
DARIAH	Strong interest in the project from prospective users.	Immaturity of the project means no results of user engagement are currently available
DEISA	There are Europe-wide calls, supported by a press release to attract users and user communities. Most of the users were recruited and trained by the project team. The idea is to make the project known to other communities so they will be able to take the developed technologies and apply them in their daily work.	At the moment, there is a strong focus on one user community, the fusion community. Further targets for DEISA support are EU FP7-supported computational projects. Ten European computational science grand-challenge projects from the DEISA Extreme Computing Initiative were presented at a recent conference, covering the fields of Weather and Climate Research, Engineering, Materials Science, Astrophysics, Computational Neuro Sciences, Plasma Physics and Computational Bio Sciences.
DRIVER	245 repository managers have submitted their data. Three countries (Belgium, Portugal and Spain) are using or considering to deploy the D-NET framework for their national repository.	
EELA-2	User recruitment is an important part of the EELA-2 activities. There are several coordinated measures, like user tutorials, Grid schools, workshops in a community or country, and customized “Gridification weeks”. In addition, both the management of EELA as well as local partners engage in further dissemination activities in their environment. These activities are to some extent successful,	

	as the number of applications supported by the infrastructure is rising.	
EGEE	EGEE is still often considered as particle physics project. EGEE III has taken much effort to correct this perception. It went into all scientific communities coming into question to use Grids. These efforts were successful and now there are user communities from 15 different scientific fields. Since EGEE has strong ties with specialist communities the communication of the benefits is very easy and institutionalized.	Up to now it was not possible to recruit a substantial amount of users from the industry. EGEE provides differing levels of secure data storage including an encrypted service (called Hydra) used by the life science communities. Business are reluctant to put valuable data outside their own enterprise resources and this is an issue just not for EGEE and grids but all external services (grids or clouds).
ETSF	Institutionalised way of user recruitment	
GÉANT	Support of very large co-operative research endeavours will sustain the user base	
MediGrid		No user base beyond the project
NVO	There is a strategy for recruiting new users.	The strategy is not very helpful when the design is cumbersome, or when astronomers are unwilling/unable to analyze multi-wavelengths across datasets.
OGF	The open, network structure of the OGF engages diverse communities through face-to-face meeting, marketing and in other means. However, competition from alternative technologies weakens these innate advantages.	
OSG	The project has strategy for recruiting new users. As detailed above, the OSG follows a three pronged approach, that utilizes an engagement team that works closely with users to enter into new communities. Informants have noted that the engagement has helped them join the OSG e-Infrastructure and offer these resources to users in over 100 labs, mostly in the US.	
Swedish Nat. Data Service	SND is currently undertaking a user survey and adopting new strategies for outreach.	These efforts are still in progress, so no results can be reported here.
Swiss BioGrid		None was developed during the project as it was an organic, bottom-up project devised by the scientists.
TeraGrid	The infrastructure has a strategy for recruiting new users.	

Table 1-10: Strengths and weaknesses of involvement of current users

	Strengths	Weaknesses
C3-Grid	Current users are mostly highly committed. Many important projects within the earth sciences are not realizable without Grid technology anymore. There is a vital necessity to stick with this technology to acquire prestigious projects and to publish in high impact journals.	Since the Grid is not fully operable yet, it is still a problem to open up Grid technology to not computer-savvy scientists. It still needs specialist knowledge to use the Grid and shies potential users away, if the workload is too high to have the Grid doing what it should do.
CineGrid	Some CineGrid members have large intrinsic motivations and drive the community as it contributes to their home organization's core activities and mission.	The community does not have any strategy or guideline to have its members involved. Except for the CineGrid exchange, there are no coordinated R&D activities and much is done on an ad hoc basis as project opportunities appear. Some members, in particular from private companies, have been described as "developing members" who do not contribute much to the research, but show interest in the community's developments.
CLARIN	N/A	N/A
D4science	Some users have large intrinsic motivations and are very interested in a further use of the e-Infrastructure; this is described in some research papers.	
DARIAH	Prospective users are being integrated into the project from the outset.	As above, immaturity of project means no results available.
DEISA	Some users have large intrinsic motivations and are very interested in a further use of the e-Infrastructure.	Because not all projects can be accepted, not all potential users can benefit from the e-Infrastructure and there is a preference for high-level projects with a strong need for super computing.
DRIVER	Involvement of current users seems to be positive	
EELA-2	Involvement of the existing EELA-2 members in the project is secured through regular telephone and Skype conferences, occasional f2f meetings, mailing lists, a Wiki, Blogs, national and international meetings and workshops plus the annual EELA-2 conference. Furthermore, current members need to contribute to the outreach and training events of the project and thus interact with each other as well as with (potential) users.	
EGEE	EGEE does have a scheme to retain users: the user forum, user steering committee etc. and an escalation process to ensure that grievances/complaints coming from users do come to the attention of the management.	
ETSF	Good rate of repeat-users	
GÉANT	Integration with very large research projects	Invisible to end users
MediGrid	N/A	N/A

NVO	The NVO does not target users at the moment. A small core of users who are directly engaged with the project play more of an advisory role.	
OGF		OGF manages to engage its current users—that is, the adopters of its standards mainly by the fact that they have little other choices if they are e-Infrastructure providers. Commercial users are much more challenging, since they often follow technological fashions that diverge from grids. Preliminary efforts are taking place to connect grids to cloud computing, but it is too soon to assess their potential.
OSG	Users are exposed to and often take part in decisions. The engagement team keeps newer users involved.	
Swedish Nat. Data Service	See above.	
Swiss BioGrid	Good user involvement during project, now discontinued, may be revived.	No infrastructure in Switzerland to obtain users.
TeraGrid	After recognizing that a "build it and they will come" approach is untenable, TeraGrid has moved to an innovative three pronged strategy that includes marketing and information dissemination, a novel Science Gateways program that minimizes the need for users to change in adopting the TeraGrid, and Campus Champions that leverages local presence of technology advocates in university campuses. These programs managed to attract users that were not traditionally associated with supercomputing, but require high-end computation and data resources	

Table 1-11: Strengths and weaknesses of organizational bedding

	Strengths	Weaknesses
C3-Grid	All involved institutions have a long tradition as research institutions. Many of them are flagships of the German research system.	
CineGrid		The community is rather organizationally detached and not integrated into any organization such as an academic society or research institution.
CLARIN	The project is well established within multiple institutions and a number of overlapping academic communities. This project is very much a 'bottom-up' effort, signifying strong commitment from the institutions involved.	
D4science	D4Science seems to be embedded well, as it contributes to the core mission of its participating organizations, namely to deliver grid computing services.	
DARIAH	Yes, the project is well embedded, but…	The variety of institutions involved in the project may be problematic in future.
DEISA	DEISA seems to be embedded well, as it contributes to the core mission of its participating organizations, namely to deliver supercomputing services.	
DRIVER	well bedded in organizations who seem to be very dedicated.	
EELA-2	It is currently being evaluated and negotiated whether the LGI can become a part of RedCLARA and this can be mirrored in similar national pairs of NGI/NREN.	EELA-2 is not (yet) embedded in any organization.
EGEE	The organizational bedding of EGEE can't be any better. It is connected to virtually every Grid project of at least national importance. Many tasks of EGEE are done in cooperation with other institutions. An example is the communication with potential user groups via NRENs.	
ETSF	well integrated in the participating institutions, thematic organisation in nodes.	
GÉANT	Integration of NRENs through DANTE and Terena	Some challenges as to solidarity
MediGrid	Project well anchored in participating organisations	Little integration between partners
NVO	The NVO is important to participating institutions, especially to astronomical ones (as opposed to computer science). This group is likely to pick up some of the development made in the project, should funding stop. They will also continue to take part in the project in its next round.	
OGF	Grid computing, and the work of the OGF is	

	well recognized and facilitated by the vast majority of e-Infrastructure institutions.	
OSG		Fermilab is the main player in the OSG, and appears to be the most committed than others. Nonetheless, the opportunistic computing model that offers economies of scale and is based on trust does promote higher institutional commitment.
Swedish Nat. Data Service	Tightly embedded within governmental agencies and university institutions. Well established in Swedish e-Science initiative.	
Swiss BioGrid	The project was extremely well embedded within the participating institutions.	
TeraGrid		While strongly embedded in participating institutions, continual competition for grants—especially the upcoming TeraGrid Extreme Digital Resources—weakens the overall commitment to the project.

Table 1-12: Strengths and weaknesses of institutionalized links

	Strengths	Weaknesses
C3-Grid	As figurehead of the German Grid community at least the bracing within German and European Grid projects is excellent. Furthermore there exist at least lose affiliations to most Grid projects all over the world.	
CineGrid	CineGrid is informed by the work of other e-infrastructure projects and communities, in particular the OptIPuter project and the GLIF community. This is mainly because CineGrid members contribute to or even drive these projects and communities.	Institutionalised forms of cooperation were not mentioned by any of the sources on CineGrid.
CLARIN	Yes. CLARIN have worked hard to research and integrate themselves within similar projects and infrastructures. Co-operation is further secured through dedicated liaison personnel.	
D4science	D4Science is well informed of the work of other e-infrastructure projects and communities and is collaborating with other FP6 & FP7 projects and R&D programmes; furthermore, the user communities participate in several projects respectively programmes.	The collaborations are of different nature, as they range from technical exchanges involving mutual exploitation of technologies to the sharing of e-Infrastructure resources and joint organization of networking and dissemination events.
DARIAH	Some links being built with CLARIN and Europeana to ensure interoperability.	
DEISA	DEISA is well informed of the work of other e-infrastructure projects and communities and is collaborating with other initiatives like CLARIN, COSMOS, DANTE, EFDA/ITER, ENES and the European Psi-k Network in Material Science.	
DRIVER	Links to large parts of the repository landscape exist	
EELA-2	Institutionalised co-operations exist with different other infrastructures: RedCLARA, Latin American NRENs, Géant (transmission capacities), EGEE and OurGrid (on middleware).	
EGEE	One important link to other big projects is the fact that EGEE is funded by the EC like most of the leading potential user projects. EGEE has institutionalized links to most Grid projects and the NRENs.	
ETSF	No information	
GÉANT	Strong (as core business) links to national NRENs. Links also exist to user organisations, such as the LHC.	
MediGrid	Good links to international GRID projects	
NVO	There are good, ongoing relationships with IVOA, and some degree of collaboration with	

	e-Infrastructure providers, such as TeraGrid.	
OGF	Cultivated for a decade, OGF is a quintessential cooperation network among diverse organizations in the e-Infrastructure ecosystem—including all major e-Infrastructure providers.	
OSG	There are good relationships, including interoperation with multiple international e-Infrastructures, most notably the EGEE. OSG also has relations with TeraGrid and Japan's NAREGI.	
Swedish Nat. Data Service	Yes, with CESSDA and with other researchers and institutions using data.	
Swiss BioGrid	Good links while project lasted	Absence of links to non-existing infrastructure
TeraGrid		Aside from efforts to collaboration with the Open Science Grid, there are no established interoperation mechanisms, only exchanges of knowledge and practices.

Table 1-13: Strengths and weaknesses of external use of software and tools

	Strengths	Weaknesses
C3-Grid	A significant part of the work of C3-Grid was to develop middleware and Grid standards. Many other younger Grid projects in Germany have adopted the technology and tools.	The core of the Grid technology is the middleware. C3-Grid - like all D-Grid projects - use gLite as middleware. But from an international point of view much more research is done on Globus, an alternative to gLite. Globus is used in many other paradigmatic projects.
CineGrid	The major coordinated development in CineGrid is related to a distributed system for storing and retrieving at high-speed large high-quality audio and high-resolution video material, the CineGrid Exchange. The developments in this area are supported and closely monitored by those CineGrid members, who have similar needs in their home institutions. Besides, CineGrid members share their developments and achievements in projects with the community.	No examples of wider sharing or use of CineGrid results were mentioned by the informants.
CLARIN	N/A	N/A
D4science	Within the VREs the users have the possibility of selecting a number of technologies and services and creating a bundle of them, for domain specific investigations and analysis. For example the users can share an archive or a database. Other communities can also benefit from the automised processes.	No examples of wider sharing or use of D4Science results were mentioned by the informants or in the available documents.
DARIAH	N/A	N/A
DEISA	DEISA is one of the biggest projects in the field of grid and super computing and provides several e-Infrastructures with computing power and resources.	
DRIVER	Core business of DRIVER is external use of their software platform which has been quite successful	
EELA-2	EELA-2 sites are also providing computer cores to EGEE.	EELA-2 has only few research & development activities. These mainly address infrastructure and application services for the project.
EGEE	The gLite services are currently adopted by more than 250 Computing Centers and used by more than 15,000 researchers in Europe and around the world.	
ETSF	the core business of the ETSF is to provide code to user projects.	N/A
GÉANT	N/A	N/A
MediGrid	Use in follow up projects	
NVO	NVO's collaboration with IVOA on standards as well as technologies ensures that developments made in the US will be used elsewhere. Commercial partners have also used this work.	

OGF	Specifications and recommendations OGF developed are being widely used, particularly in academic e-Infrastructure providers, but also by commercial providers of applied distributed (Grid) computing.	
OSG	OSG uses common, well established middleware tools such as Condor, Globus and VDT. Many other e-Infrastructures rely upon these tools.	
Swedish Nat. Data Service	The project uses the Swedish University network SUNET.	
Swiss BioGrid	Lessons learned from SBG have been transferred to the SwiNG project.	
TeraGrid		TeraGrid has a very large number of users. At the same time most of its developments serve various participating sites in TeraGrid, but there is no evidence to suggest that it is used elsewhere.

Table 1-14: Opportunities and threats of funding of member organizations

	Opportunities	Threats
C3-Grid	All member organizations are major research institutes or universities. Their funding is guaranteed for the future.	
CineGrid		An overall assessment of the funding of CineGrid organizations is very difficult due to their number and diversity. One of the main drivers of the community who also acts as secretariat, Pacific Interface Inc., is a small consultancy firm in the areas of business consulting and business development. An evaluation of its funding situation is not possible, but the funding is probably less dependable than that of a major university or other publicly funded organization.
CLARIN	Multiple participating organizations so difficult to say, although this could be seen as an advantage – being anchored to so many organizations reduces the threat to the project by unstable funding in one or more partner institutions.	
D4science	The Environmental Monitoring (EM) and Fisheries and Aquaculture Resources Management (FARM) communities are big and strong communities and linked with the FAO and WorldFish Center. Therefore a funding of member organizations could be possible.	
DARIAH		Not stable. DARIAH was delayed by funding cuts which effectively closed down UK collaborator AHDS.
DEISA	DEISA is linked with other strong organizations, i.e. supercomputing centres. Therefore a funding of member organizations could be possible.	
DRIVER	Participating organizations are universities and national repositories that are not dependent on volatile funding.	
EELA-2	The EELA-2 member organizations are mainly higher education and research organizations in Europe and Latin America. It is not possible to assess their funding situation.	
EGEE	All member organizations are research institutions like universities. They may not lavish money but at least the long-term funding is guaranteed.	
ETSF		Rather than on engagement of member organizations, ETSF hinges on top-down funding
GÉANT	Being an indispensable and mission critical factor in the national research landscapes, funding of NRENs can be expected to be secured.	No objective measure of fair shares in funding contribution of partners, solidarity is crucial.

MediGrid	N/A since project has ended	N/A since project has ended
NVO	Participating organizations are universities and national labs that are not dependent on transient funding.	
OGF		Funding to Grid activities within commercial participating organizations has reduced considerably and a similar trend is found in the US academic field.
OSG	Participating organizations are universities and national labs that are not dependent on transient funding.	
Swedish Nat. Data Service	Solid funding for both agencies and institutions.	
Swiss BioGrid	Stable, particularly the commercial partner, which continues to invest in exploiting the results.	
TeraGrid	Although the organizational composition would likely change, the allocation of next round public funding has been ensured. Nevertheless, until the winner of the bid is announced, there is fierce competition among current collaborators, which clouds day-to-day operation.	

Table 1-15: Opportunities and threats of technology monitoring

	Opportunities	Threats
C3-Grid	Within the earth science community C3-Grid is setting standards. The project is being presented and discussed at all major conferences in the affiliated fields. Furthermore, C3-Grid is an active member of the Grid community, so developments in this field won't be missed.	The purchase and maintenance of the hardware is a responsibility of the participating organizations. Hence, it is not guaranteed that all use the same high standards of hardware. There is no obligation to adapt the best technology. But up to now this is more a theoretical problem.
CineGrid	The community receives first-hand information on new developments mainly through some of its members, who are at the forefront of their fields and involved in standardization and governance activities in academia as well as business.	
CLARIN	Yes. The project has considerable accumulated experience in technology development, and knowledge of potential and actual technologies currently outside the project which may be useful.	
D4science	The project receives first-hand information on new developments mainly through some of its members, who are - like the participating Universities and the CERN - at the forefront of their fields and involved in standardization and governance activities in academia as well as business.	
DARIAH	Yes, and through collaboration with other infrastructures is likely to stay ahead of these developments.	
DEISA	The project receives first-hand information on new developments mainly through some of its members, who are—like the participating supercomputing and research centres—at the forefront of their fields and involved in standardization and governance activities in academia as well as business.	
DRIVER	N/A	N/A
EELA-2	The project members are aware of the technological developments in the area of Grid computing as this is their core area of expertise.	However, they are only partly familiar with the computing models and possible alternatives in their application domains, such as biomedicine, HEP, earth sciences and the like.
EGEE	EGEE is not only a cutting-edge project with a leading position within the community, it has also established institutions to enhance the cooperation with "competing" projects like the Globus Toolkit to set conjoint standards to harmonize and ease the interoperability.	
ETSF	Technology here means code, with a very probable longevity	
GÉANT	Driver of networking technologies	

MediGrid	N/A since project has ended	N/A since project has ended
NVO	NVO involves renowned experts on distributed academic computing as well as astronomy experts. However, as noted above, there is a clash between computer scientists and astronomers resulting from over exploring technological opportunities, and not being focused on delivering a simple to use production facility.	
OGF	Through the work of dozens of groups and committees, new technologies are identified and considered to be incorporated or addressed by the OGF.	
OSG	OSG involves some of the world's most renowned experts on distributed academic computing. However, there is no indication that efforts are being made to consider alternative technologies, such as clouds.	
Swedish Nat. Data Service	Not known.	Need to seek solutions for secure network access.
Swiss BioGrid	g-Lite was good solution	There was no optimal solution for federating datasets
TeraGrid	TeraGrid involves some of the world's most renowned experts on distributed academic computing. However, there is no indication that efforts are being made to consider alternative technologies, such as clouds.	

Table 1-16: Opportunities and threats of funding competition with other infrastructures or technologies

	Opportunities	Threats
C3-Grid	C3-Grid is very well embedded in D-Grid. Hence not only C3-Grid but other projects as well help to improve the tools in use.	As mentioned the middleware gLite used is different from the middleware Globus of other major projects.
CineGrid	Neither in technological nor commercial sense there is any strong competition for CineGrid as no similar initiatives exist. The Enhanced Digital Cinema (EDcine, http://www.edcine.org/) project was funded within the 6th Framework Programme and focused on the advancement of digital cinema in Europe. However, the CineGrid community sticks out because of the excellence of its members and it can be considered as unique. CineGrid is doing experimental and pre-commercial work, hence commercial competition is not relevant.	
CLARIN	Competition is not strong – collaboration is extremely strong. CLARIN seeks to integrate itself within and consolidate existing efforts rather than compete with them.	Potential competition with current FP7 project DARIAH. Both projects currently work with one another, but if funding becomes scarcer, they may be forced into competition.
D4science	Developments like gCube and the automatized generation of VRE result in a unique selling proposition.	Competition for D4Science results from similar initiatives adding to the EGEE work.
DARIAH	Scarcity of similar Humanities projects means that there is no fierce competition, and more of a collaborative, integrated effort.	Currently working with other infrastructures but tensions may arise if funding becomes scarcer.
DEISA	Neither in technological nor commercial sense there is any strong competition for DEISA as no similar initiatives exist. The focus in EGEE is more on grid computing with the need of data exchange.	Cloud computing may be a threat; but it has unsolved problems in the field of security and can hardly reach the same computing power.
DRIVER		Google booksearch
EELA-2		Technological competition between Grid computing and other computing models, e.g. local clusters or cloud computing, may already constitute or develop in the future as an alternative for many scientists.
EGEE	A competitive technology might be cloud computing. EGEE has commissioned a study to compare the advantages and disadvantages. The study (Bégin 2008) comes to the conclusion that cloud and Grid computing may be integrated and are not competitors regarding implementation.	
ETSF	ETSF is a very unique infrastructure that caters for a previously untapped research need.	
GÉANT	No other organizations and service providers like Géant exist in Europe.	

MediGrid	N/A since project has ended	N/A since project has ended
NVO	There is no discernable competition.	
OGF		Each e-Infrastructure has its own middleware system. Being a highly complex technology, even the devoted work of groups such as GIN (see above), can only support partial interoperation.
OSG	The open all-inclusive model of the OSG offers a low barrier entry and economic benefits to participants. Still, cloud computing offers a significant threat, should it be publicly available and be able to serve the specialized needs of high-end computation.	
Swedish Nat. Data Service	No competition exists due to the unique nature of this resource.	
Swiss BioGrid	There was none within Switzerland at the time.	
TeraGrid	Being a highly complex and specialized operation, there are no alternatives e-Infrastructure technologies that can be implemented across participating sites to support the provision level of TeraGrid. Still, cloud computing poses a significant threat, should it be publicly available and be able to serve the specialized needs of supercomputing/high-end computation and data scientific users.	

Table 1-17: Opportunities and threats of security risks

	Opportunities	Threats
C3-Grid	Up to now no security risks are known.	A more sophisticated access right management system has to be developed. A separate project proposal has been developed and submitted for funding.
CineGrid		Security problems could affect the CineGrid community negatively: Firstly, the production, archiving and subsequent use of the CineGrid Exchange audio/video material require a system of digital rights management that protects the material from commercial and other misuse. Second, the skepticism towards using networks for transmitting movie content or making content for network experiments and demonstrations available has been stated as one of the barriers to entering the community that applies in particular to the motion picture industry; the security of the content is also the major issue in this case.
CLARIN	N/A	N/A
D4science		Security problems could affect the D4Science community negatively. In the fields of Environmental Monitoring and Fisheries and Aquaculture Resources are strong political and commercial interests.
DARIAH	N/A	N/A
DEISA		Security problems could affect the DEISA community negatively. In the field of fusion and nuclear power are strong political and commercial interests.
DRIVER	None disclosed	None disclosed
EELA-2	The combination of gLite and OurGrid middleware lowers security risks according to our informants' opinion. In the OurGrid all remote tasks are executed within a virtual machine that does not have access to the network and harm could only be done to the virtual machine.	
EGEE	Within the scientific communities no problems are reported	Users from the industry can't adopt EGEE because of a lack of data privacy.
ETSF	None disclosed	None disclosed
GÉANT	None disclosed	None disclosed
MediGrid	None disclosed	None disclosed
NVO	While implementing commonly used authentication and other security mechanisms, the type of data used does not require extensive security measures.	
OGF	N/A	N/A
OSG		While implementing commonly used authentication and other security mechanisms

		informants acknowledge that this infrastructure is not ready for handling of sensitive data
Swedish Nat. Data Service	Currently this is not a problem but….	Secure sign-in may be more of a problem in future. This is still being evaluated.
Swiss BioGrid	N/A	No threats on a small scale, but scaling up would require security solutions.
TeraGrid	There is a stream of research and development on security, including identity management and advanced authentication mechanisms.	

Table 1-18: Opportunities and threats of changes of user communities and fields

	Opportunities	Threats
C3-Grid	The current trend within the earth sciences is to develop models with huge data bases. These data bases can only be handled with Grid technology. It is conceivable that more and more scientists will use the Grid.	Since more scientists will use the Grid the Grid has to become more user-friendly. It has to work like usual software, which means that no highly specialized skills have to be necessary to use it. Furthermore the Grid will be opened to researchers from all over the world including countries with no good internet access. Hence, the access to data has to be simplified in a way that only the data really needed is downloaded. A more sophisticated pre-processing of the data has to be developed and implemented.
CineGrid	The current trends and expected changes in the networking and electronic visualization fields and the media education/science sector have not been assessed in the interviews in detail. However, there are at least two different trends which are supportive to the community's work: 1) a general trend in higher education and research towards including high-quality multimedia content and visualizations; 2) the rising importance of digital cinema technologies in the motion picture industry.	
CLARIN	Not known.	Not known.
D4science	There are several trends which are supportive to the community's work, e.g. the increasing need of climate data because of the global warming and the increased awareness of an ecological balance.	
DARIAH	Not known.	Not known.
DEISA	There are several trends which are supportive to the community's work, e.g. the increasing need of electricity (which can be a product of nuclear power stations) and mobility (which can be supported by results of fusion research).	
DRIVER	Diverse fields, changes cannot be projected.	
EELA-2	Diverse fields, changes cannot be projected.	
EGEE	Diverse fields, changes cannot be projected.	
ETSF	Communities yet unserved provide for opportunities to expand the services of ETSF	
GÉANT	Due to little competition not to be expected	
MediGrid	N/A since project has ended	N/A since project has ended
NVO	NVO is promoting a new research paradigm in astronomy. Informants note that this new paradigm is well regarded, but it needs to be backed by a robust and easy to use e-Infrastructure.	
OGF		Again, this largely depends on the degree to

		which new technological paradigms—such as cloud computing—will be adopted, both in commercial, as well as in academic e-Infrastructures.
OSG	OSG has implemented various mechanisms that accommodate specialized environments—thus not requiring users to change. Among these are community tailored engagements, as well as partnerships with mediators who provide OSG resource to a particular community, without them knowing that they are using these resources.	
Swedish Nat. Data Service	Current investment by Swedish government in the exploitation of this data will ensure continued growth of user community and research potential.	Whether this potential is realized remains open.
Swiss BioGrid	User involvement was good during the project…	..but the project was discontinued
TeraGrid		It does not seem likely that the need for high-end distributed resources TeraGrid provides will quickly expand beyond communities that are currently served.

2 Annex tables – Survey among e-infrastructure communities

Table 2-1: Respondents by highest academic degree

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No degree	5	1.2	1.3	1.3
	Bachelor or Master	153	37.6	38.5	39.8
	Doctoral degree	239	58.7	60.2	100.0
	Total	397	97.5	100.0	
Missing	System	10	2.5		
Total		407	100.0		

Table 2-2: Clusters of respondents according to time use pattern (arithmetic mean and median values of working time in %)

	Teaching time		Research time		Professional work time		Administration time	
	Mean	Med.	Mean	Med.	Mean	Med.	Mean	Med.
Cluster 1 "Scholars" (n=117)	37.5	30	36.4	40	10.6	10	15.5	10
Cluster 2 "Researchers" (n=159)	6.6	5	75.2	75	7.0	0	11.1	10
Cluster 3 "Professionals" (n=84)	3.4	0	13.7	10	71.4	70	11.6	10
Cluster 4 "Administrators" (n=45)	6.1	0	18.1	20	18.2	15	57.6	50
All respondents for time use (n=381)	14.7	10	44.7	40	22.9	10	17.6	10

Table 2-3: Respondents by attitude towards new technologies: Among my peers, I am usually the first to try out new technologies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	0.2	0.3	0.3
	Disagree	11	2.7	2.8	3.1
	Neutral	74	18.2	19.0	22.1
	Agree	202	49.6	51.9	74.0
	Strongly Agree	101	24.8	26.0	100.0
	Total	389	95.6	100.0	
Missing	System	18	4.4		
Total		407	100.0		

Table 2-4: Respondents by attitude towards new technologies: In general, I am hesitant to experiment with new technologies.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	155	38.1	42.6	42.6
	Disagree	124	30.5	34.1	76.6
	Neutral	35	8.6	9.6	86.3
	Agree	27	6.6	7.4	93.7
	Strongly Agree	23	5.7	6.3	100.0
	Total	364	89.4	100.0	
Missing	System	43	10.6		
Total		407	100.0		

Table 2-5: Respondents by e-infrastructure project which they selected to report

		Frequency	Percent	Valid Percent	Cumulative Percent
Case study projects	C3-Grid	5	1.2	1.2	1.2
	CineGrid	1	0.2	0.2	1.5
	CLARIN	15	3.7	3.7	5.2
	D4science	12	2.9	3.0	8.1
	DARIAH	6	1.5	1.5	9.6
	DEISA	40	9.8	9.9	19.5
	DRIVER	9	2.2	2.2	21.7
	EELA2	73	17.9	18.0	39.7
	EGEE	55	13.5	13.5	53.2
	ETSF	4	1.0	1.0	54.2
	GEANT	12	2.9	3.0	57.1
	MediGrid	2	0.5	0.5	57.6
	OGF	10	2.5	2.5	60.1
	OSG	8	2.0	2.0	62.1
	SND	1	0.2	0.2	62.3
	Swiss Bio Grid	1	0.2	0.2	62.6
	TeraGrid	2	0.5	0.5	63.1
	US NVO	25	6.1	6.2	69.2
Other projects	Belief	2	0.5	0.5	69.7
	BeSTGRID	4	1.0	1.0	70.7
	BiG Grid	2	0.5	0.5	71.2
	EMBRACE	2	0.5	0.5	71.7
	ENEA-GRID	2	0.5	0.5	72.2
	EUAsiaGrid	2	0.5	0.5	72.7
	IVOA	3	0.7	0.7	73.4
	NCeSS	3	0.7	0.7	74.1
	NorduGrid	3	0.7	0.7	74.9
	OGSA-DAI	2	0.5	0.5	75.4
	OMII-UK	2	0.5	0.5	75.9

	RNP	3	0.7	0.7	76.6
	SEE-GRID	2	0.5	0.5	77.1
	UK NGS	4	1.0	1.0	78.1
	Walhalla	2	0.5	0.5	78.6
	Other	87	21.4	21.4	100.0
	Total	406	99.8	100.0	
Missing	System	1	0.2		
Total	407	100.0			

Note: Only the case projects plus other projects with 2 or more responses are shown.

Table 2-6: Respondents by geographic scope of e-infrastructure project which they selected to report

Geographic scope		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	National	66	16.2	20.8	20.8
	International	251	61.7	79.2	100.0
	Total	317	77.9	100.0	
Missing	System	90	22.1		
Total		407	100.0		

Table 2-7: Respondents by disciplinary scope of e-infrastructure project which they selected to report

Disciplinary scope		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disciplinary	79	19.4	26.5	26.5
	Multidisciplinary	219	53.8	73.5	100.0
	Total	298	73.2	100.0	
Missing	System	109	26.8		
Total		407	100.0		

Table 2-8: Respondents by type of service of e-infrastructure project which they selected to report

Type of service		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Computing	217	53.3	69.3	69.3
	Data	96	23.6	30.7	100.0
	Total	313	76.9	100.0	
Missing	System	94	23.1		
Total		407	100.0		

Table 2-9: Respondents by driver for e-infrastructure project which they selected to report

Driver		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Developer-driven	164	40.3	57.7	57.7
	Community-driven	120	29.5	42.3	100.0
	Total	284	69.8	100.0	
Missing	System	123	30.2		

Total	407	100.0		

Table 2-10: Field characteristics by clusters of fields (arithmetic mean and median)

Field characteristics	Established low collaboration		Novel dynamic collaborative		Dynamic competitive		Total	
	Arith. mean	Median	Arith. mean	Median	Arith. mean	Median	Arith. mean	Median
People in my field typically work alone	3.0	3	1.7	2	2.0	2	2.4	2
Collaboration is necessary in my field	4.1	4	4.7	5	4.4	4	4.3	4
People in my field typically collaborate with a small group of peers (2-10) on the same project	4.0	4	2.9	3	4.2	4	3.7	4
People in my field typically collaborate with medium to large groups of peers (10+) on the same project	2.7	3	3.8	4	2.4	2	2.9	3
In my field the competition for academic recognition and/or commercial success is intense	3.5	3	4.1	4	4.2	4	3.9	4
Problems, paradigms, approaches, or methods change rapidly in my field	3.2	3	4.2	4	4.2	4	3.8	4
Research/Work in my field is often done with exploratory research designs	3.6	4	4.2	4	3.8	4	3.8	4
Research/Work in my field is often done with causal research designs	3.2	3	3.0	3	3.2	3	3.2	3
My field is novel and establishing itself within my discipline	3.2	3	3.8	4	3.4	3	3.4	3
In order to make an impact scholars in my field need to specialize as theoretic-ians, empiricists, methodologists or in other roles.	3.7	4	4.0	4	3.9	4	3.8	4

Table 2-11: Number of other individuals from the same field using/participating in the e-Infrastructure by research field (in %)

No. of other individuals	Astronomy or Astrophysics	Biological Sciences and Medicine	Chemical and Material Sciences	Computer and Information Sciences	Engineering and Technology	Earth and Other Natural Sciences	Physical Sciences	Social Sciences and Humanities	Total
None	4.2%	10.7%	11.1%	0.0%	0.0%	0.0%	0.0%	7.7%	4.0%
1-5	12.5%	21.4%	5.6%	31.4%	25.0%	29.4%	19.0%	15.4%	21.0%
6-10	4.2%	10.7%	27.8%	17.1%	10.0%	11.8%	33.3%	7.7%	15.3%
21-100	20.8%	35.7%	22.2%	22.9%	20.0%	29.4%	14.3%	23.1%	23.9%
101-500	12.5%	0.0%	0.0%	2.9%	0.0%	0.0%	9.5%	7.7%	4.0%
More than 500	16.7%	3.6%	11.1%	8.6%	10.0%	5.9%	4.8%	15.4%	9.1%
Don't know	29.2%	17.9%	22.2%	17.1%	35.0%	23.5%	19.0%	23.1%	22.7%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%
Case numbers	24	28	18	35	20	17	21	13	176

Table 2-12: Number of other individuals from the same field using/participating in the e-Infrastructure by start of involvement in the selected e-infrastructure (in %)

No. of other individuals	Start of involvement in the selected e-infrastructure				
	Involvement from the start	Involvement 1-2 years after project start	Involvement 3-5 years after project start	Involvement > 5 years after project start	Total
None	2.6%	0.0%	4.0%	5.0%	2.8%
1-5	6.6%	14.7%	20.2%	17.5%	14.8%
6-10	14.5%	19.1%	26.3%	12.5%	19.4%
21-100	32.9%	29.4%	18.2%	27.5%	26.1%
101-500	11.8%	10.3%	3.0%	5.0%	7.4%
More than 500	14.5%	5.9%	1.0%	7.5%	6.7%
Don't know.	17.1%	20.6%	27.3%	25.0%	22.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

Table 2-13: Number of other individuals from the same field using/participating in the e-Infrastructure by type of e-infrastructure (in %)

	Computing versus data e-Infrastructure		Developer- versus community-driven		Total
	Computing	Data	Developer-driven	Community-driven	
None	3.4%	1.1%	4.4%	0.0%	2.7%
1-5	18.9%	7.6%	19.6%	9.0%	15.4%
6-10	18.4%	20.7%	24.7%	13.5%	19.1%
21-100	24.3%	30.4%	22.2%	27.9%	26.2%
101-500	7.3%	8.7%	5.1%	10.8%	7.7%
More than 500	7.3%	6.5%	3.8%	11.7%	7.0%
Don't know	20.4%	25.0%	20.3%	27.0%	21.8%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

Table 2-14: Geographic distribution of other individuals in the field that are using/participating in the e-Infrastructure by geographic reach of this e-infrastructure(in %)

Geographic distribution	International/national e-Infrastructure		
	National	International	Total
In a single region	7.4%	9.3%	9.0%
In multiple regions within a country	61.1%	9.8%	19.7%
Across multiple countries within a continent	3.7%	41.3%	34.1%
Across continents	27.8%	39.6%	37.3%
Total	100.0%	100.0%	100.0%

Table 2-15: Geographic distribution of other individuals in the field that are using/participating in the e-Infrastructure by research field (in %)

Geographic distribution	Astronomy or Astrophysics	Biological Sciences and Medicine	Chemical and Material Sciences	Computer and Information Sciences	Engineering and Technology	Earth and Other Natural Sciences	Physical Sciences	Social Sciences and Humanities	Total
In a single region	4.8%	21.4%	0.0%	22.9%	6.7%	31.3%	5.0%	16.7%	14.6%
In multiple regions within a country	19.0%	10.7%	17.6%	31.4%	33.3%	12.5%	20.0%	25.0%	21.3%
Across multiple countries within a continent	19.0%	25.0%	64.7%	20.0%	26.7%	25.0%	40.0%	33.3%	29.9%
Across continents	57.1%	42.9%	17.6%	25.7%	33.3%	31.3%	35.0%	25.0%	34.1%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%
Case numbers	21	28	17	35	15	16	20	12	164

Table 2-16: Respondents by function of involvement in the selected e-infrastructure project and continent (in %)

Respondent type	Europe	North-America	Latin America	Asia	Other	Total
Research user	41.5%	50.0%	57.1%	45.8%	50.0%	46.1%
Other user	10.5%	7.1%	4.8%	12.5%	12.5%	9.1%
Developer	48.0%	42.9%	38.1%	41.7%	37.5%	44.8%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 2-17: Respondents by function of involvement in the selected e-infrastructure project and selected project (in %)

	Selected e-Infrastructure					
Respondent type	DEISA	EELA-2	EGEE	US NVO	Other	Total
Research user	95.0%	53.4%	36.4%	56.0%	35.5%	45.9%
Other user	0.0%	4.1%	14.5%	8.0%	11.2%	9.1%
Developer	5.0%	42.5%	49.1%	36.0%	53.3%	45.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 2-18: Respondents by primary sponsor of the activities with the selected e-infrastructure and geographic scope and driver of the selected e-infrastructure (in %)

Primary sponsor	Geographic scope of the selected e-infrastructure		Driver		Total
	National	International	Developer-driven	Community-driven	
Governmental funding agency (national)	69.1%	34.1%	35.7%	41.7%	41.1%
International governmental funding agency (e.g. EU)	7.3%	36.8%	28.6%	36.9%	30.9%
Private funding agency	1.8%	2.7%	3.6%	1.9%	2.5%

Own institution	21.8%	26.4%	32.1%	19.4%	25.5%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

Table 2-19: Respondents by services and resources used or developed and activity profile (in %)

Services and resources used	Scholars	Researchers	Professionals	Administrators	Total
Grid computing	48.7%	49.1%	41.9%	55.6%	48.2%
Supercomputing	25.6%	25.8%	4.7%	11.1%	19.7%
Visualization	14.5%	15.1%	17.4%	17.8%	15.7%
Simulation	30.8%	20.8%	12.8%	8.9%	20.6%
Data management tools	22.2%	33.3%	41.9%	46.7%	33.4%
Data analysis tools	23.9%	27.0%	31.4%	28.9%	27.3%
Data collections	21.4%	28.9%	36.0%	26.7%	28.0%
Online storage	19.7%	25.2%	25.6%	40.0%	25.3%
Collaboration tools	31.6%	18.9%	23.3%	33.3%	25.1%
Remote access to research instruments	20.5%	17.0%	8.1%	6.7%	15.0%
Individual support/advice	15.4%	20.1%	23.3%	11.1%	18.4%
Other	8.5%	10.7%	11.6%	11.1%	10.3%
My own applications ported on the e-infrastructure	29.1%	31.4%	15.1%	24.4%	26.5%
Online digital materials for research	28.0%	9.2%	41.2%	12.5%	20.1%

Table 2-20: Respondents by services and resources used and research field (in %)

Services and resources used	Astronomy or Astrophysics	Biological Sciences and Medicine	Chemical and Material Sciences	Computer and Information Sciences	Engineering and Technology	Earth and Other Natural Sciences	Physical Sciences	Social Sciences and Humanities	Total
Grid computing	12.5%	62.5%	16.7%	63.9%	55.0%	50.0%	52.4%	7.7%	44.5%
Supercomputing	16.7%	28.1%	61.1%	16.7%	35.0%	44.4%	42.9%	7.7%	30.2%
Visualization	45.8%	12.5%	5.6%	13.9%	15.0%	11.1%	0.0%	15.4%	15.4%
Simulation	12.5%	25.0%	33.3%	13.9%	35.0%	38.9%	47.6%	15.4%	26.4%
Data management tools	45.8%	25.0%	11.1%	25.0%	10.0%	33.3%	19.0%	46.2%	26.4%
Data analysis tools	45.8%	25.0%	11.1%	11.1%	10.0%	16.7%	19.0%	46.2%	22.0%
Data collections	70.8%	18.8%	16.7%	22.2%	5.0%	38.9%	9.5%	53.8%	28.0%
Online storage	29.2%	21.9%	11.1%	19.4%	10.0%	44.4%	28.6%	30.8%	23.6%
Collaboration tools	12.5%	9.4%	16.7%	30.6%	20.0%	16.7%	14.3%	30.8%	18.7%
Remote access to research instruments	12.5%	9.4%	5.6%	19.4%	15.0%	16.7%	19.0%	15.4%	14.3%
Individual support/advice	8.3%	18.8%	27.8%	5.6%	5.0%	27.8%	19.0%	7.7%	14.3%
Other	0.0%	6.3%	0.0%	11.1%	5.0%	0.0%	0.0%	0.0%	3.8%
My own applications ported on the e-infrastructure	16.7%	37.5%	33.3%	27.8%	35.0%	55.6%	42.9%	7.7%	32.4%
Online digital materials for research	33.3%	9.4%	16.7%	25.0%	25.0%	27.8%	0.0%	15.4%	19.2%

Case numbers	22	31	17	33	18	15	17	10	163

Table 2-21: Respondents by involvement measured in time and number of services and resources used or developed (in %)

Intensity of involvement with services and resources	Involvement measured in time			
	less than 25%	between 25 and 75%	more than 75%	Total
Small involvement	56.7%	26.7%	22.4%	40.4%
Medium involvement	33.5%	50.0%	48.3%	41.8%
High involvement	9.8%	23.3%	29.3%	17.8%
Total	100.0%	100.0%	100.0%	100.0%

Table 2-22: Respondents by involvement measured as number of services and resources used or developed and primary institutional affiliation (in %)

Intensity of involvement with services and resources	Primary institutional affiliation			
	Academia	Government and international org.	Private sector	Total
Small involvement	40.1%	36.2%	90.5%	42.6%
Medium involvement	43.3%	44.7%	9.5%	41.4%
High involvement	16.7%	19.1%	0.0%	16.0%
Total	100.0%	100.0%	100.0%	100.0%

Table 2-23: Respondents by time of involvement in e-infrastructure and start of involvement with the selected e-infrastructure (in %)

Involvement measured in time	Start of involvement with the selected e-infrastructure				
	Involvement from the start	Involvement 1-2 years after project start	Involvement 3-5 years after project start	Involvement > 5 years after project start	Total
less than 25%	53.2%	50.0%	52.6%	65.7%	53.9%
between 25 and 75%	32.5%	29.7%	34.7%	28.6%	32.1%
75% or more	14.3%	20.3%	12.6%	5.7%	14.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

Table 2-24: Respondents by involvement measured as number of services and resources used or developed and start of involvement with the selected e-infrastructure (in %)

Intensity of involvement with services and resources	Start of involvement with the selected e-infrastructure				
	Involvement from the start	Involvement 1-2 years after project start	Involvement 3-5 years after project start	Involvement > 5 years after project start	Total
Small involvement	33.3%	50.0%	47.9%	52.6%	45.2%
Medium involvement	51.4%	37.5%	38.5%	42.1%	42.2%
High	15.3%	12.5%	13.5%	5.3%	12.6%

involvement Total	100.0%	100.0%	100.0%	100.0%	100.0 %

Table 2-25: Respondents by time of involvement in e-infrastructure and research field (in %)

Involvement measured in time	Astronomy or Astrophysics	Biological Sciences and Medicine	Chemical and Material Sciences	Computer and Information Sciences	Engineering and Technology	Earth and Other Natural Sciences	Physical Sciences	Social Sciences and Humanities	Total
less than 25%	69.6%	51.7%	56.3%	61.3%	64.7%	46.7%	77.8%	72.7%	61.9%
between 25 and 75%	26.1%	34.5%	37.5%	22.6%	35.3%	33.3%	16.7%	27.3%	28.8%
75% or more	4.3%	13.8%	6.3%	16.1%	0.0%	20.0%	5.6%	0.0%	9.4%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 2-26: Respondents by involvement measured as number of services and resources used or developed and research field (in %)

Intensity of involvement with services and resources	Astronomy or Astrophysics	Biological Sciences and Medicine	Chemical and Material Sciences	Computer and Information Sciences	Engineering and Technology	Earth and Other Natural Sciences	Physical Sciences	Social Sciences and Humanities	Total
Small involvement	40.9%	48.4%	47.1%	57.1%	44.4%	33.3%	44.4%	45.5%	46.5%
Medium involvement	40.9%	45.2%	35.3%	31.4%	38.9%	38.9%	38.9%	36.4%	38.2%
High involvement	18.2%	6.5%	17.6%	11.4%	16.7%	27.8%	16.7%	18.2%	15.3%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 2-27: Respondents by time of involvement in e-infrastructure and type of field (in %)

	Field characteristics			
Involvement measured in time	Established low collaboration	Novel dynamic collaborative	Dynamic competitive	Total
less than 25%	45.2%	55.7%	47.1%	48.7%
between 25 and 75%	37.6%	31.1%	35.7%	35.3%
75% or more	17.2%	13.1%	17.1%	16.1%
Total	100.0%	100.0%	100.0%	100.0%

Table 2-28: Respondents by involvement measured as number of services and resources used or developed and type of field (in %)

Intensity of involvement with services and resources	Field characteristics			
	Established low collaboration	Novel dynamic collaborative	Dynamic competitive	Total
Small involvement	42.7%	36.5%	38.4%	39.7%
Medium involvement	37.9%	42.9%	45.2%	41.4%
High involvement	19.4%	20.6%	16.4%	18.8%

Total	100.0%	100.0%	100.0%	100.0%

Table 2-29: Catalysts and barriers by type of e-infrastructure (in %)

	Geographic scope		Disciplinary scope		Type of service		Driver	
Catalysts and barriers	National	Inter-national	Disci-plinary	Multidis-ciplinary	Computing	Data	Devel-oper	Com-munity
Catalysts								
Access to resources	25.7%	26.8%	28.0%	27.0%	27.4%	23.9%	28.7%	28.3%
Organizational catalysts	23.0%	26.4%	21.3%	27.0%	27.9%	20.7%	31.1%	15.8%
Technical capabilities	28.4%	20.9%	16.0%	23.7%	25.1%	16.3%	20.1%	20.0%
Ease of use	6.8%	7.1%	9.3%	6.2%	6.5%	7.6%	7.9%	4.2%
Funding-related catalysts	5.4%	5.0%	5.3%	4.7%	4.7%	6.5%	6.7%	1.7%
Training-related catalysts	12.2%	15.1%	9.3%	16.1%	16.7%	9.8%	16.5%	12.5%
Other catalysts	2.7%	3.8%	5.3%	3.3%	3.3%	4.3%	4.9%	5.0%
Barriers								
Access to resources	2.7%	4.6%	1.3%	5.2%	5.6%	1.1%	6.1%	1.7%
Organizational barriers	18.9%	17.2%	14.7%	18.0%	18.1%	15.2%	22.0%	11.7%
Technical capabilities	28.4%	16.3%	26.7%	16.6%	16.3%	25.0%	11.6%	29.2%
Ease of use	21.6%	16.3%	14.7%	18.0%	20.0%	12.0%	17.7%	16.7%
Funding-related barriers	6.8%	8.8%	10.7%	7.6%	8.4%	8.7%	9.1%	4.2%
Training-related barriers	10.8%	13.0%	9.3%	13.7%	14.4%	7.6%	15.2%	10.0%
Other barriers	8.1%	10.5%	5.3%	11.4%	11.2%	7.6%	13.4%	5.0%

Table 2-30: Spearman rank correlation coefficients between the different questions on usability

	It is easy to become skilful at using the [selected e-infra.] services.	It is easy for me to get help at using [selected e-infra.] services when I need it.	I find it difficult to get [selected e-infra.] services to provide the services I need.	Overall, I find [selected e-infra.] services easy to use.
It is easy to become skilful at using the [selected e-infra.] services.	1.000	.511**	-.350**	.810**
It is easy for me to get help at using [selected e-infra.] services when I need it.	.511**	1.000	-.279**	.514**
I find it difficult to get [selected e-infra.] services to provide the services I need.	-.350**	-.279**	1.000	-.355**
Overall, I find [selected e-infra.] services easy to use.	.810**	.514**	-.355**	1.000

** Significant at the level of 0.01

Table 2-31: Assessment of the usability of the selected e-infrastructure by year of first involvement (in %)

Assessment of the usability of the selected e-infrastructure	Year of first involvement with the e-infrastructure

	1990-1999	2000-2004	2005-2009
It is easy to become skilful at using the [selected e-infra.] services.	77.8%	42.9%	43.5%
It is easy for me to get help at using [selected e-infra.] services when I need it.	75.0%	59.4%	64.3%
I find it difficult to get [selected e-infra.] services to provide the services I need.	14.3%	15.6%	19.0%
Overall, I find [selected e-infra.] services easy to use.	66.7%	50.0%	41.3%

Table 2-32: Assessment of the usability of the selected e-infrastructure by degree of involvement measured in time (in %)

Assessment of the usability of the selected e-infrastructure	Involvement measured in % of working time			
	less than 25%	between 25 and 75%	75% or more	Total
It is easy to become skilful at using the [selected e-infra.] services.	36.5%	45.8%	70.0%	45.3%
It is easy for me to get help at using [selected e-infra.] services when I need it.	59.3%	68.1%	68.4%	64.3%
I find it difficult to get [selected e-infra.] services to provide the services I need.	18.8%	15.9%	23.5%	17.9%
Overall, I find [selected e-infra.] services easy to use.	34.1%	47.9%	63.2%	44.8%

Table 2-33: Assessment of the usability of the selected e-infrastructure by intensity of e-infrastructure involvement (in %)

Assessment of the usability of the selected e-infrastructure	Intensity of involvement with services and resources of selected e-infrastructure			
	Small involvement	Medium involvement	High involvement	Total
It is easy to become skilful at using the [selected e-infra.] services.	35.1%	50.8%	57.1%	45.3%
It is easy for me to get help at using [selected e-infra.] services when I need it.	53.3%	70.3%	77.8%	64.3%
I find it difficult to get [selected e-infra.] services to provide the services I need.	21.1%	16.9%	12.5%	17.9%
Overall, I find [selected e-infra.] services easy to use.	33.3%	53.1%	55.6%	44.8%

Table 2-34: Respondents by activities undertaken to involve others in the e-infrastructure and development area (in %)

Activities undertaken to involve others	Academic and IT support services	Supercom-puting and distributed computing	Networking	Application Develop-ment	Other	Total
Gave talks or demonstrations advocating use	62.2%	80.3%	56.3%	60.0%	77.3%	62.2%
Published on the services provided and their use in research	51.4%	60.6%	62.5%	40.0%	54.5%	51.4%

Solicited the participation of /use by colleagues from my own institution	64.9%	69.7%	50.0%	60.0%	59.1%	64.9%
Solicited the participation of /use by colleagues from other institutions	56.8%	71.2%	50.0%	45.7%	72.7%	56.8%
I did not specifically involve others	18.9%	0.0%	18.8%	20.0%	4.5%	18.9%

Table 2-35: Respondents by activities undertaken to involve others and start of involvement in the e-infrastructure (in %)

Activities undertaken to involve others	Start of involvement with the selected e-infrastructure				
	Involvement from the start	Involvement 1-2 years after project start	Involvement 3-5 years after project start	Involvement > 5 years after project start	Total
Gave talks or demonstrations advocating use	58.8%	62.9%	47.1%	39.0%	55.3%
Published on the services provided and their use in research	43.8%	48.6%	35.6%	24.4%	39.8%
Solicited the participation of /use by colleagues from my own institution	65.0%	62.9%	59.6%	41.5%	58.7%
Solicited the participation of /use by colleagues from other institutions	57.5%	52.9%	45.2%	29.3%	48.9%
I did not specifically involve others	15.0%	11.4%	14.4%	29.3%	14.3%

Table 2-36: Impact on the research or work programme by continent of the respondent (in %)

Lack of the eInfrastructure or similar resources would impair my research/work programme	Continents					
	Europe	North-America	Latin America	Asia	Other	Total
Not at all	9.8%	0.0%	5.1%	11.1%	0.0%	7.6%
A little	24.5%	22.2%	15.4%	33.3%	66.7%	23.4%
Much	52.9%	50.0%	64.1%	44.4%	0.0%	53.8%
Totally	12.7%	27.8%	15.4%	11.1%	33.3%	15.2%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Note case numbers: Europe 102, North-America 18, Latin America 39, Asia 9 Other 3, Total 171.

Table 2-37: Impact on the research or work programme by type of selected e-infrastructure (in %)

		Lack of the eInfrastructure or similar resources would impair my research/work programme				
		Not at all	A little	Much	Totally	Total
Geographic scope	National	7.4%	33.3%	33.3%	25.9%	100.0%
	International	6.5%	23.1%	59.3%	11.1%	100.0%
Disciplinary scope	Disciplinary	7.4%	37.0%	37.0%	18.5%	100.0%
	Multidisciplinary	6.8%	21.4%	59.2%	12.6%	100.0%
Type of service	Computing	5.7%	21.9%	58.1%	14.3%	100.0%
	Data	10.0%	36.7%	40.0%	13.3%	100.0%

Driver	Developers	6.3%	18.8%	61.3%	13.8%	100.0%
	Community	6.7%	33.3%	44.4%	15.6%	100.0%

Table 2-38: Impact on the research or work programme by research field (in %)

Lack of the eInfrastructure or similar resources would impair my research/work programme	Astronomy or Astrophysics	Biological Sciences and Medicine	Chemical and Material Sciences	Computer and Information Sciences	Engineering and Technology	Earth and Other Natural Sciences	Physical Sciences	Social Sciences and Humanities	Total
Not at all	0.0%	4.0%	6.3%	12.5%	0.0%	0.0%	5.6%	0.0%	4.8%
A little	19.0%	32.0%	12.5%	15.6%	21.4%	7.7%	33.3%	62.5%	23.1%
Much	47.6%	56.0%	75.0%	71.9%	71.4%	69.2%	27.8%	25.0%	57.8%
Totally	33.3%	8.0%	6.3%	0.0%	7.1%	23.1%	33.3%	12.5%	14.3%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%
Case numbers	21	25	16	32	14	13	18	8	147

Table 2-39: Impact on the research or work programme by type of research field (in %)

Lack of the eInfrastructure or similar resources would impair my research/work programme	Field characteristics			
	Established low collaboration	Novel dynamic collaborative	Dynamic competitive	Total
Not at all	7.1%	4.0%	5.7%	6.0%
A little	26.8%	36.0%	17.1%	25.9%
Much	50.0%	44.0%	62.9%	52.6%
Totally	16.1%	16.0%	14.3%	15.5%
Total	100.0%	100.0%	100.0%	100.0%

Table 2-40: Respondents by benefits of using the selected e-infrastructure and service type of selected e-infrastructure (in %)

Benefits of using the selected e-infrastructure	Selected infrastructure: Computing				Selected infrastructure: Data			
	No benefit	Little benefit	Large benefit	Total	No benefit	Little benefit	Large benefit	Total
Training, learning how to use technology	12.4%	40.4%	47.2%	100.0%	14.3%	47.6%	38.1%	100.0%
Experimenting with new technology	5.5%	44.0%	50.5%	100.0%	0.0%	51.9%	48.1%	100.0%
Obtaining technical support	11.6%	52.3%	36.0%	100.0%	38.9%	38.9%	22.2%	100.0%
Preparing tools for research	13.1%	42.9%	44.0%	100.0%	47.4%	31.6%	21.1%	100.0%
Obtaining new software/ applications or standards	38.0%	40.5%	21.5%	100.0%	22.7%	45.5%	31.8%	100.0%
Obtaining access to high-end distributed computing	7.8%	24.4%	67.8%	100.0%	40.0%	45.0%	15.0%	100.0%
Obtaining access to large-scale distributed storage or databases	21.3%	38.8%	40.0%	100.0%	13.6%	27.3%	59.1%	100.0%

Obtaining access to advanced visualization or remote instruments	54.5%	31.8%	13.6%	100.0%	11.1%	55.6%	33.3%	100.0%
Obtaining shared digitized materials	51.4%	31.4%	17.1%	100.0%	10.0%	30.0%	60.0%	100.0%

Table 2-41: Respondents agreeing to statements on impact of using the selected e-infrastructure by continent (in %)

	Continent of respondents					
The selected e-infrastructure has enabled me to …	Europe	North-America	Latin America	Asia	Other	Total
Accomplish research tasks more quickly	77.6%	63.6%	73.6%	85.7%	33.3%	74.6%
Produce more research output per year	67.5%	48.4%	63.0%	71.4%	33.3%	63.9%
Do research at lower costs	63.5%	62.5%	69.6%	42.9%	50.0%	63.3%
Do more accurate, higher quality research	63.7%	45.2%	72.7%	80.0%	50.0%	64.0%
Access resources for my research faster or better	77.7%	68.8%	81.8%	78.6%	50.0%	77.0%
Produce, process or analyse data faster and better	72.9%	53.3%	72.2%	78.6%	50.0%	70.4%
Work on research problems that I could not address before	74.0%	73.5%	75.0%	92.9%	50.0%	74.6%
Have more publications or conference proceedings accepted	42.5%	24.1%	51.9%	38.5%	40.0%	42.1%
Cases	174	33	53	14	6	280

Table 2-42: Respondents agreeing to statements on impact of using the selected e-infrastructure by degree of involvement measured in time (in %)

	Involvement measured in % of working time			
The selected e-infrastructure has enabled me to …	less than 25%	between 25 and 75%	75% or more	Total
Accomplish research tasks more quickly	66.1%	81.3%	81.8%	74.6%
Produce more research output per year	59.3%	66.0%	67.4%	63.9%
Do research at lower costs	54.3%	66.0%	79.5%	63.3%
Do more accurate, higher quality research	63.0%	66.3%	59.5%	64.0%
Access resources for my research faster or better	73.3%	79.4%	84.1%	77.0%
Produce, process or analyse data faster and better	64.9%	75.3%	82.2%	70.4%
Work on research problems that I could not address before	72.4%	79.2%	75.6%	74.6%
Have more publications or conference proceedings accepted	40.7%	46.6%	37.5%	42.1%

Table 2-43: Respondents agreeing to statements on impact of using the selected e-infrastructure by year of first involvement in the e-infrastructure (in %)

	Year of first involvement in selected e-infrastructure			
The selected e-infrastructure has enabled me to …	1990-1999	2000-2004	2005-2009	Total
Accomplish research tasks more quickly	83.3%	77.1%	72.5%	74.6%
Produce more research output per year	77.8%	67.2%	60.8%	63.9%
Do research at lower costs	77.8%	80.9%	54.8%	63.3%
Do more accurate, higher quality research	88.9%	62.1%	61.7%	64.0%

Access resources for my research faster or better	88.9%	74.6%	76.3%	77.0%
Produce, process or analyse data faster and better	77.8%	79.1%	65.9%	70.4%
Work on research problems that I could not address before	88.9%	77.1%	71.9%	74.6%
Have more publications or conference proceedings accepted	64.7%	54.1%	34.5%	42.1%

Table 2-44: Respondents agreeing to statements on impact of using the selected e-infrastructure by type of involvement in the e-infrastructure (in %)

	Type of involvement in the e-infrastructure			
The selected e-infrastructure has enabled me to …	Research user	Other user	Developer	Total
Accomplish research tasks more quickly	74.2%	66.7%	75.7%	74.6%
Produce more research output per year	65.1%	54.5%	63.4%	63.9%
Do research at lower costs	62.3%	40.0%	65.9%	63.3%
Do more accurate, higher quality research	67.2%	61.5%	61.2%	64.0%
Access resources for my research faster or better	75.8%	78.6%	77.9%	77.0%
Produce, process or analyse data faster and better	65.9%	66.7%	75.0%	70.4%
Work on research problems that I could not address before	78.8%	64.3%	71.5%	74.6%
Have more publications or conference proceedings accepted	45.1%	N/A	39.2%	42.1%

Table 2-45: Respondents agreeing to statements on impact of using the selected e-infrastructure by research field (in %)

The selected e-infrastructure has enabled me to …	Astronomy or Astrophysics	Biological Sciences and Medicine	Chemical and Material Sciences	Computer and Information Sciences	Engineering and Technology	Earth and Other Natural Sciences	Physical Sciences	Social Sciences and Humanities	Total*
Accomplish research tasks more quickly	68.4%	81.8%	87.5%	81.8%	66.7%	71.4%	81.3%	25.0%	74.6%
Produce more research output per year	42.1%	81.8%	62.5%	77.3%	60.0%	73.3%	80.0%	14.3%	63.9%
Do research at lower costs	42.1%	75.0%	50.0%	68.2%	54.5%	80.0%	66.7%	28.6%	63.3%
Do more accurate, higher quality research	57.9%	68.2%	78.6%	63.6%	60.0%	80.0%	80.0%	50.0%	64.0%
Access resources for my research faster or better	89.5%	72.7%	66.7%	72.7%	76.9%	93.3%	73.3%	37.5%	77.0%
Produce, process or analyse data faster and better	52.6%	63.6%	64.3%	65.0%	63.6%	92.9%	73.3%	37.5%	70.4%
Work on research problems that I could not address before	70.0%	95.5%	75.0%	85.7%	75.0%	86.7%	66.7%	62.5%	74.6%
Have more publications or conference proceedings accepted	21.1%	55.6%	50.0%	40.9%	50.0%	50.0%	66.7%	28.6%	42.1%
Case numbers	19	22	16	22	12	14	16	8	280

* The total N is larger than the N of research fields, as the total includes also professional users and developers.

Table 2-46: Respondents agreeing to statements on the influence of using the selected e-infrastructure on their collaboration network by continent (in %)

My involvement with the selected e-infrastructure has influenced my collaboration network …	Continent of respondents					
	Europe	North-America	Latin America	Asia	Other	Total
I generally collaborate more	75.1%	61.1%	81.7%	81.3%	60.0%	74.8%
Geographical range of collaborations has grown	77.1%	64.7%	69.5%	81.3%	60.0%	74.1%
More collaboration with colleagues from developing countries	36.3%	24.2%	53.7%	50.0%	20.0%	38.7%
More collaboration with commercial firms	24.4%	18.8%	15.4%	15.4%	0.0%	21.1%
More collaboration with academic institutions	73.6%	58.8%	76.3%	92.9%	60.0%	73.1%
More interdisciplinary collaboration	62.5%	40.0%	65.5%	84.6%	40.0%	61.0%
Case numbers	177	36	60	16	5	294

Table 2-47: Respondents agreeing to statements on the influence of using the selected e-infrastructure on their collaboration network by degree of involvement measured in time (in %)

My involvement with the selected e-infrastructure has influenced my collaboration network …	Involvement measured in % of working time			
	less than 25%	between 25 and 75%	75% or more	Total
I generally collaborate more	67.5%	80.2%	89.8%	74.8%
Geographical range of collaborations has grown	68.3%	75.5%	91.8%	74.1%
More collaboration with colleagues from dev. countries	28.7%	38.0%	66.7%	38.7%
More collaboration with commercial firms	18.4%	21.1%	30.4%	21.1%
More collaboration with academic institutions	66.7%	73.0%	93.6%	73.1%
More interdisciplinary collaboration	51.2%	66.0%	83.3%	61.0%

Table 2-48: Respondents agreeing to statements on the influence of using the selected e-infrastructure on their collaboration network by year of first involvement in the e-infrastructure (in %)

My involvement with the selected e-infrastructure has influenced my collaboration network …	Year of first involvement in selected e-infrastructure			
	1990-1999	2000-2004	2005-2009	Total
I generally collaborate more	73.7%	76.8%	74.4%	74.8%
Geographical range of collaborations has grown	77.8%	76.8%	72.9%	74.1%
More collaboration with colleagues from dev. countries	64.7%	34.3%	37.4%	38.7%
More collaboration with commercial firms	17.6%	28.1%	18.7%	21.1%
More collaboration with academic institutions	84.2%	73.1%	72.3%	73.1%
More interdisciplinary collaboration	66.7%	60.9%	60.4%	61.0%

Table 2-49: Respondents agreeing to statements on the influence of using the selected e-infrastructure on their collaboration network by research field (in %)

My involvement with the selected e-infrastructure has influenced my collaboration network …	Astronomy or Astrophysics	Biological Sciences and Medicine	Chemical and Material Sciences	Computer and Information Sciences	Engineering and Technology	Earth and Other Natural Sciences	Physical Sciences	Social Sciences and Humanities	Total*
I generally collaborate more	50.0%	79.2%	60.0%	72.0%	50.0%	85.7%	52.9%	66.7%	74.8%
Geographical range of collaborations has grown	50.0%	60.9%	71.4%	70.8%	40.0%	92.9%	47.1%	66.7%	74.1%
More collaboration with colleagues from dev. countries	5.3%	19.0%	23.1%	45.5%	30.0%	58.3%	18.8%	12.5%	38.7%
More collaboration with commercial firms	11.1%	9.5%	9.1%	20.0%	30.0%	23.1%	12.5%	0.0%	21.1%
More collaboration with academic institutions	40.0%	54.5%	71.4%	88.0%	70.0%	68.8%	75.0%	55.6%	73.1%
More interdisciplinary collaboration	20.0%	59.1%	46.2%	58.3%	33.3%	53.8%	47.1%	33.3%	61.0%
Case numbers	20	24	15	24	10	14	17	9	294

* The total N is larger than the N of research fields, as the total includes also professional users and developers.

Table 2-50: Respondents' by impact cluster and type of selected e-infrastructure (in %)

		Impact clusters				
		Strong positive impact	Positive impact	No impact	Total	Cases
Geographic scope	National	17.1%	53.7%	29.3%	100.0%	41
	International	37.2%	50.4%	12.4%	100.0%	121
Disciplinary scope	Disciplinary	20.6%	41.2%	38.2%	100.0%	34
	Multidisciplinary	34.8%	55.7%	9.6%	100.0%	115
Type of service	Computing	36.8%	53.8%	9.4%	100.0%	117
	Data	16.7%	45.2%	38.1%	100.0%	42
Driver	Developers	38.6%	53.0%	8.4%	100.0%	83
	Community	21.8%	47.3%	30.9%	100.0%	55

Table 2-51: Respondents' agreement to statements on National and International Grid Initiatives by continent (in %)

	E-infrastructure selected by the respondent					
	DEISA	EELA2	EGEE	US NVO	Other	Total
National Grid Initiatives						
NGIs are necessary as the most cost effective coordination scheme at country level	64.3%	95.5%	80.0%	55.6%	75.2%	78.7%
NGIs are necessary as the right body to optimise operation and support	53.8%	93.2%	82.8%	55.6%	76.0%	78.4%
NGIs are necessary as the right body to optimise	50.0%	93.2%	73.3%	44.4%	69.5%	72.8%

dissemination efforts and user support						
NGIs are necessary to ensure best adoption and compliance with middleware standards	45.5%	83.3%	67.7%	55.6%	67.6%	69.2%
NGIs are necessary as the suitable structure to represent all the national DCI at international level	36.4%	93.2%	73.3%	44.4%	76.2%	75.9%
International Grid Initiatives						
IGIs are necessary for the coordination of infrastructures spanning continents	78.6%	95.2%	90.3%	88.9%	88.2%	89.4%
IGIs are necessary to standardise operation and support of DCI	92.9%	92.9%	93.5%	88.9%	81.6%	86.9%
IGIs are necessary to optimise worldwide dissemination efforts and user support	75.0%	95.2%	80.0%	66.7%	67.0%	75.6%
IGIs are necessary to guarantee the largest inter-operability of DCIs	92.3%	92.9%	93.3%	66.7%	81.0%	85.6%
IGIs are necessary to anticipate the evolution of DCI technology	83.3%	90.5%	80.6%	44.4%	64.7%	73.0%
Case numbers	14	42	31	9	102	198

Table 2-52: Verbatim responses on policy recommendations

By promotion of ' a standard user friendly Web interface 'to use these e-infrastructures , just one interface for each platform. By promotion of a standard user support service on these platforms. Now there are too many GRId- projects in the computer science research atmosphere which are supported by European funding, what is the greatest common divisor ??? Where is the end-user? For example in EGEE , there should be an interface for Glite ... It is hardly used in Belgium because it is an horror. Projects like the Karim Chine project from Biocep start from the right philosophy and should be supported.
I think they should be more flexible. In order to finish my project I need more computation. After the approval of the project the computational time was divided by three using some empirical factor that does not work (sp6 is three times faster). I was not able to complain in the DEISA infrastructure. Also it is clear that in a project we cannot compute how much resources we need exactly. Therefore there should be some people to contact and some flexibility in the allocation of computational resources.
* Provide clear national strategy around einfrastructure, outlining drivers and strongly connected research communities, and lead agencies and organisations * Highlight einfrastructures during RFP processes, and apply funding requirements to ensure that related infrastructure capital expenditure from research projects is aligned with national e-infrastructures * Facilitate the aggregation of research agendas towards developing and sustaining einfrastructure developments
Must include software engineering department with the research team. Must force research team to think about and formulate clearly the computation flow. Provide blueprints and architectural guidelines on how to build a distributed computation/application. Must force in academic curricula the sensibility towards computational problems: researchers are NOT used to think in big! Hence they will waste the eInfrastructure!
A small, but non negligible (e.g. 10%) of resources could be reserved for research programs that are still maturing, but that need huge CPU resources even during this exploratory phase. The research track of the team proposing the activity should be the main criterion to allocate this resources. If you grant access to DEISA only to mature research proposals (which is rather the case, now), you will get mainly conventional research. Ground breaking work starts always like a gamble.
More financial resources to different levels of research, not only in applied or interactive projects (computer

science - science) but also in fundamental research in computer science, infrastructure and social problems related with the use of e-infrastructures (security, politics, economy influence). On the other side, is important to take into account the development of "green e-infrastructure", computer science projects must be "greens" also.
Infrastructures must be stable and reliable, so: a. by giving scientists credits if they invest time in enhancing the infrastructures they use b. research funding should make allowances for infrastructure costs c. direct resources to research questions that were hard to investigate without infrastructures
Provide better peer review of proposals that utilize e-Infrastructure. Right now, too many proposals are rejected because they are perceived to be "infrastructure" proposals and not "research" proposals. This situation has been bad, and it is getting worse (not better). Something must be done to train the peer review panels as soon as possible, since otherwise the investment in e-Science and e-Infrastructure will be wasted
Policy makers should realize that e-Infrastructure is not one, but, just like any other infrastructure, is a collective effort by several smaller or larger contributors. No infrastructure has global ownership or coordination not all infrastructures even rely on the same set of standards. Learn from past experience, leave the door open to opportunities, allow flexibility and healthy competition, do not impose global rules.
Investing more on qualified human resources at the various levels of the infrastructure (operators, administrators, network managers etc) and more on fast advanced network infrastructures. Implementing policies and strategies for the long-term sustainability of these infrastructures through the creation of regional, national and international bodies responsible for the organisation and coordination of the infrastructures.
Three major problems in my opinion are: - insufficient usability - insufficient interoperability - insufficient software quality These issues must be addressed as soon as possible in order to make e-Infrastructure projects a success. Hence, financial (or other) incentives to increase these qualities should be established.
By making it easier to make data available, eg. language data rely heavily on the solution to the copyright problem. For language technology application traditional copyright rules are not useful. Policy makers should also be aware of the fact that small languages such as Danish have to use proportionally more resources on language infrastructure than large languages such as English.
Make it institutionally and ubiquitously available as if it were the telephone, mobile phone, electricity, or air we breathe. Support software applications design and provide career and career plans for whole generations of developers rather that living from hand to mouth on short term contracts well into their forties and fifties.
e-Infrastructure needs to focus on management of the research products, and not focus so strongly on generation of products. This can be considered socialization of computing, to include broader community in use of the national infrastructure. A similar concept is sharing of software code across all researchers in a field
In countries where the technology is not widespread, I believe that most of the effort should be placed in training people to use new scientific methodologies that can profit from the massive amounts of computing and storage available and that can be put together thanks to these e-Infrastructures.
Focus more on the big research questions that these e-Infrastructures can help answer. Don't focus on the scholarly services dimension. We all know this is very important, but lets face it, Libraries 2.0 is not going to capture the imagination of the public and the public money for research.
By investing in innovative, robust structures that are nevertheless agile and flexible (that won't be outdated too soon) and by using and advocating the use of open standards. Also by investing in enough manpower to maintain the infrastructures for the long term and keep developing them.
There must be identified applications that will create impact in the country's economic value, to make policy makers in the national level to support and sustain the investment and advance use of e-infrastructure. In developing countries, immediate problems have priority
Making the e-infrastructure familiar for more people,with workshops for the older and introducing or building e-infrastructure in public schools, for the children. Also teachers should enhance their knowledge to keep on with new technologies and teaching strategies.

Supporting economically the accomplishment of participating grid computing projects. As much as national level as international level. Promoting through events and tutorials the use of grid, at least once a year in all the involved countries.
Policies are an inherent feature of distributed systems and thus policies are required to enable resource sharing and govern the use of the e-Infrastructure resources. So policy makers are a small but important part of the e-Infrastructure
e-Infrastructures should also be available on commercial network and not only on NRENs to ensure sustainability as well as access for user groups such as hospitals or other healthcare/pharmaceutical actors which have a commercial activity.
Promote discussion about the social and individual consequences and of the benefits for the societies of this new technology. Promote the improvement of the related Human-Machine Interfaces. Try to reduce the fear in using new technologies
Decide to organize great (and international) scientific programmes about Humanities and social sciences, that means scientific programmes needing high cooperation and a huge digital data's management (storage, editing, treatment, etc.)
There are some legal issues regarding data storage, management and processing that are very complex for research teams and developers to address. Some legal support and especially details could be provided for speeding up the process.
Policy maker should push for a flexible and open GRID access to a variety of computational resources, both HPC and High Throughput oriented, stressing the requirements for interoperability between different GRID infrastructures.
Generally I see the problem mainly in providing e-infrastructure, in my case in particular supercomputing power. The workers in my field (theoretical astrophysics) surely are aware of it and make use of it as need dictates.
e-Infrastructure should not be seen as a tool only for research communities. K12 education could strongly benefit from such infrastructure as it allows institutions to reduce investment while improving technical services.
Funding in 3-5 year blocks, including funding for research projects that will utilize e-Infrastructure, rather than just for developing it. Also funding for research problems associated with e-Infrastructure.
knowing the needs of researcher groups about this technologies. Motivating the use of the grid technology in different fields (grid application)encouraging private/public companies for to improve its services
Promotion of PhD programmes in EU universities on Engineering and Computational Sciences (cf. Oden Report) as a demonstration of e-Science at the basis of the scientific advancements for the XXI Century
Focus on alternatives to "Grid", especially on web service standards. These have proved far more effective in promoting interoperability and integration of data-dependent services.
Develop programs for stimulation of e-Infrastructure in new areas; programs to boost the development of applications and tools; increased attention to education in e-Science.
by showing good examples (pilot projects); by making it easy and relatively cheap to access the e-Infrastructure; by taking away the (emotional and political) barriers
They could provide scientific researchers with tokens for use of computational resource, sometimes instead of providing money directly for computational equipment.
by disseminating and engaging their scientific communities in new initiatives such as ESFRI projects at national level and all applications on the infrastructures
1) by rewarding and funding the development and evaluation of production-ready technology;2) by providing stable funding for user support and training
Being proactive, showing their practical use (i.e. adoption of released technology for common use cases) and advertising the advantages they provide.
By making clear decisions on sustained funding, not just funding projects. Basic for advancing e-infrastructures is the long-term maintenance.
Just remembering that, nowadays, e-Infrastructures are becoming a necessary condition for development, i.e. for independence, in a e-Society.
Promoting e-Infrastructure in a wider community; presenting practical and interesting applications. Promoting interdisciplinary studies.

by encouraging wider support for many grid (interoperable) initiatives instead of looking for one institutional or national solution.
Policy makes have strongly to support at different levels the use of e-infrastructure in both development and research applications
In general, the use of scientific results by policy makers is much less a problem of technology than a problem of sociology.
By helping finding the (relatively modest) financial resources to support the NGI in the country and the IGI (if it exists)
The development and implementation of e-Infrastructure is fully depending on policy work! The technology is there already!
by being demonstrated the advantages of products in support to decision making, as delivered through e-infrastructures
By issuing well-balanced lows related to data storage and processing, especially personal (including medical) data.
It is important to raise awareness among governments about the importance of developing e-Infrastructure.
By paying more attention to the needs of end users and less to the claims of those promoting technologies
Provide entry point requirements and kick-start funding as well as program management and monitoring.
Foster initiatives to promote the integration of the Research Institutes in Brazil and with Europe.
Definitively in their function of defining the most cost effective e-Infrastructures for e-Research
By helping in the transfer of both fund and opportunities to develop solutions to national problems
If I would know this I would not tell you but sell the information for a lot of money to the EC :)
By creating bodies able to influence decisions at national level in as much as possible countries
by providing tools allowing reallocation of resources for a given group of scientists on demand
is very important involve to policy makers if we want guaranties about a real functional work
A grid services brokerage company is required. Infrastructure use grants could be given.
agree on standards and policies support sustainable and compatible grid infrastructure
To support Projects such as EELA is essential to develop the use of e-Infrastructure.
funding and articulation of a global vision explaining goals, plans and motivations
By making use of it themselves - ie have the organisations they lead depend upon it
Promoting (i.e. economically) the establishment of NGIs and similar organizations
Examine the models of the European Grid and how it is integrated across domains
Move the pieces (Grid, data management, etc.) better together (as in Australia)
Set guidelines for use and require it to be a part of any new funding request
By abolishing the grid, and concentrating on efficient supercomputer centres.
Development of Collaborative research project and availability of financing
More stable funding, allowing to hire enough developers and *retain* them!
Yes, To promote developments and new projects that stimulate investigation
To improve the dissemination of information and training about these tools.
collaborate in eInfrastructure programmes, policies at international level
in providing more money to the user projects of these e-Infrastructures
simple, at best international, laws for providing and sharing resources
by promoting community work for sharing information, inputs and outputs
by providing high level tools easing access to the grid infrastructure
Insist that computing resources funded locally are connected to NGIs.
Focus on the end use applications and not regard the user as a loser.
Improve the simplicity and accessibility of the user interface layer.
Creating standards and study previous cases such Internet evolution

Provision for more funds. Involving more institutes/ organizations.
To help schools to involve e-infrastructure in education process
Promote the business and social benefits to the general public.
Funding support. NASA has been fairly generous in this regard.
channel funding initiatives using/developing e-Infrastructures
By granting free access to HPC/Grid Computing to scientists
Keeping in mind the ideas of all the members of the projects
By funding effort to make it truly virtualised, easy to use
Promote usage on target areas & disseminate success stories
Permanent and diverse interaction between scientific pairs.
by organizing their setup better: classic top down approach
support for funding projects for national infraestructures
with permanent activities like hands on practice trainning
Concentrate on user needs not cool technology or politics
I am sure they could, if they understood its importance.
To motivate collaborative projects and joint execution.
understanding, awareness, endorsement, support, funding
with support and funds for the projects in the field
Stimulating the project development of great scope
make resources more readily and reliably available
EGEE is too complex compare to commercial clouds.
Increase the available computational resources.
participation should be easier and encouraging
Being pro-active and taking decisions faster!
Make them simple, easy to use and homogeneous
Founding PhD Graduations on Grid Computing
By giving the credibility to such a system
With more budget, and more dissemination.
Make the e-Infrastructure more available.
More accessible funding opportunities.
financially support these initiatives
Consistent long term funding message
involve end-users from the beginning
As they are doing at European Level
by tailoring the financial support.
Dragged by operational needs.
by devoting more money to it
By strongly supporting them.
federal systems are better
Fund scientific research
By giving money to it.
Making easier its use
Our group work on it.
well, via funding...
get out of the way
securing budgets

More funding

Table 2-53: Respondents' agreement to statements on National and International Grid Initiatives by type of field (in %)

	Field characteristics			
	Established low collaboration	Novel dynamic collaborative	Dynamic competitive	Total
National Grid Initiatives				
NGIs are necessary as the most cost effective coordination scheme at country level	73.8%	88.2%	69.0%	78.7%
NGIs are necessary as the right body to optimise operation and support	68.9%	92.2%	78.6%	78.4%
NGIs are necessary as the right body to optimise dissemination efforts and user support	65.1%	82.4%	76.2%	72.8%
NGIs are necessary to ensure best adoption and compliance with middleware standards	54.1%	84.0%	66.7%	69.2%
NGIs are necessary as the suitable structure to represent all the national DCI at international level	70.0%	88.2%	64.3%	75.9%
International Grid Initiatives				
IGIs are necessary for the coordination of infrastructures spanning continents	88.3%	97.9%	87.8%	89.4%
IGIs are necessary to standardise operation and support of DCI	85.0%	93.8%	82.9%	86.9%
IGIs are necessary to optimise worldwide dissemination efforts and user support	72.9%	87.5%	62.5%	75.6%
IGIs are necessary to guarantee the largest inter-operability of DCIs	83.1%	93.8%	82.9%	85.6%
IGIs are necessary to anticipate the evolution of DCI technology	61.0%	89.6%	66.7%	73.0%
Case numbers	60	48	41	149

Table 2-54: Respondents' recommendations by selected e-infrastructure (in %)

	DEISA	EELA2	EGEE	US NVO	Other	Total
Access to resources	10.0%	1.4%	3.6%	0.0%	2.8%	3.2%
Organizational recommendations	7.5%	9.6%	12.7%	12.0%	14.0%	12.3%
Technical capabilities	0.0%	2.7%	1.8%	0.0%	3.7%	2.7%
Ease of use	0.0%	1.4%	5.5%	4.0%	5.1%	3.9%
Funding-related recommendations	10.0%	8.2%	9.1%	8.0%	12.6%	10.8%
Training-related recommendations	2.5%	6.8%	1.8%	0.0%	4.7%	4.2%
Awareness-raising measures	2.5%	6.8%	5.5%	0.0%	6.1%	5.4%
Other recommendations	0.0%	1.4%	0.0%	0.0%	0.0%	0.2%
Cases	40	73	55	25	214	407

3 e-Infrastructure Provider Survey – Interview Guidelines

1. Characteristics of the field

To get a clearer sense about the project, I'd like to start by asking a few questions about the field or sub-fields to which the project relates to.

a. But first, please tell me about your background

- Probe: educational background

b. So, what academic field would you say you are a part of? Is it the field—or fields—that the project mostly caters to?

c. How prevalent has collaboration been in this field before the establishment of the project?

- Probe: size of collaborations, international collaboration, competition

d. What is the number of coauthors on a typical publication in the field?

- Note: distinction between "big" and "small" science or something in between

e. How established is the field around the world?

- Probe: international conferences, journals, research institutes

f. How is research in the field divided? (i.e. defined roles of theoreticians, empiricists, method/tool developers; role of facility providers, ICT infrastructure providers)

g. At what rate do problems, paradigms, approaches change, or "fashions" appear and disappear?

- Probe: ask for examples

2. Project overview

Now I would like you to tell me a little about the history of the project.

a. What motivated the establishment of the project

- Probe: funding opportunities, international competition, apparent research benefit, long term vision)

b. What are the main goals of the project?

c. When did the project officially start?

- Probe: different stages (i.e. unfunded preparatory phase or development, rounds of funding), scheduled finish date

d. Considering the time that has passed and the project goals, how mature do you consider the project to be?

e. Who is funding the project, and in what amounts?

- Probe: (rough estimate) division of funding among countries?

f. Can you roughly estimate direct and indirect costs of using and developing the supporting e-Infrastructure for the project? (e.g. per annum)

- Probe: activities and/or equipment breakdown

3. Organizational structure

Let me now ask you a few questions about the organization of the project

a. What is the size and composition of the project?

- Probe: number of partners/institutions/countries involved in the project, industry participants

b. How is "labor" divided in the project among the different participants?

- Probe: development tasks, basic research

c. What is the “governance” structure of the project?

- Probe: steering committee, working groups (request a list, if applicable)

- Probe: How are decisions in the project taken (e.g. centralized versus decentralized decision-making)?

d. How do you sustain involvement in the project?

- Probe: motivation for participation and contribution, mode of interaction that enables collaboration (e.g. email, regular face-to-face meetings)?

e. How many users do you have today?

- How does this number compare to past years? What would the target for the future be (for example, when the service will be fully operational?)

f. How do you recruit them?

- What are the main obstacles you experienced in recruiting users?

- What are the main drivers for adoption?

4. Interdisciplinary collaboration

I’d now like to ask a few questions about your experiences in interdisciplinary collaboration in the project.

a. What is the project’s disciplinary composition?

- Probe: proportion of computer scientists and domain scientists

b. What are the different roles each group has in the project?

c. How do different groups work with one another?

- Probe: can you think of a few typical examples

d. Various studies on e-Infrastructure have noted challenges in interdisciplinary collaboration. Did or do you encounter any such problems?

- Probe: can you think of other challenges? (language, divergent objectives)

e. What did you do to address these barriers?

- Probe: how much time it took, whether still have problems

5. Technology

I have several questions about the particular technologies and data you develop and rely on.

a. Please describe the main technologies used in the project

- Probe: supercomputing, computational and data Grid, specialized applications, network, simulation software

- Note. If too many, ask for references (website, or publication)

b. Which of these technologies did your project develop, or plans to develop? How specific are they to your field, and how may they be applies to other fields ?

- Probe: technological alternatives in field

c. Were there any alternatives to these technologies when you started the project?

- Probe: could you speculate what might have been the cost for using these alternatives?

d. What are the main data sources used in the project?

- Probe: type: experimental, observational, human subjects; size and geographic distribution

e. How are data shared across participating institutions?

- Probe: challenges in sharing data including concerns about privacy, security, and standardization

f. How are data analyzed?

- Probe: methodological/technological alternatives

6. Contribution

Finally, I'd like to ask for your assessment of the project's current and potential impact

a. What do you consider the main contribution of the project so far, either within or beyond the field; how would you measure it?

- Probe: datasets/technologies developed, major publications, change of scientific practices, new methods

b. Are there any other outcomes such as an increased geographical span of scientific collaboration in your field or possible economic impact (e.g. integrating European science, strengthening linkages globally and to less developed countries, linkages to the private sector, commercialization of technology)

- Probe: has the e-Infrastructure you develop contributed to new research projects (name a few; if many—such as in providers—ask to quantify, and request supporting materials such as reports or websites)?

c. How do you think the project can contribute in the future?

- Probe: challenges to accomplishing these objectives?

d. What may threaten the project from accomplishing these objectives?

- Probe: implemented sustainably mechanisms after funding has ceased, or should policy/regulatory frameworks change

7. Wrap-up

These are all the questions I had.

a. Are there any other subjects that you think may be relevant to the study that we have not covered?

b. Could you please refer me to others associated with your project who could contribute to this study?

c. As the study continues, would it be possible for me to follow up with you for questions and clarifications?

I'd like to let you know when our report is completed, around December of this year. Is [means of initial contact] the best way to get in touch with you?

Thank you for taking the time to participate in our study. Your input is very much appreciated!

4 e-Infrastructure Research Communities Survey – Questionnaire

e-Infrastructure Survey

Thank you for your willingness to participate in this survey.

The e-Infrastructure survey is part of eResearch 2020, a study commissioned by the European Commission, Directorate General Information Society and Media and conducted by the Oxford Internet Institute, the University of Chicago/National Opinion Research Center, the University of Applied Sciences Northwestern Switzerland and empirica Communication and Technology Research.

Results of the survey will help define a roadmap of strategies that will guide public policies and enhance the uptake and use of e-infrastructure in science. In order for us to understand the relevant factors your response is crucial .

We estimate that it takes approximately 20 minutes to complete the survey. You can interrupt the survey at any time. Your answers will then be saved so that you can continue from where you stopped later on (on the same PC). If you have any questions or comments, please contact eResearch2020@empirica.com.

1 Do you use, develop or provide geographically distributed and shared digital resources, such as data, computation or visualization?

(These are commonly referred to as e-Science, e-Infrastructure, or Cyberinfrastructure and will be referred to as e-Infrastructure in this questionnaire.) *

Please choose only one of the following:

☐Yes

☐No

2 Thank you for taking a look at our survey which is aimed at users, providers and developers of e-Infrastructure. If you are interested, though, you may continue and answer the questions as applicable or leave the survey. What do you want to do? *

[Only answer this question if you answered 'No' to question '1']

Please choose only one of the following:

☐Continue

☐Quit

A_Demographics

3 Which of the following best describes your primary institutional affiliation?

Please choose only one of the following:

☐Research university (Doctorate granting institution)

☐Teaching university or college

☐Government agency

☐Nonprofit research organization

☐International organization

☐Commercial firm or service provider

☐Other

4 What percentage of your annual working time do you spend on ... ? (sum = max. 100%)

Please write your answer(s) here:

Teaching (courses, grading and preparing)

Research

Other professional work (e.g. professional practice, third mission, patent and license work)

Administration and unallocable internal time

5 In what country do you currently work?

Please choose only one of the following:

☐ Afghanistan

…

☐ Zimbabwe

6 What is the highest academic degree you have obtained?

Please choose only one of the following:

☐ Bachelor's or equivalent

☐ Master's or equivalent

☐ PhD or equivalent

☐ Other doctoral degree (e.g. MD, JD)

☐ Habilitation or equivalent

☐ No degree

B_Involvement with eInfrastructure

7 What is the name of the e-Infrastructure you are mainly involved with, either as a user or as a developer?

Please choose only one of the following:

☐ C3-Grid

☐ CineGrid

☐ CLARIN

☐ D4science

☐ DARIAH

☐ DEISA

☐ DRIVER

☐ EELA

☐ EGEE

☐ ETSF (European Theoretical Spectroscopy Facility)

☐ EUFORIA

☐ GEANT

☐ MediGrid

☐NCeSS (National Centre for e-Social Science)

☐Open Grid Forum (OGF)

☐Open Science Grid (OSG)

☐Swedish National Data Service

☐Swiss Bio Grid

☐TeraGrid

☐US National Virtual Observatory (NVO)

☐Other, namely...

8 In what year did you first use or become otherwise involved with ***e-infra selected in Q7***?

Please choose only one of the following:

☐1990

…

☐2009

☐Other

9 How did you first learn about ***e-infra selected in Q7***?

Please choose only one of the following:

☐I participated in the e-Infrastructure from the start

☐From someone within my institution

☐From someone outside my institution

☐At a workshop, training session held by the eInfrastructure

☐At a conference

☐Printed or web material

☐Other

10 In what capacity have you been involved in ***e-infra selected in Q7*** ? (Multiple answers possible)

Please choose all that apply:

☐Principle investigator / Co-Principle investigator

☐Member of governing body (i.e. Executive Committee)

☐Project manager

☐Researcher

☐User (including pilot user)

☐Software developer

Other:

11 How would you characterize your attitude towards new technologies?

Please choose the appropriate response for each item:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Among my peers, I am usually the first to try out new technologies	☐	☐	☐	☐	☐
In general, I am hesitant to experiment with new technologies	☐	☐	☐	☐	☐

12 Who is the primary sponsor of your work connected to ***e-infra selected in Q7*** ?

Please choose only one of the following:

☐Governmental funding agency (national)

☐International governmental funding agency (e.g. EU)

☐Private funding agency

☐Own institution

☐Other (specify)

13 What proportion of your work time has the involvement with ***e-infra selected in Q7*** taken up?

Please write your answer here:

14 In what ways have you personally influenced other individuals to use / participate in ***e-infra selected in Q7*** ? (Multiple answers possible)

Please choose all that apply:

☐Gave talks or demonstrations advocating use

☐Published on the services provided and their use in research

☐Actively solicitated the participation of / use by colleagues from my own institution

☐Actively solicitated the participation of /use by colleagues from other institutions

☐I did not specifically involve others

Other specify please:

15 Do you spend more time:

a) using existing e-Infrastructure services to support your research work

b) using existing e-Infrastructure services for professional non-research purposes

c) developing e-Infrastructure services and tools for others to use

Please choose only one of the following:

☐I mainly use e-Infrastructure tools, services and resources to support my research

☐I mainly use e-Infrastructure tools to support my professional non-research work

☐I mainly develop e-Infrastructure services and tools for others to use

C Use of e-Infrastructure for research purposes

16 Please select the research field that most closely represents your use of ***e-infra selected in Q7***

Please choose only one of the following:

☐Astronomy or Astrophysics

☐Biological Sciences

☐Chemical Sciences

☐Computer and Information Sciences

☐Engineering and Technology

☐Earth and Environmental Sciences

☐Mathematics

☐Materials Science

☐Medical and Health Sciences

☐Particle and Nuclear Physics

☐Other Physical Sciences

☐Other Natural Sciences

☐Social Sciences

☐Humanities

☐Other

17 To your knowledge, how many individuals working in your field are using / participating in ***e-infra selected in Q7*** in a similar way to yours?

Please choose only one of the following:

☐None

☐1-5

☐6-10

☐21-100

☐101-500

☐More than 500

☐Don't know (and cannot give an estimate)

18 What is the geographic distribution of this ***e-infra selected in Q7*** group of users? They are located...

Please choose only one of the following:

☐...in a single region

☐...in multiple regions within a country

☐...across multiple countries within a continent

☐...across continents

19 This research group involves users from...?

Please choose only one of the following:

☐...a single academic institution

☐...multiple academic institutions

☐...a single non-academic institution

☐...multiple non-academic institutions

☐...multiple academic and non-academic institutions

20 Please briefly describe the main catalysts and barriers that influenced your first use of ***e-infra selected in Q7*** services, according to their importance.

	Catalysts	Barriers
Most important		
Second most important		
Third most important		

21 Which of the following ***e-infra selected in Q7*** services or resources do you use? (multiple)

Please choose all that apply:

☐Grid computing

☐Supercomputing

☐Visualisation

☐Simulation

☐Data management tools

☐Data analysis tools

☐Data collections

☐Online storage

☐Collaboration tools

☐Online digital materials for research (images, audio, video, text - including publications)

☐Remote access to research instruments

☐Individual support / advice customized to my requirements (e.g. methods/analysis)

☐Other

☐My own applications ported on ***e-infra selected in Q7*** resources

22 Which other services or resources do you use?

Please write your answer here:

23 On average, how often have you used these services from ***e-infra selected in Q7*** in the past six months?

Please choose the appropriate response for each item:

	Daily	Weekly	Monthly	Quarterly	Just once	Never	I don't know
Grid computing	☐	☐	☐	☐	☐	☐	☐
Supercomputing	☐	☐	☐	☐	☐	☐	☐
Visualization	☐	☐	☐	☐	☐	☐	☐
Simulation	☐	☐	☐	☐	☐	☐	☐
Data management tools	☐	☐	☐	☐	☐	☐	☐
Data analysis tools	☐	☐	☐	☐	☐	☐	☐
Data collection	☐	☐	☐	☐	☐	☐	☐
Online storage	☐	☐	☐	☐	☐	☐	☐
Collaboration tools	☐	☐	☐	☐	☐	☐	☐
Online digital materials for research (images, audio, video, text)	☐	☐	☐	☐	☐	☐	☐
Remote access to research instruments	☐	☐	☐	☐	☐	☐	☐
Individual support / advice customized to my requirements (e.g. methods/analysis)	☐	☐	☐	☐	☐	☐	☐
My own applications ported on ***e-infra selected in Q7*** resources	☐	☐	☐	☐	☐	☐	☐

24 Please indicate the extent to which you agree with the following statements with regard to ***e-infra selected in Q7*** services

Please choose the appropriate response for each item:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	NA
It is easy to become skilful at using ***e-infra selected in Q7*** services	☐	☐	☐	☐	☐	☐
It is easy for me to get help at using ***e-infra selected in Q7*** services when I need it	☐	☐	☐	☐	☐	☐
I find it difficult to get ***e-infra selected in Q7***	☐	☐	☐	☐	☐	☐

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	NA
to provide the services I need						
Overall, I find ***e-infra selected in Q7*** services easy to use	☐	☐	☐	☐	☐	☐

D Impact of e-Infrastructure resources/services on research

25 Please tell us about the degree to which your use of has affected the activities listed below.

Please choose the appropriate response for each item:

	Large benefit	Small benefit	No benefit
Training, learning how to use technology	☐	☐	☐
Experimenting with new technology	☐	☐	☐
Obtaining technical support	☐	☐	☐
Preparing tools for research (e.g. migrating applications, solving interoperability problems etc.)	☐	☐	☐
Obtaining new software/applications or standards	☐	☐	☐
Obtaining access to high-end distributed computing	☐	☐	☐
Obtaining access to large-scale distributed storage or databases	☐	☐	☐
Obtaining access to advanced visualization or remote instruments	☐	☐	☐
Obtaining shared digitized materials	☐	☐	☐

26 Please tell us what impact use of / the involvement with ***e-infra selected in Q7*** has had on your research.
e-infra selected in Q7 has enabled me to...

Please choose the appropriate response for each item:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
...accomplish research tasks more quickly.	☐	☐	☐	☐	☐
...produce more research output per year.	☐	☐	☐	☐	☐
...do research at lower costs	☐	☐	☐	☐	☐
...do more accurate, higher quality research.	☐	☐	☐	☐	☐

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
...access resources for my research faster or better.	☐	☐	☐	☐	☐
...have more publications or conference proceedings accepted.	☐	☐	☐	☐	☐
...produce, process or analyse data faster and better.	☐	☐	☐	☐	☐
...work on research problems that I could not address before	☐	☐	☐	☐	☐

27 Have there been other impacts of ***e-infra selected in Q7*** on your research? If yes, please specify.

Please write your answer here:

28 Please tell us: The availability of ***e-infra selected in Q7*** or similar resources for my research work is...

Please choose only one of the following:

☐very important

☐important

☐neutral

☐unimportant

☐very unimportant

29 Please tell us: The lack of ***e-infra selected in Q7*** or similar resources would impair my Research Programme...

Please choose only one of the following:

☐not at all

☐a little

☐much

☐totally

30 Please tell us how your use of / involvement with ***e-infra selected in Q7*** has influenced your collaboration network.

Please choose the appropriate response for each item:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I generally collaborate more.	☐	☐	☐	☐	☐
The geographical range of my collaborations has grown.	☐	☐	☐	☐	☐

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I collaborate more with colleagues from developing countries.	☐	☐	☐	☐	☐
I collaborate more with colleagues from commercial firms.	☐	☐	☐	☐	☐
I collaborate more with colleagues from academic institutions.	☐	☐	☐	☐	☐
I collaborate more with colleagues from other fields of science than my own.	☐	☐	☐	☐	☐

31 Have there been other ways in which ***e-infra selected in Q7*** has influenced your collaboration? If yes, please specify.

Please write your answer here:

32 Please indicate the extent to which you agree with the following statements.

Please choose the appropriate response for each item:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Researchers in my field typically work alone.	☐	☐	☐	☐	☐
Collaboration is necessary in my field.	☐	☐	☐	☐	☐
Researchers in my field typically collaborate with a small group of peers (2-10) on the same research project	☐	☐	☐	☐	☐
Researchers in my field typically collaborate with medium to large groups of peers (10+) on the same research project.	☐	☐	☐	☐	☐
In my field the competition for academic recognition and/or commercial success is intense	☐	☐	☐	☐	☐
In order to make an impact scholars in my field need to specialize as theoreticians, empiricists, methodologists or in other roles.	☐	☐	☐	☐	☐
Research problems, paradigms, approaches, or methods change rapidly in my field.	☐	☐	☐	☐	☐
Research in my field is often done with exploratory research designs.	☐	☐	☐	☐	☐
Research in my field is often done with	☐	☐	☐	☐	☐

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
causal research designs.					
My field is novel and establishing itself within my discipline.	☐	☐	☐	☐	☐

33 Please tell us how likely or unlikely you think the following developments are:

Please choose the appropriate response for each item:

	very likely	likely	neither likely nor unlikely	unlikely	very unlikely
In the next five years new computer resource delivery models such as Software as a Service, Cloud Computing or Utility Computing will be adopted by a large share of researchers in my field.	☐	☐	☐	☐	☐
In the next five years the use of new computer resource delivery models such as Software as a Service, Cloud Computing or Utility Computing will significantly contribute to scientific progress in my field.	☐	☐	☐	☐	☐

E. Use of e-Infrastructure for professional or non-research purposes

34 Please select the field of work that most closely represents your use of ***e-infra selected in Q7***

Please choose only one of the following:

☐Academic support services, including library services and information technology

☐Non-academic support services, including information technology

☐Other

35 To your knowledge, how many individuals working in your field are using / participating in ***e-infra selected in Q7*** in a similar way to yours?

Please choose only one of the following:

☐None

☐1-5

☐6-10

☐21-100

☐101-500

☐More than 500

☐Don't know (and cannot give an estimate)

36 What is the geographic distribution of these users of ***e-infra selected in Q7***?

Please choose only one of the following:

☐In a single region

☐In multiple regions within a country

☐Across multiple countries within a continent

☐Across continents

37 This community involves practitioners from...?

Please choose only one of the following:

☐... a single academic institution

☐...multiple academic institutions

☐...a single non-academic institution

☐...multiple non-academic institutions

☐...multiple academic and non-academic institutions

38 Please briefly describe the main catalysts and barriers that influenced your first use of ***e-infra selected in Q7*** services, according to their importance.

	Catalysts	Barriers
Most important		
Second most important		
Third most important		

39 Which of the following ***e-infra selected in Q7*** services or resources do you use? (multiple)

Please choose all that apply:

☐Grid computing

☐Supercomputing

☐Visualization

☐Simulation

☐Remote access to research instruments

☐Data management tools

☐Data analysis tools

☐Data collections

☐Online storage

☐Collaboration tools

☐Individual support/ advice customized to my requirements (e.g. methods/analysis)

☐Other

☐My own applications ported on ***e-infra selected in Q7*** resources

40 Which other resources do you use?

Please write your answer here:

41 On average, how frequently have you used these services from ***e-infra selected in Q7*** in the past six months?

Please choose the appropriate response for each item:

	Daily	Weekly	Monthly	Quarterly	Just once	Never	I don't know
Grid computing	☐	☐	☐	☐	☐	☐	☐
Supercomputing	☐	☐	☐	☐	☐	☐	☐
Visualization	☐	☐	☐	☐	☐	☐	☐
Simulation	☐	☐	☐	☐	☐	☐	☐
Remote access to research instruments	☐	☐	☐	☐	☐	☐	☐
Data management tools	☐	☐	☐	☐	☐	☐	☐
Data analysis tools	☐	☐	☐	☐	☐	☐	☐
Data collections	☐	☐	☐	☐	☐	☐	☐
Online storage	☐	☐	☐	☐	☐	☐	☐
Collaboration tools	☐	☐	☐	☐	☐	☐	☐
Individual support / advice customized to my requirements (e.g. methods/analysis)	☐	☐	☐	☐	☐	☐	☐
My own applications ported on ***e-infra selected in Q7*** resources	☐	☐	☐	☐	☐	☐	☐

42 Please indicate the extent to which you agree with the following statements with regard to ***e-infra selected in Q7*** services.

Please choose the appropriate response for each item:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	NA
It is easy to become skilful at using ***e-infra selected in Q7*** services.	☐	☐	☐	☐	☐	☐
It is easy for me to get help at using ***e-infra selected in Q7*** services when I need it.	☐	☐	☐	☐	☐	☐

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	NA
I find it difficult to get ***e-infra selected in Q7*** to provide the services I need.	☐	☐	☐	☐	☐	☐
Overall, I find ***e-infra selected in Q7*** services easy to use.	☐	☐	☐	☐	☐	☐

F Impact of e-Infrastructure on professional or non-research practices

43 Please tell us about the degree to which your use of ***e-infra selected in Q7*** has affected the activities listed below.

Please choose the appropriate response for each item:

	Large benefit	Small benefit	No benefit
Training, learning how to use technology	☐	☐	☐
Experimenting with new technology	☐	☐	☐
Obtaining technical support	☐	☐	☐
Preparing tools for work (e.g. migrating applications, solving interoperability problems etc.)	☐	☐	☐
Obtaining new software/applications or standards	☐	☐	☐
Obtaining access to high-end distributed computing	☐	☐	☐
Obtaining access to large-scale distributed storage or databases	☐	☐	☐
Obtaining access to advanced visualization or remote instruments	☐	☐	☐
Obtaining access to shared digitized materials	☐	☐	☐

44 Please tell us about the degree to which your use of***e-infra selected in Q7*** has had an impact on your work as listed below. ***e-infra selected in Q7***has enabled me to...

Please choose the appropriate response for each item:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
...accomplish work tasks more quickly.	☐	☐	☐	☐	☐
...produce more work output per year.	☐	☐	☐	☐	☐
...do work at lower costs.	☐	☐	☐	☐	☐
...do more accurate, higher quality work.	☐	☐	☐	☐	☐
...access resources for my work faster or better.	☐	☐	☐	☐	☐
...produce, process or analyse data faster or	☐	☐	☐	☐	☐

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
better.					
...work on problems that I could not address before.	☐	☐	☐	☐	☐
...conduct my work more efficiently using workflows.	☐	☐	☐	☐	☐

45 Have there been other impacts of ***e-infra selected in Q7*** on your work activities? If yes, please specify.

Please write your answer here:

46 Please tell us: The availability of ***e-infra selected in Q7*** or similar resources for my work is...

Please choose only one of the following:

☐very important

☐important

☐neutral

☐unimportant

☐very unimportant

47 Please tell us: The lack of ***e-infra selected in Q7*** or similar resources would impair my work...

Please choose only one of the following:

☐not at all

☐a little

☐much

☐totally

48 Please tell us how your use of / involvement with ***e-infra selected in Q7*** has influenced your collaboration network.

Please choose the appropriate response for each item:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I generally collaborate more.	☐	☐	☐	☐	☐
The geographical range of my collaborations has grown.	☐	☐	☐	☐	☐
I collaborate more with colleagues from developing countries.	☐	☐	☐	☐	☐

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I collaborate more with colleagues from commercial firms.	☐	☐	☐	☐	☐
I collaborate more with colleagues from academic institutions.	☐	☐	☐	☐	☐
I collaborate more with colleagues from other professions than my own.	☐	☐	☐	☐	☐

49 Have there been other ways in which ***e-infra selected in Q7*** has influenced your collaboration? If yes, please specify.

Please write your answer here:

50 Please indicate the extent to which you agree with the following statements.

Please choose the appropriate response for each item:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Practitioners in my field typically work alone.	☐	☐	☐	☐	☐
Collaboration is necessary in my field.	☐	☐	☐	☐	☐
Practitioners in my field typically collaborate with a small group of peers (2-10) on the same work project	☐	☐	☐	☐	☐
Practitioners in my field typically collaborate with medium to large groups of peers (10+) on the same work project.	☐	☐	☐	☐	☐
In my field the competition for academic recognition and/or commercial success is intense	☐	☐	☐	☐	☐
Work problems, paradigms, approaches, or methods change rapidly in my field.	☐	☐	☐	☐	☐
Work in my field is often done with exploratory work designs.	☐	☐	☐	☐	☐
Working my field is often done with causal work designs.	☐	☐	☐	☐	☐
My field is novel and establishing itself within my discipline.	☐	☐	☐	☐	☐

51 Please tell us how likely or unlikely you think the following developments are:

Please choose the appropriate response for each item:

	very likely	likely	neither likely nor unlikely	unlikely	very unlikely
In the next five years new computer resource delivery models such as Software as a Service, Cloud Computing or Utility Computing will be adopted by a large share of practitioners in my field.	☐	☐	☐	☐	☐
In the next five years the use of new computer resource delivery models such as Software as a Service, Cloud Computing or Utility Computing will significantly contribute to progress in my field.	☐	☐	☐	☐	☐

G Development of e-Infrastructure resources/services

52 Please select the area that most closely represents your development activities for ***e-infra selected in Q7*** ?

Please choose only one of the following:

☐Supercomputing

☐Distributed high-performance and high throughput computing (i.e. Grid)

☐Networking

☐Application Development

☐Academic support activities, including library services, methodological or theoretical research support

☐Information technology support services

☐Other

53 To your knowledge, how many individuals working in your field are using / participating in ***e-infra selected in Q7*** in a similar way to yours?

Please choose only one of the following:

☐None

☐1-5

☐6-10

☐21-100

☐101-500

☐More than 500

☐Don't know (and cannot give an estimate)

54 What is the geographic distribution of developers of ***e-infra selected in Q7***? They are located...

Please choose only one of the following:

☐...in a single region

☐...in multiple regions within a country

☐...across multiple countries within a continent

☐...across continents

55 This community involves developers from...?

Please choose only one of the following:

☐...a single academic institution

☐...multiple academic institutions

☐...a single non-academic institution

☐...multiple non-academic institutions

☐...multiple academic and non-academic institutions

56 Please briefly describe the main catalysts and barriers that influenced your first involvement with ***e-infra selected in Q7*** services, according to their importance.

	Catalysts	Barriers
Most important		
Second most important		
Third most important		

57 Which of the following ***e-infra selected in Q7*** services or resources do you develop or provide? (multiple)

Please choose all that apply:

☐Grid computing

☐Supercomputing

☐Visualisation

☐Simulation

☐Data management tools

☐Data analysis tools

☐Data collections

☐Online storage

☐Collaboration tools

☐Remote access to research instruments

☐Individual support / advice customized to my requirements (e.g. methods/analysis)

☐Other

☐My own applications ported on ***e-infra selected in Q7*** infrastructure

58 Which other services or resources do you use?

Please write your answer here:

59 On average, how frequently have you worked to develop these ***e-infra selected in Q7*** services in the past six months?

Please choose the appropriate response for each item:

	Daily	Weekly	Monthly	Quarterly	Just once	Never	I don't know
Grid computing	☐	☐	☐	☐	☐	☐	☐
Supercomputing	☐	☐	☐	☐	☐	☐	☐
Visualization	☐	☐	☐	☐	☐	☐	☐
Simulation	☐	☐	☐	☐	☐	☐	☐
Data management tools	☐	☐	☐	☐	☐	☐	☐
Data analysis tools	☐	☐	☐	☐	☐	☐	☐
Data collections	☐	☐	☐	☐	☐	☐	☐
Online storage	☐	☐	☐	☐	☐	☐	☐
Collaboration tools	☐	☐	☐	☐	☐	☐	☐
Remote access to research instruments	☐	☐	☐	☐	☐	☐	☐
Individual support/advice	☐	☐	☐	☐	☐	☐	☐
My own applications ported on ***e-infra selected in Q7*** resources	☐	☐	☐	☐	☐	☐	☐

H Impact of e-Infrastructure development practices

60 Please tell us about the degree to which your work with ***e-infra selected in Q7*** has affected your knowledge, skills contacts and resource access. Working with ***e-infra selected in Q7*** has enabled me to...

Please choose the appropriate response for each item:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Learn how to develop new technology.	☐	☐	☐	☐	☐
Experiment with new technology.	☐	☐	☐	☐	☐
Learn about new computing models and paradigms.	☐	☐	☐	☐	☐
Increase my programming skills.	☐	☐	☐	☐	☐
Increase my knowledge of other scientific fields and domains.	☐	☐	☐	☐	☐
Obtain access to technical resources (computing, data, instruments etc.)	☐	☐	☐	☐	☐

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Obtain access to funding.	☐	☐	☐	☐	☐
Make new contacts in my field of work.	☐	☐	☐	☐	☐
Make new contacts in other scientific fields and domains.	☐	☐	☐	☐	☐

61 Have there been other impacts of ***e-infra selected in Q7*** on your knowledge, skills, contacts and resource access? If yes, please specify.

Please write your answer here:

62 Please tell us what impact ***e-infra selected in Q7*** has had on the research of its users as you experience it. ***e-infra selected in Q7*** has enabled its users to...

Please choose the appropriate response for each item:

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	I don't know
...accomplish research tasks more quickly.	☐	☐	☐	☐	☐	☐
...produce more research output per year.	☐	☐	☐	☐	☐	☐
...do research at lower costs.	☐	☐	☐	☐	☐	☐
...do more accurate, higher quality research.	☐	☐	☐	☐	☐	☐
...access resources for their research faster or better.	☐	☐	☐	☐	☐	☐
...have more publications or conference proceedings accepted.	☐	☐	☐	☐	☐	☐
...publish more in media of higher reputation.	☐	☐	☐	☐	☐	☐
...produce, process or analyze data faster or better.	☐	☐	☐	☐	☐	☐
...work on research problems that could not be addressed before.	☐	☐	☐	☐	☐	☐
...conduct research more efficiently using workflows.	☐	☐	☐	☐	☐	☐

63 Please tell us how your use of / involvement with ***e-infra selected in Q7*** has influenced your collaboration network.

Please choose the appropriate response for each item:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I generally collaborate more.	☐	☐	☐	☐	☐

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The geographical range of my collaborations has grown.	☐	☐	☐	☐	☐
I collaborate more with colleagues from developing countries.	☐	☐	☐	☐	☐
I collaborate more with colleagues from commercial firms.	☐	☐	☐	☐	☐
I collaborate more with colleagues from academic institutions.	☐	☐	☐	☐	☐
I collaborate more with colleagues from other fields of science than my own.	☐	☐	☐	☐	☐

64 Have there been other ways in which ***e-infra selected in Q7*** has influenced your collaboration? If yes, please specify.

Please write your answer here:

65 Please indicate the extent to which you agree with the following statements.

Please choose the appropriate response for each item:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Developers in my field typically work alone.	☐	☐	☐	☐	☐
Collaboration is necessary in my field.	☐	☐	☐	☐	☐
Developers in my field typically collaborate with a small group of peers (2-10) on the same development project	☐	☐	☐	☐	☐
Developers in my field typically collaborate with medium to large groups of peers (10+) on the same development project.	☐	☐	☐	☐	☐
In my field the competition for academic recognition and/or commercial success is intense	☐	☐	☐	☐	☐
Development problems, pradigms, approaches, or methods change rapidly in my field.	☐	☐	☐	☐	☐
My field is novel and establishing itself within my discipline.	☐	☐	☐	☐	☐

66 Please tell us how likely or unlikely you think the following developments are:

Please choose the appropriate response for each item:

	very likely	likely	neither likely nor unlikely	unlikely	very unlikely
In the next five years new computer resource delivery models such as Software as a Service, Cloud Computing or Utility Computing will be adopted by a large share of developers in my field.	☐	☐	☐	☐	☐
In the next five years the use of new computer resource delivery models such as Software as a Service, Cloud Computing or Utility Computing will significantly contribute to scientific progress in my field.	☐	☐	☐	☐	☐

I: National and International Grid Initiatives

67 The next four questions are about national and international initiatives (NGIs, IGIs) promoting grids, cyberinfrastructure, or other shared high-performance computing infrastructures. Are you familiar with, involved in establishing, or expect to benefit from any such national or multinational initiative? *

Please choose only one of the following:

☐ I am involved, familiar or expect to benefit

☐ I am not familiar or expect to benefit and want to skip these questions

68 In your opinion, what are the major arguments to have a National Grid Initiative?

National Grid Initiatives are necessary...

Please choose the appropriate response for each item:

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
... as the most cost effective coordination scheme of computing resources at the country level.	☐	☐	☐	☐	☐
... as the right body to optimise the operation and support of the infrastructure.	☐	☐	☐	☐	☐
...as the right body to optimise the dissemination efforts and the user support.	☐	☐	☐	☐	☐
...to ensure the best adoption of and compliance with the middleware standards.	☐	☐	☐	☐	☐
...as the suitable structure to represent all the national Distributed Computing Infrastructures at the international level.	☐	☐	☐	☐	☐

69 In your opinion, what are the major arguments to have International Grid Initiatives such as the European Grid Initiative (EGI)? International Grid Initiatives are necessary...

Please choose the appropriate response for each item:

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
...for the coordination of infrastructures spanning several continents	☐	☐	☐	☐	☐
...to standardise the operation and support of distributed computing infrastructure.	☐	☐	☐	☐	☐
...to optimise worldwide the dissemination efforts and the user support.	☐	☐	☐	☐	☐
...to guarantee the largest inter-operability of distributed computing infrastructures.	☐	☐	☐	☐	☐
...to anticipate the evolution of distributed computing infrastructures technology.	☐	☐	☐	☐	☐

70 For the future of your Research Programme, how important or unimportant do you consider the coordination of Grid initiatives...

Please choose the appropriate response for each item:

	very important	important	neutral	unimportant	very unimportant
...at the national level	☐	☐	☐	☐	☐
...at the international level	☐	☐	☐	☐	☐

J: Recommendation to policy makers

71 How in your opinion could policy makers advance the use of e-Infrastructure?

Please write your answer here:

72 Thank you for taking the time to participate in the survey!

We greatly appreciate that you took the time to share your opinions with us.

You can provide your e-mail address so that we will send you the results as soon as they are published.

Please write your answer here:

Thank you for completing this survey.

5 List of Acronyms

AAA	Authentication, Authorisation and Accounting
AES	Audio Engineering Society
AMPAS	Academy of Motion Picture Arts and Sciences
APGrid PMA	Asia Pacific Grid Policy Management Authority
API	Application Programming Interface
ATASKF	Applications Task Force
AWI	Alfred-Wegener-Institute for Polar- and Marine Research
BADC	British Atmosphere Data Centre
BELIEF	Bringing Europe's eLectronic Infrastructures to Expanding Frontiers
BES	OGSA Basic Execution Services
BMBF	German Federal Ministry of Education and Research
BOINC	Berkeley Open Infrastructure for Network Computing
C3Grid	Collaborative Climate Community Data and Processing Grid
CA	Certification Authority
Calit2	California Institute for Telecommunications and Information Technology
CASPAR	Cultural, Artistic and Scientific knowledge for Preservation, Access and Retrieval
CB	Consortium Board
CBS WMO	Commission for Basic Systems committee of the World Meteorological Organization
CDO	Climate Data Operators diagnosis-/analysis program
CEI	Computer Engineering Institute of the University of Dortmund
CERA	Climate and Environmental Retrieval and Archive
CLARA	Cooperación Latino-Americana de Redes Avanzadas
CMS	Content Management System
Condor-G	Condor for Globus
CORDIS	Community Research and Development Information Service
D4Science	DIstributed colLaboratories Infrastructure on Grid ENabled Technology 4 Science
DARPA	Defense Advanced Research Project Agency
DART	DEISA Accounting Report Tool
DCI	Digital Cinema Initiatives, LLC
DCPCs	Data Collection or Product Centers
DCPE	DEISA Common Production Environment
DECI	DEISA Extreme Computing Initiative
DGI	D-Grid Integration project
DILIGENT	Digital Library Infrastructure on Grid Enabled Technology
DIS	Data Information Service.
DKRZ	German Climate Computing Centre
DOI	Digital Object Identification Marker
DRIVER	Digital Repository Infrastructure Vision for European Research
DRM	Digital Rights Management
DRMAA	Distributed Resource Management Application API
DRMS	Distributed Resource Management System
DWD	Deutscher Wetterdienst (German Weather Service)
EAB	External Advisory Board
EC	European Commission
ECMWF	European Centre for Medium-range Weather Forecasts
EELA	E-infrastructure shared between Europe and Latin America
EELA-2	E-science Grid facility for Europe and Latin America
EFDA	European Fusion Development Agreement
EGA	Enterprise Grid Alliance

EGEE	Enabling Grids for E-SciencE
EGI	European Grid Initiative
e-IRG	e-infrastructure Reflection Group
EM	Environmental Monitoring
EMSA	European Maritime Safety Agency
EO	Earth Observation
ESA	European Space Agency
ESFRI	European Strategy Forum on Research Infrastructures
ESG	Earth Systems Grid
ETICS	eInfrastructure for Testing, Integration and Configuration of Software
ETSF	European Theoretical Spectroscopy Facility
EU	European Union
f2f	face-to-face
FARM	Fishery and Aquaculture Resources Management
FCPPS	Fishery Country Profiles Production System
FP7	Seventh Research Framework Programme of the EU
FTTH	Fiber to the Home
FUB	Freie Universität Berlin (Free University of Berlin)
FWIS	Future WMO Information System
GACG	Grid für Astrophysik (Grid for Astrophysics)
GCM	Global Ocean Chlorophyll Monitoring
gCube	("g" stands for "Grid")
GF	Grid Forum
GGF	Global Grid Forum
GIN	Grid Interoperation Now
GIS	Grid Information Service
GISCs	Global Information System Centres
GKSS	Research Centre Geesthacht
GLIF	Global Lambda Integrated Facility
GPFS	IBM General Parallel File System
GrADS	Grid Analysis and Display System
GRIB	GRIdded Binary
GRIS	Grid Resource Information Service
GSI	Grid Security Infrastructure
GTS	Global Telecommunication Systems
GUI	Graphical User Interface
GVM	Global Land Vegetation Monitoring
HDI	Human Development Index
HEP	High-energy physics
HEP-Grid	Grid of the German High Energy, Nuclear as well as Astroparticle Physics communities
HET	High Performance Computing in Europe Taskforce
HGF	Helmholtz Association of German Research Centres
HLRE	Centre for high-performance computing at DKRZ
HPC	High-performance computing
HPCBP	High Performance Computing Basic Profile
HSM	Hierarchical Storage Management
ICIS	Integrated Capture Information System
ICSU	International Council of Scientific Unions
ICT	Information and communication technologies
IDE	Integrated Development Environment
IETF	Internet Engineering Task Force
IfM	Institute for Meteorology of the FUB

IGMK	Institute for Geophysics and Meteorology of the University of Cologne
IGTF	International Grid Trust Federation
IPCC	Intergovernmental Panel on Climate Change
IST	Information Society Technologies
ISTP	Internal Specific Targeted Projects
IT	Information technology
ITIL	Information Technology Infrastructure Library
iVDGL	international Virtual Data Grid Laboratory
IVOA	International Virtual Observatory Alliance
JDSL	Data Structures Library in Java
JRA	Joint Research Activity
JRU	Joint Research Unit
JSDL	Job Submission Description Language
JSPG	Joint Security Policy Group
JuBE	Juelich Benchmark Environment
LGI	Latin American Grid Initiative
LHC	Large Hadron Collider
LIGO	Laser Interferometer Gravitational-Wave Observatory
LSF	Load Sharing Facility
MB	Management Board
MCAT	MetaData Catalog
MGA	Members General Assembly
NA	Networking Activities
NAREGI	National Research Grid Initiative of Japan
NCF	Nationale Computerfaciliteiten
NeOn	Network Ontologies
netCDF	Network Common Data Form
NJS	Network Job Supervisor
NOW	Netherlands Organisation for Scientific Research
NREN	National Research and Education Network
NVO	National Virtual Observatory
OASIS	Organisation for the Advancement of Structured Information Standards
OGF	Open Grid Forum
OGSA	Open Grid Services Architecture
OMII-UK	Open Middleware Infrastructure Institute
OpenMP	Open Multi-Processing
OSG	Open Science Grid
PBS	Portable Batch System
PEB	Project Executive Board
PINGO	Procedural Interface for GRIB formatted Objects
PKI	Public Key Infrastructure
PMB	Project Management Board
PRACE	Partnership for Advanced Computing in Europe
QoS	Quality of Service
R&D	Research and development
RA	Registration Authority
RMIS	Risk Management Information Systems
ROC	Regional Operation Centre
RRZK	Data centre of the University of Cologne.
RTD	Research & Technical Development
RUS	Resource Usage Service
SA	Service Activities
SaaS	Software as a Service

SAML	Security Assertion Markup Language
SAPIR	Search In Audio Visual Content Using Peer-to-peer IR
SLA	Service Level Agreement
SLO	Service Level Objectives
SMP	Symmetric multiprocessing
SOA	A Service Oriented Architecture
SRB	Storage Resource Broker
SRM	Storage Resource Manager
STC	Science & Technology Council
TB	Technical Board
TERENA	Trans-European Research and Education Networking Association
TLS	Transport Layer Security
TMF	Telematikplattform für medizinische Forschungsnetze
UCSD	University of California at San Diego
UNICORE	Uniform Interface to Computing Resources
UR	Usage Record
VDT	Virtual Data Toolkit
VO	Virtual Organization
VOMRS	VO Membership Registration Service
VOMS	Virtual Organisation Membership Service
VR	Virtual Reality
VRE	Virtual Research Environment
WDCC	World Data Centre for Climate
WDC-RSAT	World Data Center for Remote Sensing of the Atmosphere
WMO	World Meteorological Organization
WS GRAM	Web Services Grid Resource Allocation and Management
WS-I	Web Services Interoperability organization
WSRF	Web Services Resource Framework
XPath	XML Path Language
XSLT	XSL Transformations
ZIB	Konrad-Zuse-Institute Berlin

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