Workprogramme 2014-15 e-Infrastructures

DCH-RP final conference
22 September 2014

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DG CONNECT
European Commission

European Commission

e-infrastructure

DEVELOPMENT AND DEPLOYMENT OF E-INFRASTRUCTURES AND SERVICES FOR RESEARCH

Jason de Caires Taylor,
underwater statue, Cancun Mexico
http://www.underwatersculpture.com/

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Vision

Approach

Transversal

- Cutting across disciplines and sectors

Support tomorrow's science

- Open science, open access, best solutions

Enabling innovation

- Developing and testing innovative solutions
- Servicing industry and SMEs
- Spinning out technologies

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DRIVERS for change

- MORE COMPUTING POWER
- BIG DATA
- GLOBAL CONNECTIONS
- GLOBAL PARTICIPATION
- OPEN IS BETTER
  - WITHIN AND BETWEEN SCIENTIFIC COMMUNITIES
  - BETWEEN SCIENCE AND SOCIETY

CHALLENGES

- Need for long term perspective
  - Operational continuity
  - Sustainability
- Efficient and effective use of national and EU funding
- Resolving strategic, policy, legal, technical, financial and governance issues
- Innovation as a priority
  - Support SMEs
- Support to Horizon 2020

FET
Human Brain Project,...

LEIT
Big Data in ICT,...

Societal Challenges

SC1
Research on Alzheimer

SC2...

SC3
Earth observation

SC4, SC5, ...

e-Infrastructure to support:

- Research under Horizon 2020
- Open Access policy
- Open Data pilot
- Data Management Planning
- ...

e-Infrastructure integrates resources and services...

- Networking
- Computing
- Data
- Software
- User interfaces

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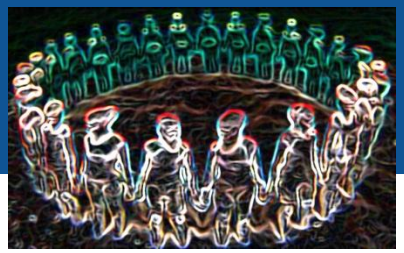
Research Infrastructures in Horizon 2020

	Developing the European research infrastructures for 2020 and beyond		
	Developing new world class RI	**Integrating and opening existing national RI of pan-European interest**	**Development, deployment and operation of ICT based e-Infrastructures**
Fostering the innovation potential of Ris and their human capital			
Reinforcing European RI policy and international cooperation			

Matrix approach to implementation



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RESEARCH INFRASTRUCTURE (DRAFT)
Work Programme 2014-2015

CALL 1
DEVELOPING NEW WORLD CLASS INFRASTRUCTURES

- DESIGN STUDIES
- SUPPORT TO PREPARATORY PHASE OF ESFRI PROJECTS
- SUPPORT TO THE INDIVIDUAL IMPLEMENTATION AND OPERATION OF ESFRI PROJECTS
- SUPPORT TO THE IMPLEMENTATION OF CROSS-CUTTING INFRASTRUCTURE SERVICES AND SOLUTIONS FOR CLUSTER OF ESFRI AND OTHER RELEVANT RESEARCH INFRASTRUCTURE INITIATIVES IN A GIVEN THEMATIC AREA

CALL 2
INTEGRATING AND OPENING RESEARCH INFRASTRUCTURES OF PAN-EUROPEAN INTEREST

- INTEGRATING AND OPENING EXISTING NATIONAL AND REGIONAL RESEARCH INFRASTRUCTURES OF PAN-EUROPEAN INTEREST

CALL 3
E-INFRASTRUCTURES

- MANAGING, PRESERVING AND COMPUTING WITH BIG RESEARCH DATA
- E-INFRASTRUCTURES FOR OPEN ACCESS
- TOWARDS GLOBAL DATA E-INFRASTRUCTURES: RESEARCH DATA ALLIANCE
- PAN-EUROPEAN HIGH PERFORMANCE COMPUTING INFRASTRUCTURE AND SERVICES
- CENTRES OF EXCELLENCE FOR COMPUTING APPLICATIONS
- NETWORK OF HPC COMPETENCE CENTRES FOR SMES
- PROVISION OF CORE SERVICES ACROSS E-INFRASTRUCTURES
- RESEARCH AND EDUCATION NETWORKING – GEANT
- E-INFRASTRUCTURES FOR VIRTUAL RESEARCH ENVIRONMENTS (VRE)

CALL 4
SUPPORT TO INNOVATION, HUMAN RESOURCES, POLICY AND INTERNATIONAL COOPERATION FOR RESEARCH INFRASTRUCTURES

- INNOVATION SUPPORT MEASURES
- INNOVATIVE PROCUREMENT PILOT ACTION IN THE FIELD OF SCIENTIFIC INSTRUMENTATION
- STRENGTHENING THE HUMAN CAPITAL OF RESEARCH INFRASTRUCTURES
- NEW PROFESSIONS AND SKILLS FOR E-INFRASTRUCTURES
- POLICY MEASURES FOR RESEARCH INFRASTRUCTURES
- INTERNATIONAL COOPERATION FOR RESEARCH INFRASTRUCTURES
- E-INFRASTRUCTURE POLICY DEVELOPMENT AND INTERNATIONAL COOPERATION
- NETWORK OF NATIONAL CONTACT POINTS

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INTEGRATED e-INFRASTRUCTURE SERVICES

VRE

E-INFRASTRUCTURES FOR VIRTUAL RESEARCH ENVIRONMENTS (VRE)

PROVISION OF CORE SERVICES ACROSS E-INFRASTRUCTURES

DATA

COMPUTING

NETWORK OF HPC COMPETENCE CENTRES FOR SMES

MANAGING, PRESERVING AND COMPUTING WITH BIG RESERACH DATA

RESEARCH AND EDUCATION NETWORKING – GEANT

CENTRES OF EXCELLENCE FOR COMPUTING APPLICATIONS

E-INFRASTRUCTURES FOR OPEN ACCESS

CONNECTIVITY

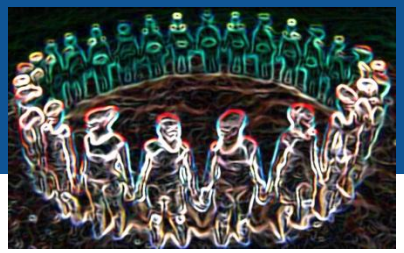
PAN-EUROPEAN HIGH PERFORMANCE COMPUTING INFRASTRUCTURE AND SERVICES

TOWARDS GLOBAL DATA E-INFRASTRUCTURES RESEARCH DATA ALLIANCE

SUPPORT

E-INFRASTRUCTURE POLICY DEVELOPMENT AND INTERNATIONAL COOPERATION

NEW PROFESSIONS AND SKILLS FOR E-INFRASTRUCTURES



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INTEGRATED
e-INFRASTRUCTURE
SERVICES
across...

Industry

Automotive

Oil and gas

Pharmaceuticals

Smart cities

Health

Climate change

Physics

Social sciences

... ...

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Call 3 Topic 1: Managing, preserving and computing with big research data

MANAGING, PRESERVING AND COMPUTING WITH BIG RESERACH DATA

Challenges:

- **Capacity increase** to manage, store and analyse extremely large, heterogeneous and complex **research datasets**, including text mining of large corpora
- Integrated, secure, permanent, on-demand service-driven, privacy-compliant and **sustainable e-infrastructures incorporating advanced computing resources and software**
- **Provision of services** cutting across a wide-range of scientific communities and addressing diverse of computational requirements
- **Legal constraints and requirements**, system and service architectures, formats, types, vocabularies and legacy practices of scientific communities

CLOSED

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Call 3 Topic 1: Managing, preserving and computing with big research data

MANAGING, PRESERVING AND COMPUTING WITH BIG RESERACH DATA

Scope:

- A federated **pan-European data e-infrastructure**
  - cost-effective and interoperable solutions for data management and long term preservation
- **Services** for quality and reliability
  - including certification mechanisms and services
- Federating data management and curation tools and services
  - on the basis of an **open architecture**
  - support development of **Data Management Plans**
- Large scale virtualisation of data/compute centre resources
- Support to **European Grid Infrastructure** to achieve
  - long-term sustainability of grid infrastructures in Europe
  - added value to NGI's

CLOSED

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Call 3 Topic 1: Managing, preserving and computing with big research data

MANAGING, PRESERVING AND COMPUTING WITH BIG RESERACH DATA

… scope:

Proof of concept & prototypes of data infrastructure- enabling software

- extremely **large** or highly **heterogeneous data** sets
- e.g. for databases or data mining

Enabling aggregation of content for textual analysis

- Platform for **text mining**, analytics, visualisation
- Consulting and counselling services on the legal framework and permissions to text mine collections

PaaS platform — ***platform as a service***

- Long-tail communities regard IaaS as too time consuming with uncertain benefit
- PaaS level of abstraction reduces the learning curve and provides an easier and powerful tool
- Building on today's e-infrastructures including EGI and cloud providers
- Probable candidates: running PaaS implementations and other developed under FP7

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Conditions for the Managing, Preserving and Computing with Big Research Data to

MANAGING, PRESERVING AND COMPUTING WITH BIG RESERACH DATA

- Type of action:
  - Research and Innovation Action
- Call 3 – e-Infrastructures
- Deadline for the submission of proposals:
  - 02/09/2014
- Overall budget: **55** M€

CLOSED

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Call 3 Topic 5: Centres of Excellence for Computing applications

CENTRES OF EXCELLENCE FOR COMPUTING APPLICATIONS

Challenges

Establish a limited number of user-centred Centres of Excellence (CoE) in the application of HPC for addressing scientific, industrial or societal challenges. They may be thematic, transversal or challenge driven.

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The CoE's are expected to be:

- **User-driven**, with the application users and owners playing a decisive role in governance
- **Integrated**: encompassing not only HPC software but also relevant aspects of hardware, data management/storage, connectivity, security, etc.
- **Multidisciplinary**: with domain expertise co-located alongside HPC system, software and algorithm expertise
- **Distributed** with a possible central hub, **federating capabilities** around Europe, exploiting available competences, and ensuring **synergies** with national/local programmes

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Proposals for CoEs will provide pan-European services such as:

CENTRES OF EXCELLENCE FOR COMPUTING APPLICATIONS

- **consultancy** to industry and SMEs
- developing, optimising and scaling HPC application **codes towards peta and exascale** computing
- testing, validating and maintaining codes and managing the associated data
- quality assurance
- **co-design** of hardware, software and codes
- **research** in HPC applications
- addressing the **skills gap** in computational science

CLOSED

They will aim at:

- synergy with **exascale** R&D through **co-design**
- Sustainability by clear **business plans**
- **creating communities** around specific **codes** that impact the target sectors, involving ISVs, and exchange of **best practices** in particular for SMEs
- a governance structure driven by the needs of the **users**
- commercial **management expertise**

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Applications

Example application/thematic areas

CENTRES OF EXCELLENCE FOR COMPUTING APPLICATIONS

- Medicine & life sciences
- Biology, genomics and drug discovery
- Weather, climate & solid earth sciences
- Industrial applications & engineering
- Materials science, chemistry and nanoscience
- Astrophysics, high-energy physics and plasma physics

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Other examples might be oriented around **societal/industrial challenges**, such as 'personalised health/medicine', 'cleaner production', 'safer car', 'smart cities' …

…or around **industry sectors** like pharma, automotive, oil and gas …

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Expected Impacts

CENTRES OF EXCELLENCE FOR COMPUTING APPLICATIONS

- Improved access to computing applications and expertise
- Improved competitiveness for companies and SMEs
- European leadership in applications that address societal challenges and/or industrial applications
- More scientists and engineers trained

International co-operation is encouraged where there are clear mutual benefits and the partners have the relevant HPC capacity

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Conditions for the Centres of Excellence topic:

CENTRES OF EXCELLENCE FOR COMPUTING APPLICATIONS

- Type of action:
  - Research and Innovation Action
- Call 3 – e-Infrastructures
- Deadline for the submission of proposals:
  - 14/01/2015
- Overall budget: **40 M€**
- **8-10 CoEs are expected to be funded**
  - Follow up Call is expected in the future
- Indicative budget per proposal: **4 -5M€**

CLOSED

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Call 3 Topic 9

Virtual Research Environments - VRE

E-INFRASTRUCTURES FOR VIRTUAL RESEARCH ENVIRONMENTS (VRE)

- VREs are… groups of researchers, typically **widely dispersed**, who are **working together** through ubiquitous, trusted and **easy access to services** for **scientific data, computing and networking** in a collaborative, **virtual** environment: the e-Infrastructures

- **Characteristics:**

  - Address the needs of **specific scientific communities** – in support of e-Science;
  - Have users from **both academia and industry**;
  - Involve bottom-up research and develop **user-oriented services**;
  - Are based on **e-infrastructures**

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Call 3 Topic 9: Virtual Research Environments - VRE

E-INFRASTRUCTURES FOR VIRTUAL RESEARCH ENVIRONMENTS (VRE)

Specific Challenge:

Capacity building in interdisciplinary research through community-led development and deployment of service-driven digital environments for large-scale cross-disciplinary research collaboration and data interoperability

Expected Impact:

- **More effective collaboration** between researchers and increased take-up of collaborative research by new disciplines
- Easier discovery, access and re-use of data, resulting in **higher productivity** of researchers
- **Accelerate innovation** via access to integrated digital research resources across disciplines

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Call 3 Topic 9: Virtual Research Environments - VRE

E-INFRASTRUCTURES FOR VIRTUAL RESEARCH ENVIRONMENTS (VRE)

Scope:

- Integration of resources **across all layers of the e-infrastructure** (networking, computing, data, software, user interfaces) → cross-disciplinary data interoperability
- Requirements from real use cases → integrate heterogeneous data from multiple sources and **re-use tools and services** from existing infrastructures
- Target: any area of Science and Technology, especially **interdisciplinary** ones
- **Standardised** building blocks and workflows, well-documented interfaces and interoperable components
- Define **semantics, ontologies and metadat**a to enable data citation and promote data sharing, to ensure interoperability
- **Easy-to-use functionalities**

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E-INFRASTRUCTURES FOR VIRTUAL RESEARCH ENVIRONMENTS (VRE)

Conditions for the VRE topic:

- Type of action:
  - Research and Innovation Action
- Call 3 – e-Infrastructures
- Deadline for the submission of proposals:
  - 14/01/2015
- Overall budget: **42** M€
- Indicative budget per proposal: **2 – 8 M€**

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HOW TO BRIDGE THE GAP BETWEEN SCIENCE AND ICT?

New professions and skills for e-infrastructures

Coordination and Support Action

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HOW TO BRIDGE THE GAP BETWEEN SCIENCE AND ICT?

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Call 4 Topic 4:New professions and skills for e-infrastructures: Challenges

NEW PROFESSIONS AND SKILLS FOR E-INFRASTRUCTURES

Specific Challenges:

- Researchers, university professors and students need adequate **support in computing and networkin**g, as well as in handling, analysing and storing large amounts of digital content.
- **Education programmes** for the emerging professions of **e-infrastructure operators, research technologists, data scientists or 'data librarians'** need to be defined and developed
- **Professional recognition** of these communities and the development of appropriate curricula, training and skills are crucial to ensure effective services to institution staff and students.
- **Wider opportunities for training** of these communities need to be offered

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Call 4 Topic 4:New professions and skills for e-infrastructures: Challenges

NEW PROFESSIONS AND SKILLS FOR E-INFRASTRUCTURES

Scope:

- Defining/updating a **university curricula** for e-infrastructure
- **Training programmes** for e-infrastructure professionals
- Establishment of these professions as d**istinct professions**
- Networking and **information sharing** among e-infrastructure operators
- **Awareness raising** and promotion of e-infrastructures community champions

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Call 4 Topic 4:New professions and skills for e-infrastructures: Challenges

NEW PROFESSIONS AND SKILLS FOR E-INFRASTRUCTURES

Impact:

- The number of education institutions offering **degrees** for e-infrastructure experts, research technologists, data scientists and data librarians should **increase**.
- Graduates and practitioners in these fields should gain **access to degrees**, programmes, information sharing tools and training opportunities to improve their skills.
- The number of individuals **able to design, develop and maintain** e-science tools and services as well as to support researchers with computational and data expertise, should **increase significantly.**

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Call 4 Topic 4:New professions and skills for e-infrastructures: Challenges

NEW PROFESSIONS AND SKILLS FOR E-INFRASTRUCTURES

Conditions for the topic:

- Type of action:
  - **Coordination and Support Action**
- Call 4 – Support to Innovation, Human resources, Policy and International cooperation
- Deadline for the submission of proposals:
  - **14/01/2015**
- Overall budget: **2.5 M€**

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Conditions for the Call on e-Infrastructures:

Specific conditions :

- Proposals should be structured around **Networking, Service and Joint Research Activities**
- The **Software** to be developed needs to be **open source**
- A **Data Management Plan** to be developed enabling data preservation, on-line discoverability, authorisation and re-use of data
- Clear **Metrics (KPIs)** to be proposed and used;
- **Open Access to Publications** resulting from the project;
- Usefulness of services to the end user community and financial **sustainability** to be ensured;

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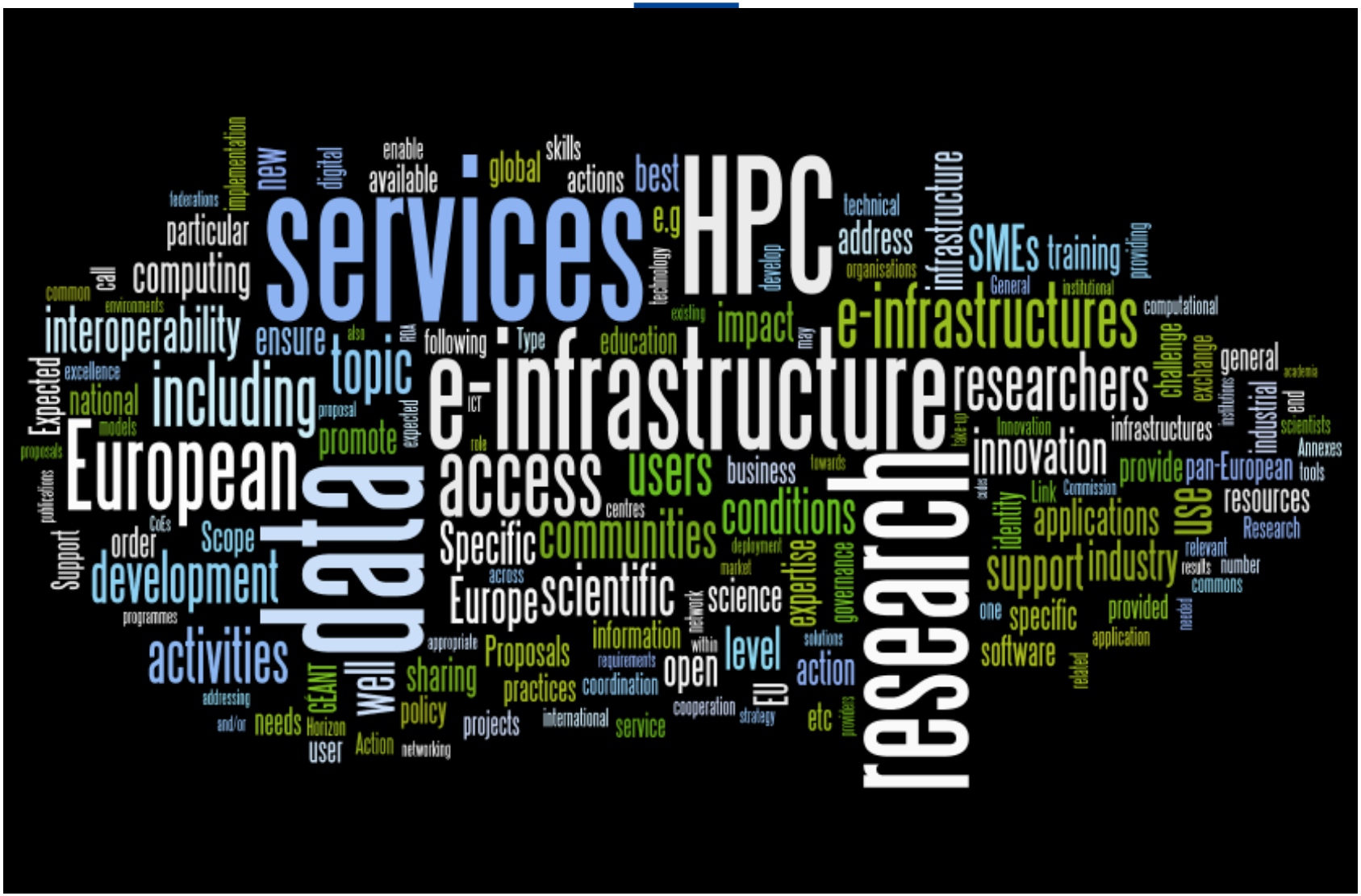
Where should the emphasis be?

- Services
- Thinking innovation
  - With both suppliers or users
- Mainstreaming skills development
- Integration between data and computing
- Business plans for financial sustainability
  - …and partnerships with the private sector
- Supporting policies
- open data and software
- Sharing basic operations services and building blocks
- Monitoring performance (KPIs)

IN SUMMARY…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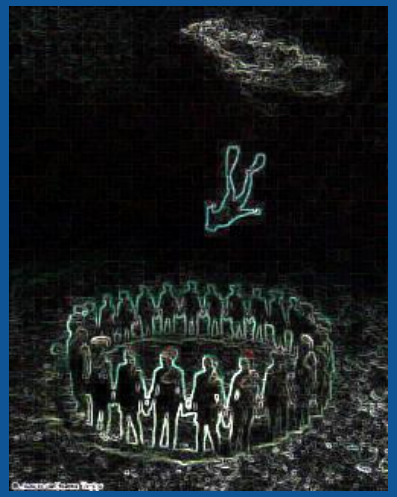
THANK YOU



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