



## JISC Project Plan

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<b>Project Director</b>	Neil Geddes / Andrew Richards		
<b>Project Manager &amp; contact details</b>	Andrew Richards		
<b>Partner Institutions</b>			
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## Overview of Project

### 1. Background

e-Research is one of the 8 strategic themes of the JISC, within which grid computing is one of the key technologies<sup>1</sup>. The National Grid Service has developed as a framework for collaborative use of computing and data infrastructures across projects and institutions. The focus of the NGS is in supporting research collaborations, which may be distributed and come together as an ad-hoc arrangement that changes with time, through the development of a persistent common e-infrastructure. It is the mechanisms (and interfaces) for resource provision and project support, rather than the underlying resources, which form the basis of this collaborative environment, thereby enabling development and exploitation of an increasingly sophisticated generic tool set which can be exploited by new activities without the need to develop and/or learn new skills. The NGS has provided a production service since 2004. Building on the work of the Grid Support Centre and the Grid Operations Support Centre, which came under the NGS branding in 2006, the NGS provides academic researchers from all disciplines with access to a wide range of computational and data facilities within the UK. Through its programme of driving the adoption of open standards<sup>2</sup> based solutions the NGS is facilitating common access mechanisms to such facilities, enabling intra-institutional collaboration to become a day to day reality in the pursuit of research. Through its active collaborations with international grid activities such as EGEE<sup>3</sup> and the Teragrid<sup>4</sup>, the NGS has also been successful in facilitating international research projects such as the current GENIUS<sup>5</sup> project (provisioning and supporting lightpath connections, using ja.net Lightpath<sup>6</sup>), and its previous work under the RealityGrid project, the Integrative Biology project<sup>7</sup> (bringing distributed data management to a new community) and astronomers using the Sloane Digital Sky Survey (SDSS).

To quote from the current UK Large Facilities Roadmap;

*“The UK is, and is committed to remaining, a leading nation in the fields of research and innovation ... To maintain and build on this impressive achievement requires that UK researchers have access to a full range of world-class research facilities and infrastructure...The growth of digital and communication technologies and networking has also created emerging opportunities to establish new kinds of facility – interconnected networks of information, resources and of researchers. These create new research opportunities both through their ability to collect, bring together and find patterns and information in large amounts of data”.*

Half of the facilities listed in the UK roadmap are anticipated to be international, and are also listed in the European ESFRI roadmap ([ftp://ftp.cordis.europa.eu/pub/esfri/docs/esfri-roadmap-report-26092006\\_en.pdf](ftp://ftp.cordis.europa.eu/pub/esfri/docs/esfri-roadmap-report-26092006_en.pdf)). The implication is thus that, if constructed, these facilities could be sited anywhere in Europe. In November 2007 the Competitiveness Council of the European Union **invited** “Member States to encourage public and private research institutions to make full use of the emerging distributed forms of research activity (namely eScience) based upon international research networks

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<sup>1</sup> The NGS aligns to JISC’s strategic priorities as described in Appendix 2.

<sup>2</sup> The NGS currently supports services that use the following standards: GridFTP 1.0, JSDL 1.0, GLUE 1.3 and x509 v3

<sup>3</sup> For EGEE the NGS provides the UK Certificate Authority, the core of the UK and Ireland Regional Operations Centre and the interface to the EGEE Global Grid User Support (GGUS) system.

<sup>4</sup> NGS support cross authentication for TeraGrid users and support for UK-US TeraGrid collaborations such as GENIUS.

<sup>5</sup> GENIUS and RealityGrid – <http://www.realitygrid.org>

<sup>6</sup> Ja.net Lightpath <http://www.ja.net/services/lightpath/index.html>

<sup>7</sup> Integrative Biology <http://www.integrativebiology.ox.ac.uk/>

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*made possible by the availability and world-class unique quality of distributed European network infrastructures like GEANT and GRID” to address the full exploitation of pan European research infrastructure. In May 2008 the Council emphasized “the essential role of e-infrastructures as an integrating mechanism between Member States, regions as well as different scientific disciplines, also contributing to overcoming digital divides”.*

The Scottish Government notes that the Science and Innovation Investment Framework represents ... a significant real growth in funding of science over the coming decade, which should ... benefit Scotland if our universities, as in recent years, continue to win around 12% of such funding through the UK Research Councils.<sup>8</sup> Key aims of the Scottish Science Strategy are to maintain a strong science base fully connected to UK and international activity and funding sources; and to promote Scotland as a centre of world-leading scientific excellence.

The UK NGS, with its connections into Europe through EGEE<sup>9</sup>, DEISA<sup>10</sup> and potentially PRACE<sup>11</sup>, puts the UK in a strong position to exploit both current and future research infrastructures across Europe. A position which will be jeopardised without the NGS.

Looking towards the future the NGS has a clear role in continuing to drive the adoption of standards based approaches for collaborative research across institutional boundaries within the UK by:

- enabling HEI and researcher access to the wide range of resources already established through the NGS and leveraging existing and future authentication services such as the UK Access Management Federation.
- integrating HEI resources and researchers into the national and international framework.
- integrating further resources and thereby increasing the pool of computational and data facilities.
- enabling a wide range of community-led support programmes to exploit a persistent common infrastructure.
- delivering core services in support of collaborative research.
- engaging with appropriate standards bodies (e.g. OGF<sup>12</sup>) to develop effective standards based on user and community requirements.

In achieving this, the NGS needs to continue to build on the technical achievements to date and to further the models for brokering of resources between institutes, enhance the environment for the provision of shared services, and to facilitate models with institutes for sustaining the resources into the future. For users the NGS must continue to promote and facilitate training at all levels in order to utilise this developing UK e-Infrastructure and to provide visibility of UK e-infrastructure on the international stage.

## 2. Aims and Objectives

The mission of the NGS is:

*To provide coherent electronic access for UK researchers to all computational and data based resources and facilities required to carry out their research, independent of resource or researcher location.*

Within this broad goal the aim of this project is the provision and exploitation of a sustainable framework for integration of computing and data services. In order to achieve this the NGS will:

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<sup>8</sup> <http://www.scotland.gov.uk/Topics/Business-Industry/science/16607/21333>

<sup>9</sup> Enabling Grids for E-sciencE <http://public.eu-egee.org/>

<sup>10</sup> Distributed European Infrastructure for Supercomputing Applications <http://www.deisa.eu/>

<sup>11</sup> Partnership for Advanced Computing in Europe <http://www.prace-project.eu/>

<sup>12</sup> Open Grid Forum <http://www.ogf.org/>

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1. deploy and support the services required to operate collaborative data and computation services in the UK (see Appendix 1 and 3 for details)
2. encourage and support integrated (grid) access to the full range of the UK's computation, data and other appropriate research facilities, with 'single sign on' support that is fully integrated into the standard practices of UK institutions.
3. provide support and training for inter-institutional e-research activities through provision of coordinated services, and direct support for innovative projects.
4. expand the community of e-infrastructure resource providers by providing the national framework and support services, to facilitate inter-institutional collaboration.
5. disseminate best practice in the operation and use of shared e-infrastructure services through documentation, reviews and focused support events.
6. interface to partner international (grid) infrastructures as required to support UK researchers.
7. collaborate with other national and international e-infrastructures in appropriate research, development, standardisation activities which form synergies with the NGS and its mission.
8. develop the business models and plan for sustaining the infrastructure required to support UK researchers.
9. lead engagement with the European Grid Initiative for the UK, developing a long term plan with GridPP and other stakeholders to deliver a single National Grid Initiative (NGI).

To be successful, these activities will be increasingly embedded in the routine operations of UK HEIs and research organisations. The NGS already links resources in 24 UK Universities and research labs, through its partnership process. This facilitates collaborative research within and between institutes using e-infrastructure at a minimal cost to HEIs. Achieving the successful embedding of these activities through expanded partner engagement, broader uptake of services and distribution of activities is a central theme of the NGS service.

### 3. Overall Approach

The NGS will support an open standards based infrastructure for combining computation and information from multiple data sources, reducing the need for specific arrangements for access and bespoke software or intensive researcher effort. Common interfaces will be increasingly important as the number, scale and variety of resources used for research increases. The NGS must pioneer systematic arrangements that relieve the load on both resource providers and resource users, thereby developing and supporting best practice across UK academic research. Where multiple solutions exist, choices will be driven by user requirements matched with strategic UK policies<sup>13</sup>.

The NGS will develop and operate a policy and best practice framework for the operation, inter-operation and sharing of research computing services across the UK. This will include policies for partnership, user access, operations, development, and security. The framework will include:

- a repository of appropriate user and system documentation, e.g. F.A.Q-s, best practice guides and training materials
- the ongoing review of member services to both ensure that membership remains an improving recognition of quality and to disseminate best practice.
- a UK help desk and support centre, integrated into related international developments

This support framework will be based upon operation of the core services that are required to exploit the full range of UK e-resources available for research. The support framework will also underpin users of the services, monitoring of members' services, help to identify and fix interoperability issues and thus maintain the day-to-day integrity of the e-infrastructure.

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<sup>13</sup> For example the UK e-Government Interoperability Framework already specifies that “– preference will be given to standards with the broadest remit, so appropriate international standards will take preference over EU standards, and EU standards will take preference over UK standards.”

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The NGS will support a complete range of 'Baseline Services' as required by users and institutions. At present the services currently provided are defined in Appendix 3. These will need to be compatible and interoperable with those offered on partner infrastructures. The scope and nature of the services required will evolve as Institutional needs evolve. The NGS will monitor the demand for services, as detailed in work package 2 and subsequently implement and retire services as appropriate.

Overall the services supported by the NGS will support a National Grid infrastructure which will allow researchers to:

- make systematic use of local, national and international resources to collect, process, move, preserve and make available digital information.
- easily search, find, and browse through information relating to the available resources to identify services of value to their goals.
- make accurate value judgements on the quality of the services available.
- collaborate more widely than before and align research efforts with expert communities around the world.

The emphasis is on the functionality and the services provided, not on the underlying technologies. The latter, while critical to the success of the NGS, will be of second order interest to NGS users. For strategic reasons of longer term sustainability, interoperability and service quality, the NGS will continue to work towards a Service Oriented Architecture based on standard Web Service interfaces exposing the set of common Baseline Services. Through the Open Grid Forum the NGS will continue to be involved with and track developments and emerging standards that will enable the NGS to deliver the functionality and services required.

## 4. Project Outputs

**A key output from the project will be a sustainable business plan that covers:**

- a portfolio of core NGS services essential to support e-Research activities within the UK.
- an expanded community of resource providers.
- best practice guidelines in the operation and use of shared services.
- gateways to international activities.
- national services required for interfacing to international activities such as the European Grid Infrastructure (in partnership with others).
- supporting common authentication and authorisation based on institutional infrastructure.
- support for cross institutional activities.
- a support Centre.
- documentation and training for both end users and service providers.
- operational security support and coordination for grid systems
- detailed service definitions for a sustainable infrastructure
- detailed business cases for a sustainable UK National Grid Service.
- research outputs (from users).

**Development** of sustainable model for national e-infrastructure framework, enabling researchers access to national and international resources. Such a national e-infrastructure framework will enable HEIs to adopt such services at a lower cost. It will not only facilitate better inter and intra campus collaboration but also provide the common e-infrastructure platforms for large scale ESFRI projects and their HEI collaborators to build upon.

### Contributions to the JISC e-Framework

This project will contribute expertise in common platforms for developing e-infrastructure within the UK. To the e-Framework this project will assess the current service offerings delivered by the NGS, to

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identify those that can be analysed and described within the e-Framework processes. Certain NGS services have already been documented e.g. parts of the UK CA through the SARoNGS project for inclusion in the e-Framework. During this project phase other NGS service components will also be examined to identify those suitable for inclusion.

## 5. Project Outcomes

**Increased engagement** with user community through direct support of HEIs to participate in and deliver to a national e-infrastructure that underpins requirements of researchers at those HEI institutes. This will in turn facilitate greater cross institute and cross research domain collaboration.

**International participation** with peer e-infrastructures across Europe and beyond. As a result of developing a national e-infrastructure, the UK is in a position to participate in and contribute to international e-infrastructure developments and provide support for international research collaborations.

**New Research communities** develop as increasing numbers of HEIs support e-infrastructure, creating new opportunities for cross discipline research and an increased awareness across a HEI as opposed to being isolated within specific departments.

## 6. Stakeholder Analysis

Stakeholder	Interest / stake	Importance
University campus research computing services/facilitators	Standards, road mapping, user support/engagement/collaboration	High
Research laboratories and institutions	Accessibility of facilities	High
Research scientists	Standard interfaces and access to resources	High
Research Councils, JISC	Optimising use of infrastructure investments	High
Vice Chancellor for Research (*or equivalent)	Optimising use of HEI investment	High
Community and project infrastructure projects	Interoperability and sustainability	High
UK Government	Developing national e-infrastructure	Medium
University campus computing services	Interoperability standards and road mapping	Medium
Ja.Net	Grid represents both value added services on top of super janet and a potential range of new risks and threat to the network	low

## 7. Risk Analysis

Risk	Probability (1-5)	Severity (1-5)	Score (P x S)	Action to Prevent/Manage Risk
Insufficient financial support for an effective national e-infrastructure, that delivers services for users and	3	5	15	Ensure funding is in place early and work with new partners and user groups to increase the scale and relevance of the NGS.

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institutes.				
Service under utilised in terms of end users or number of institutes joining NGS as member sites	3	5	15	Ongoing survey of user requirements to ensure that developments meet user demands and services provided are sufficient
Service over subscribed in terms of too many end users or too many member sites requiring support and services beyond that provisioned for in NGS current plans.	3	5	15	Work with partners and affiliates to effectively integrate increasing resources across the UK and internationally. Work with funding agencies to ensure the NGS is suitable resourced to meet the needs of its user base.
Security	3	5	15	Work with other infrastructure providers and technology developers to ensure that security risks and threats are taken seriously and acted upon. Continued user training to improve understanding and requirements of working on a shared infrastructure.
External suppliers are not focussed on requirements or are not sufficiently aware of what is needed for the NGS to deliver the appropriate service.	3	4	12	Work with developers and partner infrastructures to ensure that developments are focused on user and service provider requirements.
Inadequate support infrastructure	2	5	10	Monitoring of performance of support activities and pro-active management by the NGS Project Board
Service levels do not meet expectations of member sites and end users.	2	4	8	At proposed funding levels. Services will not typically provide 24x7 cover. This is typical of research services. We will work closely with research service providers to ensure appropriate expectations and work with partners to enhance service levels as appropriate.
Failure to integrate with other national e-Infrastructure components, e.g. University authentication systems	2	4	8	A range of activities help to mitigate this. STFC committed to compatibility with National and international facilities for which they are responsible. NGS partners directly engaged in a number of projects integrating grid and shibboleth. Partners actively engaged in regional grids (White Rose, Northwest, ScotGrid).
Failure to make available developed software (applications or central services) on time due to undelivered external dependencies	2	4	8	Work with developers of other external dependencies where possible to ensure they understand fully the NGS requirements and timescales. Where control or influence can not be exerted then ensure alternatives are evaluated by NGS developers.
Lack of international compatibility	1	4	4	(impact likely to increase with time) Active engagement of NGS Director(s) and key staff in international initiatives. E.g. GGF, EGEE, GridCoord, LCG

## 8. Standards

Name of standard or specification	Version	Notes
X.509 proxy certificates	RFC 3820	User authentication to NGS resources and

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		to related grids such as Teragrid and EGEE
X.509 attribute certificates	X.509	User authentication to NGS resources and to related grids such as Teragrid and EGEE
SAML (attribute assertions)	SAMLv1.1 or 2.0	Within SARoNGS framework for user authentication to NGS resources
XACML (request context)	V2	
GridFTP	1.0	NGS resource profile. Data transfer between NGS resources
JSDL		NGS Portal, used for control of job submission templates GridSAM instance running at OeRC
GRAM	2.4	Job submission to NGS resources. Included in the Virtual Data Toolkit
GLUE	1.4	Information publishing for all resources
Usage Record	1.0	All resources publishing to the NGS UAS (User Accounting System)
WS-DAI	1.0	OGSA-DAI instances running in Manchester and STFC
SAGA	1.0	Installation in progress on Oxford and STFC resources
WS-Security	1.1	WS hosting service at Belfast

## 9. Technical Development

Overall technical evaluation, development and deployment of services for the NGS will be under the guidance of the NGS Operations Board, which reports to the NGS Management Board for direction and designation of NGS policy. Working within the NGS policies as determined by NGS management board, Operations board will follow best practice to ensure services delivered are of a professional nature and are developed, operated and monitored in accordance with these requirements and to ensure at all times that the needs of the user community are represented.

Any development of software will be designed before code is written and reviewed by the project managers at each partner site. Version Control Software versioning will be used to ensure the developers are using the most up to date code. Backups of the Version Control Software server ensure that the development process will be protected against hardware failure. Also there will be developer guidance, and QA and release procedures

Any software delivered in this project will as far as we can be made available under an Open Source Initiative (OSI) approved Open Source licence. This might fail in dependence on external components with more restrictive licensing, where the timescales of this project do not permit us to develop an open source solution, nor to strengthen an existing one. In this case we will indicate this and suggest how to work around it.

## 10. Intellectual Property Rights

Under the Universities of Oxford, Manchester, Edinburgh, Leeds and STFC policies on intellectual property (which cover all employees and students), these institutions claim ownership of a range of intellectual property rights with commercial potential. These Universities do not assert any claim to the ownership of copyright in artistic works, books, articles or lectures, apart from those specifically commissioned by the University. Results arising from projects funded by the JISC at Oxford, Manchester, Leeds, Edinburgh and STFC would therefore usually be shared and owned in the first instance by the collaborating parties as the employing institutions. The University Of Oxford seeks to maximise the commercial potential of its intellectual property through its wholly owned technology transfer company, ISIS Innovation Ltd, the University of Manchester has similarly the University of

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Manchester Intellectual Property Limited (UMIP) and STFC will similarly seek to exploit developments through the CLIK technology transfer company.

Notwithstanding the above statement on IPR for the respective institutes involved in this project, the JISC has the license to perpetual use within the HE and FE sector.

## Project Resources

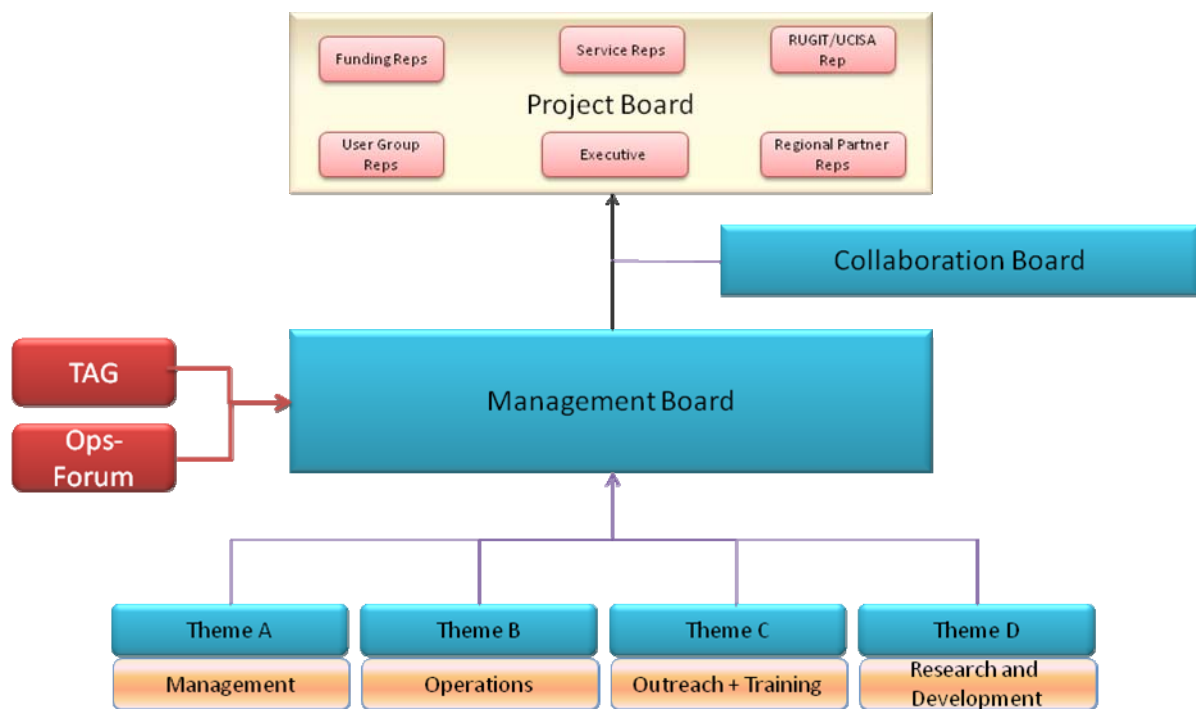
### 11. Project Partners

STFC is the lead partner and only signatory to the contract. STFC will sub contract clearly defined service requirements and work packages to partner institutes. This model will facilitate a longer term sustainable modular service that can purchase or enable services more rapidly at host institutes capable of providing the required service level.

### 12. Project Management

The overall management structure of the NGS is defined as in figure 1. The project board represents the interface to the funding bodies and external stakeholders.

Day to day management of the NGS is the responsibility of the Executive Director, who is assisted by the Technical Director, Head of Deployment and Head of Outreach. At the level of day to day management the Management Board and lower reporting structure is required to ensure the NGS can internally manage as appropriate its ongoing service delivery and operational commitments.



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**Project Board (PB).** The Project Board will form the decision-making body for any strategic issues concerning the operation of the Consortium. It will:

- have overall strategic oversight of the project;
- set priorities for the project's programme of work;
- monitor the progress of delivery of the project;
- approve changes to plans;
- manage major risks to the project;
- take corrective action as appropriate;
- monitor the engagement of the project with the wider community.

JISC will appoint a Programme Manager to act on its behalf and represent it on the PB. The project will be represented on the Project Management Board by a senior representative of STFC (the Director, e-Science or proxy), and senior executive officers from the project including, but not limited to the Project Executive. The PB may request attendance by the other service managers as required. The PB will meet half yearly (and additionally if necessary). The chair will be elected by the board itself. The NGS project PI will nominally act as the chair of the board in the absence of an elected person, or the ability of the board to elect a chair.

Each member of the project board that is not a member of this NGS project will have voting rights. Decisions of the board will stand when the board is quorate. Quorate will be defined as when at least 50% of those eligible to vote are present. Votes will stand when at least 50% of voting members are either present at board or have cast their vote in advance.

A full list of expected members of this board is to be found below.

### **Collaboration Board (CB)**

The Collaboration Board will meet at least annually and report to the Project Board in consultation with the Management Board. The CB will represent all parties with interests in the NGS including all partner and affiliate sites, collaborating projects and user communities.

**Management Board (MB)** The Management Board will be the senior executive body covering the development and operation of the project. It will:

- set operational priorities for the project's programme of work;
- monitor the progress of delivery of the project;
- approve changes to work package plans;
- manage operational and development risks to the project;
- take corrective action as appropriate;
- monitor the engagement of the project with the wider community.

The MB will be chaired by the Executive Director and will consist of all of the senior executive positions within the project. The MB will normally meet weekly and not less than monthly.

## ***Membership of boards:***

### **1. Project Board**

*Membership of the Project board is defined as:*

**Chair:** To be elected by board

**Members:**

**Project** (*represents the executive component within the project board*)

NGS Director (Neil Geddes)

Executive Director (Andrew Richard)

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Technical Director (David Wallom)

### **Stakeholders**

#### **Funding representatives**

JISC representative (James Farnhill)  
EPSRC representative (Sarah Fulford)  
*Other RC representative as appropriate and agreed by board.*

#### **Service Representatives**

GridPP representative (David Britton)  
JANET representative (David Salmon)  
HPC-SIG representative (Iain Stewart)  
CAMPUS-SIG representative (Hugh Beedie)

UCISA representative  
RUGIT representative

### **Community**

Collaboration board chair

User Group representative (x3) – aim to at least get 1 per meeting

Other project members, service representatives or other experts, may be invited as required by the board.

## **2. Collaboration Board**

*Membership of the collaboration board is defined as:*

#### **Chair:**

Appointed by board

#### **Members:**

*Non voting members of the NGS attending as required by Collaboration Board to provide expert input.*  
Director NGS (Neil Geddes)  
Executive Director (Andrew Richards)  
Technical Director (David Wallom),  
Head of Outreach (Gillian Sinclair),  
Head of Training (David Fergusson)  
Head of Operations (Peter Oliver)  
Head of Support (John Kewley),  
UKI Federation Manager (Claire Devereux)

#### *Voting members*

\*Nominated representatives from all partner and affiliate sites.

## **3. Management Board**

*Membership of the management board is defined as:*

#### **Chair:**

Executive Director (Andrew Richards)

#### **Members:**

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PI (project director, Neil Geddes)  
Technical Director (David Wallom),  
Theme Work Package Leaders: Peter Oliver, Gillian Sinclair, Jason Lander, David Fergusson, Mike Jones, Steven Young  
\*Additional Theme Work Package Experts or nominated Leaders may be invited at the discretion of MB and as required.

The Technical Advisory Group and Operations Forum report to and advise as appropriate the NGS Management Board directly.

#### ***4. Technical Advisory Group***

The TAG will report to and advise the development board on matters of service delivery and make recommendations for policy and service delivery. Under the TAG specific sub groups e.g the CA-TAG can exist to foster links between entities such as the NGS and the GridPP in areas of common service requirements and to ensure parties with vested interests in NGS services have representation and a say in the development of specific services.

**Chair:** Technical Director (David Wallom) or elected member of the TAG.

**Membership:**

Open to all partner level NGS sites and associated infrastructure providers.

#### ***5. Operations Forum Group***

The Operations Forum will exist as a self managing group with the key objective to provide direct technical support and advice to the NGS service community in general.

**Chair:** self elected within operations forum group. (chair open to rotation)

**Membership:**

The operations forum will hold open meetings to which all interested resource providers, whether current NGS certifies sites or not will be welcome to attend. This will facilitate wider engagement with the resource providing community.

The operations forum will report to the Management board and in association with the TAG provide input to overall NGS service delivery and management as appropriate.

### ***Project Team***

The NGS project has over the last 4 years built a significant expertise in grid technologies.

**Dr Neil Geddes** is the e-Science Director at the UK Science and Technology Facilities Council. A particle Physicist by training, Neil has been involved in distributed computing for over 20 years and in

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e-Science and grid computing since 2000. In 2001, as Director of the PPARC e-Science programme, Neil was a founder member of the LHC Computing Grid (wLCG) and initiated the UK GridPP project. Neil served as Chair of the wLCG Collaboration Board until January 2008. Away from particle physics, Neil has led the NGS project since 2004 and has been heavily involved in all phases of the European EGEE project. Neil is the UK representative on the European e-Infrastructure Reflection Group and a member of the ESFRI expert group on e-Infrastructure.

**Dr Andrew Richards** is the Executive Director for the National Grid Service and deputy head of the Scientific Computing Technology Group at STFC e-Science. He has a background in structural geology. He has been involved with grid computing and e-Science since 2002, and has worked across a broad range of e-Science projects, from supporting end users to leading the development of the UK National Grid Service. His work also incorporates development activities within EGEE and GridPP.

He is also the PI on the JISC funded SARoNGS (Shibboleth Access for Resources on the NGS) project and co-PI on the OMII-UK funded JSDL Portlets project.

**Dr David Wallom** is the Technical Manager of the Oxford e-Research Centre. He has a background in Experimental Particle Physics having worked on the BaBar project at Stanford Linear Accelerator Centre. He has been involved with e-Science since participating in the European Space Agency SpaceGRID project as lead developer after which he moved to the Grid Support Centre at Rutherford Appleton Laboratory.

He is currently the Technical Director of the NGS, leading on the efforts to engage further institutional members in the project and give general technical guidance on the roadmap for the project. He is also the PI of the UK Engineering Task Force Network, funded by EPSRC after being its chair for the last 3 three years whilst it was funded through the core program. He is a Co-investigator on various projects including the e-Research South project, a collaboration between Oxford, Reading, Southampton and STFC to build capability in e-Research within the south of England and Wales and a number of JISC & OMII-UK funded technological development projects. He is also the institutional lead in the OGF-Europe project and as such sits on the OGF Global Standards Council.

**Dr David Fergusson** is Deputy Director for Training Education and Outreach at the National e-Science Centre (University of Edinburgh). He has a background in biomedical research and commercial bioinformatics development. He manages NeSC's EGEE's training Activity (NA3, 2004 - 2008) and is a member of the EGEE project's Project Executive Board. He taught at and managed the International Summer School for Grid Computing (2004 - 08) and GridKa Summer Schools in 2004 & 2005. He established the International Summer School for Biomed Grids in 2006 and the International Winter School for Grid Computing as a distance learning counterpart for ISSGC in 2007. A Principle Investigator and work package leader of the JISC eUptake project, David has also been involved in representing the UK and user support activities in the discussions for the European Grid Initiative (EGEE follow on), is a co-chair of the OGF Education and Training Community Group and Deputy chair of the e-IRG Education and Training Task Force.

**Dr Mike Jones** leads the Grid Developments Team within Research Computing Services at the University of Manchester. His PhD studies the use of global file systems within grid computing.

He specialises in grid security, and has worked on various security projects involving Shibboleth, Kerberos, Community Authorisation Service, Virtual Organisation Membership Service, Akenti, Public Key and Grid Security Infrastructures. He works closely with the UK eScience Certification Authority and manages the University's Registration Authority.

He has represented the North West eScience Centre on the UK Grid Engineering Task Force since 2001, helped form the Level 2 Grid and has been working with the NGS since its inception in 2004 where he is currently responsible for the VOMS service. He is co-investigator on two current projects: SARoNGS, a follow on from the SHEBANGS and ShibGrid projects; and NanoCMOS, a demanding project which tackles grid security, file distribution, metadata and large scale computing.

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He is involved in the national and global grid communities where he is active at the programme level within the UK eScience All Hands Meetings and the Open Grid Forum.

Further interests include grid file systems, interfaces, and information systems.

**Dr Gillian Sinclair** has four years experience of Grid user outreach and six years experience of user outreach within UK academia. She has devised marketing campaigns and publicity materials for several new academic research centres and has considerable experience in writing grid related articles for both specialist and non-specialist publications as well as press releases and newsletters. Gillian has significant experience of working with large numbers of stakeholders and organisations resulting in a large network of pertinent contacts within all areas of academia. Gillian has considerable experience of organising events including international conferences as well as being the local organiser for the largest ever OGF event.

**Dr Steven Young** is the Operations Manager of the Oxford e-Research Centre. He has a background in Electrical Engineering and Computer Science. He has been manager of the Oxford NGS core site since 2004. He is work package leader for Partner and Resource Integration within the current phase of the UK National Grid Service.

**Dr David Meredith** is a software engineer for the UK National Grid Service and a member of the Scientific Computing Technology Group in the STFC e-Science Centre. His background is in computer modelling of geodynamic processes and structural geology. He is a member of the OGF JSDL working group and is co-PI on the OMII-UK funded JSDL portal project. David's main research interests include distributed computing and enterprise systems with application to the sciences. He has five years J2EE (Java Enterprise Edition) development experience and has worked on a number of e-Science and related projects.

**Dr. Shiv Kaushal** has gained experience in Grid computing through his PhD studies at the University of Manchester. These focused on Grid security and fed directly into the GridPP project, GridSite. Shiv offers technical support to NGS users and outreaches to new user communities within the region. He is responsible for running and developing the NGS monitoring system based on the Inca framework, produced by the San Diego Supercomputing Center. He is a member of the successful regional White Rose Grid e-Science Centre and the University of Leeds Distributed Systems & Services Group.

**Dr Peter Oliver** is the Group Leader for the Scientific Computing Technology group within the e-Science Centre and is responsible for ensuring that the computational applications and middleware software stacks are in place to support STFC Facilities (ISIS, Diamond etc) and the wider academic community such as NGS services.

Dr Peter Oliver has 17 years of experience in High Performance Computing and has been involved with the NGS since its conception in 2002. His background is in computational chemistry, parallel code development and systems administration.

The Project team also relies on the expertise of the following individuals who contribute to the successful development and operation of the current NGS and who help to preserve and expand the e-Science knowledge in developing an advanced research skills base in our broad research community: Kevin Haines, Claire Devereux, Matt Viljoen, John Kewley, Jonathon Churchill, Duncan Tooke, Gordon Brown, Keir Hawker, Ming Jiang, Jens Jensen, Mingchao Ma, Jason Lander, Joanna Schmidt, Matt Ford, Simon Collins, Robert Franks, Matteo Turilli and many others who contribute to the success of the NGS.

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### 13. Programme Support

No specific requirements, though the project is happy for the programme manager to participate within the regular meetings.

### 14. Budget

The budget as agreed for the NGS project is attached in Appendix A. The original proposal encompassed a required funding total to continue the NGS service. As funded the NGS has been granted £1M per year for 2 years from JISC and £507,201 per year for 2 years from EPSRC. The budget in Appendix A represents only the apportionment of funding from JISC.

The split in funding between the JISC and EPSRC has been reflected in the NGS workplan as:

- JISC funding covers the operation of and further development of the common, ‘business as usual’ components of the NGS e-infrastructure. This also covers the deployment of and support in adopting, this e-infrastructure within HEIs in the UK.
- EPSRC funding provides support for the development of researches use of new and novel techniques, that will in time filter down as production quality services for consumption by the broader NGS communities across all HEIs

## Detailed Project Planning

### 15. Workpackages

The work packages for NGS phase 3 are detailed in the separate document referred to in Appendix B. A Thematic structure for the work packages has been created under the NGS Management Board to oversee this work process. This is shown below.

NGS Management Board Themes		Work Package(s)	Work Package Leader	Contracted Sites
<b>Management Board</b>	<b>Theme A</b> <i>Service Management (Executive Dir)</i>	JWP1 – Project Management JWP3 – Transition to SLA	Executive Director (Andrew Richards)	<b>STFC</b> Oxford
		JWP4– Accounting and Charge Models	Mike Jones	Leeds <b>Manchester</b>
	<b>Theme B</b> <b>Operations Board</b> <i>(Operations)</i>	JWP2 – Core Services <i>EWPO – Core Service contribution</i>	Operations Manager (Peter Oliver)	Leeds Manchester Oxford

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	<i>Manager)</i>			<b>STFC</b>
	<b>Theme C</b> Liaison (Executive Director)	JWP5a Partnership	Technical Director (David Wallom)	Leeds Manchester <b>Oxford</b> STFC
		JWP5b Training	David Fergusson	<b>Edinburgh</b> All as part of normal site support activities
		JWP5c Outreach	Gillian Sinclair	<b>Manchester</b> All as part of normal site support activities
		JWP6 International Engagement	Neil Geddes	All as part of normal outreach. Overall coordination STFC.
	<b>Theme D</b> Research Development (Technical Director)	EWP1 - OPN EWP4 – Novel User Support Environments	Technical Director (David Wallom)	Leeds Manchester <b>Oxford</b> STFC
		EWP2 – Agile Deployment Environments	David Fergusson	<b>Edinburgh</b> Oxford
		EWP3 –Integrated Infrastructure	Jason Lander	<b>Leeds</b> Manchester STFC

## 16. Evaluation Plan

Timing	Factor to Evaluate	Questions to Address	Method(s)	Measure of Success
Annual report, integrated into NGS site reviews process	Impact of NGS on HEIs	What impact has joining the NGS had on a site/resource provider	1 to 1 site survey	Identified increase in user uptake at institute. Identified increase in inter and intra campus collaboration attributable to NGS joining. Identified cost savings at institute due to use of NGS provided core services. Reported recognition of new research, within HEIs, that has been facilitated by joining the NGS
Annual	User Survey	What impact has the NGS had on	User survey	Increase in collaborative

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		increasing research collaborations, generating new research relying on e-infrastructure, and what e-infrastructure components from the NGS have been important		research projects that directly attribute work to use of the NGS. Need to track citations in papers etc.
Annual	Innovation Forums	Is NGS delivering the services required by users and resource providers	Direct discussion	

## 17. Quality Plan

The NGS service does not primarily develop software. In collaboration with other service providers such as OMII-UK, the NGS primarily aims to take software and deploy into service. However, the requirements to deploy software often necessitate small amounts of software development work. Where software development is required within the NGS, the NGS will aim to produce all such software in line with the following quality plan and to make available the developments to the broader community for adoption or further development.

<b>Output Timing</b>	<b>Quality criteria</b>	<b>QA method(s)</b>	<b>Evidence of compliance</b>	<b>Quality responsibilities</b>	<b>Quality tools (if applicable)</b>
User Documentation	Fitness for purpose	Review and test by independent users	Test report	Project Manager	Word processor
Dissemination papers	Leading edge	Review by external reviewers	Accepted for conference or journal	Authors of paper	Word processor
Design documentation	Fit for purpose	Internal reviews	Signed off by Project Director	Project Director	Word processor, Version control software
Software deliverables	Performs as expected	Code inspections	Integrated into NGS	Project Director	Version control software, Regression test bench
Background info document	Comprehensive and clear	Review by project members	Accepted by project team for publication on project web site	Project Manager	Word processor
Use cases document	All possible configurations covered	Review by project members	Accepted by project team for publication on project web	Project Manager	Word processor

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			site		
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## 18. Dissemination Plan

Timing	Dissemination Activity	Audience	Purpose	Key Message
Annual	NGS Innovation Forum	Current and prospective users, current and prospective resource providers, stakeholders	Annual NGS showcase event to provide engagement with overall NGS community	Disseminate information on current activities, best practices, use case examples and future plans.
Ongoing	Web presence: NGS website with specific documentation and user community specific sections	Users	Support new and continuing use of NGS interfaces	Help is available and responsive
Ongoing	Web presence: NGS website specific section for resource providers	Partners and affiliates	Management of partners and affiliates	NGS offers valuable support for partners
Annual	All Hands Meeting booth	Users and partners	Encourage new users and partners	NGS still exists and continues to develop in conjunction with users requirements
As required Min of 2 per year	Case Studies	Current and prospective users, current and prospective resource providers, stakeholders	Encourage new and existing users, increase awareness of range of possibilities using NGS resources	NGS can offer valuable services for your research
As required by user demand, though on average target at least 1 per month	Presentations at key user community, subject specific, conferences, and road-show events	Potential and existing users	Attract new and continuing users	NGS can offer valuable services for your research
As required by demand, though on average target at least 1 per month	Presentations at key community conferences, e.g. RCUK Grant holders conferences, JISC conference	Policy makers	Gather strategic support for NGS goals	Common infrastructure makes specific investments more effective
Ongoing	WIKI. Driven by user community input and requirements	user community	Foster community and other common developments	Supporting community activities
Monthly	Press releases and news items – working in conjunction with JISC and other outreach activities. Work package JWP5c Outreach provides more details relating to this activity.	Various	Increase visibility and profile of NGS	NGS exists and is valuable

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## 19. Exit and Sustainability Plans

<b>Project Outputs</b>	<b>Action for Take-up &amp; Embedding</b>	<b>Action for Exit</b>
A Portfolio of core NGS services essential to support e-Research activities within the UK.	Business case for JISC service, or service that can be supported via an appropriate business model by HEIs/resource providers/resource consumers directly.	On delivery of core NGS services into a sustained service portfolio, the NGS project would no longer be required. If service is not taken up as a national activity or funded as such, the NGS core services would need to be provided at an individual HEI level and resource providers would need to be informed.
An expanded community of resource providers.	Community engagement activities supported by core services	Resource providers develop ad-hoc individual collaboration and sharing agreements
Best practice guidelines in the operation and use of shared services.	Maintained on website	Incorporated into ongoing service or maintained for 1 year by STFC.
Gateways to international activities.	Standard interfaces become the norm, supported by UK and/or International underpinning services as required	Projects and users informed and required to develop individual ad-hoc relationships with international partners.
Supporting common authentication and authorisation based on institutional infrastructure.	Increase inter-operation with Access Management Federation enabling wider range of institutes to use grid infrastructure.	Institutes rely on Access Management Federation or provide other authentication and authorisation services locally.
Support for cross institutional activities.	Embedded into normal NGS support and training activities. NGS acts as centralised brokering service.	Projects and users informed and required to develop individual ad-hoc relationships
Support Centre.	Part of business case for JISC service	Individual institutes and projects become responsible for supporting their own communities directly
Documentation and Training.	Maintained on website and through regular courses arranged by NeSC	Incorporated into ongoing service or maintained for 1 year by STFC.
Operational security support and coordination for grid systems	Increase interoperation with GridPP and other UK activities e.g ja.net CSIRT under the banner of the UK& Ireland ROC (Regional Operations Centre)	Individual institutes informed. Incorporated into institutes standard operational security procedures.
NGI Services for interfacing to International activities such as the European Grid Infrastructure.	Provide NGI services as required in-line with NGS baseline service provision. Work with providers such as OMII-UK to develop and deliver solutions as and when required.	Individual institutes informed and required to run own services locally to interface to international activities
Detailed service definitions for sustainable infrastructure	Part of business case for JISC service	Individual institutes informed who would need to take individual or collective responsibility for meeting e-

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		infrastructure requirements of their users.
Detailed business case for a sustainable UK National Grid Service.	Part of business case for JISC service	Individual institutes informed who would need to take individual or collective responsibility for meeting e-infrastructure requirements of their users.
Research outputs (from users)	Engage with user communities via NGS outreach, develop case studies, work with appropriate community engagement projects (e.g. current ENGAGE, eIUS, e-Uptake projects). Use these routes to measure impact on research through use of the NGS.	No action required. User communities responsible for finding own research e-infrastructure. No ongoing requirement to measure research output as a result of national services.

Project Outputs	Why Sustainable	Scenarios for Taking Forward	Issues to Address
Core services	Ongoing need for the services to support HEIs, reduce costs for HEIs, facilitate greener computing infrastructure by sharing resources and expertise.	<ul style="list-style-type: none"> <li>Central funding,</li> <li>Direct charging to users, projects, or institutions</li> <li>Self coordinating community</li> </ul>	<ul style="list-style-type: none"> <li>Clear definition of services provided, costs and value to users.</li> <li>Need for central coordination</li> <li>Sustainability of project funding</li> </ul>
Community of resource providers	Benefit to researchers of integrated resources. Also facilitates a framework for resource sharing	<ul style="list-style-type: none"> <li>Self sustaining community - achieved where interfaces and processes are standardised.</li> <li>Central broker or enabler to support and help encourage community formation</li> </ul>	<ul style="list-style-type: none"> <li>Costs</li> <li>sustainability</li> </ul>
International engagement and cross-infrastructure interfaces	Needs of researchers collaborating internationally or accessing international resources	<ul style="list-style-type: none"> <li>National coordinating activity</li> <li>National provider</li> <li>Ad-hoc project based interfaces</li> </ul>	<ul style="list-style-type: none"> <li>Costs</li> <li>Sustainability</li> <li>Requirements from international partners</li> </ul>
Training and outreach	Anticipated ongoing need for up-skilling, awareness raising, and opportunities for coordinated and shared activities	<ul style="list-style-type: none"> <li>Community embedded activities</li> <li>Coordinating activities</li> <li>Central provision</li> <li>Ad-hoc or project based initiatives</li> </ul>	<ul style="list-style-type: none"> <li>Sustainability</li> <li>Costs</li> <li>Duplication and scalability</li> </ul>

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## Appendix A. Project Budget

<b>Directly Incurred Staff</b>	<b>Apr 2009–Mar 2010</b>	<b>Apr 2010–Mar 2011</b>	<b>TOTAL £</b>
15.8 FTE <i>(£80K per institute contribution, including estates and indirect costs, represents JISC 80% contribution under fEC)</i>  Key NGS Staff roles are listed in Appendix C with associated %FTE. Related EGEE earnings and additional NGS contributing staff are also listed.	£1,584,001 <i>(£1,267,200)</i>	£1,584,001 <i>(£1,267,200)</i>	£3,168,002 <i>(£2,534,401)</i>
<b>Total Directly Incurred Staff (A)</b>	<b>1,584,001</b>	<b>1,584,001</b>	<b>£3,168,002</b>
<b>Non-Staff</b>	<b>April 08 – March 09</b>	<b>April 09 – March 10</b>	<b>TOTAL £</b>
Travel and expenses	£100,000	£100,000	£200,000
Core Site Hardware/software operating costs	£150,000	£150,000	£300,000
Dissemination, NGS events and publicity materials	£50,000	£50,000	£100,000
<b>Total Directly Incurred Non-Staff (B)</b>	<b>£300,000</b>	<b>£300,000</b>	<b>£600,000</b>
<b>Directly Incurred Total (A+B=C) (C)</b>	<b>£1,884,001</b>	<b>£1,884,001</b>	<b>£3,768,002</b>
<b>Directly Allocated</b>	<b>April 08 – March 09</b>	<b>April 09 – March 10</b>	<b>TOTAL £</b>
Staff	£ n/a	£ n/a	£ n/a
Estates	£ n/a	£ n/a	£ n/a
Other	£ n/a	£ n/a	£ n/a
<b>Directly Allocated Total (D)</b>	<b>£ n/a</b>	<b>£ n/a</b>	<b>£ n/a</b>
<b>Indirect Costs (E)</b>	<b>£ n/a</b>	<b>£ n/a</b>	<b>£ n/a</b>
<b>Total Project Cost (C+D+E)</b>	<b>£1,884,001</b>	<b>£1,884,001</b>	<b>£3,768,002</b>
<b>Amount Requested from JISC</b>	<b>£1,000,000</b>	<b>£1,000,000</b>	<b>£2,000,000</b>
<b>EPSRC Contribution</b>	<b>£507,201</b>	<b>£507,201</b>	<b>£1,014,402</b>
<b>Institutional Contributions</b>	<b>£376,800</b>	<b>£376,800</b>	<b>£753,600</b>
<b>Percentage Contributions over the</b>	<b>JISC</b>	<b>Partners (inc EPSRC)</b>	<b>Total</b>

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<b>life of the project</b> <b>(Staff FTEs costed at 80/20 fEC)</b>	<b>53 %</b>	<b>contribution)</b> <b>47 %</b>	<b>100%</b>
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## **Appendix B. Workpackages**

See Attached Document – 'NGS-ProjectPlan-September2009().docx'

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## Appendix C. Project Staff Budget Breakdown

Key NGS Staff with associated %FTE.

<b>Project Role</b>	<b>%FTE</b>
Executive Director	1.0
Technical Director	0.5
Outreach Officer	0.5
Project Support	0.5
Support Manager	1.0
Support staff	1.0
Operations Manager	0.3
Security Officer	0.4
Sys Admin/Developer	5.45
Senior Developer	0.5
Technical Developer	0.8
Database Admin/Developer	2
Database Manager	0.1
Certification Authority	0.25
Training Manager	1.0
Training Support	0.5
<b>Total</b>	<b>15.8</b>