

e-Infrastructures in Horizon 2020

e-Infrastructures for data and computing



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European Commission – DG CONNECT

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 &
operation of ICT-
based e-
Infrastructures

**Fostering the innovation potential
of RIs and their human capital**

**Reinforcing European RI policies and
international cooperation**

Matrix approach to implementation



e-infrastructure approach in Horizon 2020

Transversal

Cutting across disciplines and sectors

Support tomorrow's science

Open science, open access, best solutions

Enabling innovation everywhere

Developing and testing innovative solutions

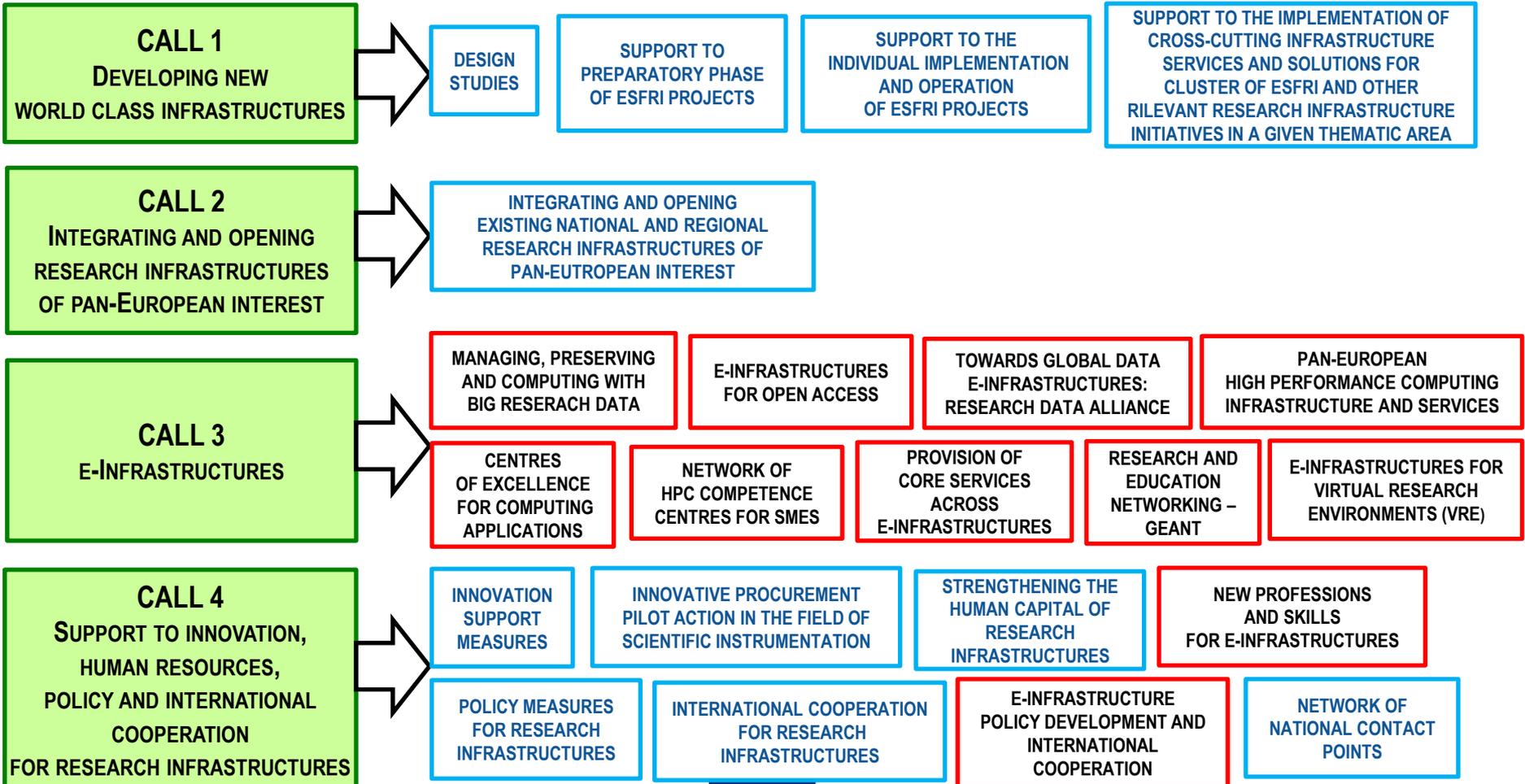
Servicing industry and SMEs

Spinning out technologies

Skills development across all actions

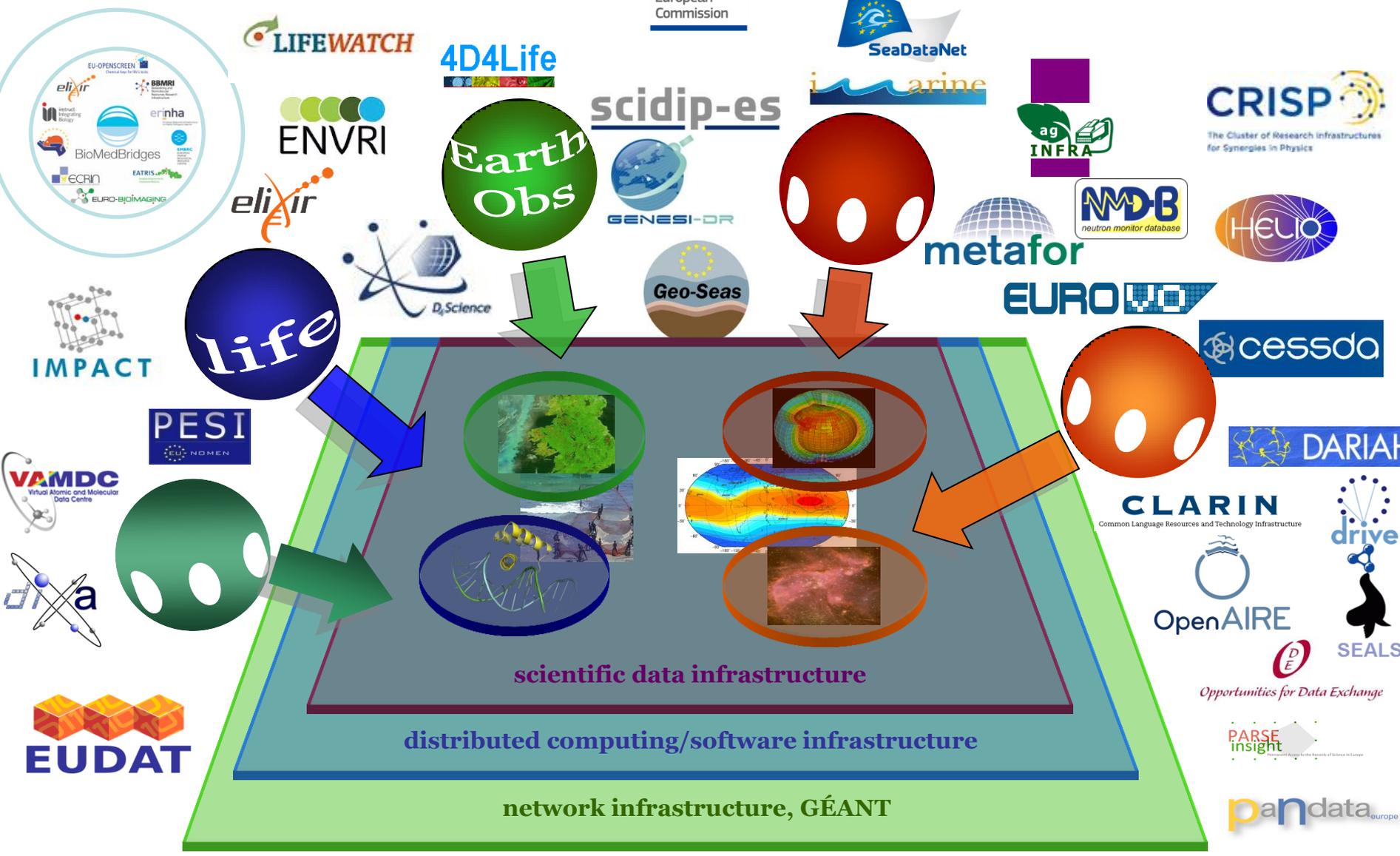


RESEARCH INFRASTRUCTURE Work Programme 2014-2015



Examples of past (FP7) work on computing and data e-infrastructures

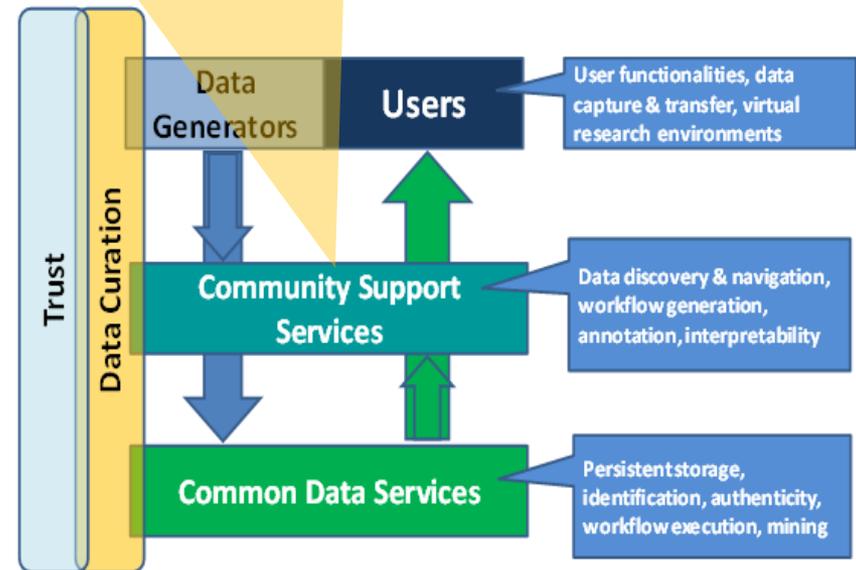
Data e-infrastructure in FP7 bridging islands



Implementing interoperable data infrastructures

- (a) **data generators**; research projects, big research infrastructure, installations or medium size laboratories, simulation centres, surveys or individual researchers
- (b) **discipline-specific data service providers**, providing data and workflows as a service
- (c) **providers of generic common data services** (computing centres, libraries)
- (d) **researchers as users**, using the data for science and engineering

community driven data infrastructure, including ESFRI, ESFRI clusters and others



Open. Share. Re-use.

Science. Set Free. ■

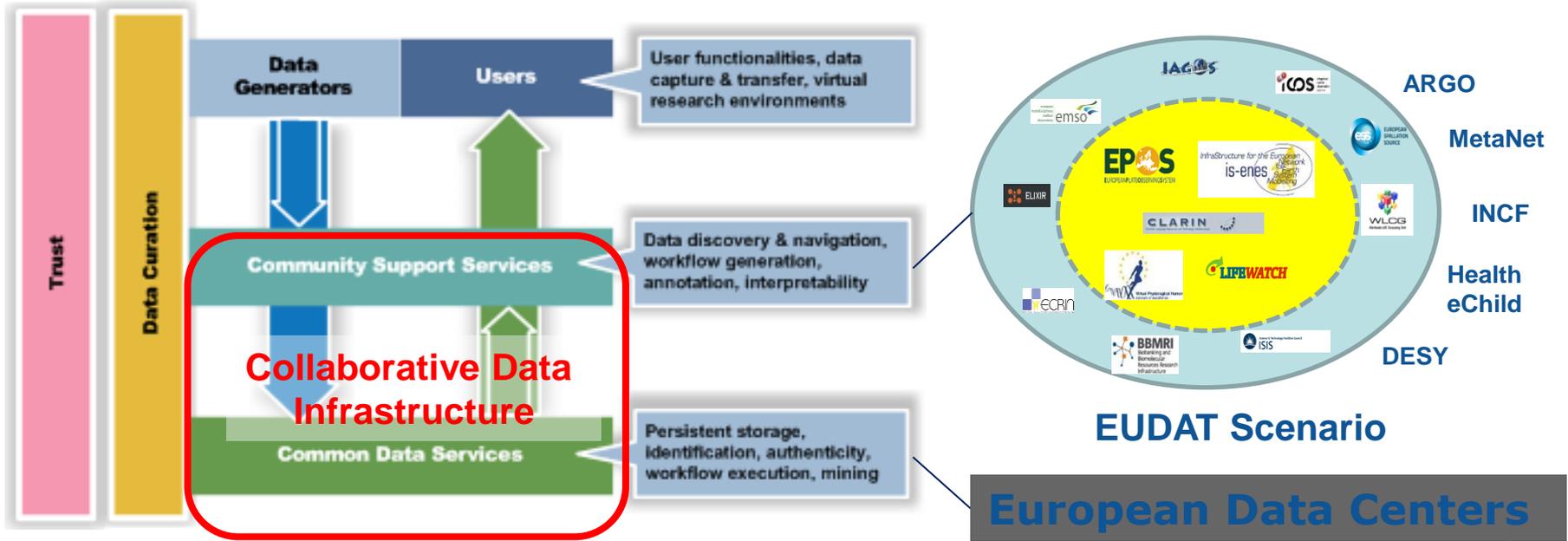
Research results. Linked.



OpenAIRE

Open Access Infrastructure for Research in Europe

Data driven research across disciplinary and geographical boundaries
 Register relevant data objects stored in certified repositories
 Virtually integrate data objects in trusted federations
 Foster advancements in interoperability of object content
 Fragmentation and heterogeneity of data require standardization vs.
 innovation dynamics



launched 18 March



Research Data Alliance: Common Infrastructure, Policy and Practice Drives Data Sharing and Exchange throughout the Data Life Cycle

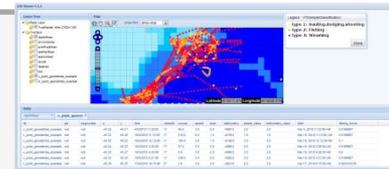


From Prof. Fran Berman and Prof. John Wood, Members of the RDA Council

community-driven data e-infrastructures



- * Vessel Activity Analysis
- * Biological Niche Modeling
- * Fishery Country Profile Product
- * Global Catch Statistics Quality Improvement
- * ...



Simplified access and exploitation of tools for data analysis and processing

harmonization, aggregation, access to heterogeneous, multi-disciplinary and multi-format data

GEOSeas



EMODNET



GENESI-DR



GBIF



community-driven data e-infrastructures



The **Virtual Observatory** is a community-led response to the challenges the astronomical community faces in data management and storage.



VO DataScope Query

Hosted by:
HEASARC
NASA/GSFC

NVO Home
Help
VO Tools and Services
NVO Feedback

Query VO resources for a given region of a sky

Note: DataScope V2.1 released March 26, 2007 (many cosmetic changes and some bug fixes)

What do we know about a given point or region in the sky?

To find out, just enter a target or position. The NVO DataScope will show you the results from hundreds of resources.

Position:
Use a target name (e.g., 3c273) or position (e.g., 10 10 10.1, 20 20 20.2)

Size: (in degrees, max is 2)

Run query:

Skip cache? Refresh registry?

Do not add to list of recent queries?

Some recent queries:

- [CGCG 456-050 \(0.25\)](#)
- [30 dor \(0.25\)](#)
- [186.66, -63.13 \(0.0833\)](#)
- [VCC 2062 \(0.25\)](#)
- [M87 \(0.25\)](#)

Positions may be entered in decimal (dd.f, sdd.f) or sexagesimal (hh mm ss.f, dd mm ss.f) notation or as targets recognized by NED or SIMBAD.

The **Size** should be entered in decimal degrees.

Data found(143)
No data (356)
Errors(24)
Waiting(0)
100% complete

Position:m1
Resources/hits: 523/36295

Summary
Resources
Data Table
No Data
Still Processing
Errors

Data for 2nd Digitized Sky Survey (Blue)

Quick Links: [ASCII](#) | [MetaData](#) | [XML](#) | [VOPlot](#) | [Overlay](#)

<input type="checkbox"/>	All	Survey	Ra	Dec	Dim	Size	Scale
1.	<input type="checkbox"/> View	FOV dss2b	05 34 32.0	22 00 52.1	300 300	0.25 0.25	-8.333333333333334E-4 8.333333333333334E-4
2.	<input type="checkbox"/> View	dss2b	05 34 32.0	22 00 52.1	300 300	0.25 0.25	-8.333333333333334E-4 8.333333333333334E-4
3.	<input type="checkbox"/> View	FOV dss2r	05 34 32.0	22 00 52.1	300 300	0.25 0.25	-8.333333333333334E-4 8.333333333333334E-4
4.	<input type="checkbox"/> View	dss2r	05 34 32.0	22 00 52.1	300 300	0.25 0.25	-8.333333333333334E-4 8.333333333333334E-4
5.	<input type="checkbox"/> View	FOV dss2r	05 34 32.0	22 00 52.1	300 300	0.25 0.25	-8.333333333333334E-4 8.333333333333334E-4
6.	<input type="checkbox"/> View	dss2r	05 34 32.0	22 00 52.1	300 300	0.25 0.25	-8.333333333333334E-4 8.333333333333334E-4

Hosted by the Astrophysics Science Division and the High Energy Astrophysics Science Archive Research Center (HEASARC)

HEASARC Director: Dr. Nicholas E. White,

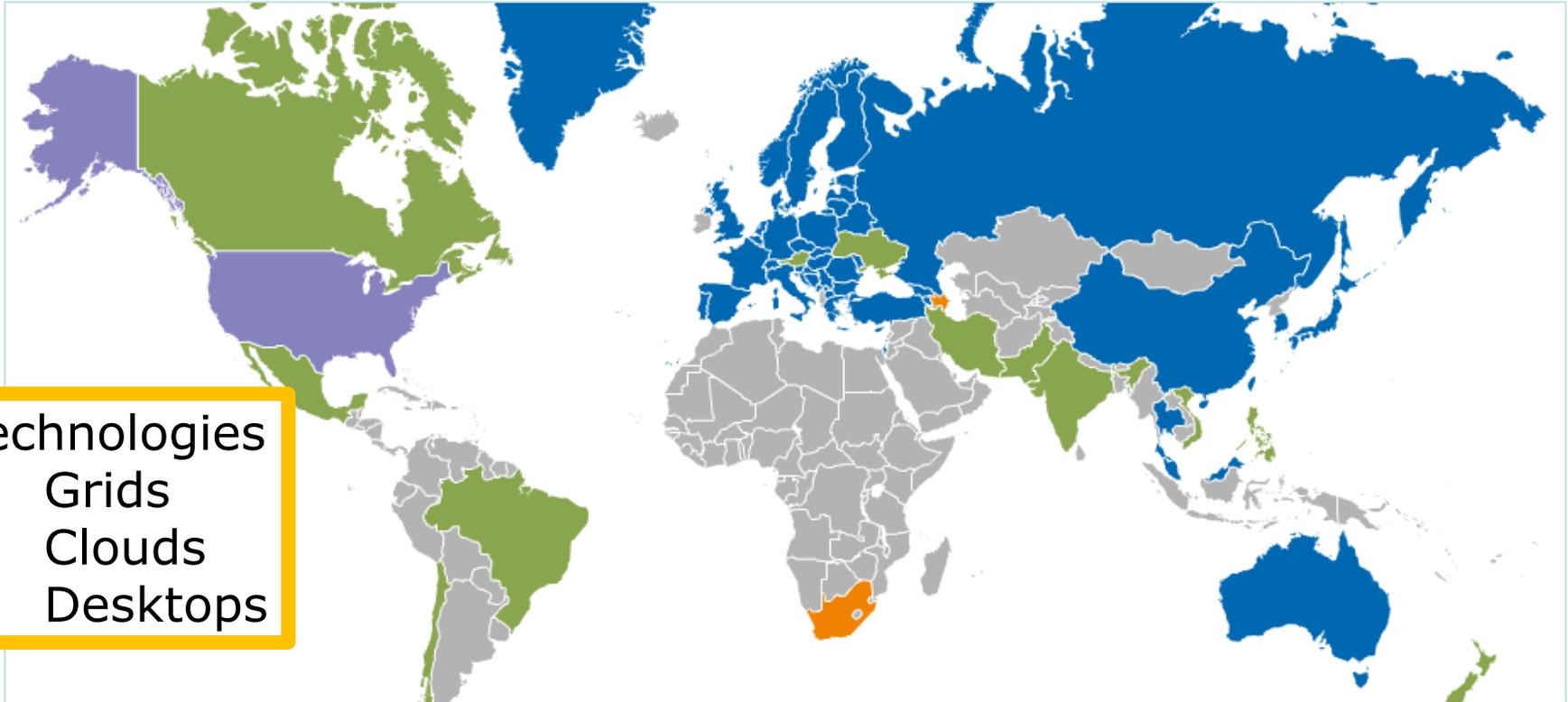
HEASARC Associate Director: Dr. Roger Brissenden,

Responsible NASA Official: Phil Newman

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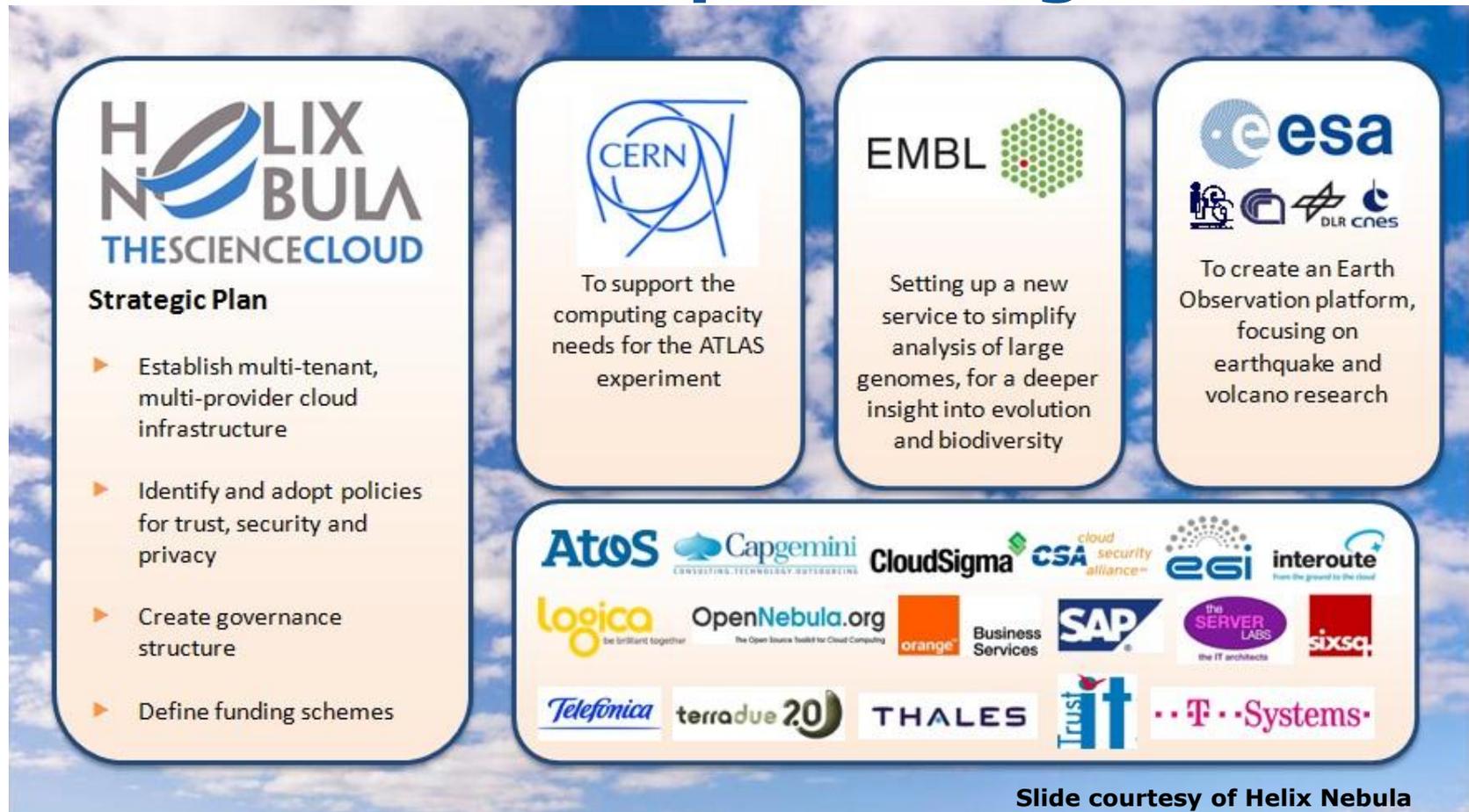


The European Grid Infrastructure today



From 14 regional to 34 operations centres in 53 countries
From 188,000 jobs/day with 80,000 cores on 250 Resource Centres
to 1,200,000 jobs/day with 430,000 cores on 337 Resource Centres

A European Cloud Partnership: big science teams up with big business



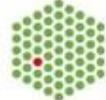


Strategic Plan

- ▶ Establish multi-tenant, multi-provider cloud infrastructure
- ▶ Identify and adopt policies for trust, security and privacy
- ▶ Create governance structure
- ▶ Define funding schemes



To support the computing capacity needs for the ATLAS experiment



Setting up a new service to simplify analysis of large genomes, for a deeper insight into evolution and biodiversity



To create an Earth Observation platform, focusing on earthquake and volcano research



Computing and data infrastructure in WP 2014-2015

Public Consultation on Research Data Infrastructures

closed 27/3/2013

ec.europa.eu/digital-agenda/en/content/consultation-research-data-infrastructures-framework-action

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Consultation on Research Data Infrastructures: Framework for Action

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Introduction

In preparation to H2020, the European Commission (DG CONNECT) has put together a [Framework for Action](#) addressing the area of **Research Data e-Infrastructures**.

The "Action Fiches" propose concrete domains of action. They aim at realising the European vision for a global interoperable data e-infrastructure supporting open, digital-driven, science (note that High Performance Computing and Distributed Computing as such are outside

About the public consultation

What

Relevance, Strengths, Weaknesses
Propose additional areas of actions

How many

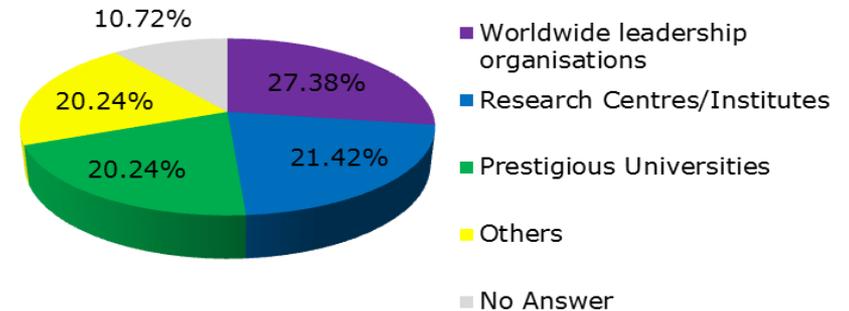
80+ replies from 100+ organisations

Who

Research organisations and associations, academia,...

LERU, LIBER, CNRS, COAR, EIROforum,, OpenAIRE, CERN, APA, Volker Mehrmann
TU Berlin, European Bioinformatics Institute, Max Planck Society, Observatoire
Astronomique de Strasbourg, Museum f. Naturkunde Berlin, Pensoft Publishers,
University of Edinburgh, University of Göttingen, University of Florence, etc.

The number of different types of institution which the survey participants come from





European
Commission

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 RESEARCH 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



CALL 3

1. Managing, preserving and computing with big research data

MANAGING, PRESERVING
AND COMPUTING WITH
BIG RESEARCH DATA

Development and deployment of integrated, secure, permanent, on-demand service-driven and sustainable e-infrastructures for scientific computing and data

2. e-Infrastructure for Open Access

TOWARDS GLOBAL DATA
E-INFRASTRUCTURES
RESEARCH DATA ALLIANCE

Robust e-infrastructure supporting Open Access policies in Europe, providing reliable and permanent access to digital scientific records

3. Towards global data e-infrastructures

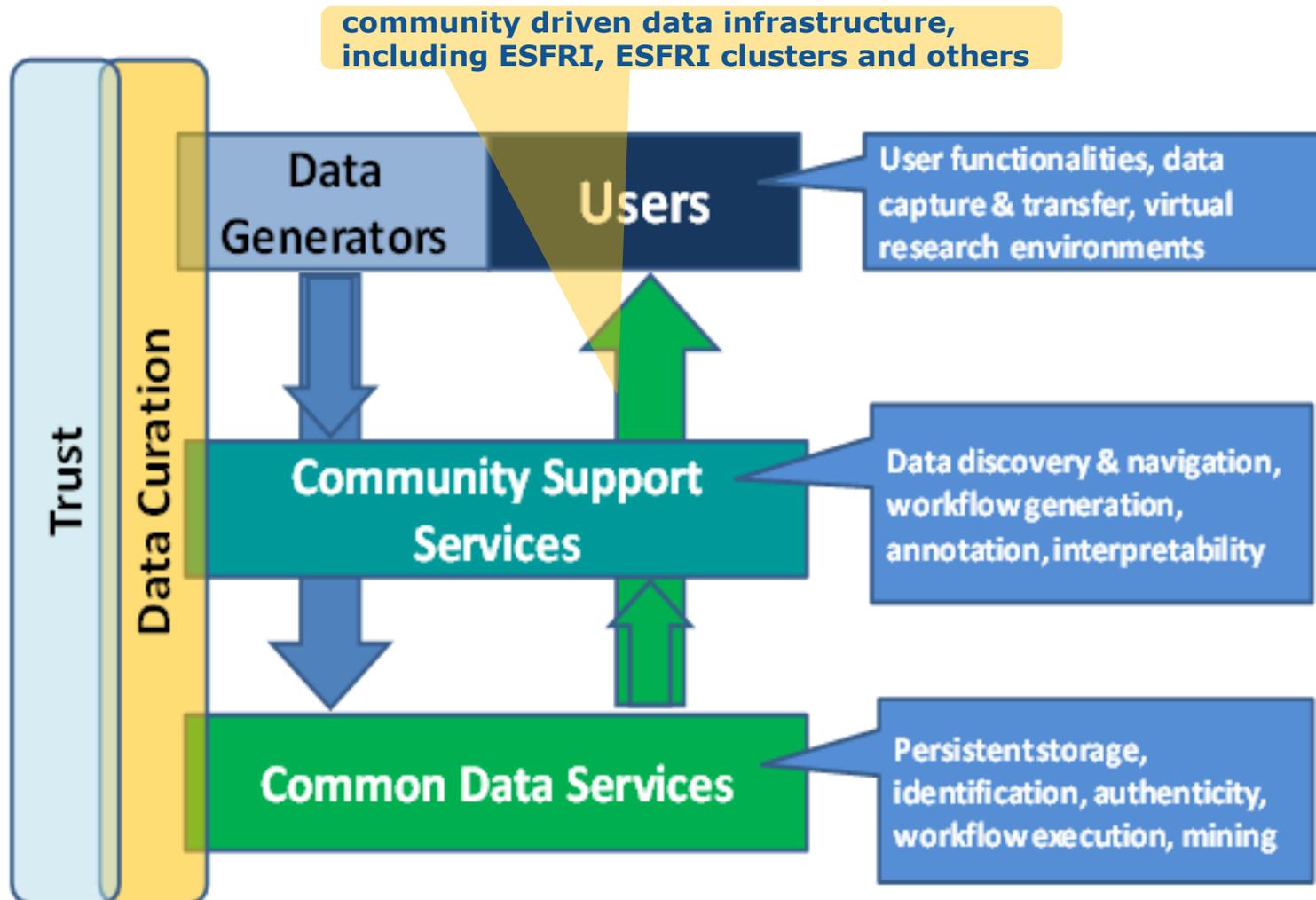
Consolidating Europe's contribution to the Research Data Alliance (RDA) and ensuring that RDA serves to foster research data interoperability at global level

E-INFRASTRUCTURES
FOR OPEN ACCESS

7. Provision of core services across e-infrastructures

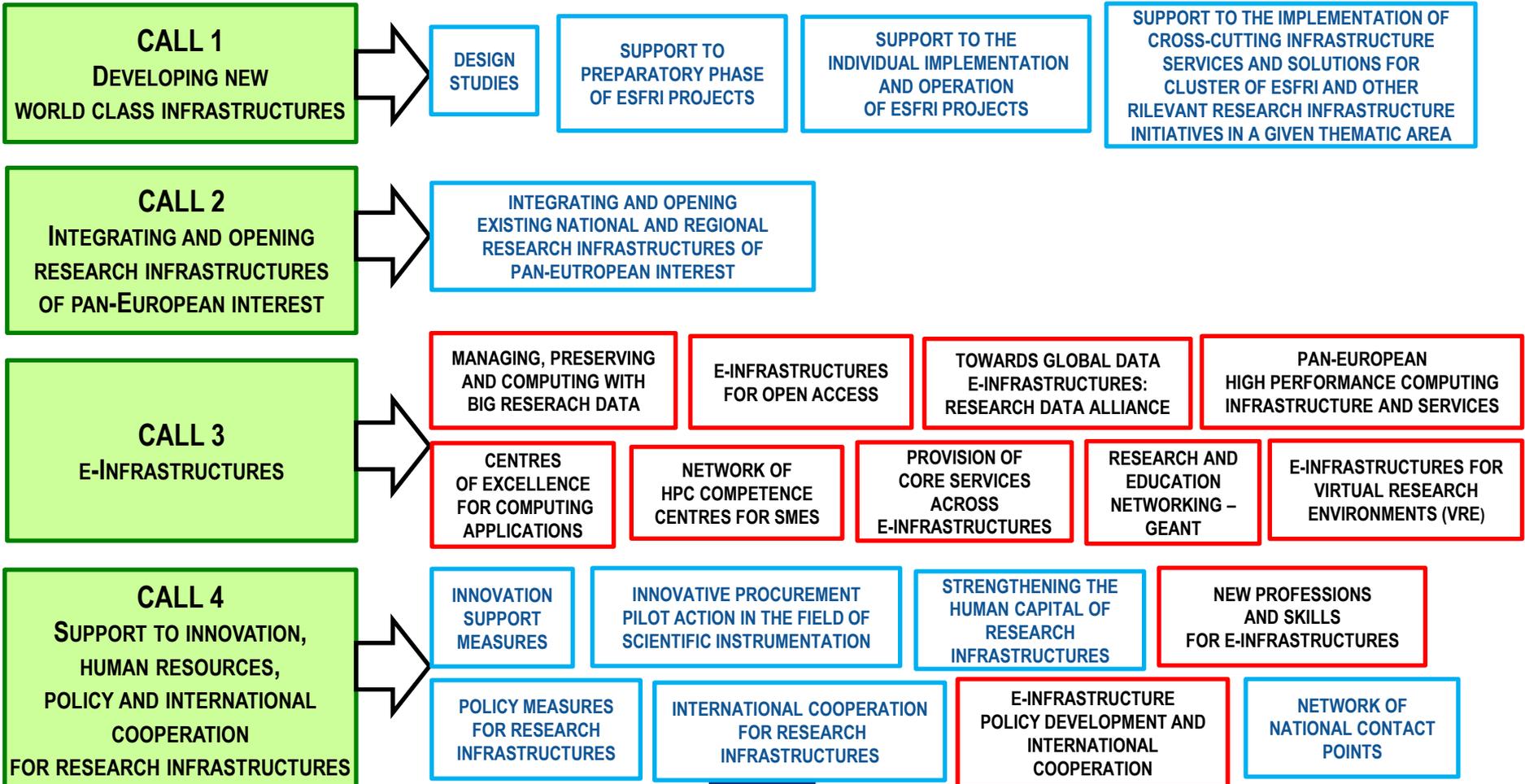
Harmonise and/or deploy core e-infrastructure services to ensure their effective use

data infrastructure architecture





RESEARCH INFRASTRUCTURE Work Programme 2014-2015



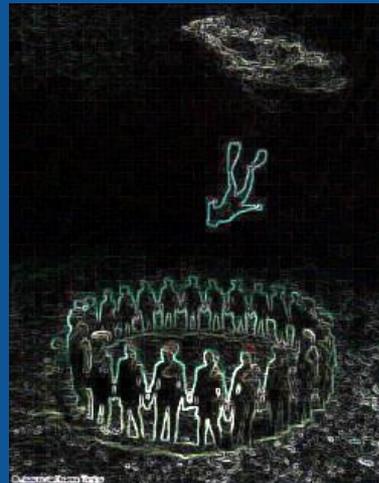


Our challenges in 2014:

- *Bridging generic "service-driven" and "community-driven" data infrastructures*
 - Remove silos rather than make new ones!
- *Integration between data and computing*
 - How to use what we've got without extrapolating the past
- *Supporting policies; open data; open software*
- *Sharing basic operations services and building blocks*
- *Business plans for financial sustainability*
 - ...and partnerships with the private sector



THANK YOU



European Commission – DG CONNECT
eInfrastructures



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

Challenges:

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



Call 3 Topic 1: Managing, preserving and computing with big research data (2/3)

Scope:

- *Federated pan-European infrastructure for data manag't*
 - **Access, replication, annotation, search, compute, analysis, preservation**
- *Services for quality and reliability*
 - **including certification mechanisms and services**
- *Federating data management and curation tools*
 - **support development of Data Management Plans**
- *Large scale virtualisation of data/compute centre resources*
- *Standards-based open platform for scientific computing*
 - **deployed on different hardware and e-infrastructures**
 - **abstract application development and execution from available resources; for long-tail research communities**



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

Scope (continued):

- *Support the evolution of the European Grid Infrastructure*
 - **Federation of ICT resources to offer compute/storage services (any kind of resource: public and private, grid and cloud, ...)**
- *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**



Call 3 Topic 2: e-Infrastructure for Open Access

Challenges:

- **Reliable and permanent access** to digital scientific records
- Based on already existing e-infrastructures (**institutional and thematic repositories, aggregators**, etc.)
- **Supporting Open Access policies**, also for Horizon 2020
- Some key elements:
 - **Link literature and data** in order to enable a more transparent evaluation of research and reproducibility of results
 - Provide service driven infrastructures to enable wide participation in the **Open Data Pilot**
 - Include scheme to provide financial support to **Gold Open Access post-grant**



Call 3 Topic 2: e-Infrastructure for Open Access

Scope:

1. Service-driven e-infrastructure for OA

- Linking institutional and thematic repositories across Europe
- Respond to requirements of researchers and organisations
- Helpdesks to support producers and users of information
- Technical solutions for sharing sensitive data (e.g. patient data)
- Bibliometrics and webometrics for open access

2. Prototyping new services in support of open science

- New forms of publishing, peer review, data mining services, ...
- Stimulation of publishing in open access journals
- Barriers to data sharing and pan-European data sharing agreements

3. Global interoperability of open access data e-infrastructures

- Linking platforms across the globe



Call 3 Topic 3: Towards global data e-infrastructures – Research Data Alliance

Challenges:

- Europe's contribution to the Research Data Alliance (RDA), ensuring that RDA fosters research data interoperability and exchange at global level
- Ensure Europe's role as a global player
- *RDA is an open international forum to create consensus on solutions and best practices to specific problems hampering data exchange and interoperability*



Call 3 Topic 3: Towards global data e- infrastructures – Research Data Alliance

Scope:

1. Active **participation of European stakeholders** (organisations and individual experts) in RDA; promotion of EU industry involvement and innovation.
2. Engagement of scientific communities in defining **best practices for data exchange**
3. RDA **governance** structures
4. Establishment of **coordination mechanisms** at European level and with international organisations dealing with **standardisation**, research data and education issues (IETF, W3C, CODATA, OECD, UNESCO, ...).



Call 3 Topic 7: Provision of core services across e-Infrastructures

PROVISION OF
CORE SERVICES
ACROSS
E-INFRASTRUCTURES

Challenge:

Harmonise and deploy core infrastructure services

Scope:

- Development and uptake of a **Digital Identifier** e-infrastructure **for digital objects** (articles, datasets, collections, software, nomenclature, etc.) **and authors**;
- Deployment and promotion of a pan-European **identity federation** for researchers, educators and students
 - **Implementing an ERA Communication action**

NB! Core services: those needed across a broad range of communities and e-infrastructures and ensure their interoperation



Call 3 Topic 7: Provision of core services across e-Infrastructures

PROVISION OF
CORE SERVICES
ACROSS
E-INFRASTRUCTURES

Expected Impact:

- **Improved interoperability** of e-infrastructure services, hence easier access and collaboration between scientists
- **Reduce duplication of efforts** for common services
- DIs open **new prospects for services** and for encouraging **openness and trust**
- Europe-wide **single sign-on service** enables researchers to collaborate within secure and trusted virtual research environments
- AAI facilitates **sharing** of information resources at EU level
- Expansion of the **coverage of national identity federations** for network, services and applications. Easier participation in identity federations



Call 3 Topics 1,2,3 and 7: Practicalities

When (indicative)

Call publication date 11/12/2013

Call deadline for Topic 2 15/04/2014 at 17:00

Call deadline for Topics 1, 3 and 7 02/09/2014 at 17:00

Budget (indicative)

Topic 1 Managing, preserving and computing with big research data: 55M€

Topic 2 e-Infrastructure for Open Access: 13M€

Topic 3 Towards global data e-infrastructures – RDA: 4 M€

Topic 7 Provision of core services across e-Infrastructures: 6 M€