What e-Infrastructures Provide for the ERA and What is Needed to Complete the Service Portfolio

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Outline

- e-Infrastructures for the ERA
- Current Challenges
  - eIRG Blue Paper
  - A personal note
- Some experience from the UK

What Do e-Infrastructures Provide?

- Networking
  - GEANT + NRENs
- Distributed Computing
  - EGI + NGIs
- High Performance Computing
  - PRACE +T1's ?
- Open Access publications
  - OpenAIRE + institutional/subject repositories
- Data infrastructures
  - …many …
- Community innovation
  - VRC/VRE/VO
- Value added
  - Authentication, Authorisation, Identity
  - Access from anywhere
- Software !

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What Do e-Infrastructures Provide?

- Common ESFRI RI Issues
  - Access to remote and/or istributed infrastructures
  - Broadening exploitation
  - Data, data, data
- Common Framework/Language to underpin ERA
  - Enfranchising researchers across Europe
- Focus and channel for multi-National Cooperation
  - N discussions rather than N**2
- Cooperation beyond Europe
  - ALICE, EUMEDCONNECT, TEIN2 …
  - EU-India-Grid, EUMEDGRID, EELA…
- Opportunities for leading researchers at scales beyond the reach of single countries
  - Wherever they are

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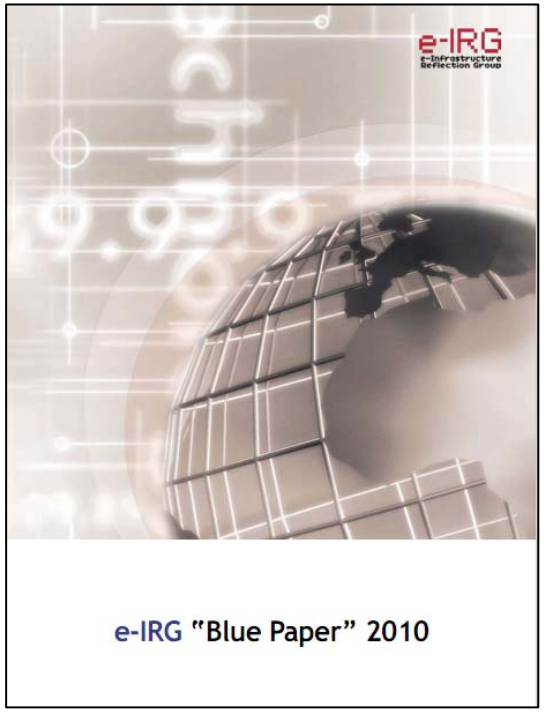
2010 “Blue Paper”

- Examine ways in which ESFRI Research Infrastructures (RI) and their users can engage and exploit common e-Infrastructure services to satisfy their requirements.
  - An assessment of Europe’s e-Infrastructure service portfolio,
  - Identifies the opportunities and challenges involved



- e-Infrastructure Service Areas

  Networking, Authentication, Authorisation and Accounting, Grid, Cloud and Virtualisation, High Performance Computing, Remote Access and Remote Instrumentation, Data infrastructures and persistent storage, Virtual Research Communities and collaboration, Generic Issues

Executive Summary - 1

- Benefits from a common e-Infrastructure:
  - avoiding diverting resources for research into ad-hoc basic ICT service provision
  - avoiding unnecessary duplication in provision of ICT solutions
  - leveraging existing expertise and experience
  - facilitating the integration and interoperation of different communities and RI
  - broadening engagement across Europe and internationally
  - encouraging and supporting open research and innovation

Executive Summary - 2

- Key themes to encourage the exploitation of fit-for-purpose common e-infrastructure:
  - There must be co-evolution of Research Infrastructures, e-Infrastructure and user requirements.
  - Collaboration between RI and e-Infrastructures should be actively supported at all levels, to their mutual benefit.
  - service-oriented delivery models
  - ICT technology will continue to develop rapidly.
  - E-Infrastructure tools and resources must be developed in a global context

Generic Issues

- **Business and Governance Models** [and the need for users] to play a bigger role in the governance and management of the e-Infrastructures
  - Strategic. Operational, and standardization
- **Digital Divide** issues and role of EC co-funding
- **New User Induction** and training
- **Cost Effectiveness**
- **Green IT**
- **Software**
  - exploiting the multi-cored and multi-CPU Competitiveness

Conclusions (from the Blue Paper)

- **Co-evolution of Research Infrastructures, e-Infrastructure and user requirements; Active and direct user engagement**
- **Internationalisation of Research**
- **Exploitation of available services; Service orientation; Sustained Innovation**
- **Next steps**
  - encourage and directly support engagement across user, developer and provider communities.
  - Identify and address barriers to this
  - Address European E-infrastructure Forum short term actions.
  - Follow up the generic issues identified

What is Needed to Complete the Service Portfolio ?

- We still have a long way to go with data
  - Long list of recommendations DMTF ➔
  - Data integration and access framework
    - Break out of community silos
  - Connection to publication

data.gov.uk BETA
Opening up government

DATA.GOV
EMPOWERING PEOPLE

- UK Government requiring increasing availability
  - Principles on data management and sharing
  - Innovators drive development
  - Need for improved management drives a “market”

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What is Needed to Complete the Service Portfolio ?

- Improve what exists
  - Must deliver real research benefits
  - Better integration (user perspective)
  - e.g. as yet no single, or integrated set of AAA tools
- Deploy and exploit all the things we haven't thought of yet
  - Translation of tools/practices/innovations
  - Innovation in the user communities
- User engagement essential
  - This is a two way process

The Experience from STFC

- Range of Facilities with common requirements
  - Neutrons and Photons …
  - Computing, data, publications, user management
- E-Science Centre to “e-enable” them
  - Fund core developments and capabilities
  - Initially ring fenced funding, increasingly less so
  - External advice -> Facilities Board
- Fund the “capability”
  - Facilities fund the capacity
    - Through the e-Science Centre or directly
  - Continued R&D through competitive funding
- Build on the track record
  - PaNdata (http://www.pan-data.eu/)

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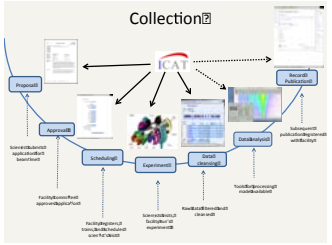
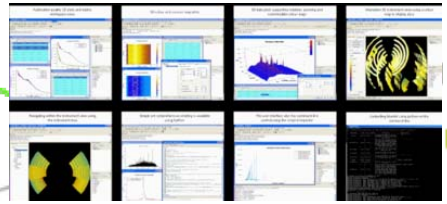
STFC e-Science facilities

- Networking
  - Integrated into NREN
- Computing
  - Facilities integrated into NGI
  - PRACE
- Data
  - Storage and Curation
  - Integrated Management
- Publications
  - Institutional repository
- VRC/VRE





UNITE YOUR RESEARCH WITH ICAT

Concluding Remarks

- We have a long way to go with data
- There is no single organizational model that works for everything or everyone
- User requirements + technical expertise ->opportunity

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Blue Paper

Recommendations on specific areas…

Networking

- Recognise new RI as ‘innovation engines’ in research network evolution, and encourage them to engage with this role by defining, testing and using new networking services
- Encourage RI to participate in networking coordination bodies to secure an ongoing exchange of information on the development of advanced networking services
- Encourage advanced users and research network providers to ensure that national and European authorities support appropriate governance and financial models

Authentication, Authorisation and Accounting

- Accelerate the process of the continued integration of different identity technologies, through supporting the active collaboration between the IGTF, GÉANT and relevant European and international working groups.
- Continue to improve national infrastructures and their alignment with agreed standard procedures for identity management and assurance.
- Require that, wherever possible, future pan-European e-Infrastructure and ESFRI RI projects define their access control policies and mechanisms from the beginning, in accordance with the standards and best practices adopted by the community.

Grid, Cloud and Virtualisation

- Promote collaboration among grid and cloud infrastructure providers and users to raise awareness of the range of available technologies and how to best use them
- Encourage RI to inform NGIs and EGI.eu of their technical requirements and provide feedback on existing and future services, with a focus on requirements and services rather than technologies
- Support organisational models that encourage the RI community to engage with the management structures of the NGIs, EGI, and related activities such as EMI and IGE

High Performance Computing

- Improve understanding of the specific requirements of the research community (the “science case”), and the broader economic needs in terms of driving future requirements for the largest HPC systems
- Support the development of a balanced HPC ecosystem that integrates resources at a range of scales matched to user requirements
- Promote specific enabling activities, such as scalable software development and user training, to ensure efficient usage of HPC resources

Remote Access and Remote Instrumentation

- Encourage RI and sensor networks to connect to the wider networked world using standard interfaces, either directly, or indirectly, through the existing e-Infrastructure
- Formalise the responsibility of European RI to support remote users
- Champion the user- and broader societal perspective for development and deployment of new RI and sensor networks

Data infrastructures and persistent storage

- Identify and promote common (long-term) data-related services across different RI
- Encourage, through policy and facilitation, community practises and standards that assist researchers in exploiting multiple data resources, within and across disciplines
- Raise awareness of the responsibilities set by the Toronto statement, INSPIRE directive, and similar initiatives

Virtual Research Communities and collaboration

- Build VRCs by fully exploiting the benefits of the ERA and integrating a stimulating mixture of the involved organisational entities. Multidisciplinary and/or PPP VRCs are recommended
- Ensure VRC developments are incremental and application- and challenge-led
- Exploit the educational and innovation potential of VRC tools developed and deployed by research communities.

Overview: scientific data e-Infrastructure