Draft Horizon 2020 Work Programme 2014-2015

in the area of

"European research infrastructures (including e-Infrastructures)"

Important notice:

This paper is made public just before the adoption process of the work programme to provide potential participants with the currently expected main lines of the work programme 2014-2015. It is a working document not yet endorsed by the Commission and its content does not in any way prejudge the final decision of the Commission.

The adoption and the publication of the work programme by the Commission are expected in mid-December 2013. Only the adopted work programme will have legal value, subject to, among others:

a) The adoption of the Council Decision establishing the Specific Programme implementing Horizon 2020 – The Framework Programme for Research and Innovation (2014-2020) by the legislative authority without significant modifications,

b) A positive opinion by the committee established in the Council Decision establishing the Specific Programme implementing Horizon 2020, and

c) The availability of the appropriations provided for in the draft budget for 2014 after the adoption of the budget for 2014 by the budgetary authority or, if the budget is not adopted, as provided for in the system of provisional twelfths.

This adoption will be announced in this website.

Information and topic descriptions indicated in this working document may not appear in the final work programme; and likewise, new elements may be introduced at a later stage. Any information disclosed by any other party shall not be construed as having been endorsed by or affiliated to the Commission.

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Introduction

Research infrastructures are facilities, resources and services that are used by the research communities to conduct research and foster innovation in their fields. Where relevant, they may be used beyond research, e.g. for education or public services. They include: major scientific equipment (or sets of instruments); knowledge-based resources such as collections, archives or scientific data; e-infrastructures, such as data and computing systems and communication networks; and any other infrastructure of a unique nature essential to achieve excellence in research and innovation. Such infrastructures may be 'single-sited', 'virtual' or 'distributed'.

Research infrastructures play an increasing role in the advancement of knowledge and technology and their exploitation. By offering high quality research services to users from different countries, by attracting young people to science and by networking facilities, research infrastructures help structuring the scientific community and play a key role in the construction of an efficient research and innovation environment. Because of their ability to assemble a 'critical mass' of people, knowledge and investment, they contribute to national, regional and European economic development. Research infrastructures are also key in helping Europe lead a global movement towards open, interconnected, data-driven and computer-intensive science and engineering. e-Infrastructures will make every European researcher *digital,* increasing creativity and efficiency of research and bridging the divide between developed and less developed regions.

Just as public infrastructures form the substrate of civil society, research infrastructures are the backbone of scientific communities. Research infrastructures have been a well-established concept in the physical sciences for a long time. More recently, the concept of openly accessible infrastructures has spread into all disciplines of science, including life, environmental, social sciences and the humanities. This spread has happened not least under the influence of interdisciplinary users and the increasing importance of e-Science. Research infrastructures therefore provide research opportunities and services to researchers in many areas also addressed by other Parts of Horizon 2020, in particular the Parts "Societal Challenges", "Leadership in Enabling and Industrial Technologies" (LEIT), and the other parts of "Excellent Science": "Future and Emerging Technologies", "Marie Skłodowska-Curie" and "European Research Council" actions. This is also reflected in the close links between several of the topics of Research Infrastructures and certain Focus Areas. Furthermore production-level e-infrastructures are able to serve the computing and data needs of any project in the framework programme fostering economies of scale in the use of ICT systems by projects supported by Horizon 2020.

Activities funded under this Part foster the innovation potential of research infrastructures, for example by reinforcing partnerships with industry, transfer of knowledge and other dissemination activities, use of research infrastructures by industrial researchers, and involvement of industrial associations in consortia or in advisory bodies.

Research Infrastructure activities also contribute to widening participation to the programme by supporting the development of Regional Partner Facilities in ESFRI projects and integrating activities. The use of European Structural and Investment Funds to build capacities and infrastructures at national and regional level in line with the relevant smart specialisation strategy is encouraged (further information can be found in section "Specific features for Research Infrastructures").

The Research Infrastructures Work Programme foresees actions to provide support services for the implementation of the Open Research Data Pilot. Further information on the Open Research Data Pilot can be found in the Guidelines on Open Access in Horizon 2020.

Call - Developing new world-class research infrastructures

H2020-INFRADEV-2014/2015

This call focuses on developing new world-class research infrastructures. The aim is to facilitate and support the implementation, long-term sustainability and efficient operation of the research infrastructures identified by the European Strategy Forum on Research Infrastructures (ESFRI) as well as other world-class research infrastructures, which will help Europe respond to grand challenges in science, industry and society. In addition, the next generation of new research infrastructures can be identified through design studies. Support will be provided to:

- the conceptual and technical design of new research infrastructures, which are of a clear European dimension and interest, through a bottom-up approach (deadline and budget 2014);
- the preparatory phases of ESFRI projects, through a targeted approach (deadline and budget 2015);
- the individual implementation and operation of prioritised ESFRI projects, through a targeted approach (deadline and budget 2015);
- the implementation and operation of cross-cutting infrastructure services and solutions for clusters of ESFRI and other world class research infrastructures (deadline 2014 and budget 2014-2015).

Proposals are invited against the following topics:

INFRADEV-1-2014: Design Studies

Specific challenge: New leading-edge research infrastructures in all fields of science and technology are needed by the European scientific community in order to remain at the forefront of the advancement of research, and to be able to help industry strengthen its base of knowledge and its technological know-how. The aim of this activity is to support the conceptual and technical design and preparatory actions for new research infrastructures, which are of a clear European dimension and interest. Major upgrades of existing infrastructures may also be considered if the end result is intended to be equivalent to, or capable of replacing, an existing infrastructure.

Scope: Design studies should address all key questions concerning the technical, legal and financial feasibility of new or upgraded facilities, leading to a 'conceptual design report' showing the maturity of the concept and forming the basis for identifying and constructing the next generation of Europe's and the world's leading research infrastructures. Conceptual design reports will present major choices for design alternatives and associated cost ranges, both in terms of their strategic relevance for meeting today's and tomorrow's societal challenges, and (where applicable) in terms of the technical work underpinning the development of new or upgraded research infrastructures of European interest. All fields of science are considered.

The activities that could be performed in a Design Study proposal include:

- Scientific and technical work, i.e. (1) the drafting of concepts and engineering plans for the construction, as well as the creation of final prototypes for key enabling technologies and implementation plans for transfer of knowledge from existing prototypes to the new research infrastructure; (2) scientific and technical work to ensure that the beneficiary

scientific communities exploit the new facility from the start with the highest efficiency, including the introduction of new processes or software.

- Strategic work, i.e. (1) plans to integrate harmoniously the new infrastructure into the European fabric of related facilities in accordance, whenever appropriate, with the Community objective of balanced territorial development; (2) the identification of the best possible site(s) for setting up new facilities; (3) the estimated budget for construction and operation (4) the design of a workable legal (e.g. an ERIC) and governance structure; (5) the planning of research services to be provided at international level.

The main outcomes of the projects funded under this action will be conceptual or technical design reports for new or upgraded research infrastructures,

When the Design study includes scientific and technical work it should be implemented as a *Research and innovation action*, otherwise as a *Coordination and support action*. The Commission considers that proposals requesting a contribution from the EU of between EUR 1 and 3 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact:

- Funding bodies for research infrastructures become aware of the strategic and funding needs of the scientific community.
- Policy bodies at the national level (e.g. funding bodies, governments), at European level (e.g. ESFRI) and internationally (e.g. the Organisation for Economic Co-operation and Development's Global Science Forum) have a sound decision basis to establish long-range plans and roadmaps for new research infrastructures of pan-European or global interest.
- The technical work carried out under this topic will contribute to strengthening the technological development capacity and effectiveness as well as the scientific performance, efficiency and attractiveness of the European Research Area.

Type of action: Coordination and support actions or Research and innovation actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

INFRADEV-2-2015: Preparatory Phase of ESFRI projects

Specific challenge: The ESFRI roadmap, updated periodically, identifies the needs of the European scientific community in terms of research infrastructures. However, inclusion in the ESFRI roadmap does not guarantee that these needed infrastructures will be built. Before proceeding with the construction and/or implementation of the identified infrastructures, many preliminary decisions need to be taken with respect to issues such as the identification of funders, the financial plan for sustainability, the governance by involved stakeholders, the site and legal form of the managing organisation, the architecture and the service policies. The aim of this activity is to provide catalytic and leveraging support for the preparatory phase leading to the construction of new research infrastructures or major upgrades of existing ones.

Scope: The preparatory phase aims at bringing the project for the new or upgraded research infrastructure identified in the ESFRI roadmap or in the European strategy for particle physics (CERN Council) to the level of legal, financial, and, where applicable, technical maturity required for implementing it. Proposal consortia should involve all the stakeholders necessary to move the project forward, to take the decisions, and to make the financial commitments necessary before construction can start (e.g. national/regional ministries/governments,

research councils, funding agencies). Appropriate contacts with ministries and decision makers should be continuously reinforced, thus further strengthening the consortia. Operators of research facilities, research centres, universities, and industry may also be involved whenever appropriate. During the preparatory phase the Commission may act as a 'facilitator', in particular with respect to the financial engineering needed for the construction phase. The preparation of the legal agreements (including site, governance, financing of the new research infrastructures) is one of the main activities and deliverables and must be finalised before the end of the project (e.g., through the signature of a Memorandum of Understanding).

If the preparatory phase includes technical work it should be implemented as a *Research and innovation action*, otherwise as a *Coordination and support action*. The detailed list of activities that can be included in a preparatory phase proposal is given in part A of the section "Specific features for Research Infrastructures".

Under Horizon 2020 support can be provided to two types of preparatory phase proposals[1]:

Preparatory phase type I: Proposals will address research infrastructures identified in the periodic updates of the ESFRI roadmap or in the European strategy for particle physics, that are willing to set up a pan-European governance and legal structure (e.g. in the form of an ERIC). The Commission considers that proposals requesting a contribution from the EU of up to EUR 5 million would allow this challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Preparatory phase type II: Proposals will target new research infrastructures projects already supported by EU through a first preparatory phase grant and that are identified by ESFRI as requiring additional support to complete their preparatory phase. In this case a reduced grant for the continuation of the preparatory phase could be given to support a limited set of activities in particular for setting up an adequate governance and management structure, securing financial commitment and broadening the membership. The Commission considers that proposals requesting a contribution from the EU of up to EUR 2 million would allow this challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact:

Proposals will raise the technical, legal and financial maturity of projects for new research infrastructures to the level required to enable the construction work to start.

- All the technical, financial, and legal documents which are necessary for the implementation phase of a new or upgraded research infrastructure are created. Participating funding bodies are able to take their final funding decisions and to conclude the legal agreements necessary for the implementation.
- In particular, any technical work necessary to draft the final technical design is completed, providing a sound technical base for establishing a cost baseline and detailed financial planning.
- The financial needs of the project are mapped out to the extent necessary for funding agencies to establish their own medium- and long-term financial planning; and
- The preparation of the legal agreements for establishing the implementing / operating consortium is completed, including the project's governance and appropriately detailed internal rules.

[1] The list of research infrastructures targeted by this topic will be provided once their identification by ESFRI has been completed.

- The technical work carried out under this topic will contribute to strengthening the technological development capacity and effectiveness as well as the scientific performance, efficiency and attractiveness of the European Research Area.

Type of action: Coordination and support actions or Research and innovation actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

INFRADEV-3-2015: Individual implementation and operation of ESFRI projects

Specific challenge: The research infrastructures identified in the ESFRI roadmap or in the European strategy for particle physics have benefitted from EU support for their preparatory phase. Some of them have already moved on to the implementation phase and/or have started their operation. The initial phase is, however, the most delicate and difficult one for new pan-European infrastructures in the process to become fully operational as technologies, services and procedures need to be finalised and best tuned, financial sustainability must be proved and users' trust and awareness must be gained.

Scope: Under the 2014-2015 work programme this topic will only target the implementation and initial operation of new research infrastructures which are identified by ESFRI, in the context of the prioritisation exercise[2], as requiring a specific support to complete or launch their construction[3], thus contributing to the fulfilment of the Innovation Union commitments. The new research infrastructures addressed by this topic are the ones that are setting up, or have already set up, their governance and legal structure, e.g. on the basis of the European Research Infrastructure Consortium (ERIC) or any suitable structure at European or international level. Support will be provided for central coordination, operation, access provision, enlargement of the membership, training and innovation activities. Activities can include setting up and initial running of the central coordination office, enhancement of the technical architecture, detailed R&D and engineering work, development of innovative components, users' access, data management (including possible open access to data), inter-operability, standardisation, outreach, training and international cooperation. Specific attention will be given to the role of industry, in particular to facilitate where relevant the access of SMEs as users and partners of the research infrastructure for technological developments, e.g. through technology transfer activities as well as the development of services to industry. The activity may also support the development of Regional Partner Facilities. The detailed list of activities that can be supported under this topic is given in part B of the section "Specific features for Research Infrastructures".

The Commission considers that proposals requesting a contribution from the EU of up to EUR 15 million would allow this topic to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact:

This activity will:

[2] The conclusions of the December 2012 Competitiveness Council emphasise "the need for renewing and adapting the mandate of ESFRI to adequately address the existing challenges and also to ensure the follow-up of implementation of already on-going ESFRI projects after a comprehensive assessment, as well as the prioritisation of the infrastructure projects listed in the ESFRI Roadmap"

[3] The list of research infrastructures targeted by this topic will be provided once their identification by ESFRI has been completed.

- contribute to the realisation of the Innovation Union flagship initiative's Commitment n. 5: "*to complete or launch the construction of 60% of the ESFRI projects by 2015*";
- strengthen the ERA position and role in the global research environment;
- reinforce the partnership between the Commission, Member States, Associated Countries and relevant stakeholders in establishing pan-European research infrastructures;
- enhance the role of the Union in international organisations and multilateral forums;
- support progress towards the development of global research infrastructures;
- enable researchers to address societal challenges with a global dimension such as climate change;
- foster capacity building and Research Infrastructure human capital development in targeted/relevant regions;
- raise the technological level of the European industry and SME's, thus improving their competitive position, through their involvement in research infrastructures development and service provision.

Type of action: Research and innovation actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

INFRADEV-4-2014/2015: Implementation and operation of cross-cutting services and solutions for clusters of ESFRI and other relevant research infrastructure initiatives

Specific challenge: If different research infrastructure initiatives such as ESFRI projects, other world class research infrastructures, ERICs, e-infrastructures and Integrating Activity projects are developed, implemented and operate in isolation, there is a risk of fragmentation, lack of interoperability between them and parallel development of divergent solutions to same problems. In order to avoid this, there is a need in Europe to coordinate common activities, to define harmonised policies for access to the infrastructures and data lifecycle (acquisition, access, deposit, sharing and re-use), to develop and deploy common underpinning technologies and services, and to implement common and efficient solutions on issues such as, for example, data sharing and provision, architecture of distributed infrastructures, distributed and virtual access management, and development of common critical physical and virtual components (e.g. detectors, components for data management).

Scope: This topic will contribute to the construction and operation of the research infrastructures identified in the ESFRI Roadmap, therefore proposals must be centred and built around ESFRI projects in a specific thematic area that is broad enough to gather critical mass (e.g. Biomedical Science, Advanced Light Sources, Astronomy, Environment and Earth Sciences). While the ESFRI projects represent the core component of any cluster, other relevant world class research infrastructures, ERICs, e-infrastructures and Integrating Activity projects should also be involved in a cluster.

To ensure coordination and synergies between the largest possible number of ESFRI projects and other research infrastructure initiatives in a thematic area, proposals should address a coherent set of common activities and be comprehensive.

Proposals should develop synergies and complementarity, optimise technological implementation, define workflows and ensure coordination, harmonisation, integration and interoperability of data, applications and other services between the ESFRI and other research infrastructure initiatives in specific thematic areas. They could focus on issues such as policies, models and solutions for data and knowledge handling, including access, preservation and management; protection of sensitive data and sample; technological innovation and innovative processes with key industry partners; harmonised access policies;

deployment and management of networks of observatories; real time observations, sampling procedures; timescales; instrumentation; standards.

Proposals may address the development of skills and the specific training of staff managing and operating the research infrastructures, as well as fostering the innovation potential of research infrastructures, in complementarity with the horizontal activities supported under Call H2020-INFRASUPP-2014/2015 (in particular topics INFRASUPP-3-2014 and INFRASUPP-4-2015). Activities should contribute to a faster adoption of best practices and foster the use of open standards and interoperability in data and computing services. When addressing common or interoperable data services, proposals should encompass the definition of metadata, ontologies and identifiers as well as models (e.g. open web services) to process semantics at machine level. Proof of concept, prototyping and deployment of advanced data services will be supported. The detailed list of activities that can be supported under this topic is given in part C of the section "Specific features for Research Infrastructures".

Consortia should include key participants of the involved infrastructures initiatives as well as other partners needed to develop the required solutions. Proposals should build upon the state of the art in ICT and e-infrastructures for data, computing and networking and work in cooperation with e-infrastructure service providers.

This topic is complementary with topics EINFRA-1-2014, Big research data, and EINFRA-9-2015, Virtual Research Environments - VRE: EINFRA-1-2014 addresses services that are potentially transversal and generic, VREs integrate data, network and computing resources for interdisciplinary communities whereas INFRADEV-4-2014/2015 address interoperability of services and common solutions for cluster of ESFRI and other research infrastructure initiatives in thematic areas.

The Commission considers that proposals requesting a contribution from the EU of between EUR 6 and 15 million would allow this topic to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact:

- Contribution to the realisation of the Innovation Union flagship initiative's Commitment n. 5: "*to complete or launch the construction of 60% of the ESFRI projects by 2015*";
- Common ready-to-use services, systems, standards or other types of components will be made available to the involved research infrastructures initiatives, including the non-ESFRI projects, thus contributing to the development of a consistent European research infrastructures ecosystem.
- Interoperability between research infrastructure services, including data services, enables novel research leading to innovation and new insights;
- The efficiency and productivity of researchers rise thanks to an easier and seamless access to complementary services provided by different infrastructures and/or to reliable and open data services and infrastructures for discovering, accessing, and reusing data;
- Research communities adopt common approaches to the data management lifecycle (data and metadata curation), which leads to economies of scale;
- Trust in a community's data improves;
- Economies of scale and saving of resources are realised due to the optimisation of implementation and operation through the common development of components and solutions.

Type of action: Research and innovation actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

CONDITIONS FOR THIS CALL

Publication date: 11/12/2013

Deadline(s)[4] [5]:

INFRADEV-1-2014 and INFRADEV-4-2014/2015	02/09/2014 at 17.00.00 Brussels time
INFRADEV-2-2015 and INFRADEV-3-2015	[14/01/2015 at 17.00.00 Brussels time]

Overall indicative budget: EUR 70.00 million from the 2014 budget[6] and EUR 129.00 million from the 2015 budget[7]

	2014 EUR million	2015 EUR million	
INFRADEV-1-2014	15.00		Single stage
INFRADEV-2-2015		14.00	Single stage
INFRADEV-3-2015		90.00	Single stage
INFRADEV-4-2014/2015	55.00	25.00	Single stage

Eligibility and admissibility conditions: The conditions are described in parts B and C of the General Annexes to the work programme, with the following exceptions:

INFRADEV-2-2015 and INFRADEV-3-2015	Concerning the minimum number of participants, given the specific nature and challenge addressed by this topic, a sole beneficiary as defined in article 122 of the Financial Regulation and referred to in article 199 of the Rules of application of the Financial Regulation is eligible (e.g. an ERIC).

Evaluation criteria, scoring and threshold: The criteria, scoring and threshold are described in part H of the General Annexes to the work programme.

Evaluation procedure: The procedure for setting a priority order for proposals with the same score is given in part H of the General Annexes. The full evaluation procedure is described in the relevant guide associated with this call.

- Indicative timetable for evaluation and grant agreement:

[4] The Director-General responsible may delay this deadline by up to two months.

[5] The deadlines provided in brackets are indicative and subject to a separate financing decision for 2015

[6] Subject to the availability of the appropriations provided for in the draft budget for 2014 after the adoption of the budget 2014 by the budgetary authority or, if the budget is not adopted, as provided for in the system of provisional twelfths.

[7] The budget amounts are indicative and will be subject to a separate financing decision to cover the amounts to be allocated for 2015.

	Information on the outcome of the evaluation (*single stage*)	Indicative date for the signing of grant agreements
All topics	Maximum 5 months from the final date for submission.	Maximum 3 months from the date of informing applicants they have been successful.

Consortium agreements: In line with the Rules for Participation and the Model Grant Agreement, participants in Research and Innovation Actions are required to conclude a consortium agreement prior to grant agreement. However, for mono-beneficiary actions resulting from this call under topic INFRADEV-1-2014, INFRADEV-2-2015 or INFRADEV-3-2015, participants are not required to conclude a consortium agreement.

Call - Integrating and opening research infrastructures of European interest

H2020-INFRAIA-2014/2015

This call focuses on opening up key national and regional research infrastructures to all European researchers from both academia and industry and ensuring their optimal use and joint development. Through a targeted approach, specific types of research infrastructures or research communities will be addressed, ranging across all fields of science and technology.

In addition to serving basic science challenges, Integrating Activities under the different domains target research infrastructures needed to address the Societal Challenges, in particular "Health, demographic change and well-being", "Food security, sustainable agriculture and forestry, marine and maritime and inland water research, and the bioeconomy", "Secure, clean and efficient energy", "Climate action, environment, resource efficiency and raw materials", "Smart, green and integrated transport", and "Europe in a changing world – Inclusive, innovative and reflective societies" as well as some of the Focus Areas such as "Blue Growth" and "Water Innovation". They also target research infrastructures needed to gain leadership in the industrial and enabling technology such as "Nano and advanced materials, manufacturing and processing". Light sources facilities provide services to different user communities and as such they are encouraged to participate in all relevant areas of this call.

Proposals are invited against the following topic:

INFRAIA-1-2014/2015: Integrating and opening existing national and regional research infrastructures of European interest

Specific challenge:

European researchers need effective and convenient access to the best research infrastructures in order to conduct research for the advancement of knowledge and technology. The aim of this action is to bring together, integrate on European scale, and open up key national and regional research infrastructures to all European researchers, from both academia and industry, ensuring their optimal use and joint development.

Scope:

An Integrating Activity will mobilise a comprehensive consortium of several research infrastructures[8] in a given field as well as other stakeholders (e.g. public authorities, technological partners, research institutions) from different Member States, Associated Countries and other third countries when appropriate.

Funding will be provided to support, in particular, the trans-national and virtual access activities provided to European researchers (and of researchers from Third Countries under certain conditions), the cooperation between research infrastructures, scientific communities, industries and other stakeholders, the improvement of the services the infrastructures provide, the harmonisation, optimisation and improvement of access procedures and interfaces.

[8] Exceptionally, the consortium may include only one research infrastructure providing access, if this facility is of a truly unique nature.

An Integrating Activity shall combine, in a closely co-ordinated manner:

(i) Networking activities, to foster a culture of co-operation between research infrastructures, scientific communities, industries and other stakeholders as appropriate, and to help developing a more efficient and attractive European Research Area;
(ii) Trans-national access or virtual access activities, to support scientific communities in their access to the identified research infrastructures;
(iii) Joint research activities, to improve, in quality and/or quantity, the integrated services provided at European level by the infrastructures.

All three categories of activities are mandatory as synergistic effects are expected from these different components. However, the focus among these categories will differ for 'Starting' and 'Advanced' Communities (see definitions below).

Integrating Activities should, whenever appropriate, give due attention to any related initiatives internationally (i.e. outside the EU), foster the use and deployment of standards, carry out research on impacts of the involved research infrastructures (direct and indirect, on social, environmental and economic levels) as well as of the project itself.

Integrating Activities should also organise the efficient curation, preservation and provision of access to the data collected or produced under the project, defining a data management plan. Data management, interoperability (definition of metadata and ontologies) as well as advanced data and computing services should be addressed where relevant. To this extent, proposals should build upon the state of the art in ICT and e-infrastructures for data, computing and networking, and either work in cooperation with e-infrastructure service providers or include them in the consortium.

Integrating Activities in particular should contribute to fostering the potential for innovation, including social innovation, of research infrastructures by reinforcing the partnership with industry, through e.g. transfer of knowledge and other dissemination activities, activities to promote the use of research infrastructures by industrial researchers, involvement of industrial associations in consortia or in advisory bodies. A specific work package on innovation is therefore recommended in all Integrating Activity proposals.

In this work programme, Integrating Activities address two classes of different communities:

(1) 'Starting Communities' whose research infrastructures show a limited degree of coordination and networking at present. The strongest impact for these communities will be expected typically to arise from a focus on networking, standardisation and establishing a common access procedure, which lay the foundation for well-used trans-national and virtual access provision. The Commission considers that proposals requesting a contribution from the EU of up to EUR 5 million would allow this topic to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

(2) 'Advanced Communities' whose research infrastructures show an advanced degree of coordination and networking at present, in particular, through Integrating Activities awarded under previous Framework Programmes. The strongest impact for these communities will be expected typically to arise from focusing on innovation aspects and on widening trans-national and virtual access provision. Proposals from Communities that have benefitted from EU funding for Integrating Activities before will have to clearly demonstrate the added value and the progress beyond current achievements of a continuation project. The Commission considers that proposals requesting a contribution from the EU of up to EUR 10 million would allow this topic to be addressed

appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

In both cases, Integrating Activities are expected to duly take into account all relevant ESFRI research infrastructures to exploit synergies and to ensure that rationally designed, comprehensive and coherent overall concepts for European Infrastructures are being pursued.

As the scope of an integrating activity is to ensure coordination and integration between all the key European infrastructures in a given field and to avoid duplication of effort, at most one proposal per area is expected to be funded.

Further conditions and requirements that applicants should fulfil when drafting a proposal are given in part D of the section "Specific features for Research Infrastructures". Compliance to these provisions will be taken into account during evaluation.

Following an open bottom-up consultation with stakeholders and the analysis of the collected input by a panel of independent experts, this work programme calls for proposals addressing one or, where appropriate, more of the following areas listed under the different domains:

Biological and Medical Sciences - Starting Communities

Health information, clinical data, samples and medical images – support to population studies. This activity aims at integrating medical information, clinical data, human biological samples and imaging data generated by hospitals, health care and study centres, so as to support large cohort studies in given target population and disease areas as well as personalised and patient stratification approaches for prevention and treatment. Operational interfaces should allow efficient and sustained flow of data, samples and images from and to established European infrastructures, such as the ESFRI ones (e.g. BBMRI, ECRIN, EURO-BIOIMAGING and ELIXIR) and give user-friendly access to these research resources while following applicable ethical requirements. Standardisation of data acquisition and analysis, in particular for imaging data, interoperability and storage aspects are amongst the issues to be addressed.

New tools and resources for analysing and integrating genomic, epigenomic, proteomic, metabolomic and phenomic data. This activity should link genomics, epigenomics, proteomics, metabolomics and phenomics resources related to animal, plant and micro-organisms, derived from sectors such as health, food, energy and the environment, and provide user-friendly tools to exploit this data for research and innovation. Access and training activities should ensure the optimum use of these tools and resources. The proposal should integrate existing European research infrastructures active in generating and handling such biological data, and exploit synergies with ELIXIR and other relevant ESFRI infrastructures such as INFRAFRONTIER, ISBE, and MIRRI.

Plant and forestry material resources. This activity should integrate European research facilities working with plant including forestry materials, such as seed and tree banks, to provide researchers with wider and better informed access to high quality plant material, and ensure wide use of advanced technology platforms supporting crop biology, forestry, and agricultural and horticultural research in a wider sense. Synergies with relevant ESFRI infrastructures, such as ELIXIR and EMBRC, should be duly exploited.

European nanomedicine characterisation infrastructure. This activity aims at integrating European key reference facilities that have the capability to both characterise and engineer nanoparticles for medical applications. It should offer access to a coherent set of tools, resources and expertise to support chemical, physical and biological research on medical applications, supporting both academic research teams and industry (including SMEs).

Synergies with relevant ESFRI Infrastructures, such as EATRIS, EURO-BIOIMAGING,INSTRUCT, and INFRAFRONTIER should be duly exploited.

Research infrastructures supporting rare diseases research. This activity aims at integrating sufficient amounts of information and data concerning patients suffering from rare diseases, in order to enable the study of the aetiology of these diseases, the monitoring of their epidemiology and the development and test of diagnostic tools and preventive and therapeutic interventions. Synergies with relevant ESFRI Infrastructures, such as BBMRI, ECRIN, EATRIS, INFRAFRONTIER, EuroBioImaging, ELIXIR, and EU-OPENSCREEN, should be duly exploited.

Biological and Medical Sciences - Advanced Communities

High-containment biosafety facilities and virus collections including for high-risk animal/human pathogens. This activity aims at improving the access to high-quality authenticated collections of both human and animal viruses including those requiring high-biosafety level laboratories (BSL 3 and 4), to support upstream virology, microbiology and immunology research as well as translational research aiming at drug and vaccine development, and to support epidemiological studies targeting disease and epidemics control. Giving safe access to high risk virus collections, including providing the necessary training, should be complemented with high containment animal facilities to allow to safely study livestock and transboundary zoonotic diseases. Synergies with relevant ESFRI Infrastructures, such as BBMRI, ERINHA, MIRRI, and EMBRC, should be duly exploited.

Vaccine infrastructures. This activity aims at bridging the 'translational gap' in biomedical research by providing academia- and SME- driven vaccine R&D with easily accessible, high quality services and expertise to support vaccine formulation, access to GMP (Good Manufacturing Practices), preclinical studies including relevant animal models, vaccine trials, compilation of regulatory dossiers and advice on production issues like upscale and quality control. This activity should support the development of both human and veterinary vaccines, for prophylactic and therapeutic applications. Synergies with relevant ESFRI Infrastructures, such as EATRIS, ISBE, ECRIN, INFRAFRONTIER, and INSTRUCT, should be duly exploited.

Research Infrastructures for translating research on biological structures into innovation in biomedicine. This activity should expand the availability of structural biology services (such as X-ray and neutron scattering, advanced NMR and advanced imaging technologies) to new communities of users, and in particular to scientists with backgrounds other than structural biology, including from SMEs, to benefit translational research in drugs discovery, informed drugs and vaccine design and other fields like biotechnology and biomaterials. Synergies with relevant ESFRI Infrastructures, such as INSTRUCT, EUROBIOIMAGING, EU-OPENSCREEN, and EATRIS, should be duly exploited.

Research infrastructures in aquaculture. This activity aims at integrating highly diverse aquaculture research facilities and providing to research teams easy access to them. Specific attention should be given to dedicated facilities for new species, disease aspects, links to high-throughput sequencing and contribution to sustainable aquaculture. Synergies with relevant ESFRI Infrastructures, such as EMBRC, should be duly exploited.

Energy - Starting Communities

European facilities for electrochemical energy storage testing. This activity aims at integrating and providing access to research infrastructures supporting research on electrochemical storage devices for renewable energy (such as dry room facilities for assembly of lab cells series, electron microscopy combined with chemical analysis and

calorimetric analysis, neutron and x-ray techniques and test rigs). It should support an integrated research approach along the entire value chain, from materials research to applications.

Testing of wind turbines, ocean energy converters and electrical subsystems for grid integration under laboratory conditions. This activity aims at supporting the precompetitive research that is needed to address the challenges that wind and ocean energy creates for the electrical grid, by promoting coordination within the European community and by providing access to research infrastructures, regardless of their location.

Energy - Advanced Communities

European smart grids research infrastructure. The transition towards high shares of renewable energy and the tendency to a more decentralised energy supply requires a grid with sufficient hosting capacity and the ability to manage the power fluctuation of the renewable sources. This activity should provide laboratory environments that enable the testing of different smart grid configurations considering different scenarios under safe boundary conditions without influencing end-customers of the electrical power supply.

Environmental and Earth Sciences - Starting Communities

Research infrastructures for hydrological/ hydrobiological research. This activity should bring together existing observatories of European freshwaters (river basins, continental, island and overseas territories) covering both abiotic and biotic components, i.e. addressing hydrological, hydrometeorological, sedimental, morphological and hydrochemical aspects as well as biological/ecological indicators of water quality. Water Framework Directive objectives should be considered and access to the infrastructures should be clearly defined.

Research infrastructures for research on crustal fluids and geo-resources. This activity should link the key European analogue experimental, numerical, and observational (imaging) facilities in providing an additional underpinning pillars to EPOS (European Plate Observing System). Appropriate links with the ICDP (International Continental Scientific Drilling Program) should be made.

Research infrastructures for long-term ecosystem and socio-ecological research. This activity should bring together LTER (Long Term Ecological Research) site-based and properly instrumented facilities and critical zone observatories, covering the widest variety of terrestrial and aquatic environments in Europe (wherever reasonable organised in clusters). It should incorporate long-term socio-ecological research platforms as well as integrate research field sites, associated data management and numerical simulation tools in order to address threats to soil and water and in particular challenges on urbanisation, land use, and food security. The provided access and services should enable researchers addressing the broad range of ecosystem research issues (biodiversity loss, ecosystem services, climate change adaptation and mitigation, land use and management, etc.). Appropriate links with the LIFEWATCH infrastructure for biodiversity research should be made.

Research infrastructures for ocean drilling. This activity should develop a unique EU component for scientific research drilling. It should integrate with IODP (Integrated Ocean Drilling Program) and share technology (drilling and logging, sample and data curation) with ICDP. It should link with EMSO (European Multidisciplinary Seafloor Observation) and other crustal boreholes in creating underground and subseafloor observatory network. It should foster involvement of and links with industry in underpinning joint research projects.

Environmental and Earth Sciences - Advanced Communities

Aerosol, clouds, and trace gases research infrastructure. This activity should further integrate state-of-the-art European ground-based stations for long term observations of

aerosols, clouds and short lived gases that are essential to climate and air-quality research. New integration tools and long-term sustainability should be addressed, in particular by linking with appropriate ESFRI projects.

Research infrastructures for environmental hydraulic research. This activity should integrate the major rare/unique environmental hydraulic infrastructures in Europe and network with the other European hydraulic infrastructures in order to optimise their use to help solve climate change adaptation problems. Particular attention to harmonising and organising the flux of data is expected.

Research infrastructures for terrestrial research in the Arctic. This activity should integrate, as an international network for terrestrial research and monitoring in the Arctic, key research stations and large research field sites throughout the circumpolar Arctic and adjacent northern countries, aiming at implementing capacity for research, monitoring and education. The network should link with marine and atmospheric networks, aiming at close cooperation.

Research infrastructures for forest ecosystem and resources research. This activity aims at integrating and facilitating broad access to forest research facilities and methodologies with a view to enabling, coordinating and harmonising research and monitoring including investigation of the biological effects of air pollution and mitigation and adaptation to climate change. Access should be provided to data on genetic and species diversity in forest ecosystems. Support for development of forest management approaches should be part of the project, taking into account environmental and land use changes and the bioeconomy.

Research Infrastructures for integrated and sustained coastal observation. This activity should further harmonise observation techniques in several European coastal and shelf seas, integrating key observing platforms as well as developing further the collection of biological data, in particular exploiting synergies with marine biological observatories. It should link with appropriate ESFRI projects such as EURO-ARGO, EMSO and EMBRC and aim at a single European channel for all physical, chemical and biological coastal data.

Mathematics and ICT - Starting Communities

Distributed, multidisciplinary European infrastructure on Big Data and social data mining. This activity should integrate large social data repositories, social data mining methods and tools, and supercomputing facilities for conducting large-scale analytical processing. This integrated infrastructure should enable performing complex processes to extract social knowledge. The proposal should also address training in social data mining, to foster the availability of skilled data scientists.

Mathematics and ICT - Advanced Communities

Integrating activity for facilitating access to HPC (High Performance Computing) centers. This activity aims at furthering the services harmonisation and enhancement of national and regional High Performance Computing centers of pan-European interest and at enlarging the European HPC user base preparing it to the use of the top end HPC resources such as PRACE (Partnership for Advanced Computing in Europe).

Engineering, Material Sciences, and Analytical facilities - Starting Communities

Advanced frontier research in nanoelectronics. Nanotechnology and particularly nanoelectronics are priority areas of European technology development. The growing interest on 'more than Moore' and beyond CMOS concepts requires long-term vision and focused investment of resources. This activity aims at integrating the corresponding infrastructures, based on frontier research and linked with matching technology platforms, to enable a smooth and consistent transition of the European industry to a new era of nanoelectronics.

Engineering, Material Sciences, and Analytical facilities - Advanced Communities

Advanced nanofabrication. This activity aims at furthering the integration of, and access to, infrastructures for micro- and nanofabrication and metrology applications based on nanoscale phenomena, targeting academic and research small-to-medium size laboratory-scale facilities with specific expertise in nanoscience.

Advanced material research based on large-scale facilities. This activity aims at furthering the integration of materials science studies, fabrication and analysis (emerging from nanofoundry and characterisation research) performed at laboratories linked to state-of-the-art large scale facilities such as neutron and synchrotron radiation sources and FELs.

Leading-edge research based on advanced laser sources. This activity aims at furthering the integration of state-of-the art laser technology enabling a wide range of novel applications with high industrial and social impact, such as bio-and nanophotonics, (bio)material analyses, (bio)medical diagnosis and treatment, communication and data processing. Synergies with relevant ESFRI Infrastructures, such as European XFEL, EUROFEL and ELI, should be duly exploited.

Functional materials for special applications. This activity aims at furthering the integration of, and access to, facilities for the development, treatment and characterisation of advanced functional materials ranging from hard to soft matter using advanced technologies.

Facilities for research on materials under extreme conditions. This activity aims at integrating research facilities in physics and materials science dealing with extreme conditions of matter: low and high temperature, high pressure, high (electro-)magnetic fields and aggressive chemical environments. The activity should enable a wider research community to perform experiments, particularly in the field of nanophysics, utilising user-friendly instrumentation.

Large-scale testing facilities for engineering applications. This activity aims at improving and providing access to the European research infrastructures such as wind tunnels and other industrial test benches for transport and particularly for aeronautics, including support for developing future norms for public transportation and safety.

Physical Sciences - Starting Communities

European laboratory astrophysics. Laboratory Astrophysics is a rapidly growing field, not least because the knowledge of fundamental physical properties and processes at nuclear, atomic and molecular levels is crucial for the interpretation of data from ground- and space-based observatories as well as solar-system probes. This activity aims at coordinating and integrating joint efforts of separate laboratories, for all aspects of generation, collection, distribution, curation, and access to data or samples. Links with the respective ESFRI projects in astrophysics (like CTA and SKA) should be established.

Research infrastructures for high-energy astrophysics. This activity aims at opening up existing facilities for developing, calibrating and testing both generic technologies as well as individual instruments developed for space missions in an environment representative of space conditions. Access should be provided in particular to scientists without national access to testing and calibration facilities, at the same time stimulating scientific and technological exchanges among European teams.

Science at deep-underground laboratories. This activity aims at achieving a high level of integration of facilities for deep underground fundamental science (e.g. dark matter and neutrino studies) and other interdisciplinary applications by simultaneously establishing common access procedures, promoting the common planning of experiments, and by

coordinating technological efforts in order to optimise use and access to resources and to avoid duplication.

Integrating gravitational wave research. This activity aims at integrating the communities of researchers studying gravitational waves and their astrophysical sources: both laser and atom interferometers with their extreme technological requirements; observations of graviational-wave sources through electromagnetic waves and high-energy particles; numerical/theoretical studies of such sources. It should address also the computing and data handling needs of these communities.

Physical Sciences - Advanced Communities

Detectors for future accelerators. This activity aims at furthering the integration of, and access to, the key research infrastructures in Europe for the testing and development of advanced detector technologies.

Research infrastructures for nuclear physics. This activity aims at furthering the integration of, and access to, the key research infrastructures in Europe for studying the properties of exotic nuclei or of nuclear matter at extreme conditions.

European planetary science. This activity aims at furthering the integration of the key research infrastructures in Europe for studying planetary science by drawing in new partners and by providing access to the facilities and to a larger number of users, taking into account the multi- and trans-disciplinary nature of the field.

Social Sciences and Humanities - Starting Communities

Generations and gender: a cross-national longitudinal data infrastructure for research on social cohesion and social inclusion and for the study of inter-generational relations in an ageing society. This activity aims at coordinating and integrating national research infrastructures built on longitudinal survey data by implementing common collection procedures and standards, harmonising micro- and macro-level information, and stimulating optimal use of these sources by researchers in demography, sociology, economics and other social sciences.

Research infrastructures for studying the role of intangible investment for economic growth and for the study of cultural, historical and institutional innovation processes. This activity aims at bringing together research infrastructures in order to sustain and further develop the empirical analytical framework that includes intangible capital in sources-of-economic-growth analysis. It also aims at bringing together research infrastructures for the study of cultural, historical, and institutional innovation processes.

Social Sciences and Humanities - Advanced Communities

Contemporary European history: European Holocaust research infrastructure. This activity aims at building upon existing research infrastructures and expanding them to include new material and new techniques in order to open distributed access of researchers to scattered material.

European research infrastructures for restoration and conservation of cultural heritage. This activity aims at bringing together facilities, located in research centres, universities and important culture institutions of different countries, for advanced diagnostics as well as the restoration and conservation of cultural heritage overcoming fragmentation, rationalising resources and advancing the international role of European cultural heritage research.

Expected impact:

Integrating Activities are the main instrument to realise the Innovation Union flagship initiative's Commitment n. 4: "*Opening of Member State operated research infrastructures to the full European user community*", with a structuring impact on the ERA and on the way research infrastructures operate, evolve and interact with similar facilities and with their users. In particular:

- Researchers will have wider, simplified, and more efficient access to the best research infrastructures they require to conduct their research, irrespective of location. They benefit from an increased focus on user needs.
- A new generation of researchers is educated that is ready to exploit in the best way all the essential tools needed for their research.
- Operators of related infrastructures develop synergies and complementary capabilities, leading to improved and harmonised services. There is less duplication of services, leading to an improved use of resources across Europe. Economies of scale and saving of resources are also realised due to the optimisation of operation and common development.
- Closer interactions between larger number of researchers active in and around a number of infrastructures facilitate cross-disciplinary fertilisations and a wider sharing of information, knowledge and technologies across fields and between academia and industry.
- Innovation is fostered through a reinforced partnership of research organisations with industry.
- The integration of major scientific equipment or sets of instruments and of knowledge-based resources (collections, archives, structured scientific information, data infrastructures, etc.) leads to a better management of the continuous flow of data collected or produced by these facilities and resources.
- When applicable, the integrated and harmonised access to resources at European level can facilitate the use beyond research and contribute to evidence-based policy making.
- When applicable, the socio-economic impact of past investments in research infrastructures from the European Structural and Investment Funds is enhanced.

Type of action: Research and innovation actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

CONDITIONS FOR THIS CALL

Publication date: 11/12/2013

Deadline(s)[9]:

INFRAIA-1-2014/2015	02/09/2014 at 17.00.00 Brussels time

Overall indicative budget: EUR 90.00 million from the 2014 budget[10] and EUR 50.00 million from the 2015 budget[11]

	2014 EUR million	2015 EUR million	
INFRAIA-1-2014/2015	90.00	50.00	Single stage

Eligibility and admissibility conditions: The conditions are described in parts B and C of the General Annexes to the work programme, with the following exceptions:

INFRAIA-1-2014/2015	Given the specific nature of this topic, specific eligibility conditions, in addition to the standard eligibility conditions for Research and Innovation Action, apply: all the three types of activities: networking, access and joint research activities shall be included in the proposal. Please read carefully the provisions under the part D of the section "Specific features for Research Infrastructures" before the preparation of your application.

Evaluation criteria, scoring and threshold: The criteria, scoring and threshold are described in part H of the General Annexes to the work programme, with the following exceptions:

INFRAIA-1-2014/2015	For the criterion Excellence, in addition to its standard sub-criteria, the following aspects will also be taken into account; • The extent to which the Networking Activities will foster a culture of co-operation between the participants and other relevant stakeholders. • The extent to which the Access Activities (Trans-national Access and/or Virtual activities) will offer access to state-of-the-art infrastructures, high quality services, and will enable users to conduct excellent research. • The extent to which the Joint Research Activities will contribute to quantitative and qualitative improvements of the services provided by the infrastructures.

[9] The Director-General responsible may delay this deadline by up to two months.

[10] Subject to the availability of the appropriations provided for in the draft budget for 2014 after the adoption of the budget for 2014 by the budgetary authority or, if the budget is not adopted, as provided for in the system of provisional twelfths.

[11] These budget amounts are indicative and will be subject to a separate financing decision to cover the amounts to be allocated for 2015.

Evaluation procedure: The procedure for setting a priority order for proposals with the same score is given in part H of the General Annexes. The full evaluation procedure is described in the relevant guide associated with this call.

- Indicative timetable for evaluation and grant agreement:

	Information on the outcome of the evaluation (*single stage*)	Indicative date for the signing of grant agreements
INFRAIA-1-2014/2015	Maximum 5 months from the final date for submission.	Maximum 3 months from the date of informing applicants they have been successful.

Consortium agreements: In line with the Rules for Participation and the Model Grant Agreement, participants in Research and Innovation Actions are required to conclude a consortium agreement prior to grant agreement.

Call - e-Infrastructures

H2020-EINFRA-2014/2015

This call focuses on e-infrastructures and is motivated by the following priorities:

- Integrating e-infrastructure resources and services across all layers (networking, computing, data, software, user interfaces), in order to provide seamless services tailored to user needs. Integration will be facilitated by agreeing and deploying common or interoperable core services and service building blocks, which is the main aim of topic EINFRA-7-2014, by avoiding rigid boundaries between computing and data (in EINFRA-1-2014 and EINFRA-5-2015), and by user-driven integration in Virtual Research Environments (topic EINFRA-9-2015).
- Implementing the e-infrastructure to ride the wave of "big data", on the basis of the policy orientations provided by the High-Level Group on Scientific Data[12] and the "framework for action" published in March 2013[13], through topics EINFRA-1-2014, EINFRA-2-2014 and EINFRA-3-2014.
- Providing support to the e-infrastructure for Open Access as defined in the Communication on Scientific Information[14] through EINFRA-1-2014 and EINFRA-2-2014, in particular for the implementation of the Open Access mandate (covering all Horizon 2020 publications output) and the Open Data Pilot, and for federating researcher electronic identities as defined in the ERA Communication[15] through EINFRA-7-2014. Activities in EINFRA-1-2014 and EINFRA-2-2014 will provide services to support project participants in any area of Horizon 2020 for managing the life cycle of data they collect or produce within their projects (e.g. deposition, storing, access and preservation).
- Implementing the e-infrastructure part of the EU strategy on High Performance Computing (HPC)[16], in particular the provision of services, the infrastructure for computing applications (Centres of Excellence) and a network of HPC Competence Centres for SMEs through topics EINFRA-4-2014, EINFRA-5-2015 and EINFRA-6-2014. A Public-Private Partnership (PPP) in HPC (expected by the end of 2013) will provide the framework for the implementation of the HPC strategy, addressing in particular the Centres of Excellence in computing applications and the development of HPC technologies towards exascale (supported in the Future and Emerging Technologies part of the Excellent Science pillar).
- Under topic EINFRA-8-2014 it is intended to establish a partnership with the selected consortium, based on the agreed action plan, through entering into a Framework Partnership Agreement (FPA)[17]. Within this framework, the Commission intends to

[12] http://cordis.europa.eu/fp7/ict/e-infrastructure/docs/hlg-sdi-report.pdf

[13] http://cordis.europa.eu/fp7/ict/e-infrastructure/docs/framework-for-action-in-h2020_en.pdf

[14] COM(2012)401 final, http://ec.europa.eu/research/science-society/document_library/pdf_06/era-communication-towards-better-access-to-scientific-information_en.pdf

[15] COM(2012)392 final, http://ec.europa.eu/research/science-society/document_library/pdf_06/era-communication-partnership-excellence-growth_en.pdf

[16] Communication "High-Performance Computing: Europe's place in a Global Race" http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2012:0045:FIN:EN:PDF

[17] Commission Delegated Regulation (EU) No 1268/2012 of 29 October 2012, Article 178

award Specific Grant[18] with the selected consortium (see also section on "Other actions), in order to implement the action plan of the FPA.

- Software cuts across almost all topics. Strategic software is addressed in EINFRA-1-2014 (e.g. sub-topic 7 on database software for extremely large datasets) and computing application codes are addressed in EINFRA-5-2015.
- Mainstreaming innovation and the development of human capital in all topics that are relevant.

Proposals addressing e-infrastructure services development (all topics in this call except EINFRA-3-2014 and EINFRA-6-2014) will combine, in a closely co-ordinated manner, Networking, Service and Joint Research Activities as detailed in part E of the section "Specific features for Research Infrastructures". Further conditions and requirements that applicants should fulfil when drafting a proposal are also given in this section. Compliance to these provisions will be taken into account during evaluation.

The projects funded under the e-Infrastructures part are expected to participate in the Pilot on Open Research Data in Horizon 2020 in line with the Commission's Open Access to research data policy for facilitating access, re-use and preservation of research data. Further guidance on the Open Research Data Pilot is made available on the Participant Portal.

Proposals are invited against the following topics:

EINFRA-1-2014 – Managing, preserving and computing with big research data

Specific challenge: Development and deployment of integrated, secure, permanent, on-demand service-driven, privacy-compliant and sustainable e-infrastructures incorporating advanced computing resources and software are essential in order to increase the capacity to manage, store and analyse extremely large, heterogeneous and complex datasets[19], including text mining of large corpora. These e-infrastructures need to provide services cutting across a wide-range of scientific communities and addressing a diversity of computational requirements, legal constraints and requirements, system and service architectures, formats, types, vocabularies and legacy practices of scientific communities that generate, analyse and use the data.

Scope: Proposals should address at least one of the first five (5) activities, or activities 6, 7 or 8 individually. Proposers are encouraged to leverage on prior work on open prototype services and to use discoverable service catalogues, common APIs, service-level agreements (SLAs) and transparent billing.

(1) Establishing a federated pan-European data e-infrastructure to provide cost-effective and interoperable solutions for data management and long term preservation. The needs for data access, storage, replication, annotation, search, compute, analysis and reuse of information across disciplines should be accommodated in different research and education contexts. All these functions should expose standard interfaces for interoperation with other data sources to aggregate them or to be aggregated, considering also ethical and regulatory requirements for

[18] Awarding of specific grants will follow the rules and procedures established in the Financial Regulation.

[19] Research data include large datasets collected, developed or generated for/by research, integration of small distributed datasets, as well as data not originally collected for research, which may include environmental, social and humanities data.

sensitive data (e.g. patient data). Sustainability is of paramount importance, therefore robust business models should be proposed to encourage investment from all stakeholders. Foreseen challenges are technical, legal and organisational, including engaging e-infrastructure operators and other service providers (such as those receiving support under topics EINFRA-2-2014, EINFRA-3-2014, and EINFRA-7-2014);

(2) Services to ensure the quality and reliability of the e-infrastructure, including certification mechanisms for repositories and certification services to test and benchmark capabilities in terms of resilience and service continuity of e-infrastructures;

(3) Federating institutional and, if possible, private data management and curation tools and services used across or at some point of the full data lifecycle, including approaches for identification of open data sources and data collected with sensitive or restricted access features. Services and tools should be federated on the basis of an open architecture and should offer or coordinate support to the development of Data Management Plans, in particular for Horizon 2020 project participants;

(4) Large scale virtualisation of data/compute centre resources to achieve on-demand compute capacities, improve flexibility for data analysis and avoid unnecessary costly large data transfers.

(5) Development and adoption of a standards-based computing platform (with open software stack) that can be deployed on different hardware and e-infrastructures (such as clouds providing infrastructure-as-a-service (IaaS), HPC, grid infrastructures…) to abstract application development and execution from available (possibly remote) computing systems. This platform should be capable of federating multiple commercial and/or public cloud resources or services and deliver Platform-as-a-Service (PaaS) adapted to the scientific community with a short learning curve. Adequate coordination and interoperability with existing e-infrastructures (including GÉANT, EGI, PRACE and others) is recommended

(6) Support to the evolution of EGI (European Grid Infrastructure) towards a flexible compute/data infrastructure capable of federating and enabling the sharing of resources of any kind (public or private, grid or cloud, etc.) in order to offer computing and storage services to the whole European scientific community. The proposal will address operations for supplying services (IaaS, PaaS, SaaS) at European level, engagement of and tailoring of services to new user communities and dissemination activities.

(7) Proof of concept and prototypes of data infrastructure-enabling software (e.g. for databases and data mining) for extremely large or highly heterogeneous data sets scaling to zetabytes and trillion of objects. Clean slate approaches to data management targeting 2020+ 'data factory' requirements of research communities and large scale facilities (e.g. ESFRI projects) are encouraged.

(8) Enable the creation of a platform and infrastructure for mining text aggregated from different sources/publishers that responds to the needs of users (researchers). This includes the definition of technical requirements (e.g. on interoperability, metadata standards and aggregation of new services) as well as addressing legal and contractual issues to serve the needs of text mining communities. The project should also provide consulting and counselling services to solve problems related with the legal framework and permissions to text mine collections, and to advise researchers on the benefits and practice of text mining. The development of the proposed platform and services should be informed by the studies on policy and licencing issues associated with Text and Data Mining that will be funded from the Call on "Science with and for Society" (GARRI.5.2014 - Scientific Information in the Digital Age: Text and Data Mining). Therefore, the successful proposals in these two calls are expected to engage in a mutual dialogue and establish synergies in their work.

A maximum of EUR 8 million of the total budget for this topic is foreseen for activity (6).

This topic is complementary with topic INFRADEV-4-2014/2015, as it addresses services that are potentially transversal and generic, whereas INFRADEV-4-2014/2015 addresses interoperability of services and common solutions for cluster of ESFRI and other research infrastructure initiatives in thematic areas.

Expected impact:

- Increased availability of scientific data for scientific communities independently of them having already embraced or not e-science; this will be measured by cross-border data traffic over the research networks in Europe as a proxy.
- Better optimisation of the use of IT equipment for research.
- Avoiding lock-in to particular hardware or software platforms in the development of science.
- Scientific communities embrace storage and computing infrastructures as state-of-the-art services become available and the learning curve for their use becomes less steep; this will be measured by the storage capacity available for pan-European use as well as by the number of users of EGI and other production e-infrastructures in this area.
- Through the development of large pooled and interoperable text mining infrastructures, efficiencies of scale will reduce the overall costs, and more open licensing schemes will spread the use of such licenses and boost the exchange of text mining resources and practices.

Type of action: Research and innovation actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

EINFRA-2-2014 – e-Infrastructure for Open Access

Specific challenge: Europe needs a robust e-infrastructure supporting Open Access policies, also for Horizon 2020. This infrastructure, based on already existing e-infrastructures (institutional and thematic repositories, aggregators, etc.), should support reliable and permanent access to digital scientific records. A key element will be capacity building to link literature and data in order to enable a more transparent evaluation of research and reproducibility of results. Such an action will include an analysis of alternative means of public support to Gold Open Access in order to identify the optimal approach. The Open Access mandate and the Open Data Pilot of Horizon 2020 impose new requirements for the infrastructures to fully support participants to comply with their obligations and objectives. Therefore, a key objective will be to provide service driven infrastructures to enable wide participation in the Open Data Pilot.

Scope: Proposals should address all the following activities:

(1) Service-driven data e-infrastructure responding to general and specific requirements of researchers and research organisations for open access to and deposit of scientific information (including journal articles, books, monographs, conference proceedings, thesis, grey literature, software and data, as well as services linking literature, data and software). This e-infrastructure will further develop the research capacity through a coordinated and participatory architecture linking institutional and thematic repositories across Europe with scientific information to be used by humans and machines. An essential part of this service-

driven approach will be helpdesks designed to support the producers and users of scientific information, human networks to support data sharing and implementation of Open Access policies in Europe, as well as the promotion of technical solutions for sharing of sensitive data (e.g. patient data). The e-infrastructure should be incorporated as a legal entity within the first year of the project. Relevant indicators on the take-up of open access in Europe including for both publications and data should be elaborated and reported upon regularly. The project will promote a limited set of biblio- and webometrics that reflect open access policies. It will collect bibliometric data on publications, citations, data citations, etc. on all Horizon 2020 scientific output (including on the Open Data Pilot) and produce both standard and on-demand statistics.

(2) Developing proof of concept and prototyping new services in support of open science (e.g. new forms of publishing, innovative services based on data mining, new forms of peer review etc.), assisting researchers and educators in everyday tasks. This includes the accessory task of piloting a mechanism to stimulate publishing in open access journals by paying authors part or all of the article processing charges they incurred after the end of their grant agreement with the Commission[20]. The proposal should indicate the maximum amount to be paid per 'Gold' open access publication. Up to three post-grant publications that occur within the two years following the related EU grant expiring may be eligible. Any other conditions that would be necessary to enable as many authors as possible to participate and to ensure that this service contributes to the development of a sustainable and competitive market for scientific open access publishing should be indicated. The duration of the pilot should be 12 to 24 months unless the available budget is exhausted before. Proposals should consider barriers (including legal) to data sharing in the context of these new services and assess the possibility of pan-European information sharing agreements considering the authentication and authorization infrastructure described in topic EINFRA-7-2014.

(3) Supporting the global interoperability of open access data e-infrastructures and linking with similar initiatives across the globe in order to complement the physical access to research facilities with data access and to ensure that Europe plays a leading role in international collaborations.

It is expected that one proposal will be selected. A maximum of EUR 4 million of the total budget for this topic is foreseen for the article processing charges under point (2).

Expected impact: The intellectual capital of Europe is available to researchers, business and citizens to generate economic and scientific advances now, and that capital is safely preserved for further exploitation by future generations. Open Access publications resulting from Horizon 2020 funded research are available and easily findable online. Data needed to validate published results is linked to the publications and publicly shared whenever possible. Accurate science metrics for Horizon 2020 can be produced with almost no effort. Most of the European institutional repositories (at least 80%) as well as the principal thematic repositories are part of the same interoperable repository network.

Type of action: Research and innovation actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

[20] The pilot foreseen in activity (2) allows for the provision of financial support to third parties in line with the conditions set out in Part K of the General Annexes.

EINFRA-3-2014 – Towards global data e-infrastructures – Research Data Alliance

Specific challenge: European contribution to the development of global data infrastructures needs to ensure Europe's role as a global player. This can be achieved by strengthening and consolidating Europe's contribution to the Research Data Alliance (RDA), ensuring that RDA fosters research data interoperability and exchange at global level. RDA is an open international forum to create consensus on solutions and best practices to specific problems hampering data exchange and interoperability.

Scope: Proposals will support all of the following points:

(1) definition, operation and monitoring of the governance structures of the Research Data Alliance (RDA); secondment and exchange of staff where appropriate;

(2) active participation of European stakeholders (organisations and individual experts) in RDA and leadership initiatives in strategic working group activities; EU industry involvement and innovation will be promoted in particular;

(3) engaging scientific communities having underdeveloped data infrastructures in defining the best practices for data exchange and interoperability; and

(4) establishing coordination mechanisms at European level (national research funders, European education and research associations) and with international organisations dealing with standardisation, research data and education issues (IETF, W3C, CODATA, OECD, UNESCO, …).

Expected impact: Europe will be in a leading position in enabling the use of the world's store of research data in multi-disciplinary, data intensive global scientific collaborations. It will help the development and adoption of relevant international open standards based on the best practices of a large spectrum of research communities. It will engage research communities at early stages of standards development and address common data requirements for new services bringing together users and technology providers. It will promote sustainable models for research data sharing and install trust in the adopted solutions.

Type of action: Coordination and support actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

EINFRA-4-2014 – Pan-European High Performance Computing infrastructure and services

Specific challenge: In order to create a world-class pan-European infrastructure, and to provide state-of-the-art services and access to this infrastructure to users, independently of location, the HPC resources in Europe need to be further pooled, integrated and rationalised.

This topic contributes to the implementation of the EU strategy on High Performance Computing (HPC), in particular by providing access to the best supercomputing facilities and services for both industry and academia, and complements the activities of the Public-Private Partnership (PPP) in HPC in order to implement the HPC strategy.

Scope: Proposals should address the following activities:

(1) Provide a seamless and efficient Tier-0 service to users Europe-wide based on promoting research excellence and innovation; this includes peer-review procedures for the allocation of computing time; transparent billing; and specific services adapted to the needs of users, including ESFRI projects, Horizon 2020 projects/programmes, large institutional users or industry. Tier-0 are those services provided at pan-European level with machines devoted to the pan-European infrastructure for a significant fraction of cycles (to be agreed with the Commission) and having a minimum performance level to be periodically defined by the consortium

(2) Carry out activities (training, service prototyping, software development etc.) that build on national HPC capabilities (Tier-1) and are necessary to support Tier-0 services or a functional European HPC ecosystem;

(3) Ensure openness to new user communities and new applications; promote industrial take-up of HPC services in particular by SMEs;

(4) Implement inclusive and equitable governance and a flexible business model to ensure long term financial sustainability; the business model should allow financial or in-kind contributions by research projects/programmes, institutions, industry and regions or countries; based on an auditable cost model for the operation of HPC Centres providing European services with different financing sources;

(5) Develop and maintain the strategy for the deployment of a rich HPC environment of world-class systems with different machine architectures - evolving towards exascale - including the implementation roadmap at EU and national level, taking into account financial aspects, best practices for reduction of operating and energy costs, and the specifications and technical requirements for a varied set of Tier-0 systems ensuring a broad coverage of user needs;

(6) Working in synergy with:

- the Centres of Excellence (see topic EINFRA-5-2015 – CoEs for computing applications);
- the European Technology Platform for HPC; the pan-European HPC infrastructure will consult its users in order to provide technical specifications to guide research activities for future exascale prototypes and systems;

(7) Design and execute training and skills development programmes tailored to the needs of research in academia and industry and relevant public services in order to stay at the forefront of scientific breakthroughs, as well as introduction of scientific computing and HPC in academic curricula;

(8) Develop an international cooperation policy and associated activities.

The infrastructure should provide core and basic services in coordination with other e-infrastructure providers to promote interoperability and a seamless user experience, in accordance with topic EINFRA-7-2014. Interworking with other computing infrastructures such as clouds and grids should be ensured.

Expected impact:

- Improved services and procedures for all users to access the infrastructure and the common services, and improved allocation schemes to ensure openness to new user communities and applications;
- Increased amount of computing cycles available to researchers at European level through user-friendly and efficient procedures, helping Europe to stay at the forefront of scientific breakthroughs and innovation;

- Increased number of industrial organisations (in particular SMEs), EU projects and institutional users benefiting from access to services including training in HPC;
- Increased investment in HPC infrastructure in Europe (national, regional and EU);
- Long term financial sustainability through flexible business models and inclusive governance;
- Better coordination between demand and supply in the European HPC ecosystem, with improved collaboration of the users and procurers with technology developers and suppliers to foster innovation;

Type of action: Research and innovation actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

EINFRA-5-2015 – Centres of Excellence for computing applications

Specific challenge: Establishing a limited number of Centres of Excellence (CoE) is necessary to ensure EU competitiveness in the application of HPC for addressing scientific, industrial or societal challenges. CoEs will be user-focused, develop a culture of excellence, both scientific and industrial, placing computational science and the harnessing of 'big data' at the centre of scientific discovery and industrial competitiveness. CoEs may be 'thematic', addressing specific application domains such as medicine, life science or energy; 'transversal' on computational science (e.g. algorithms, analytics, numerical methods etc.); or 'challenge-driven', addressing societal or industrial challenges (e.g. ageing, climate change, clean transport etc.); or a combination of these types.

This topic will be carried out in the context of the Public-Private Partnership (PPP) in HPC, contributing to the implementation of the EU strategy on High Performance Computing (HPC), in particular to achieving excellence in HPC application delivery and use.

Scope: The CoEs are expected to be:

(1) User-driven, with the application users and owners playing a decisive role in governance;

(2) integrated: encompassing not only HPC software but also relevant aspects of hardware, data management/storage, connectivity, security, etc.;

(3) multidisciplinary: with domain expertise co-located alongside HPC system, software and algorithm expertise;

(4) distributed with a possible central hub, federating capabilities around Europe, exploiting available competences, and ensuring synergies with national/local programmes;

Proposals for CoEs will address:

- Provision of services such as: developing, optimising (including if needed re-design) 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; consultancy to industry and SMEs; research in HPC applications; and addressing the skills gap in computational science.
- Working in synergy with the pan-European HPC infrastructure, including by identifying suitable applications for co-design activities relevant to the development of HPC technologies towards exa-scale.

- Sustainability embracing a wide range of service models and funding from a mixture of sources, including through sponsorship by industry or hybrid public-private models. Clear business plans are expected to be presented in the proposal.
- Creating communities around specific codes that impact the target sectors, involving ISVs (independent software vendors) where appropriate, and exchange of best practices in particular for SMEs.
- A governance structure driven by the needs of the users. Commercial management expertise will be needed along with technical expertise to manage industry clients and supply chains, in addition to users from academia.

CoE should provide pan-European support including to European countries and regions with less HPC-resources.

8-10 CoEs are expected to be funded in this topic in order to test the concept. A follow up call is expected in the future that will build on the results and lessons learnt from the present call.

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

The Commission considers that proposals requesting a contribution from the EU of between EUR 4 and 5 million would allow this topic to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact:

- Improved access to computing applications and expertise that enables researchers and industry to be more productive, leading to scientific excellence;
- Improved competitiveness for companies and SMEs through access to CoE expertise and services;
- European leadership in applications that address societal challenges or are important for industrial applications through better code performance and better code maintenance and availability;
- More scientists and engineers trained in the use of computational methods and optimisation of applications.

Type of action: Research and innovation actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

EINFRA-6-2014 – Network of HPC Competence Centres for SMEs

Specific challenge: HPC competence centres have been set up in some Member States to facilitate access and take-up by industry and in particular SMEs of HPC services. As yet these centres do not cover the whole of Europe. Supporting one network of HPC competence centres will promote access to computational expertise anywhere in Europe and enable the dissemination of best practice in HPC industrial use particularly for SMEs. This topic contributes to the implementation of the European HPC strategy, in particular to foster the use of HPC by SMEs.

Scope: Proposals should address at least the following activities:

(1) networking of existing HPC competence centres providing HPC services to exchange best practices and pool technical, expertise or business resources;

(2) awareness raising and visibility activities of the benefits of HPC for SMEs in particular for countries that do not currently have such centres;

(3) identification of the pool of SMEs and available expertise in the different business areas at European level, and mechanisms to match SME needs and the available expertise;

(4) training (in synergy with the activities carried out by other organisations providing specific training for SMEs in HPC);

The aim is to support one network which will address coordination, outreach, training and the exchange of best practice and software components between the participating national and regional competence centres, complementing their current activities and services with actions of a clear European added-value that cannot be performed at local level. Direct support to adoption of HPC by individual SMEs is not expected to be carried out by this network.

This action will be complementary to the actions carried out in the Nanotechnologies, Advanced Materials, Biotechnology and Advanced Manufacturing and Processing Work Programme 2014-2015 in the specific call for manufacturing, (H2020-FoF-2014/2015) ICT Innovation for Manufacturing SMEs (I4MS) (topic FoF-9-2015).

Expected impact:

- The network of HPC competence centres will be a reference for best practices for supporting SME competitiveness through access to HPC;
- Increased number of SMEs that are aware of the potential and/or become users of HPC;
- Establishment of a focal point at European level for expertise in HPC use by SMEs;
- Increase in the size of the HPC market (services, ISVs, computers).

Type of action: Coordination and support actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

EINFRA-7-2014 – Provision of core services across e-infrastructures

Specific challenge: Support to harmonise and/or deploy core e-infrastructure services is crucial for their effective use by both production e-infrastructures and e-infrastructures under development. Core services are considered those that 1) enable e-infrastructure interoperation and 2) are common across a broad range of e-infrastructures and research communities.

Scope: Proposals will address one of the two following actions (one proposal per action will be funded):

(1) Development and promotion of the uptake of a Digital Identifier e-infrastructure for digital objects (articles, datasets, collections, software, nomenclature, etc.), contributors and authors which cuts across geographical, temporal, disciplinary, cultural, organisational and technological boundaries, without relying on a single centralised system but rather federating locally operated systems to ensure interoperability. The requirements of all relevant stakeholder groups (researchers, libraries, data centres, publishers, etc.) will be addressed;

(2) Deployment and promotion of a pan-European identity federation for researchers, educators and students, in compliance with existing identity inter-federation efforts (including Eduroam and Edugain). The action will involve (research and education) institutions in EU

Member States, existing identity federations, e-infrastructure providers and libraries. It should aim to overcome technical, organisational and legal obstacles for the implementation of an integrated and interoperable authentication and authorisation infrastructure (AAI) and to lower barriers for entry of organisations not already participating in identity federations, e.g. by providing scalable policy negotiation mechanisms, as well as legal guidance notably in data protection. It should also encourage the use of security token translation services to enable interoperability of different AAIs, as well as accounting services for enabling interoperability and aggregation in recording the usage of resources securely and reliably, including for the highly distributed heterogeneous infrastructures envisaged for global research data. Guest identities and alternative methods of identification (e.g. social media identities) are encouraged e.g. in order to allow public access at large. Assessment of penetration of existing identity federations at national level and development of training activities for data professionals on issues related to AAI enabled collaboration and data sharing (data privacy, intellectual property, cultural barriers, etc.) should be foreseen.

Expected impact:

- The interoperability of e-infrastructure services is improved, therefore access to resources and collaboration between scientists are facilitated;
- Duplication of efforts for developing services common to many e-infrastructures is reduced;
- Extensive use of Digital Identifiers opens new prospects for advanced services for science and education and for encouraging openness and building trust;
- The federation of identities allows a European-wide single sign-on service enabling researchers to collaborate within secure and trusted virtual research environments where scientific resources and content can be accessed, used, stored and shared.
- The deployment of the AAI should facilitate sharing of information resources at pan-European level.
- Expansion of the coverage of national identity federations for network, services and applications; all research institutions are able to participate in identity federations even with low level of technical or organisational preparedness.

Type of action: Research and innovation actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

EINFRA-8-2014 - Research and Education Networking – GÉANT

Specific challenge: GÉANT is recognised as the European communications commons that supports the rise of compute- and data-intensive collaborative research and education through innovative services, operational excellence and global reach. There is a clear need to further develop and maintain GÉANT in this role.

Scope: GÉANT will:

(1) Provide cost-effective and reliable services for very high-speed connectivity, identity inter-federation, resource virtualisation, mobility and trust in order to support knowledge communities, ensuring digital continuum of services to users anywhere in the EU.

(2) Enable talent anywhere in the world to cooperate with their peers in Europe through interoperable services, as well as extend beyond the traditional researcher base into wider public services where appropriate.

(3) Advance the state-of-the-art of the communication commons by constant development of both innovative multi-domain services and their use, and by translating this innovation into a competitive European ICT sector, for instance through: specific open calls; pre-commercial procurement; public-private partnerships between industry, academia and user communities to develop, experiment with or validate novel technologies in the telecom and internet domains; and exploring with industry possibilities of service provisioning through aggregation of demand and brokerage, new business models, best practices or coordination.

(4) Cope with the changing environment by structuring the governance of the European communications commons for accountability, measurability, transparency and sustainability; focusing on flexible services geared towards users; stimulating development of GÉANT's human capital (including training and exchange schemes); and aligning the regulatory, standardisation and policy framework to enable full exploitation of the communications commons.

GÉANT should provide core and basic operation services including identity federation, in coordination with other e-infrastructure providers to promote interoperability and a seamless user experience.

The long-term cooperation between the Commission and the selected consortium will be formalised within a Framework Partnership Agreement (FPA) covering the duration of Horizon 2020[21] to provide a stable environment for the implementation of GÉANT as the European communication commons and with an indicative average yearly EU funding of EUR 25 million per year[22]. This agreement shall specify the common objectives, the nature of actions planned and the general rights and obligations of each party..

Within this framework, the Commission intends to award Specific Grants[23] to the selected consortium, in order to implement the action plan agreed in the FPA, in accordance with the procedures laid down in the FPA (see also section on "Other actions").

Expected impact: By 2020 GÉANT is the European communications commons where talent anywhere is able to collaborate with their peers around the world and have instantaneous and unlimited access to any resource for knowledge creation, innovation and learning, unconstrained by the barriers of the pre-digital and the present digital world. Europe is the hub for research networking excellence world-wide. The GÉANT governance is able to cope with the changing environment and the GÉANT community collaborates intensively with European industry and academia, produces innovative solutions grounded on business needs and drives the internet evolution.

Type of action: Framework Partnership Agreement with multiple beneficiaries (no funding) providing a framework for Specific Grants

The conditions related to this topic are provided at the end of this call and in the General Annexes.

[21] As per Article 178 of the Rules of Application of the Financial Regulation and Article 16(6) of the Rules for Participation

[22] Subject to budget availability, successful evaluation and commission decision

[23] Awarding of specific grants will follow the rules and procedures established in the Financial Regulation

EINFRA-9-2015 – e-Infrastructures for virtual research environments (VRE)

Specific challenge: There is yet considerable potential and room for development in the use of virtual research environments. The objective is to address this challenge by supporting capacity building in interdisciplinary research communities to empower researchers through development and deployment of service-driven digital research environments, services and tools tailored to their specific needs. These virtual research environments (VRE) should integrate resources across all layers of the e-infrastructure (networking, computing, data, software, user interfaces), should foster cross-disciplinary data interoperability and should provide functions allowing data citation and promoting data sharing and trust.

Scope: Each VRE should abstract from the underlying e-infrastructures using standardised building blocks and workflows, well documented interfaces, in particular regarding APIs, and interoperable components. Over time VREs will be composed of generic services delivered by e-infrastructures and domain specific services co-developed and co-operated by researchers, technology and e-infrastructure providers, and possibly commercial vendors.

The VRE proposals should clearly identify and build on requirements from real use cases, e.g. for integration of heterogeneous data from multiple sources and value-added services for computing, modelling, simulation, and data exploration, mining and visualisation, taking due account of privacy aspects. They should re-use tools and services from existing infrastructures and projects at national and/or European level as appropriate.

Where data are concerned, projects will define the semantics, ontologies, the 'what' metadata, as well as the best computing models and levels of abstraction (e.g. by means of open web services) to process the rich semantics at machine level (the so called 'how' metadata), as to ensure interoperability. They may also support proof of concept, prototyping and deployment of advanced data services and environments, and access to top-of-the-range connectivity and computing.

VREs may target any area of science and technology, especially interdisciplinary ones, including ICT, mathematics, web science and social sciences and humanities. Focusing on the ICT infrastructures needed for addressing the Societal Challenges is especially encouraged. Proposals should indicate the number of researchers they target as potential users.

This topic is complementary with topic INFRADEV-4-2014/2015, as VREs integrate data, network and computing resources for interdisciplinary research communities, whereas INFRADEV-4-2014/2015 addresses interoperability of services and common solutions for cluster of ESFRI and other research infrastructure initiatives in thematic areas.

The Commission considers that proposals requesting a contribution from the EU of between EUR 2 and 8 million would allow this topic to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: VREs are expected to result in more effective collaboration between researchers and higher efficiency and creativity in research as well as in higher productivity of researchers thanks to reliable and easy access to discovery, access and re-use of data. They will accelerate innovation in research via an integrated access to potentially unlimited digital research resources, tools and services across disciplines and user communities and enable researchers to process structured and qualitative data in virtual and/or ubiquitous workspaces. They will contribute to increased take-up of collaborative research and data sharing by new disciplines, research communities and institutions.

Type of action: Research and innovation actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

CONDITIONS FOR THIS CALL

Publication date: 11/12/2013

Deadline(s)[24] [25]:

EINFRA-2-2014	15/04/2014 at 17.00.00 Brussels time
EINFRA-1-2014, EINFRA-3-2014, EINFRA-4-2014, EINFRA-6-2014, EINFRA-7-2014 and EINFRA-8-2014	02/09/2014 at 17.00.00 Brussels time
EINFRA-5-2015 and EINFRA-9-2015	[14/01/2015 at 17.00.00 Brussels time]

Overall indicative budget: EUR 95.00 million from the 2014 budget[26] and EUR 82:00 million from the 2015 budget[27]

	2014 EUR million	2015 EUR million	
EINFRA-1-2014	55.00		Single stage
EINFRA-2-2014	13.00		Single stage
EINFRA-3-2014	4.00		Single stage
EINFRA-4-2014	15.00		Single stage
EINFRA-5-2015		40.00	Single stage
EINFRA-6-2014	2.00		Single stage
EINFRA-7-2014	6.00		Single stage
EINFRA-8-2014	0.00[28]		Single stage
EINFRA-9-2015		42.00	Single stage

Eligibility and admissibility conditions: The conditions are described in parts B and C of the General Annexes to the work programme, with the following exceptions:

EINFRA-8-2014	In addition to the standard eligibility conditions for Research and Innovation Action, given the specific nature of this topic, the proposal shall be submitted solely by legal entities operating the NRENs or legal entities created by the NRENs to contribute to the deployment of connectivity and services on a pan-European scale (e.g. DANTE, TERENA, NORDUnet).

[24] The Director-General responsible may delay this deadline by up to two months.

[25] The deadlines provided in brackets are indicative and subject to a separate financing decision for 2015.

[26] Subject to the availability of the appropriations provided for in the draft budget for 2014 after the adoption of the budget for 2014 by the budgetary authority or, if the budget is not adopted, as provided for in the system of provisional twelfths.

[27] The budget amounts are indicative and will be subject to a separate financing decision to cover the amounts to be allocated for 2015.

[28] There is no budget associated to the establishment of a Framework Partnership Agreement.

Evaluation criteria, scoring and threshold: The criteria, scoring and threshold are described in part H of the General Annexes to the work programme, with the following exceptions:

EINFRA 1-2014, EINFRA 2-2014, EINFRA 4-2014, EINFRA 5-2015, EINFRA 7-2014, EINFRA 8-2014 and EINFRA 9-2015	For the criterion Excellence, in addition to its standard sub-criteria, the following aspects will also be taken into account: • The extent to which the Networking Activities will foster a culture of co-operation between the participants and other relevant stakeholders. • The extent to which the Service activities will offer access to state-of-the-art infrastructures, high quality services, and will enable users to conduct excellent research. • The extent to which the Joint Research Activities will contribute to quantitative and qualitative improvements of the services provided by the infrastructures.

Evaluation procedure: The procedure for setting a priority order for proposals with the same score is given in part H of the General Annexes. The full evaluation procedure is described in the relevant guide associated with this call.

- Indicative timetable for evaluation and grant agreement:

	Information on the outcome of the evaluation (*single stage*)	Indicative date for the signing of grant agreements
All topics	Maximum 5 months from the final date for submission.	Maximum 3 months from the date of informing applicants they have been successful.

Consortium agreements: In line with the Rules for Participation and the Model Grant Agreement, participants in Research and Innovation Actions or in Innovation Actions are required to conclude a consortium agreement prior to grant agreement.

Call - Support to innovation, human resources, policy and international cooperation

H2020-INFRASUPP-2014/2015

This call focuses on fostering the innovation potential and developing the human resources of research infrastructures especially in areas that suffer from shortages in supply or where new skills and professions need to emerge, e.g. in 'data science'. It will also aim at reinforcing European research infrastructures policy and international cooperation.

In addition to this call, innovation and development of human resources are mainstreamed in all relevant parts of the work programme. Similarly, development of policy and international cooperation are encouraged 'bottom up' in any project where these activities appear relevant. Support to the global Research Data Alliance is envisaged separately in the call on e-Infrastructures.

Proposals are invited against the following topics:

INFRASUPP-1-2014 – Innovation support measures

Specific challenge: Research infrastructures, as providers of advanced services and as procurers of leading-edge technologies, have an innovation potential that has not always been sufficiently exploited in the past. There is a clear innovation potential associated with procurement from industry during the construction of a new research infrastructure. However, enterprises (including SMEs) may not realise that they have the opportunity to benefit from this potential simply due to a lack of awareness. On the other hand, industry may find entry barriers to this sector. Moreover, users from industry typically constitute a very small fraction of a research infrastructure's users, again because they may not be aware of the availability of research infrastructures or of an infrastructure's potential relevance to their own R&D activities. There is therefore a need to stimulate innovation both from within the research infrastructures themselves and in their supplier industry.

Scope: Proposals should address the following areas:

1. Development of a portal of calls, tenders and future needs and technology transfer opportunities in research infrastructures of pan European interest;
2. Networking of procurement professionals to encourage exchange of good practices across research infrastructure sectors;
3. Awareness campaign towards industry (including SMEs) on the potential of research infrastructures for their activities in selected R&D areas;

As a first step a repository with the innovation capabilities, purchasing plans, and industrial linkages of the various research infrastructures should be set up, creating an initial point of contact for interested innovation actors. To facilitate the process, the creation of a registry of research infrastructures innovation capabilities and of topical/sectorial research infrastructure industry forums is envisaged to gather and to consolidate the views from industrial sector actors. This should be complemented by thematic knowledge networks that analyse and highlight specific innovation aspects. The Industrial Liaison Officers (ILO), usually appointed for large research infrastructures, should be involved in these networks.

The Commission expects to fund a single proposal under this heading.

Expected impact:

Research infrastructure projects (including ESFRI roadmap initiatives) actively participate in the innovation process and fully exploit their innovation potential. Support provided to industry (including SMEs) in the construction and usage of research infrastructures will lead to enhanced competitiveness of the involved actors. Thereby they will contribute to the technological development and exploitation capacity of the European Research Area. In particular this activity will:

- increase the involvement of industry (including SMEs) in the development of research infrastructures, raising the technological level and competitiveness of European companies;
- raise the awareness of industry (including SMEs) regarding opportunities offered by research infrastructure to improve their products, e.g. as experimental test facilities, innovation hubs, knowledge-based centres;
- support the integration of research infrastructures into local, regional and global innovation systems.
- When applicable, the socio-economic impact of past investments in research infrastructures from the European Structural and Investment Funds is enhanced.

Type of action: Coordination and support actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

INFRASUPP-2-2015 – Innovative procurement pilot action in the field of scientific instrumentation

Specific challenge: Europe has not always exploited the strong innovation potential that research infrastructures have towards their supplier industry. Acting as early adopters of advanced technologies research infrastructures can trigger innovation in companies supplying high-tech components (e.g. new stronger magnets or lasers). The aim of this action is to foster the innovation capacity of research infrastructures by stimulating R&D partnership with industry so as to develop the EU capacities and industrial supply in high-tech areas such as scientific instrumentation.

Scope: The activity will support pilot actions in the field of scientific instrumentation exploiting the innovation potential of research infrastructures using Pre-Commercial Procurement (PCP) and/or Public Procurement of Innovation (PPI) schemes. The following types of proposals can be submitted under this topic:

a. Feasibility studies
Proposals will focus on analysing and exploring the use of PCP or PPI procurement for common purchasing operations of a set of research infrastructures. Activities can include analysis of the state of the art and of the market offer.

b. Pre-commercial procurement in the field of scientific instrumentation (PCP)
Proposals will define requirements and terms of reference for common procurement of scientific instrumentation and organise joint PCP action encouraging research, development and validation of breakthrough solutions that can bring radical scientific and efficiency improvements in research infrastructures services.

c. Public procurement of innovative scientific instrumentation (PPI)
Proposals will focus on organizing joint procurement of innovative instrumentation by research infrastructures to enhance their services, better serving their communities.

The Commission expects to fund at least two proposals under this topic.

Expected impact:

This activity will stimulate research infrastructure projects (including ESFRI roadmap initiatives) to actively participate in the innovation process and to fully exploit their innovation potential. Support provided to industry (including SMEs) in the construction and upgrade of research infrastructures will lead to enhanced competitiveness of the involved actors. Thereby it will contribute to strengthening technological development and innovation capacity in Europe.

It will lead to economies of scale through common procurement by sets of research infrastructures.

The feasibility of Pre-commercial Procurement (PCP) and Public Procurement of Innovation (PPI) for the purchasing operations of research infrastructures will be explored and validated.

Type of action:
a. Coordination and support actions
b. Pre-commercial procurement cofund actions
c. Public procurement for innovative solutions cofund actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

INFRASUPP-3-2014 – Strengthening the human capital of research infrastructures

Specific challenge: The complexity of research infrastructures and the exploitation of their full potential require adequate skills for their managers, engineers and technicians, as well as users. Research infrastructures are built and operated at the cutting edge of what is technologically feasible, involving a high associated risk that needs to be managed. They may involve a multitude of partners in a consortium that fund and perform their construction and operation, either because they are distributed research infrastructures, or because certain problems are of a scale that can only be tackled by means of European and international cooperation. This renders their governance and the associated financial and legal issues a complex problem. Comparable issues are not usually faced by research institutions that do not operate research infrastructures, or in fields that do not yet have a long tradition of using research infrastructures. The skills and expertise specifically needed to construct, operate and use research infrastructures successfully therefore are not widely available.

EU funding will support the training of staff managing and operating research infrastructures of European interest, the exchange of staff and best practices between facilities, and the adequate supply of human resources in key disciplines, including the emergence of specific education.

While the human capital dimension will be embedded under other lines of activity of the research infrastructures work programme, specific actions will be needed to foster coordination across domains and types of infrastructures.

Scope: The activity will support the training of staff managing and operating research infrastructures. A proposal under this topic should build on the past activities and the experience gained in the projects such as RAMIRI (Realising and Managing International Research Infrastructures). It should engage with universities and prepare curricula and courses specifically for pan-European research infrastructures to address their intercultural and interdisciplinary nature as well as their diversity (global, highly distributed, single site etc.). A significant use of interactive online training material should be considered.

Expected impact: This activity will improve and professionalise the training of the staff managing and operating research infrastructures of European interest, strengthen the human capital of the involved research infrastructures, stimulating their efficient management and therefore promoting their development and competitiveness at national, European and international level.

Type of action: Coordination and support actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

INFRASUPP-4-2015 – New professions and skills for e-infrastructures

Specific challenge: The changing methods of (digital) science and research require that researchers, professors and students receive adequate support in computing and networking, as well as in handling, analysing and storing large amounts of digital content. Formal education for emerging professions of e-infrastructure operators, research technologists (including those possessing computational skills, e.g. in parallel programming), data scientists or "data librarians" hardly exists today. 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. Training opportunities should be available at all levels and for all communities potentially engaged in research and innovation related activities.

Scope: Proposals should address one or more of the following areas:

(1) Defining or updating university curricula for the e-infrastructure competences mentioned above, and promoting their adoption.

(2) Developing and executing training programmes (including for lifelong learning) for the above mentioned professionals working as part of a team of researchers or supporting research teams.

(3) Support the establishment of these professions as distinct professions from that of a researcher. Create a reference model which defines their competencies, supported by case studies and best practices relating to e-infrastructures skills, human resources management, support tools and related institutional practices. Develop alternatives means for recognising non-research contributions by research technologists and data scientists.

(4) Support networking and information sharing among already practicing e-infrastructure experts, research technologists, computation experts, data scientists and data librarians working in research institutes and in higher education.

(5) Awareness raising activities; establish and promote e-infrastructures community champions to advocate on new jobs and skills needs at schools, universities and scientific communities.

Expected impact: The number of high level education institutions offering degrees for e-infrastructure experts, research technologists, data scientists and data librarians will increase. Graduates and practitioners in these fields will have access to degrees, programmes and information sharing tools to improve their skills. The majority of European researchers will thus have access to training on e-infrastructures to develop related 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 will increase significantly.

Type of action: Coordination and support actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

INFRASUPP-5-2014 – Policy measures for research infrastructures

Specific challenge: In the context of the recent communication for a reinforced ERA partnership for excellence and growth[29] and the commitments of the Innovation Union flagship initiative[30], the focus of this action is related to the effective investment and use of research infrastructures.

Scope: Proposals will address one of the following areas:

- Support partnerships between relevant policy makers, funding bodies or advisory groups such as ESFRI and e-IRG; support cooperation and exchange of good practises between managers of research infrastructures and stakeholder networks; support survey, monitoring and assessment of the implementation and operation of research infrastructures with a view to provide advice and guidance to policy makers. Particular attention should be paid to the exchange of good practices between ESFRI projects and other world class research infrastructures as well as to the development of support actions underpinning the European strategy on research infrastructures. The proposals will build on the past experience and achievements gained in Seventh Framework Programme projects such as CoPoRi (Communication and Policy development for Research infrastructures).
- Support the development of a comprehensive database targeted at policy-makers on research infrastructures of more than national relevance in Europe. The database should be useable as a tool to support the development of a European strategy on research infrastructures. As such, the set of information to be collected should be agreed and validated by the Member States. The proposers should develop and update a portal where detailed information on the research infrastructures will be made available. The proposers should also carry out a comparative analysis of the research infrastructures landscape between Europe and strategic third country partners such as USA, Canada, Australia and the BRICS countries. The proposal should build on the experience gained in the Seventh Framework Programme MERIL (Mapping of European Research Infrastructure Landscape) project.

The Commission expects to fund up to one proposal for each area to avoid duplication of efforts.

[29] COM (2012) 392 final

[30] COM(2010) 546 final

Expected impact: This activity will:

- Strengthen the development of a consistent and dynamic European Research Area policy for research infrastructures;
- Facilitate the exchange of experiences and good practices between the national and/or regional policies and programmes;
- Enhance partnerships between policy makers and funding bodies and promote the development of appropriate monitoring tools for decision making;
- Support to ESFRI and thus contributing to the realisation of the Union flagship initiative on the implementation of 60% of the ESFRI projects by 2015;
- Contribute to the emergence of sustainable approaches, in the field of e-infrastructures, for the provision of cross-disciplinary research services;
- Encourage the pooling of resources between infrastructure operators at European level in order to face the grand challenges and to foster a culture of co-operation between them, spreading good practices and encouraging infrastructures to develop in complementary ways.

Type of action: Coordination and support actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

INFRASUPP-6-2014 – International cooperation for research infrastructures

Specific challenge: Following the recent communication of the Commission on International Cooperation in Research and Innovation[31], the research infrastructures activity will focus on a number of key third countries seen as strategic for the development, exploitation and management of world-class research infrastructures. The G8+O5 countries plus Australia, singularly or in their entirety, for the purposes of the Group of Senior Officials (GSO) on Global Research Infrastructures, are also included, without excluding the possibility of cooperation with other interested third countries or regional bodies.

Scope: In this context, the research infrastructure action will focus its activities on international cooperation in three different but complementary ways, as required: bilaterally with a single third country at policy level; multi-laterally with different third countries, targeting specific research and innovation aspects of research infrastructures of common interest in one area of science and technology; multi-laterally with different third countries if a specific effort is required in the context of a specific world class research infrastructure. Support to activities decided in the context of the Group of Senior officials on Global Research Infrastructures may fall in the latter two categories.

Proposals will address one of the following areas:

- Facilitate the development of global research infrastructures and the cooperation of European Research Infrastructures with their non-European counterparts, ensuring their global interoperability and reach, and to pursue international agreements on the reciprocal use, openness or co-financing of infrastructures, on the basis of the recommendations of the Group of Senior Officials on Global Research Infrastructures;

[31] EC communication on 'Enhancing and focusing EU international cooperation in research and innovation: a strategic approach' (COM(2012) 497).

- Support bilateral cooperation on research infrastructures with Africa. The proposal will build on the past experience and achievements gained in the Seventh Framework Programme project PAERIP (Promoting African – European Research Infrastructure Partnerships).
- Support bilateral cooperation on research infrastructures with Russia. The proposal will in particular help develop cooperation between European research infrastructures and the Russian Megascience facilities[32], including the underpinning e-infrastructure.
- Support multi-lateral cooperation with European Neighbourhood Policy (ENP) countries and Western Balkan Countries. The proposal will aim at developing regional roadmaps of research infrastructures jointly with stakeholders and policymakers and help them develop closer cooperation with research infrastructures of pan-European interest through training, data management and trans-national access.
- Support multi-lateral cooperation on research infrastructures in one or several of the following areas: Arctic research, marine science, biodiversity, food research and medicine. Particular emphasis will be made on cooperation with USA, Canada (including for implementing the Transatlantic Research Alliance, launched by the Galway Statement on Atlantic Ocean Cooperation) and Russia, without excluding other relevant countries such as Australia and New Zealand.

The proposals supporting bilateral and multi-lateral cooperation with research infrastructures in third countries should in particular:

- Identify and promote opportunities (access and data sharing) available to European scientists in these research infrastructures;
- Help developing better coordination and cooperation of European research infrastructures with their non-European counterparts; ensuring their global interoperability and reach, and to pursue international agreements on the reciprocal use, openness or co-financing of infrastructures;

Exchange good practices between user communities and managers of research infrastructures as regard for instance benchmarking performance of technology platforms, harmonisation of tests, standards, reference materials, interoperability and data handling.

Expected impact:

This activity will help to:
- Develop cooperation with key international partners for research infrastructures;
- Contribute to the development of a competitive high performance ERA in the global research environment;
- Reinforce partnership between the Commission, the Member States and relevant stakeholders in this field;
- Enhance the role of the Union in international organisations and multilateral fora;
- Support progress towards the development of global research infrastructures;
- Contribute to address societal challenges with a global dimension such as climate change;
- Contribute to capacity building and research infrastructures human capital development in targeted/relevant regions.

[32] The following 6 projects have been selected by the Russian authorities as Megascience projects: Fourth Generation Special-purpose Synchrotron Radiation Source (SSRS-4 project); International project "IGNITOR"; Exawatt Center for Extreme Light Studies (XCELS project); Nuclotron-based Ion Collider Facility (NICA project); Super C-τ Factory; The Scientific and Research Reactor Complex PIK

Type of action: Coordination and support actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

INFRASUPP-7-2014 – e-Infrastructure policy development and international cooperation

Specific challenge: To optimise e-infrastructures investments in Europe it is essential to coordinate European, national and/or regional policies and programmes for e-infrastructures, in order to develop complementarities, and promote cooperation between e-infrastructures and activities implementing other EU policies (such as regional, cohesion, industrial, health, employment, or development policy). To promote sound policy development it is essential to ensure stakeholder consultation, monitor take-up and assess the impact of past actions. To promote innovation it is necessary to identify it and spin it out from projects. The cooperation of European e-infrastructures with their non-European counterparts also requires facilitation, to ensure their global interoperability and reach.

Scope: Proposals will support one or more of the following actions:

(1) Dissemination of information on the e-infrastructure programme and of project results, including coordination among projects;

(2) Stakeholder initiatives, including a user forum to provide orientations for e-infrastructure service interoperability and integration;

(3) Policy coordination at European or regional level with the relevant policy makers, including the collection of information needed for policy making as well as the wider use of e-infrastructures for public services and society;

(4) Support to monitoring results and assessing impact of the Horizon 2020 e-infrastructure activities, including through metrics and indicators;

(5) Monitor and analyse the take-up of digital science and e-infrastructures by researchers and possible other users, such as citizens and the education sector, per country, region and research domain or community;

(6) Support to technology transfer from the e-infrastructures projects to the market;

(7) Support to cooperation with developing countries and regions to promote connectivity, global e-infrastructure services, identification of use cases and promising applications of particular interest for developing regions.

Expected impact: A consistent and dynamic European policy for research infrastructures is developed and is coordinated EU-wide. Support actions provide solid ground for future choices and help in decision making and deployment of e-infrastructures. Impact and results analysis is available in real time and can inform policy choices. Novel technology and services with market potential are identified and spun off to the market. Support measures for international cooperation address specific issues regarding reciprocal use, openness or co-financing of e-infrastructures, as well as ensure Europe's persistent presence and influence in the global e-infrastructure.

Type of action: Coordination and support actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

INFRASUPP-8-2014 – Network of National Contact Points

Specific challenge: Facilitate trans-national co-operation between NCPs for research infrastructures with a view to identifying and sharing good practices and raising the general standard of support to programme applicants, taking into account the diversity of actors that make up the constituency of the Research Infrastructures Part.

Scope: Support will be given to a consortium of formally nominated NCPs in the area of research infrastructures. The activities will be tailored according to the nature of the area, and the priorities of the NCPs concerned. Various mechanisms may be included, such as benchmarking, joint workshops, enhanced cross-border brokerage events, specific training linked to this Part as well as to gender dimension of Research and Innovation, and twinning schemes. Special attention will be given to enhance the competence of NCPs, including helping less experienced NCPs rapidly acquire the know-how accumulated in other countries. The focus throughout should be on issues specific to research infrastructures, and should not duplicate actions foreseen in the NCP network for quality standards and horizontal issues under 'Science with and for Society'. In particular attention should be given to the promotion of trans-national and virtual access, the synergies with other NCPs networks, and the cooperation with other policy and international cooperation oriented measures for research infrastructures. The proposal should build on the past experience and achievements gained in the Seventh Framework Programme EuroRis-Net+ project.

Only NCPs from EU Member States, Associated Countries, European Neighbourhood Policy countries (ENP), African countries, Australia, Canada, Russia and USA, which have been officially appointed by the relevant national authorities, are eligible to participate in and receive funding for this action. The consortium should have a good representation of experienced and less experienced NCPs.

Submission of a single proposal is encouraged. NCPs from EU Member States or Associated Countries choosing not to participate as a member of the consortium should be identified and the reason explained in the proposal. These NCPs are nevertheless invited and encouraged to participate in the project activities (e.g. workshops), and the costs incurred by the consortium for such participation (e.g. travel costs paid by the consortium) may be included in the estimated budget and be eligible for funding by the Commission.

In line with the Union's strategy for international cooperation in research and innovation[33] international cooperation is encouraged, in particular with ENP countries.

The Commission will only fund one proposal under this heading.

Expected impact:

- Improved and professionalised NCP service across the EU, thereby helping simplify access to Horizon 2020 calls, lowering the entry barriers for newcomers, and raising the average quality of proposals submitted.
- A more consistent level of NCP support services across the EU.

Type of action: Coordination and support actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

[33] COM(2012)497

CONDITIONS FOR THIS CALL

Publication date: 11/12/2013

Deadline(s)[34] [35]:

INFRASUPP-8-2014	14/05/2014 at 17.00.00 Brussels time
INFRASUPP-1-2014, INFRASUPP-3-2014, INFRASUPP-5-2014, INFRASUPP-6-2014 and INFRASUPP-7-2014	02/09/2014 at 17.00.00 Brussels time
INFRASUPP-2-2015 and INFRASUPP-4-2015	[14/01/2015 at 17.00.00 Brussels time]

Overall indicative budget: EUR 22.00 million from the 2014 budget[36] and EUR 16.50 million from the 2015 budget[37]

	2014 EUR million	2015 EUR million	
INFRASUPP-1-2014	2.00		Single stage
INFRASUPP-2-2015		14.00	Single stage
INFRASUPP-3-2014	2.00		Single stage
INFRASUPP-4-2015		2.50	Single stage
INFRASUPP-5-2014	4.00		Single stage
INFRASUPP-6-2014	7.00		Single stage
INFRASUPP-7-2014	5.00		Single stage
INFRASUPP-8-2014	2.00		Single stage

Eligibility and admissibility conditions: The conditions are described in parts B and C of the General Annexes to the work programme.

Evaluation criteria, scoring and threshold: The criteria, scoring and threshold are described in part H of the General Annexes to the work programme.

Evaluation procedure: The procedure for setting a priority order for proposals with the same score is given in part H of the General Annexes. The full evaluation procedure is described in the relevant guide associated with this call.

[34] The Director-General responsible may delay this deadline by up to two months.

[35] The deadlines provided in brackets are indicative and subject to a separate financing decision for 2015.

[36] Subject to the availability of the appropriations provided for in the draft budget for 2014 after the adoption of the budget for 2014 by the Budgetary Authority or if the budget is not adopted as provided for in the system of provisional twelfths.

[37] The budget amounts are indicative and will be subject to a separate financing decision to cover the amounts to be allocated for 2015.

- Indicative timetable for evaluation and grant agreement:

	Information on the outcome of the evaluation (*single stage*)	Indicative date for the signing of grant agreements
All topics	Maximum 5 months from the final date for submission.	Maximum 3 months from the date of informing applicants they have been successful.

Consortium agreements: In line with the Rules for Participation and the Model Grant Agreement, participants in an action are required to conclude a consortium agreement prior to grant agreement. However, for projects funded under topic INFRASUPP-1-2014, INFRASUPP-3-2014, INFRASUPP-5-2014, INFRASUPP-6-2014 and INFRASUPP-8-2014, due to the size and type of activities foreseen for these actions, participants are NOT required to conclude a consortium agreement.

Other actions[38] [39]

External expertise

This action will support:

- The use of appointed independent experts for the evaluation of project proposals and, where appropriate, for the monitoring of running projects.
- The setting up of groups of independent experts to advice on or support the design and implementation of EU research policy.

Type of action: Expert contracts

Indicative budget: **EUR 1.45 million from the 2014 budget and EUR 1.50 million from the 2015 budget**

Studies

Study on High Performance Computing (HPC): The aim of the study is to follow the progress on the implementation of the HPC strategy, to present the evolution of the European HPC ecosystem (e.g. investments, governance, market, usage, etc.), and to collect data and provide evidence of the impact and the return on HPC investments in innovation and economic progress in the EU.

Type of action: Public procurement

Indicative timetable: Second quarter of 2014

Indicative budget: **EUR 0.20 million from the 2014 budget**

GÉANT Partnership projects

Within the GÉANT Framework Partnership Agreement (FPA) awarded under topic EINFRA-8-2014 of the call e-Infrastructures, the selected consortium will be invited to submit a proposal that will implement the first year of the action plan defined in the FPA.

The submitted proposal will be evaluated according to the criteria established in the invitation of the Commission complying with the general requirements of evaluation and selection from Horizon 2020 described in part H of the General Annexes to the work programme.

This action allows for the provision of financial support to third parties in line with the conditions set out in Part K of the General Annexes.

Type of action: Research and Innovation Action funded through a specific grant agreement under the GÉANT Framework Partnership Agreement.

Timeframe: Second quarter of 2015.

Indicative budget: EUR 25 million from the 2015 budget.

[38] Subject to the availability of the appropriations provided for in the draft budget for 2014 after the adoption of the budget 2014 by the Budgetary Authority or, if the budget is not adopted, as provided for in the system of provisional twelfths.

[39] The budget amounts for 2015 are indicative and will be subject to a separate financing decision to cover the amounts to be allocated for 2015.

Budget

	2014[40] **Budget EUR million**[41]	*2015*[42] *Budget EUR million*
Calls		
Call H2020-INFRADEV-2014/2015 Developing new world-class research infrastructures	70.00 *from 08.020103*	*129.00*
Call H2020-INFRAIA-2014/2015 Integrating and opening research infrastructures of European interest	90.00 *from 08.020103*	*50.00*
Call H2020-EINFRA-2014/2015 e-Infrastructures	95.00 *from 09.040102*	*82.00*
Call H2020-INFRASUPP-2014/2015 Support to Innovation, Human resources, Policy and International cooperation	22.00 *of which 17.00 from 08.020103 and 5.00 from 09.040102*	*16.50*
Other Actions		
Experts (expert evaluators, experts groups, monitors)	1.45 *of which 1.00 from 08.020103 and 0.45 from 09.040102*	*1.50*
Public procurement	0.20 *from 09.040102*	–
Research and Innovation Action funded through a specific grant agreement under the GÉANT Framework Partnership Agreement	–	*25.00*
Horizontal activities (08.020501)		
Dissemination activities (see Part 17 of the work programme)	0.25 *of which 0.16 from 08.020103 and 0.09 from 09.040102*	–
Corporate communication (see Part 17 of the work programme)	0.13 *of which 0.08 from 08.020103 and 0.05 from 09.040102*	–
Estimated total budget	**279.03**	*304.00*

[40] Subject to the availability of the appropriations provided for in the draft budget for 2014 after the adoption of the budget for 2014 by the budgetary ~~a~~uthority or if the budget is not adopted as provided for in the system of provisional twelfths.

[41] The budget figures given in this table are rounded to two decimal places.

[42] The budget amounts are indicative and will be subject to a separate financing decision to cover the amounts to be allocated for 2015.

Specific features for Research Infrastructures

This section provides, for different types of projects supported under the Research Infrastructures calls for proposals, further conditions and requirements that applicants should fulfil when drafting a proposal. The compliance to these provisions will be taken into account during evaluation. Information on synergies with the European Structural and Investment Funds (ESIF) is also provided below.

The European Structural and Investment Funds will invest up to EUR 90 billion in innovation and research in the period 2014-2020, including into the development of research and innovation capacities and infrastructures. Therefore, Art. 17a of the Horizon 2020 Regulation and Article 31 Rules for Participation encourage synergies between Horizon 2020 and other European Union funds, such as European Structural and Investment Funds.

Synergies do not mean to replace national or private funding by ESIF or to combine them for the same cost item in a project. Synergies mean to expand the scope and impact of both funds in terms of scientific excellence and place-based socio-economic development respectively. Examples could be the development and equipment of innovation infrastructures or the fostering of innovation skills through ESIF that enable the participation in a Horizon 2020 project. ESIF can also be used to expand the support and advisory services for potential Horizon 2020 participants. ESIF can also help deploying innovative solutions stemming from Horizon 2020, e.g. through public procurement in the fields of environment, transport, health and energy.

Applicants are therefore invited to identify the smart specialisation fields of their EU Member State or region[43] and explore potential for synergies with the relevant Managing Authorities in charge of the ESI Funds in their territory[44].

A. Preparatory phase proposals

Preparatory phase proposals should cover one or more of the following activities:

- Legal work, i.e. (1) for the setting-up, construction and operation of the research infrastructure; and (2) for drafting an agreement between committed countries, in the form of a 'signature-ready' document for the setting-up and the actual implementation.
- Management and logistical work, i.e. (1) plans, in terms of construction (or major upgrade) and operation of the new research infrastructure; (2) planning (timing, resources) of staff recruitment to operate the new facility; (3) organisation of the logistic support for researchers, including informatics, etc.;
- Governance work, i.e. plans, in terms of decision-making, management structure, advisory body, IPRs, ethical issues, access rules for researchers, etc.;
- Financial work, i.e. (1) the financial arrangements for the construction, operation and decommission of the facility, using notably the complementarities between national and

[43] see: http://s3platform.jrc.ec.europa.eu/eye-ris3

[44] see: http://ec.europa.eu/regional_policy/indexes/in_your_country_en.cfm). For more details on ESIF investments in research and innovation see: http://ec.europa.eu/regional_policy/activity/index_en.cfm

EU instruments (such as the European Structural and Investment Funds or the European Investment Bank); (2) studying new mechanisms, e.g. pre-commercial procurement processes, by which public authorities may develop new approaches for financing innovative solutions;

- Strategic work, i.e. (1) analysis of the socio-economic impact of the new infrastructure; (2) plan to integrate harmoniously the new entity in the European fabric of related facilities in accordance with the objective of balanced territorial development; (3) to create or consolidate centres of excellence and/or 'regional partner facilities'; (4) the identification of the best possible site(s) to set up the new facility(-ies) and its next generations;
- Technical work, i.e. (1) final prototypes for key enabling technologies and implementation plans for transfer of knowledge from prototypes to the new facility; (2) technical work to ensure that the beneficiary research communities exploit the new facility from the start with the highest efficiency, including the introduction of new processes or software.

B. Individual implementation and operation of ESFRI projects or other world class research infrastructures

Implementation and operation phase proposals for **individual ESFRI** infrastructures should cover one or more of the activities listed below. If combined support with the European Structural and Investment Funds (ESIF) is foreseen for such infrastructure, the proposal should specify which activities will not be funded by Horizon 2020, but by ESIF (and by which Operational Programme of ESIF).

- central management and coordination;
- organisation of the logistic support for researchers, definition of access policies for researchers and management of IPRs and ethical issues;
- integration of the new entity in the European landscape of related facilities, and in the local context;
- development of regional partner facilities (RPF) aiming at a more balanced development of the European Research Area. The supported activities should help the RPF to meet the same standards required for pan-European Research Infrastructures, in particular regarding the quality of services, management and open access policy;
- development of final prototypes for key enabling technologies and implementation plans for transfer of knowledge from prototypes to the new facility;
- development of high performance methodologies and protocols, high performance instrumentation, including the testing of components, subsystems, materials, techniques and dedicated software;
- introduction of new processes or software facilitating the take-up by the research communities of the new facility ;
- R&D and engineering work jointly with industry and users; pre-commercial procurement processes, public procurement of innovation;
- innovative solutions for data or sample collection, management, processing, curation, annotation, and deposition, including relations with publishers for supporting data and sample deposition services;
- innovative software solutions for research activities;
- definition of standards, protocols and interoperability; benchmarking;
- access provision to research communities following the rules specified for *integrating activities*;

- integration of distributed resources into virtual facilities;
- spreading of good practices, consultancy and training courses to new users; outreach;
- exchange of personnel and training of staff;
- coordination with national or international related initiatives and support to the deployment of global and sustainable approaches in the field;
- mapping of infrastructures, users, investments, etc, in the specific field for supporting policy developments;
- activities to increase the potential for innovation, including social innovation, of the related infrastructure, such as networking with industries (including SMEs), dissemination of research outcome and technology transfer.

C. Implementation and operation of clusters of ESFRI and other relevant research infrastructures initiatives

Proposals for the implementation and operation phase of **clusters** of ESFRI, and other relevant research infrastructures initiatives should cover one or more of the following activities:

- coordination;
- definition and/or harmonisation of common access policies for researchers and management of IPRs and ethical issues;
- foresight studies for new common instrumentation, methods, concepts and/or technologies;
- development of final prototypes for common key enabling technologies and implementation plans for transfer of knowledge from prototypes to the new facilities;
- development of common high performance methodologies and protocols, high performance instrumentation, including the testing of components, subsystems, materials, techniques and dedicated software;
- common R&D and engineering work jointly with industry and users; common pre-commercial procurement processes;
- common innovative solutions for data or sample collection, management, processing, curation, annotation, and deposition, including relations with publishers for supporting data and sample deposition services;
- innovative software solutions for common research activities
- definition of common standards, protocols and interoperability; benchmarking;
- integration of distributed infrastructures into virtual facilities;
- spreading of good practices, consultancy and training courses to new users; outreach;
- activities to improve the efficiency of the research infrastructures' management and of their service provision including pilot provision of trans-national access (following the rules specified for *integrating activities*) by new research infrastructures to promote exchange of best practise and service provision harmonization;
- exchange of personnel and training of staff;
- coordination with national or international related initiatives and support to the deployment of global and sustainable approaches in the field;
- mapping of infrastructures, users, investments, etc, in the specific field for supporting policy developments;

- activities to increase the potential for innovation, including social innovation, of the related infrastructure, such as networking with industries (including SMEs), dissemination of research outcome and technology transfer.

D. Integrating Activities

An Integrating Activity shall cover three types of activities: Networking activities, Trans-national and/or virtual access activities, and Joint Research activities.

(i) **Networking activities**. To foster a culture of co-operation between the participants in the project, the scientific communities benefiting from the research infrastructures, industries and other stakeholders, and to help developing a more efficient and attractive European Research Area. Networking activities could include (non-exhaustive list):

- joint management of access provision and pooling of distributed resources;
- dissemination and /or exploitation of project results and knowledge, contribution to socio-economic impacts, promotion of innovation;
- reinforcing partnership with industry: outreach and dissemination activities, transfer of knowledge, activities to foster the use of research infrastructures by industrial researchers, involvement of industrial associations in consortia or in advisory bodies;
- strengthening of virtual research communities;
- definition of common standards, protocols and interoperability; benchmarking;
- development and maintenance of common databases for the purpose of networking and management of the users and infrastructures;
- activities to improve the efficiency of the research infrastructures' management and of their service provision;
- spreading of good practices, consultancy and training courses to new users;
- exchange of personnel and training of staff;
- foresight studies for new instrumentation, methods, concepts and/or technologies;
- promotion of clustering and coordinated actions amongst related projects;
- coordination with national or international related initiatives and support to the deployment of global and sustainable approaches in the field;
- promotion of long term sustainability, including the involvement of funders and the preparation of a business plan beyond the end of the project;
- definition of data management plans to organise the efficient curation, preservation and provision of access to data collected or produced under the project;
- relations with publishers for supporting data and sample deposition services;
- mapping of infrastructures, users, investments, etc, in the specific field for supporting policy developments.

(ii) **Trans-national and/or virtual access activities**.

Trans-national access activities

To provide 'free of charge' trans-national access to researchers or research teams including from industry to one or more infrastructures among those operated by participants. These access activities should be implemented in a coordinated way such as to improve the overall services available to the research community. Access may be made available to external users, either in person ('hands-on') or through the provision of remote scientific services, such as the provision of reference materials or samples, the performance of sample analysis or sample deposition.

The research infrastructures shall publicise widely the access offered under the grant agreement to ensure that researchers who might wish to have access to the infrastructure are made aware of the possibilities open to them. The research infrastructures shall promote equal opportunities in advertising the access and take into account the gender dimension when defining the support provided to visitors. They shall maintain appropriate documentation to support and justify the amount of access reported. This documentation shall include records of the names, nationalities, and home institutions of the users within the research teams, as well as the nature and quantity of access provided to them. To this extent a unit of access to the infrastructure shall be identified and precisely defined in the Grant Agreement.

The selection of researchers or research teams shall be carried out through an independent peer-review evaluation of their research projects. The research team, or its majority, must work in countries other than the country(ies) where the infrastructure is located (when the infrastructure is composed of several research facilities, operated by different legal entities, this condition shall apply to each facility) except in the case of a distributed set of resources or facilities offering remote access to the same services or when access is provided by an International organisation, the Joint Research Centre (JRC), an ERIC or similar legal entities. User teams where all or the majority of users works in third countries can be supported as far as the cumulative access provided to them is below 20% of the total amount of units of access provided under the grant. In exceptional and well justified cases a higher percentage of access to third-country user teams can be foreseen in the Grant Agreement. Only research teams, including industrial users, that are entitled to disseminate the knowledge they have generated under the project are eligible to benefit from research services to the infrastructure under the grant agreement. Exception to this condition is foreseen when users work for SMEs. The duration of stay at a research infrastructure shall normally be limited to three months, unless otherwise provided for in the Grant Agreement.

EU financial support to trans-national access will cover the *access costs*[45] incurred by the access provider for the provision of access to the selected researchers as well as the travel and subsistence incurred by these researchers to use the infrastructure.

The *access costs* charged to the grant will never include capital investments while they may cover the running costs of the infrastructure as well as the cost for the logistical, technological and scientific support to users' access, including costs for ad-hoc training needed by users to use the infrastructure and for preparatory and closing activities that may be necessary to carry out users' work on the infrastructure.

Virtual access activities

To provide virtual access to resources needed for research through communication networks without selecting or even identifying the researchers to whom access to resources is provided. Examples of virtual access activities are databases available via Internet, or data deposition services. Only virtual services widely used by the community of European researchers will be supported, therefore the services offered under a project shall be periodically assessed by an external board approved by the Commission. In addition statistics on the access provided shall be given to the Commission. Virtual access activities will be supported through the

[45] Access costs can be supported through the reimbursement of the eligible costs specifically incurred for providing access to the research teams selected for support under the project, or on the basis of unit costs calculated according to the methodology indicated in the Commission Decision COM xxxxx. In the latter case the access costs will be calculated multiplying the unit cost by the quantity of access provided under the grant. The cost of the unit of access to the infrastructure, the unit cost, shall then be indicated in the proposal. A combination of the two methods mentioned above will also be possible.

reimbursement of the operating costs incurred by the infrastructure or installation for providing virtual access to resources over the duration of the project. EU financial support will never include capital investments while it may cover all the technological and scientific support needed by researchers to effectively use the service. Only eligible costs that can be clearly attributed to the provision of access can be reimbursed.

(iii) **Joint Research activities**. These activities should be innovative and explore new fundamental technologies or techniques underpinning the efficient and joint use of the participating research infrastructures. They should involve, whenever appropriate, industries and SMEs to promote innovation. In order to improve, in quality and/or quantity, the services provided by the infrastructures, the joint research activities could address (non-exhaustive list):

- higher performance methodologies and protocols, higher performance instrumentation, including the testing of components, subsystems, materials, techniques and dedicated software;
- integration of installations and infrastructures into virtual facilities;
- innovative solutions for data or sample collection, management, curation annotation, and deposition;
- innovative software solutions for making new user communities benefit from computing services.

E. e-Infrastructures

The following conditions are expected to be met by proposals for research infrastructures:

Proposals that develop or offer services are expected to draft business plans for financial sustainability beyond the support they receive in Horizon 2020. Such business models may greatly vary depending on the service in question and will rely on funding sources chosen on a case-by-case basis (such as: government funds; income from services offered to other research projects; and income from services to industry). In particular, long-term data preservation is a major challenge and difficult to sustain without committed institutional funding. Partnering with the private sector is welcome where appropriate.

Projects should share basic operations services such as authorisation and accounting systems, service registry, etc. to the greatest extent possible; such services should not be (re)developed when they already exist unless sound justification is provided in the proposal. Furthermore, all services developed by projects should be made discoverable on-line, e.g. by including them in searchable catalogues or registries of (digital) research services with the metadata for describing and accessing the service.

All software to be developed under e-infrastructures needs to be open source with a "CC-BY" type of license[46], unless it can be well justified that it should be otherwise.

All proposals are requested to suggest clear metrics (key performance indicators) for monitoring their results and impact.

[46] See http://creativecommons.org/licenses/by/3.0/

A detailed list of activities that can be supported under e-infrastructure projects addressing all topics in call e-Infrastructures except EINFRA-3-2014 and EINFRA-6-2014, is given below:

(i) **Networking activities**. To foster a culture of co-operation between the participants in the project, the scientific communities benefiting from the e-infrastructures, industries and other stakeholders, and to help developing a more efficient and attractive European Research Area. Networking activities could include (non-exhaustive list):

- joint management of service provision and pooling of distributed resources;
- dissemination and/or exploitation of project results and knowledge, contribution to socio-economic impacts, promotion of innovation;
- reinforcing partnership with industry: outreach and dissemination activities, transfer of knowledge, activities to foster the use of e-infrastructures by industrial researchers, involvement of industrial associations in consortia or in advisory bodies;
- strengthening of virtual research communities;
- definition of common standards, protocols and interoperability; benchmarking;
- development and maintenance of common databases for the purpose of networking and management of the users and e-infrastructures;
- activities to improve the efficiency of the e-infrastructures' management and of their service provision;
- spreading of good practices, consultancy and training courses to new users;
- exchange of personnel and training of staff;
- foresight studies for new instrumentation, methods, concepts and/or technologies;
- promotion of clustering and coordinated actions amongst related projects;
- coordination with national or international related initiatives and support to the deployment of global and sustainable approaches in the field;
- promotion of long term sustainability, including the involvement of funders and the preparation of a business plan beyond the end of the project;
- definition of data management plans to organise the efficient curation, preservation and provision of access to data collected or produced under the project;
- relations with publishers for supporting data deposition services;
- mapping of e-infrastructures, users, investments, etc, in the specific field for supporting policy developments.

(ii) **Service activities**. To provide specific e-infrastructure related services to the scientific community. This may include (non-exhaustive list):

- procurement and upgrading communication infrastructure, network operation and end-to-end services;
- computer infrastructure support, operation and management; integration, test and certification; services deployed on top of generic communication and computing infrastructures to build and serve virtual communities in the various scientific domains;
- deployment, quality assurance and support of middleware component repositories;
- data and resources management (including secure shared access, global scheduling, user and application support services) to foster the effective use of distributed supercomputing facilities; federated and interoperable services to facilitate the deployment and wide use of digital repositories of scientific information;
- vertical integration of the different services in support of specific virtual research communities, including virtual laboratories for simulation and specific workspaces.

(iii) **Joint Research activities**. These activities should be innovative and explore new fundamental technologies or techniques underpinning the efficient and joint use and provision of e-infrastructure services. They should involve, whenever appropriate, industries and SMEs to promote innovation. In order to improve, in quality and/or quantity, the services provided by the e-infrastructures, the joint research activities could address (non-exhaustive list):

- higher performance methodologies and protocols, higher performance instrumentation, including the testing of components, subsystems, materials, techniques and dedicated software;
- integration of installations and infrastructures into virtual facilities;
- innovative solutions for data collection, management, curation and annotation;
- innovative solutions for communication network (increasing performance, improving management, exploiting new transmissions and digital technologies, deploying higher degrees of security and trust) and introduction of new end-to-end services (including dynamic allocation of resources and innovative accounting management);
- novel computer architecture frameworks and policies, innovative computer technologies, or new middleware solutions driving the emergence of high level interoperable services;
- advanced Service Level Agreements and innovative licensing schemes, fostering the adoption of e-infrastructures and the use of other types of research infrastructures by industry;
- innovative software solutions for making new user communities benefit from computing services.