



EN

Horizon 2020

Work Programme 2016 - 2017

4. European Research Infrastructures (including e-Infrastructures)

Important notice on the second Horizon 2020 Work Programme

This Work Programme covers 2016 and 2017. The parts of the Work Programme that relate to 2017 (topics, dates, budget) have, with this revised version, been updated. The changes relating to this revised part are explained on the Participant Portal.

(European Commission Decision C(2017)2468 of 24 April 2017)



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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 to structure 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 to 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.

The EU framework programme for Research and Innovation, Horizon 2020, gives high importance to promoting world-class research infrastructures, in a fair, transparent and open way facilitating researcher's access to the infrastructures they need, to further developing and deploying e-infrastructures, and fostering the innovation potential of research infrastructures with a focus on instrumentation and on reinforcing international cooperation with strategic third country partners. Research infrastructures provide research opportunities and services to researchers in many areas also addressed by other Parts of Horizon 2020 within "Societal Challenges", "Leadership in Enabling and Industrial Technologies" (LEIT), and "Excellent Science". This is also reflected in the close links between several of the topics in Research Infrastructures and certain Focus Areas. In this way, Research Infrastructures also contributes to other cross-cutting objectives of Horizon 2020, such as climate action and sustainable development, biodiversity, and social sciences and humanities. 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.

The Horizon 2020 Work Programme for 2016-2017 contributes to the political priorities of the new Commission's Agenda, in particular to maximise its support in strengthening Europe's global competitiveness, the creation of new and sustainable jobs and the promotion of growth.

The Research Infrastructures Work Programme 2016-2017 will put wide emphasis on fostering the long-term sustainability of research infrastructures (including through the optimisation of assessment and evaluation procedures), on expanding the role and impact of research infrastructures in the innovation chain and on maximising the exploitation of data produced and/or collected by research infrastructures.

Research Infrastructure activities also contribute to widening participation in the programme by supporting the development of Regional Partner Facilities. 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 following applies for all calls with opening dates falling between 14/10/2015 and 25/07/2016 inclusive:

A novelty in Horizon 2020 is the Pilot on Open Research Data which aims to improve and maximise access to and re-use of research data generated by projects. Projects funded under the Research Infrastructures (including e-Infrastructures) part of Work Programme 2016-2017 will by default participate in the Pilot on Open Research Data in Horizon 2020. Projects have the possibility to opt out of the Pilot, provided a justification is given for doing so. Participation in the Pilot is not taken into account during the evaluation procedure. Proposals will not be evaluated favourably because they are part of the Pilot and will not be penalised for opting out of the Pilot. More information can be found under General Annex L of the work programme. A further new element in Horizon 2020 is the use of Data Management Plans (DMPs), detailing what data the project will generate, whether and how it will be exploited or made accessible for verification and re-use, and how it will be curated and preserved. The use of a DMP is required for projects participating in the Open Research Data Pilot. Other projects are invited to submit a DMP if relevant for their planned research. Only funded projects are required to submit a DMP. Further guidance on the Pilot on [Open Research Data](#) and [Data Management](#) is available on the Participant Portal.

The following applies for all calls with an opening date on or after 26/07/2016:

Grant beneficiaries under this work programme part will engage in research data sharing by default, as stipulated under Article 29.3 of the Horizon 2020 Model Grant Agreement (including the creation of a Data Management Plan). Participants may however opt out of these arrangements, both before and after the signature of the grant agreement. More information can be found under General Annex L of the work programme.

Call - Development and long-term sustainability of new pan-European research infrastructures

H2020-INFRADEV-2016-2017

This call focuses on developing new world-class research infrastructures. The aim is to facilitate and support the implementation and long-term sustainability of the research infrastructures identified by the European Strategy Forum on Research Infrastructures (ESFRI) as well as of other world-class research infrastructures. These 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 2017);
- the preparatory phases and the support to early phase of ESFRI projects, through a targeted approach (deadline and budget 2016);
- the individual support to ESFRI and other world-class research infrastructures with established legal structure and governance such as an ERIC through a competitive approach (deadline 2016 and budget 2016-2017);
- a pilot action addressing the federation, networking and coordination of pan-European research infrastructures and clouds for the purpose of increasing research and science data availability and use (deadline and budget 2016).

As indicated in the Model Grant Agreement (Article 6.2.D.4), the methodology for charging capitalised and operating costs of "*large research infrastructures*", defined in this same Article, is not applicable for grants awarded under this call.

Proposals are invited against the following topic(s):

INFRADEV-01-2017: 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 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 a new infrastructure.

Scope: Design studies should address all key questions concerning the technical and conceptual feasibility of new or upgraded fully fledged user facilities (proposals considering just a component for research infrastructures are not targeted by this topic). Design studies lead 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 to be performed in a Design Study proposal include both:

- Scientific and technical work, i.e. (1) the drafting of concepts, architecture and engineering plans for the construction, taking into due account resource efficiency and environmental (including climate-related) impacts, as well as, when relevant, the creation of prototypes; (2) scientific and technical work to ensure that the scientific user communities exploit the new facility from the start with the highest efficiency.
- Conceptual work, i.e. (1) plans to coherently integrate the new infrastructure into the European landscape of related facilities in accordance, whenever appropriate, with the EU objective of a balanced territorial development; (2) the estimated budget for construction and operation; (3) plans for an international governance structure; (4) the planning of research services to be provided at international level, (5) procedure and criteria to choose the site of the infrastructure.

The main output of a design study will be the conceptual design reports for a new or upgraded research infrastructure of strategic importance for Europe.

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 Group of Senior Officials on Research Infrastructures – GSO) 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.
- When relevant, the improvement of the environmental (including climate-related) impact as well as the optimisation of resource and energy use are integrated in the very early phase of development of new research infrastructures.

Type of Action: Research and Innovation action

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

INFRADEV-02-2016: Preparatory Phase and support to early 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 (and of the research infrastructure, if different), the architecture and the service policies. The aim of this activity is to provide catalytic and leveraging support for the preparatory phase and the early phase of ESFRI projects leading to the construction of new research infrastructures or major upgrades of existing ones.

Scope: Following the update of the ESFRI Roadmap in 2016, support under this work programme will be provided to:

(a) Preparatory Phase for research infrastructures which enter the active project list of the ESFRI roadmap in 2016 (*Coordination and Support actions*)

The preparatory phase aims to bring the project for the new or upgraded research infrastructure identified in the ESFRI roadmap 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, before construction can start (e.g. national/regional ministries/governments, research councils, funding agencies, in particular, but not limited to, from the countries that have already declared their commitment in the application to ESFRI). 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. Technical work should be carried out when necessary to complete the final technical design, providing a sound technical base for establishing a cost baseline and detailed

financial planning. The financial needs of the project should be mapped out to the extent necessary for funding agencies to establish their own medium- and long-term financial planning.

The preparation of the legal and financial agreements (including site, governance, internal rules, financing of the new research infrastructures) is one of the main activities and deliverables and should be finalised before the end of the project (e.g., through the signature of a Memorandum of Understanding).

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”. Proposals should explain any synergies and complementarities with previous or current EU grants.

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

(b) Support to Early Phase for research infrastructures which enter the ESFRI roadmap in 2016 as emerging projects (**Research and Innovation Actions**)

This support aims to bring an emerging ESFRI project to the level of maturity required for being in the active project list.

To this extent activities will include the needed scientific, technical and conceptual work: e.g. the drafting of architecture and engineering plans for the construction, the creation of prototypes; plans to coherently integrate the new infrastructure into the European landscape of related facilities; the estimated budget for construction and operation; plans for an international governance structure; the planning of research services to be provided at international level, procedure and criteria to choose the site of the infrastructure. Proposals should explain any synergies and complementarities with previous or current EU grants.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 2 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:

All proposals:

- 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.
- A landscape of first-class sustainable RIs and services, open to researchers, industry, and other interested groups such as policy makers and the public, is progressively

established, which will impact on the acceleration of scientific discovery as well as on innovation and competitiveness.

(a) Preparatory Phase (Coordination and Support actions)

- Funding bodies are able to take funding decisions and to conclude the legal agreements necessary for the construction of new research infrastructures.

(b) Support to Early Phase (Research and Innovation Actions)

- Policy bodies at the national, European international level have a sound decision basis to establish long-range plans and roadmaps for new research infrastructures of pan-European or global interest.

Type of Action: Research and Innovation action, Coordination and support action

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

INFRADEV-03-2016-2017: Individual support to ESFRI and other world-class research infrastructures

Specific Challenge: The new research infrastructures under development at European level, such as those identified in the ESFRI roadmap, are advancing in their implementation phase and/or starting 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 financial sustainability must be proved and the trust and awareness of users must be earned.

Scope: Under the Work Programme 2016-2017 this topic will target the long-term sustainability of new research infrastructures, ESFRI and other world-class research infrastructures in Europe, with established governance and legal structure, notably on the basis of the European Research Infrastructure Consortium (ERIC) or any other suitable structure. Support will be provided to activities aimed at ensuring long-term sustainability, including enlargement of the membership, European coverage, international cooperation¹, limited pilots of access provision for testing and improving user services to increase reliability and create trust, definition of service level agreements and business/funding plan, outreach, and technology transfer activities. Proposals should explain any synergies and complementarities with previous or current EU grants.

Specific attention will be given to the interaction with industry and SMEs. Activities may also foster 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”.

¹ In line with the strategy for EU international cooperation in research and innovation (COM(2012)497)

The Commission considers that proposals requesting a contribution from the EU of between EUR 2 and 5 million would allow this challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: This activity will:

- contribute to providing Europe with a comprehensive landscape of sustainable Research Infrastructures helping to respond to challenges in science, industry and society;
- 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 fora;
- support progress towards the development of global research infrastructures;
- enable researchers to address societal challenges with a global dimension;
- foster capacity-building and Research Infrastructure human capital development in targeted/relevant regions.

Type of Action: Coordination and support action

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

INFRADEV-04-2016: European Open Science Cloud for Research

Specific Challenge: Research Infrastructures such as the ones on the ESFRI roadmap and others, are characterised by the very significant data volumes they generate and handle. These data are of interest to thousands of researchers across scientific disciplines and to other potential users via Open Access policies. Effective data preservation and open access for immediate and future sharing and re-use is a fundamental component of today's research infrastructures and Horizon 2020 actions. In this context, European research stakeholders make increasing use of cloud services to effectively handle such data.

Scope: The aim of this topic is the launch of a pilot action that should demonstrate how wide availability of scientific data and data-analysis services for European researchers can be ensured through a cloud infrastructure.

Proposals should address the federation, networking and coordination of existing research infrastructures and scientific clouds for the purpose of increasing data findability, accessibility and interoperability, improving the services provided to research communities, and facilitating re-use of data by a wider user community. Trust, easy accessibility and use by researchers should be duly taken into account. Particular attention should be paid to storage,

access and re-use needs for data and knowledge from Horizon 2020 projects, as well as to the needs of the ‘long tail of science’, including orphaned scientific communities.

The action should build on existing infrastructures and design a stakeholder driven governance framework, with the involvement of the research user community, the research infrastructures and the research funding bodies to ensure its sustainability. Links with related national and European initiatives should be established. Links should also be established with projects selected under topic EINFRA-12-2017, to collaborate, exploit potential synergies and ensure complementarity.

The Commission considers that proposals requesting a contribution from the EU of between EUR 5 and 10 million would allow this topic to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact:

- Facilitate access of researchers across all scientific disciplines to the broadest possible set of data and to other resources needed for data driven science to flourish.
- Provide a governance and business model that sets the rules for the use of data, deals with issues related to privacy, sensitivity, copyright and security and oversees the provision of services (business and governance layer).
- Create a cross-border and multi-disciplinary open innovation environment for research data, knowledge and services with engaged stakeholders and organisations.
- Foster the establishment of global standards, ontologies and interoperability for scientific data.

Type of Action: Research and Innovation action

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

Conditions for the Call - Development and long-term sustainability of new pan-European research infrastructures

Opening date(s), deadline(s), indicative budget(s):²

Topics (Type of Action)	Budgets (EUR million)		Deadlines
	2016	2017	
Opening: 08 Dec 2015			
INFRADEV-03-2016-2017 (CSA)	30.00	14.00	30 Mar 2016
Opening: 15 Mar 2016			
INFRADEV-02-2016 (CSA)	24.00		22 Jun 2016
INFRADEV-02-2016 (RIA)	8.00		
INFRADEV-04-2016 (RIA)	10.00		
Opening: 08 Dec 2016			
INFRADEV-01-2017 (RIA)		20.00	29 Mar 2017
Overall indicative budget	72.00	34.00	

Indicative timetable for evaluation and grant agreement signature:

For single stage procedure:

- Information on the outcome of the evaluation: Maximum 5 months from the final date for submission; and
- Indicative date for the signing of grant agreements: Maximum 8 months from the final date for submission.

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

Evaluation criteria, scoring and threshold: The criteria, scoring and threshold are described in General Annex H of the work programme. The following exceptions apply:

INFRADEV-01-2017,	<i>For the criterion Impact of Research and Innovation Actions the</i>
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² The Director-General responsible for the call may decide to open the call up to one month prior to or after the envisaged date(s) of opening.

All deadlines are at 17.00.00 Brussels local time.

The Director-General responsible may delay the deadline(s) by up to two months.

INFRADEV-04-2016	second sub-criterion will be substituted by: <ul style="list-style-type: none">• Where relevant, any substantial impacts not mentioned in the work programme, that would enhance innovation capacity; create new market opportunities, strengthen competitiveness and growth of companies, protect the environment, or bring other important benefits for society;
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Evaluation Procedure: The procedure for setting a priority order for proposals with the same score is given in General Annex H of the work programme.

The full evaluation procedure is described in the relevant [guide](#) published on the Participant Portal.

Consortium agreement: Members of consortium are required to conclude a consortium agreement. However, for mono-beneficiary actions resulting from this call under topic INFRADEV-03-2016-2017, participants are not required to conclude a consortium agreement.

Call - Integrating and opening research infrastructures of European interest

H2020-INFRAIA-2016-2017

This call focuses on opening up key national and regional research infrastructures to all European researchers from both academia and industry as well as ensuring their optimal use and joint development.

In addition to serving basic science challenges, Integrating Activities target research infrastructures, ranging across all fields of science and technology, needed to support the EU political priorities and address the Societal Challenges, including Focus Areas. They also target research infrastructures needed to gain leadership in the industrial and enabling technologies.

ESFRI and other world-class research infrastructures are not specifically targeted by this call. Nevertheless, where relevant, they can participate in an integrating activity together with other key national and regional research infrastructures.

As indicated in the Model Grant Agreement (Article 6.2.D.4), the methodology for charging capitalised and operating costs of "*large research infrastructures*", defined in this same Article, is not applicable for grants awarded under this call.

Proposals are invited against the following topic(s):

INFRAIA-01-2016-2017: Integrating Activities for Advanced Communities

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: 'Advanced Communities' are scientific communities whose research infrastructures show an advanced degree of coordination and networking at present, attained, in particular, through Integrating Activities awarded under FP7 or previous Horizon 2020 calls.

An Integrating Activity will mobilise a comprehensive consortium of several key research infrastructures³ in a given field as well as other stakeholders (e.g. public authorities, technological partners, research institutions) from different Member States, Associated

³ Exceptionally, the consortium may include only one research infrastructure providing access, if this facility is of a truly unique nature.

Countries and other third countries⁴ when appropriate, in particular when they offer complementary or more advanced services than those available in Europe.

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

To this extent, 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 develop 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 key 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.

Access should be provided only to key research infrastructures of European interest, i.e., those infrastructures able to attract significant numbers of users from countries other than the country where they are located. Other national and regional infrastructures in Europe can be involved, in particular in the networking activities, for the exchange of best practices, without necessarily being beneficiaries in the proposal.

Proposals from advanced communities will have to clearly demonstrate the added value and the progress beyond current achievements in terms of integration and services, of a new grant. The strongest impact for advanced communities is expected typically to arise from focusing on innovation aspects and widening trans-national and virtual access provision. Furthermore, in particular for communities supported in the past under three or more integrating activities, the creation of strategic roadmaps for future research infrastructure developments as well as the long-term sustainability of the integrated research infrastructure services provided at European level, need to be properly addressed. The latter requires the preparation of a sustainability plan beyond the grant lifecycle as well as, where appropriate, the involvement of funders.

In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), Integrating Activities should, whenever appropriate, pay due attention to

⁴ Legal entities established in Australia, Brazil, Canada, China, India, Japan, Russia, Mexico and USA, which provide, under the grant, access to their research infrastructures to researchers from Members States and Associated countries, are eligible for funding from the Union.

any related international initiative (i.e. outside the EU) and foster the use and deployment of global standards.

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, even when they opt out of the Pilot on Open Research Data. Data management (including ethics and privacy issues), interoperability, 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, working in cooperation with e-infrastructure service providers.

Integrating Activities should in particular 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.

Integrating Activities are expected to duly take into account all relevant ESFRI and other world-class research infrastructures to exploit synergies, to reflect on sustainability 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 submitted.

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

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.

On the basis of a multiannual plan drafted taking into account the assessment and the timing of previous grants as well as strategic priorities and needs, in term of research infrastructures services, emerging from other parts of Horizon 2020, this work programme invites proposals addressing the following areas listed under the different domains. A balanced coverage of the various domains, in line with the distribution of areas per domain, is expected as outcome of this topic.

Biological and Medical Sciences

Facilities for high throughput DNA sequencing. This activity aims at integrating the key research infrastructures in Europe as well as leading-edge research infrastructures located in third countries to open them up to European researchers. Adequate consideration should be

taken of the produced data and its availability for research. In this respect, synergies with other relevant ESFRI Infrastructures, in particular ELIXIR, 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 high quality services 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. Both human and veterinary vaccines, for prophylactic and therapeutic applications, should be addressed. Furthermore, work shall be carried out towards integration with the ESFRI Infrastructures EATRIS and INSTRUMENT to ensure sustainability of the trans-national access services. Synergies with other relevant ESFRI Infrastructures, such as ECRIN, should be duly exploited.

Experimental facilities for animal disease and infectiology (including zoonoses). A project under this topic must provide and facilitate access to the key experimental facilities under BSL3 conditions in Europe for animal and zoonotic infectious diseases. It will also include key collections of samples necessary for research on animal and zoonotic infectious diseases. The project should aim to integrate these facilities and resources with a long term perspective. It should also develop the necessary collaborations outside Europe, towards a global sharing of available resources.

Centres for replacement, reduction and refinement (3 Rs) of non-human primate testing. This activity aims at integrating the key non-human primate centres in Europe promoting 3 Rs, i.e. replacement, reduction, and refinement. The proposal will contribute to the objective of 3Rs, reinforcing the implementation of ethical and good practices at European level, and the protection of animals used in scientific experiments, as framed by the directive 86/609/EEC, and by the Commission proposal for its revision, COM(2008)543. The proposal should also develop the necessary collaborations outside Europe.

Facilities and resources for plant phenotyping. This activity aims at providing and facilitating access to the key research infrastructures in Europe for high throughput plant phenotyping. It should aim to integrate these facilities and resources with a long term perspective, improving coordination, as regards standards, protocols, access modalities, etc. The project should also develop the necessary collaborations outside Europe, towards a coordinated development of such facilities and resources. The facilities should enable more efficient European research to be conducted in plant genetics, plant physiology and bioecology, under controlled conditions.

Marine biological stations. This activity aims at improving and further integrating access to a wide range of marine biology and ecology resources for research, including: marine biodiversity and associated historical time-series data; culture collections of marine biological resources; marine model organisms, including specific genetic resources; up-to-date equipment for biological research (“omics”); and rare and unique facilities for experimental biology and ecology. It should also stimulate knowledge and technology transfer to industry

and to public policy-makers. Synergies with relevant ESFRI Infrastructures, in particular EMBRC, should be duly exploited.

Research Infrastructures for the control of vector-borne diseases. This activity aims at integrating specialised facilities in Europe for the study of insect-transmitted disease with the objective to validate and roll out new control measures targeting insect vectors that pose the greatest threats to human health and animal industries. These facilities, supporting research and product development, include P3 secure insectaries for research on vectors and pathogens, large scale production of mosquitoes, facilities for the testing and evaluation of insecticides, and facilities for high-throughput genetic analysis of insect vectors and pathogens. The facilities of this activity and associated networking and research activities will play a critical role in consolidating European leadership in the field of insect vector biology and disease control. Synergies with relevant ESFRI Infrastructures such as ELIXIR should be duly exploited.

Energy

Research Infrastructures for research on biomass conversion and biorefinery. This activity aims at integrating the key research infrastructures in Europe for the advanced conversion technologies of biogenic feedstock. Research Infrastructures to be integrated would be laboratory and pilot-scale installations as well as demonstration plants (facilities like furnaces, gasifiers, fermenters, biorefineries, etc.) for carrying out research in the fields of: combustion and thermal gasification of solid fuels, modelling, gas cleaning, second and third generation biofuels with emphasis on marine biomass, anaerobic digestion, biomethane production from organic waste and green biorefinery (sustainable processing of biomass into a marketable spectrum of products). The issue of the use of new feedstock is an integral part of the activity. This activity will support the European Strategic Energy Technology Plan (SET-Plan, COM (2007)723).

Research Infrastructures for offshore renewable energy. This activity aims at integrating the key research infrastructures in Europe for research, development and testing of offshore wind and ocean energy systems including electrical sub systems and grid integration through a range of TRLs (from laboratory scale TRL 1/2 through to open ocean at TRL 6/7). Trans-national access should open existing pilot and demonstration plants as well as laboratory scale installations from wave basins to large scale open sea test sites. This activity will support the European Strategic Energy Technology Plan (SET-Plan, COM (2007)723) including emerging concepts of multi-purpose platforms.

Environmental and Earth Sciences

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 project should include work on best practises for managing stations, and (international)

logistics. The network should link with marine and atmospheric networks, aiming at close cooperation.

Research Infrastructures for earthquake hazard. This activity aims at integrating the key research infrastructures in Europe for natural and anthropogenic earthquake risk assessment and mitigation. More integrated services from seismic and engineering infrastructures would contribute to supporting the reduction of vulnerability of European citizens and constructions to earthquakes. International collaboration activities and the further integration of the research field are encouraged. Synergies with relevant ESFRI Infrastructures, in particular EPOS, should be duly exploited.

Mesocosms facilities for research on marine and freshwater ecosystems. This activity aims at integrating leading mesocosm infrastructures in Europe enabling in particular research on impact of climate change, pollution and other disturbance on ecosystems, from Mediterranean to Arctic.

Atmospheric simulation chambers. This activity should further integrate key instrumented environmental chambers and improve access to them for atmospheric research, including model development, while expanding to larger scientific communities and interdisciplinary research fields. It is expected that this community work towards close cooperation with relevant ESFRI Infrastructures. By developing their complementary nature, the different research infrastructures should answer broad scientific needs such as studies of the impact of atmospheric processes e.g. on regional photochemistry, global change, as well as cultural heritage and human health effects. Building on the former integrating initiatives, the development of a strategic integrating structure should also be considered.

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 bio-economy.

Sites, experimental platforms and data collections of anthropogenic impacts for ecosystem functioning and biodiversity research. This activity aims at bringing together highly instrumented experimental, analytical and modelling facilities, looking at all major European ecosystem types and all major pressures on them. It will optimise the collaborative use of these sites by a large scientific community. Efficient methods and techniques will be implemented for rapid data sharing and processing at the European level. Synergies with relevant ESFRI Infrastructures such as ANAEE should be duly exploited.

Multidisciplinary Marine Data Centres for ocean and marine data management. This activity aims at providing and facilitating access to the key data centres in Europe for in-situ and remote sensing data for marine research (including coastal research). It must present a

long-term sustainable perspective on the integration of these facilities and related resources. It should enhance and innovate the services offered to an expanded multidisciplinary community and promote the adoption of the developed protocols and standards for interoperability to other key downstream initiatives in the field. Synergies with relevant ESFRI Infrastructures should be duly exploited.

Mathematics and ICT

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 Centres 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). It will widen trans-national access to HPC resources across different disciplines and for a wide range of applications including advanced simulation and modelling.

Material Sciences and Analytical facilities

Research Infrastructures for advanced spectroscopy, scattering/ diffraction and imaging of materials. This activity aims at integrating the key research infrastructures in Europe to offer electronic, X-ray, optic and magnetic inspection techniques, and their combinations, for the analysis and engineering of novel materials ranging from hard to soft matter. Such infrastructures would allow the detailed understanding and optimisation of the physical, chemical and biological properties of the materials.

Synchrotron radiation sources and Free Electron Lasers. This activity should provide and facilitate access of a wide range of user communities to the key research infrastructures in Europe based on Synchrotron and Free Electron Laser light sources. It aims to further integrate these facilities and resources with a long term perspective. It should also stimulate new scientific activities taking full advantage of new experimental possibilities offered by new light sources such as the European X-Ray Laser ("XFEL").

Facilities for research on materials under extreme magnetic conditions. This activity aims at integrating key research facilities for high magnetic fields. The activity should enable a wider research community to perform experiments in physics and materials science.

Infrastructures for Neutron Scattering and Muon Spectroscopy. This activity should provide and facilitate wider access to the key research infrastructures in Europe for Neutron scattering and Muon Spectroscopy. It must present a long-term sustainable perspective on the integration of these facilities and related resources. The activity should also stimulate new scientific activities taking full advantage of new experimental possibilities offered by the future European Spallation Source ("ESS").

Physical Sciences

Research Infrastructures for advanced radio astronomy. This activity should provide and facilitate access to the key research infrastructures in Europe for advanced radio astronomy, including Very Long Baseline Interferometry. It must present a long-term sustainable perspective on the integration of these facilities and related resources. A project under this topic should also stimulate new scientific activities aimed at taking full advantage of new possibilities which will be offered by relevant initiatives on the ESFRI Roadmap.

Research Infrastructures for optical/IR astronomy. This activity should provide and facilitate access to the key research infrastructures in Europe for optical and infrared astronomy. It must present a long-term sustainable perspective on the integration of these facilities and related resources. Furthermore, it should also stimulate new scientific activities aimed at taking full advantage of new possibilities which will be offered by relevant initiatives on the ESFRI Roadmap.

Research Infrastructures for hadron physics. This activity must provide and facilitate access to key research infrastructures in Europe for studying the properties of nuclear matter at extreme conditions, turning advances in hadron physics experimentation into new applications. It must present a long-term sustainable perspective on the integration of relevant facilities and related resources. Furthermore, it should also target new users and stimulate new scientific activities aimed at taking full advantage of new possibilities which will be offered by relevant initiatives on the ESFRI Roadmap, in particular FAIR.

Particle Accelerators. A project under this topic should facilitate access to state-of-the-art facilities to develop new techniques for improving the performance of existing and future accelerators. It should include accelerators for nuclear and particle physics and accelerator-based photon sources. It must present a long-term sustainable perspective on the integration of relevant facilities and related resources. A project under this topic should complement and further new scientific activities aimed at taking full advantage of new possibilities which will be offered by relevant initiatives on the ESFRI Roadmap.

Social Sciences and Humanities

Access to European Social Science Data Archives and Official Statistics. A project under this topic should aim at a further improvement of the researcher's access to official statistics. Work should address technologies for secured trans-national access to sensitive data. Synergies with relevant ESFRI Infrastructures, in particular CESSDA, should be duly exploited.

Research infrastructures for the study of poverty, working life and living conditions. The aim of this activity is to bring together research infrastructures serving European and international research in the fields of poverty, working life, and living conditions. It will compile historical data, and provide instruments for the analysis of the effects of employers' behaviour and the evaluation of labour market and social policies targeted to vulnerable groups as well as offer training to researchers interested in the use of these instruments.

Expected Impact:

- 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.
- 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 common development and the optimisation of operations.
- Innovation is fostered through a reinforced partnership of research organisations with industry.
- A new generation of researchers is educated that is ready to optimally exploit all the essential tools for their research.
- 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.
- For communities which have received three or more grants in the past, the sustainability of the integrated research infrastructure services they provide at European level is improved.
- 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 action

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

INFRAIA-02-2017: Integrating Activities for Starting Communities

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: A 'Starting Community' has never been supported for the integration of its infrastructures under FP7 or Horizon 2020 calls, in particular within an integrating activity.

An Integrating Activity will mobilise a comprehensive consortium of several key research infrastructures⁵ 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 countries⁶ when appropriate, in particular when they offer complementary or more advanced services than those available in Europe.

Funding will be provided to support, in particular, the trans-national and virtual access provided to European researchers (and to 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.

To this extent, 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 develop 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 key 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.

Access should be provided only to key research infrastructures of European interest, i.e., those infrastructures able to attract significant numbers of users from countries other than the country where they are located. Other national and regional infrastructures in Europe can be involved in the project, in particular in the networking activities for the exchange of best practises, without necessarily be beneficiaries of the action.

The research infrastructures of a 'Starting Community' usually show a limited degree of coordination and networking at present. The strongest impact of an integrating activity is

⁵ Exceptionally, the consortium may include only one research infrastructure providing access, if this facility is of a truly unique nature.

⁶ Legal entities established in Australia, Brazil, Canada, China, India, Japan, Russia, Mexico and USA, which provide, under the grant, access to their research infrastructures to researchers from Members States and Associated countries, are eligible for funding from the Union.

expected typically to arise from a focus on networking, standardisation and establishing a common access procedure for trans-national and/or virtual access provision.

In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), Integrating Activities should, whenever appropriate, give due attention to any related initiatives internationally (i.e. outside the EU) and foster the use and deployment of global standards.

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, even when they opt out of the Pilot on Open Research Data. 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, working in cooperation with e-infrastructure service providers.

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, knowledge sharing through co-creation, activities to promote the use of research infrastructures by industrial researchers, involvement of industrial associations in consortia or in advisory bodies.

Integrating Activities are expected to duly take into account all relevant ESFRI and other world-class research infrastructures to exploit synergies, to reflect on sustainability 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 submitted.

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

Integrating activities for starting communities range across all areas of science and technology. Proposals should not restrict their services to too narrow research fields and should address the wider scientific communities, even multidisciplinary ones, which can be served by the involved sets of research infrastructures.

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.

Expected Impact:

- 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.
- 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 common development and the optimisation of operations.
- Innovation is fostered through a reinforced partnership of research organisations with industry.
- A new generation of researchers is educated that is ready to optimally exploit all the essential tools for their research.
- 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.
- 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 action

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

Conditions for the Call - Integrating and opening research infrastructures of European interest

Opening date(s), deadline(s), indicative budget(s):⁷

Topics (Type of Action)	Budgets (EUR million)		Deadlines
	2016	2017	
Opening: 10 Nov 2015			
INFRAIA-01-2016-2017 (RIA)	96.00	96.00	30 Mar 2016
Opening: 08 Dec 2015			
INFRAIA-02-2017 (RIA)		50.00	30 Mar 2016 (First stage) 29 Mar 2017 (Second stage)
Overall indicative budget	96.00	146.00	

Indicative timetable for evaluation and grant agreement signature:

For single stage procedure:

- Information on the outcome of the evaluation: Maximum 5 months from the final date for submission; and
- Indicative date for the signing of grant agreements: Maximum 8 months from the final date for submission.

For two stage procedure:

- Information on the outcome of the evaluation: Maximum 3 months from the final date for submission for the first stage and maximum 5 months from the final date for submission for the second stage; and
- Indicative date for the signing of grant agreements: Maximum 8 months from the final date for submission of the second stage.

Eligibility and admissibility conditions: The conditions are described in General Annexes B and C of the work programme.. The following exceptions apply:

INFRAIA-01-2016-	Given the specific nature of this topic, specific eligibility
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⁷ The Director-General responsible for the call may decide to open the call up to one month prior to or after the envisaged date(s) of opening.

All deadlines are at 17.00.00 Brussels local time.

The Director-General responsible may delay the deadline(s) by up to two months.

HORIZON 2020 - Work Programme 2016 - 2017
European Research Infrastructures (including e-Infrastructures)

2017, INFRAIA-02-2017	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 C of the section “Specific features for Research Infrastructures” before the preparation of your application.
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Evaluation criteria, scoring and threshold: The criteria, scoring and threshold are described in General Annex H of the work programme. The following exceptions apply:

INFRAIA-01-2016-2017, INFRAIA-02-2017	<p><i>For the criterion Excellence</i>, in addition to its standard sub-criteria, the following aspects will also be taken into account;</p> <ul style="list-style-type: none"> • 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. <p><i>For the criterion Impact</i> the second sub-criterion is substituted by:</p> <ul style="list-style-type: none"> • Where relevant, any other substantial impacts not mentioned in the work programme, that would enhance innovation capacity; create new market opportunities, strengthen the competitiveness and growth of companies by developing innovations meeting European and/or global needs and markets, enhance or protect the environment, or bring other important benefits for society;
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Evaluation Procedure: The procedure for setting a priority order for proposals with the same score is given in General Annex H of the work programme.. The following exceptions apply:

INFRAIA-01-2016-2017, INFRAIA-02-2017	<p>The following approach will be applied successively for every group of <i>ex aequo</i> proposals requiring prioritisation, starting with the highest scored group, and continuing in descending order:</p> <p>(i) Proposals that address scientific domains or areas not</p>
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	<p>otherwise covered by more highly-ranked proposals will be considered to have the highest priority.</p> <p>(ii) The proposals identified under (i), if any, will themselves be prioritised according to the scores they have been awarded for the criterion <i>excellence</i>. When these scores are equal, priority will be based on scores for the criterion <i>impact</i>.</p> <p>If necessary, any further prioritisation will be based on the following factors, in order: total number of users to whom trans-national access to research infrastructures will be provided, size of budget allocated to SMEs; gender balance among the personnel named in the proposal who will be primarily responsible for carrying out the research and/or innovation activities.</p> <p>If a distinction still cannot be made, the panel may decide to further prioritise by considering how to enhance the quality of the project portfolio through synergies between projects, or other factors related to the objectives of the call or to Horizon 2020 in general. These factors will be documented in the report of the Panel.</p> <p>--</p> <p>As proposals need to give information on the research infrastructures providing access, specific page limits apply. The page limits for a full proposal is 100 pages. The limit for a first-stage proposal is 20 pages.</p>
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The full evaluation procedure is described in the relevant [guide](#) published on the Participant Portal.

Consortium agreement: Members of consortium are required to conclude a consortium agreement, in principle prior to the signature of the grant agreement.

Call - E-Infrastructures

H2020-EINFRA-2016-2017

The e-infrastructures⁸ call for 2016/2017⁹ will support the European policies on open research data, data and computing intensive science, research and education networking, high-performance computing and big data innovation¹⁰. Its implementation will be informed by the following principles:

Service orientation: The whole work programme aims at supporting a *service oriented European e-infrastructure landscape* catalysing new knowledge and innovative ICT solutions by global and multidisciplinary research. All projects will contribute to the production of a high quality catalogue of services describing the services that they will provide during the lifetime of the project or that they intend to develop during the project.

Maximizing and assessing the impact of the e-infrastructures: Proposals should define, collect and make available key performance indicators (KPIs) in support of operational, technical and socio-economic impact assessment.

Proposals should plan for active participation in international *fora* and community-led consensus building initiatives to promote data and computing infrastructure interoperability such as the Research Data Alliance.

Co-Design: In order to successfully achieve the work programme objectives and to increase the scope, depth and economies of scale of e-infrastructures, the Commission encourages that consortia applying to all topics, in particular to those in the *platform-driven* and *user-driven* innovation themes, are composed by a balanced set of partners with complementary competences and roles.

Open Research Data: Producers and users of research data will benefit from more systematically opening it to broad access, depositing and accessing their data with the objective to make research data discoverable, accessible, assessable, intelligible, useable, and wherever possible interoperable – c.f. *G8 principles on research data*¹¹.

H2020 as a catalyst of the European plan for growth and jobs: Horizon 2020 encourages synergies with other European Union Funds, with appropriate provisions not to cover the same cost items¹². The e-infrastructures call for 2016-2017 will promote when feasible the

⁸ a.k.a Information and Communication Technologies infrastructure

⁹ Is based on the "Scoping Paper" for Research Infrastructures (including e-infrastructures) and other extensive consultations

¹⁰ COM Data value chain

¹¹ G8 Science Ministers Statement London UK, 12 June 2013 -<http://bit.ly/1BtKagu>

¹² Article 17a of the Horizon 2020 Regulation and Article 31 of the rules of participation.

combined and/or the cumulative use of other funding sources as instrument to support initiatives of European interest to foster growth and jobs¹³.

The e-infrastructures call for 2016-2017 is structured along the following two themes:

Theme 1 - Integration and consolidation of e-infrastructure platforms supporting European policies and research and education communities

The integration and consolidation of e-infrastructure platforms covers the following aspects: (a) coordination of regional, national and European operations and funding (b) synergies between operational e-infrastructures (c) continuous upgrades of infrastructure without service disruption.

This theme will be covered by the topics EINFRA-11-2016 and EINFRA-12-2017 and the first point of the "Research and Education Networking - GEANT" part of GÉANT Partnership Projects (see *Other actions*).

The operation of e-infrastructure services will be funded by supporting the trans-national and virtual access activities provided to researchers. Those service activities shall comply with the conditions set out in Article 16.1 for trans-national access and Article 16.2 for virtual access to research infrastructures of the [Model Grant Agreement](#)¹⁴.

Under theme 1, only platforms and services based on systems and technologies that have at least achieved Technology Readiness Level 8 (TRL8)¹⁵ before the start of the project will be supported. The services offered under a project must be adequately documented in an open catalogue of services and shall be periodically assessed by an external board approved by the Commission and common to all EC funded e-infrastructure services.

The projects funded under this theme should establish links with all projects funded under the Specific Grant Agreement (a) "*Research and Education Networking – GÉANT*" within the GÉANT Partnership projects included under "Other actions", in order to collaborate and work on potential synergies, overlaps and gaps in the overall service offering.

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 with these provisions will be taken into account during evaluation.

Theme 2 - Prototyping innovative e-infrastructure platforms and services for research and education communities, industry and the citizens at large

e-Infrastructure platforms and services need to evolve through innovation actions to respond to the long-term needs of research and education communities, industry and the citizens at large. Innovative developments based on state-of-the-art technologies need to mature to be

¹³ "digital game-changer" on *European high-performance data networks*

¹⁴ For grants awarded under this theme capitalised and operating costs of 'large research infrastructures' as defined in the Article 6.2.D.4 of the Model Grant Agreement are not eligible.

¹⁵ Technology Readiness Level, See Annex G for further details.

integrated and offered as dependable e-infrastructures. The support to e-infrastructure innovation is done by means of two types of activities: (a) *Platform-driven e-infrastructure innovation* (technology push, driven by the supply-side) and (b) *User-driven e-infrastructure innovation* (user pull, driven by the demand-side).

This theme will be covered by the topics EINFRA-21-2017 and EINFRA-22-2016, the second point of the "Research and Education Networking - GEANT" part of GÉANT Partnership Projects and the "Interactive Computing e-infrastructure for the Human Brain Project" (see *Other actions*).

Under theme 2, only platforms and services based on systems and technologies that have achieved at least TRL 6¹⁶ before the start of the project will be supported and it is expected that they will have achieved at least TRL 8 by the end of the project. This condition does not apply to point "EINFRA-21-2017: Platform-Driven e-infrastructure innovation (a) Support to Public Procurement of innovative HPC systems, PPI".

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 with these provisions will be taken into account during evaluation.

Support to *policies and international cooperation for e-infrastructures* is covered in the INFRASUPP Call.

Proposals are invited against the following topic(s):

EINFRA-11-2016: Support to the next implementation phase of Pan-European High Performance Computing infrastructure and services (PRACE)

Specific Challenge: In order to create a world-class pan-European High Performance Computing (HPC) infrastructure and to provide state-of-the-art services with access by users, independently of their location, the HPC resources need to be further pooled, integrated and rationalised. Horizon 2020 is a key element to support the European strategy on High Performance Computing which sets the way forward, in particular regarding the access to the best supercomputing facilities and services for both industry and academia. This topic is synergetic to the activities of the Public-Private Partnership (PPP) in HPC in order to fully implement the European HPC strategy.

Scope: *Proposals will address all points below*:

(1) Provide a seamless and efficient Europe-wide Tier-0¹⁷ service to users, 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

¹⁶ Technology Readiness Level. See Annex G for further details

¹⁷ 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

users, including ESFRI projects, Horizon 2020 projects/programmes, large institutional users or industry.

(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 European Technology Platform for HPC (ETP4HPC) and the Centres of Excellence in HPC applications in support of the European HPC strategy towards the next generation of computing systems, technologies and applications. In particular, the mechanisms to be put in place by PRACE for the provision of technical specifications to guide research activities for future exascale prototypes and systems, for the testing and demonstration of such exascale solutions, for the identification of new user needs in the use of next generation computing systems evolving towards exascale, and for the reaching out to scientific and industrial communities and the transfer of know-how for the use of HPC.

(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 in the area of HPC aiming at systems interoperation.

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

Expected Impact: The successful response to this area will improve services and procedures for user access to HPC infrastructure resources and services. Allocation schemes fostering

openness to new user communities and applications will increase the amount of computing cycles available to researchers at European level through user-friendly and efficient procedures. This will help Europe staying at the forefront of scientific breakthroughs and innovation. This initiative will increase the number of industrial organisations (in particular SMEs), EU projects and institutional users benefiting from access to services including training in HPC. Benefits will also translate in 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 action

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

EINFRA-12-2017: Data and Distributed Computing e-infrastructures for Open Science

Specific Challenge: This topic covers two complementary areas of e-infrastructures very closely related with the objective to make research data *discoverable, accessible, assessable, intelligible, useable, and wherever possible interoperable* – c.f. G8 principles on research data:

(a) *Secure and agile data and distributed computing e-infrastructures:* fostering the integration of a secure, permanent, on-demand service-driven, privacy-compliant and sustainable e-infrastructure incorporating distributed databases, computing resources and software.

The European data and computing e-infrastructure landscape remains very fragmented which is an obstacle for research collaboration at European and global levels and introduces additional complexity for achieving sustainable governance. The challenge is to integrate at European level the geographically and disciplinary dispersed resources to achieve economies of scale and efficiency gains in providing the best data and computing capacity and services to the research and education communities. This action is interrelated to INFRADEV-04-2016, “*European Open Science Cloud for Research*”.

(b) *Access and preservation platforms for scientific information:* supporting the integration and consolidation of e-infrastructure for reliable and permanent open access to digital scientific records, based on existing initiatives across Europe (institutional and thematic repositories, aggregators, etc.).

The European infrastructures need to respond to the emerging requirements for seamless and reliable access to publications, research data and software. These requirements are complemented by the need for long term preservation and curation of scientific information to fully support data and computing intensive science. The challenge is to support the integration at European level of a robust and sustainable e-infrastructure, based on existing initiatives

across Europe (institutional and thematic publishing platforms, aggregators, etc.) and services supporting European Open Access policies. An additional challenge is the building of capacity to link all kinds of digital research objects in order to enable a more transparent evaluation of research and reproducibility of results, enabling trust and facilitating access by innovative business actors.

Scope: Grants awarded under this topic will be complementary between them. The respective options of Article 2, Article 31.6 and Article 41.4 of the [Model Grant Agreement](#) will be applied. The main purpose of the collaboration agreements referred to in Article 41.4 of the Model Grant Agreement is to work on potential synergies, overlaps and gaps in the overall service offering. In addition, links should also be established with projects selected under topic INFRADEV-04-2016, to collaborate, exploit potential synergies and ensure complementarity.

Proposals will address part (a) or (b), but not both. At least one proposal for each part will be selected:

(a) Secure and agile data and distributed computing e-infrastructures (proposals should address all points below):

(1) integration of computing, software and storage resources exposing them through a dynamic *registry* and *catalogue of services* supporting European research and education communities in their tasks related with data and computing intensive science. This integration should be done by means of open and flexible architectures and include institutional, regional, national and European capabilities, packaging them in the optics of end-user needs

(2) seamless operation of highly scalable and agile data and computing platforms and services dedicated to analytics including hardware and software components, database, compilers, analytics software, supported to easy user entry points for the community of users

(3) reliably address the aspects of privacy, cybersecurity and information assurance supporting multiple compartments with private, public or industrial corpus of data, protected from unauthorized access by secure interfaces

(4) adoption of standards-based common interfaces, open source components enabling access and processing of underlying data collected/stored in different platforms and formats. Empowering users to customise application and services tailoring them to specific requirements, which will differ across disciplines, applications etc

(5) work closely with user communities (from different disciplines) to foster the use of digital infrastructures, promote the values of open science and support their data management plans. Engage and train users (researchers, educators and students) to contribute to the dynamic *registry* and *catalogue of services* improving quality of data, software and computing infrastructure that become available for re-use

(6) foster interoperability of pan-European thematic/community-driven e-infrastructures providing cost-effective and interoperable solutions for data management. The data and computing e-infrastructure should be able to interoperate with resources based on different technologies which are operated/owned by public and or private organisations

(7) support the preservation and curation of data and associated software so that the reproducibility and accuracy of the data can be verified

(8) enable seamless transition and e-infrastructure upgrades, exploiting economies of scale and promoting interoperability with similar infrastructures across and beyond Europe and operate user-friendly and comprehensive repositories of software components for research and education

The Commission considers that proposals requesting a contribution from the EU of between EUR 10 and 15 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

(b) Access and preservation platforms for scientific information (proposals will address all points below):

(1) Deployment and maintenance of service-driven knowledge e-infrastructure responding to general and specific requirements of researchers and research organisations for open access to research digital objects, their registration and preservation. This e-infrastructure will further develop the research capacity through a coordinated and participatory architecture linking institutional and thematic repositories across Europe. It will support publishing platforms by providing essential services for scientific information that can be used by humans and machines. Such target platforms can be generic, specific for a research field or specialised on quality assurance, discoverability, archiving etc. Essential functions of this service-driven approach will include helpdesks, training and guidance to support producers and users of scientific information, community building to support research data sharing and management, as well as implementation of Open Access policies in Europe. Relevant indicators on the take-up of open access in Europe including publications and data should be elaborated and reported 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 Research Data Pilot) and produce both standard and on-demand statistics.

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

The Commission considers that proposals requesting a contribution from the EU of between EUR 8 and 10 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. It is expected that one proposal will be selected.

Expected Impact: (a) the operation of a federated European data and distributed computing infrastructure for research and education communities will optimise the access to IT equipment and services and will put all European researchers and educators in equal footing to access essential resources to express their talent and creativity. Establishing partnerships with industrial and private partners the e-infrastructure will train people in research and academic organisations preventing lack of skilled and specialised infrastructure operators. It will avoid the locking-in to particular hardware or software platforms that would jeopardise the long-term planning for capacity upgrades. With such an operational infrastructure more scientific communities will use storage and computing infrastructures with state-of-the-art services for their research and education activities. The open nature of the infrastructure will allow scientists, educators and students to improve the service quality by interacting with data, software and computing resources. It will increase the incentives for scientific discovery and collaboration across disciplinary and geographical boundaries, putting Europe in the driving seat at global level. It will further develop the European economic innovation capacity and provide stability to the e-infrastructure.

(b) a reliable operation of e-infrastructure services for access and preservation of scientific information will make the intellectual capital of Europe available to researchers, business and citizens at large. It will generate economic and scientific advances now and in the future as 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 95%) as well as the principal thematic repositories are part of the same interoperable repository network.

Type of Action: Research and Innovation action

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

EINFRA-21-2017: Platform-driven e-infrastructure innovation

Specific Challenge: Prepare the capacity required to future generations of e-infrastructure is the key challenge. e-Infrastructure platforms and services need to evolve through innovation actions to respond to the long-term needs of research and education communities (e.g. in case of large RIs entering in functions in a 5 to 10 years' timeframe). Platforms and services are first designed, prototyped and piloted with "supply and demand-side" approaches triggered by to the most demanding cases. The innovative developments bringing state-of the-art technology need to evolve and mature to be integrated and offered as dependable e-infrastructures.

Scope: *Proposals will address parts (a) or (b), but not both:*

(a) Support to Public Procurement of innovative HPC systems, PPI (proposals should address all points below):

(1) procurement of innovative HPC solutions supporting the deployment in Europe of world-leading HPC capability infrastructure

(2) ensuring and reinforcing European access to European leading-edge supercomputing Tier-0 infrastructures and services, by making available a substantial percentage of the new systems to European researchers in the frame of the Pan-European High Performance Computing infrastructure and services (see EINFRA-11-2016)

(3) diversify the available leading-class HPC capabilities through a rich set of HPC architectures featuring the most advanced technology made available by R&I (Research and Innovation) in Europe, in order to satisfy the needs of a wider range of users in very different key application areas

(4) contribute to the coordination of plans and procurements for the provision of leading-class HPC capabilities at European and national level in view of the implementation the European supercomputing strategy , encompassing funding and technical specifications

(b) Research and Innovation Actions for e-Infrastructure prototypes:

Proposals will address only one of the points below. At least one proposal for each point will be selected:

1. Universal discoverability of data objects and provenance (proposals should address all points below):

Prototyping an e-infrastructure service, based on standards and best-practices, for the uptake of a Digital Identifier e-infrastructure for digital objects (articles, datasets, collections, software, nomenclature, etc.), researchers and contributors, 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.) should be addressed as well as global interoperability through agreed mechanisms (e.g. in consensus building through the Research Data Alliance).

The Commission considers that proposals requesting a contribution from the EU between EUR 4 and 5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. It is expected that one proposal will be selected.

2. Computing e-infrastructure with extreme large datasets (proposals should address all points below):

Develop service prototypes to cope with very large data resources. It should include the basis software layers supporting applications such as modelling, simulation, pattern recognition,

visualisation, etc. The developments should be supported by robust mathematical methods and tools. Prototypes should follow an open source approach and aim at common interfaces to access and analyse underlying data collected/stored in different platforms, formats, locations and e-infrastructures and be tested against requirements of very large or highly heterogeneous research data sets. Clean slate approaches to high-performance computing and data management (e.g. HPC-through-the cloud, support of most innovative server's architectures for distributed computing in particular high Memory/Cores ratios allowing "in memory" processing) targeting 2020+ 'data factory' requirements of research communities and large scale facilities (e.g. ESFRI projects) are encouraged.

The Commission considers that proposals requesting a contribution from the EU between EUR 2.5 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: (a) Support to Public Procurement of innovative HPC systems, PPI: This action will contribute to the European HPC strategy through the creation of a European procurement market for the benefit of the HPC actors in Europe (in particular technology suppliers) and catalysing the efforts to vitalise the European HPC ecosystem. It positions Europe as a world-class HPC hub with more leading-class HPC computing resources and services available at European level for European academia and industry, independently of the location of users or HPC systems. It will foster adoption and use of innovative world-class HPC solutions featuring the most advanced results of the R&I in Europe, widening the access to more users, in particular for industry (including SMEs). It will improve effectiveness of public procurement in leading-class HPC systems through joint procurement and pooling of European and national resources, contributing to sustainability. Benefits will also translate in better coordination between demand and supply in the European HPC ecosystem, with improved collaboration of the users and procurers with technology suppliers.

(b) Research and Innovation Action for e-Infrastructure prototypes

Universal discoverability of data objects and provenance: the successful set up of such service based on standards and best-practices will support interoperability of e-infrastructure services. The use of Digital Identifiers opens new prospects for advanced services for science and education and for encouraging openness and building trust. Data and other resources become discoverable and easy to use which will facilitate access to resources and collaboration between scientists. It has the potential to be used as a core service across Europe and globally. Duplication of efforts for developing services common to many e-infrastructures is reduced.

Computing e-infrastructure with extreme large datasets: The successful prototyping of this action services will support the evolution of e-infrastructure services based on *exascale* data resources. It will prepare data and computing infrastructure to absorb needs of communities that push the envelope in terms of data and computing intensive science while softening the learning curve for scientific communities that will be using new services.

Type of Action: Research and Innovation action, Public Procurement of Innovative solutions

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

EINFRA-22-2016: User-driven e-infrastructure innovation

Specific Challenge: There is a need to support user-driven design and prototyping of innovative e-infrastructure services and applications to meet the needs of those communities that push the envelope in scientific and technological domains requiring top-of-the range capacity in the long term. It is also important to promote multi-domain community-driven approaches to fully exploit core e-infrastructure services with high economic innovation potential. With the support of, for example, independent software vendors, engineering companies, innovation clusters and Research and technology organisations, e-infrastructures should open up to innovative stakeholders, including researchers, citizens and SMEs, to exploit a wide range of technology developments, research results and data.

Opening e-infrastructures to develop and test innovative functionalities and advanced technology entails the support to Open Science and stairways for excellence to increase citizen's trust in science, bridging the gap between the leading research and education communities and the wider population.

Scope: *Proposals will address only one of the points below. At least one proposal for each point will be selected:*

Exploitation of e-infrastructures for user-driven innovation and pilots responding to community specific challenges

(1) Proposals are expected to support, through open e-infrastructure resources, specific requirements of European initiatives addressing societal challenges (e.g. on environment and marine sustainability, agriculture and biodiversity, health and human brain etc.). e-Infrastructures should enable fast prototyping and development of innovative networking, data and computing intensive application and services promoting adaptation, extension and repurposing of basic services. Special attention should be devoted to standardisation to make data and software reusable across the board. The network, data and computing services should lead to economies of scale and facilitate access to resources by innovators.

The Commission considers that proposals requesting a contribution from the EU between EUR 2 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.

(2) Proposals are expected to stimulate the innovation potential of innovative actors, SMEs in particular, either as suppliers of technologies and services for e-infrastructures or as users of e-infrastructures to improve their own product and service offering. The proposals shall involve actions led by innovative actors (notably SMEs) for which financial support will be

granted (minimum 80% of the EU funding requested by the proposal)¹⁸. If the maximum financial support per innovative actor exceeds EUR 60.000 (it should however never go beyond EUR 150.000) the proposal should explain why this is necessary for the objectives of the action.

The Commission considers that proposals requesting a contribution from the EU between EUR 5 and 6 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. It is expected that one proposal will be selected.

(3) Development of a pan-European identity federation services for researchers, educators and students, in compliance with existing identity inter-federation efforts (including *Eduroam* and *Edugain*). Stimulate AAI services supporting communities involved in the emerging data-rich science era to manage and share their resources. It shall respond to requirements of cybersecurity and information assurance towards integrated identity management across-disciplines and be interoperable at global level.

The Commission considers that proposals requesting a contribution from the EU between EUR 2.5 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. It is expected that one proposal will be selected.

Innovation for Open Science e-infrastructure services

(4) Reuse and improve (performance, quality, reputation, etc) the open access repository and publishing platform infrastructure for prototyping new infrastructure services in support of open science (e.g. new forms of publishing, machine-assisted knowledge extraction services from heterogeneous data resources and strengthening of machine readability and other discovery services). Prototyping of open review and research certification services engaging researchers, educators and students. Also registration and archiving services can be targeted. Developing further and widening the scope of the European Open Science e-infrastructure. Proposals should address an open scientific knowledge management infrastructure in which scientific and educational information repositories and publishing platforms form a visible part of an inter-connected and global knowledge system. Proposals can target any relevant parts of the scientific information ecosystem to enhance the links between literature, data, software, models and other digital objects. The proposed prototypes should have the potential to become part of an interoperable framework in order to enable more efficient digital science as well as transparent evaluation of research and reproducibility of results. Proposals should consider barriers (including legal) to data sharing in the context of these new services and assess the possibility of using pan-European authentication and authorization infrastructures.

The Commission considers that proposals requesting a contribution from the EU between EUR 1 and 2 million would allow this specific challenge to be addressed appropriately.

¹⁸ In line with the conditions set out in Part K of the General Annexes.

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

Expected Impact: *Exploitation of e-infrastructures for user-driven innovation and pilots responding to community specific challenges:* These actions will accelerate the development of innovative data and computing intensive services in areas of social relevance such as Health, Environment monitoring and management. It will foster the use of open e-infrastructures eco-systems to innovative use promoting smooth collaboration among and between the large European Policy data intensive initiatives. It will bridge the gap between adjacent but not connected scientific communities and promote wide dissemination of data including to the citizens engaged in science. It will support collaboration in data provision and exchange across regional and national related infrastructures allowing the integration of data from a myriad of resources and research communities.

Successful proposals will increase the number of SMEs that are aware of available e-infrastructures resources and services and become active innovators as users and or suppliers of e-infrastructures. Stronger links between e-infrastructure operators and other actors in the innovation chain, such as independent software vendors, innovation clusters and Research and technology organisations, will be put in place. The value of existing scientific information infrastructures will increase with the addition of new interoperable and/or integrated services. Successful proposals will have an impact in making European and global intellectual capital available to researchers, business and citizens. This will support scientific advances now and generate innovation with economic impact leveraging e-infrastructures such as GÉANT. The knowledge capital will be better preserved for further exploitation by future digital-born generations.

Innovation for Open Science e-infrastructures and services: successful proposals will support the objectives of Open Science and contribute, with innovative services, to the modernization of the underlying e-infrastructures and improve access to content and resources through federated management.

Type of Action: Research and Innovation action

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

Conditions for the Call - E-Infrastructures

Opening date(s), deadline(s), indicative budget(s):¹⁹

Topics (Type of Action)	Budgets (EUR million)		Deadlines
	2016	2017	
Opening: 08 Dec 2015			
EINFRA-11-2016 (RIA)	15.00		30 Mar 2016
EINFRA-22-2016 (RIA)	21.00		
Opening: 14 Apr 2016			
EINFRA-21-2017 (PPI)		26.00	20 Sep 2016
Opening: 08 Dec 2016			
EINFRA-12-2017 (RIA)		40.00	29 Mar 2017
EINFRA-21-2017 (RIA)		20.00	
Overall indicative budget	36.00	86.00	

Indicative timetable for evaluation and grant agreement signature:

For single stage procedure:

- Information on the outcome of the evaluation: Maximum 5 months from the final date for submission; and
- Indicative date for the signing of grant agreements: Maximum 8 months from the final date for submission.

Exceptional funding rates:

EINFRA-21-2017	<i>The funding rate for Public Procurement of Innovative Solutions (PPI) actions is limited to 35% of the total eligible costs (PPI is procurement for the purchase and deployment of innovative solutions) to leverage co-financing from the procurers.</i>
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¹⁹ The Director-General responsible for the call may decide to open the call up to one month prior to or after the envisaged date(s) of opening.

All deadlines are at 17.00.00 Brussels local time.

The Director-General responsible may delay the deadline(s) by up to two months.

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

Evaluation criteria, scoring and threshold: The criteria, scoring and threshold are described in General Annex H of the work programme. The following exceptions apply:

<p>EINFRA-21-2017</p>	<p>Only for (b): Research and Innovation Action for e-Infrastructure prototypes</p> <p><i>For the criterion Excellence</i> the third and fourth sub-criteria are substituted by:</p> <ul style="list-style-type: none"> • The extent to which it is demonstrated that the concerned platforms and services are based on systems and technologies that have reached TRL 6 before the start of the project and will be brought to at least TRL 8 by the end of the project. • The extent to which the proposed activities will improve, in quality and/or quantity, the services provided by state of the art e-infrastructures. <p><i>For the criterion Impact</i> the second sub-criterion is substituted by:</p> <ul style="list-style-type: none"> • Potential to enhance capacity for innovation and production of new knowledge. <p>Scoring:</p> <p>The score for the criterion <i>Excellence</i> will be given a weight of 1.5.</p>
<p>EINFRA-22-2016</p>	<p><i>For the criterion Excellence</i> the third and fourth sub-criteria are substituted by:</p> <ul style="list-style-type: none"> • The extent to which it is demonstrated that the concerned platforms and services are based on systems and technologies that have reached TRL 6 before the start of the project and will be brought to at least TRL 8 by the end of the project. • The extent to which the proposed activities will improve, in quality and/or quantity, the services provided by state of the art e-infrastructures. <p><i>For the criterion Impact</i> the second sub-criterion is substituted by:</p> <ul style="list-style-type: none"> • Potential to enhance capacity for innovation and

	<p style="text-align: center;">production of new knowledge.</p> <p>Scoring: The score for the criterion <i>Excellence</i> will be given a weight of 1.5.</p>
<p>EINFRA-11-2016, EINFRA-12-2017</p>	<p><i>For the criterion Excellence</i> the third and fourth sub-criteria are substituted by:</p> <ul style="list-style-type: none"> • The extent to which it is demonstrated that the concerned platforms and services are based on systems and technologies that have reached at least TRL 8 before the start of the project. • The extent to which the Service Activities (Trans-national and/or Virtual Access Activities) will offer access to state-of-the-art infrastructures and high quality services, and will enable users to conduct excellent research as demonstrated, inter-alia, by both the quality of the associated catalogue of services and the baseline and expected future measurements of related KPIs <p><i>For the criterion Impact</i> the second sub-criterion is substituted by:</p> <ul style="list-style-type: none"> • Potential to enhance capacity for innovation and production of new knowledge

Evaluation Procedure: The procedure for setting a priority order for proposals with the same score is given in General Annex H of the work programme.

The full evaluation procedure is described in the relevant [guide](#) published on the Participant Portal.

Consortium agreement: Members of consortium are required to conclude a consortium agreement, in principle prior to the signature of the grant agreement.

Call - Fostering the innovation potential of Research Infrastructures

H2020-INFRAINNOV-2016-2017

This call focuses on fostering the innovation potential of research infrastructures.

In addition to this call, innovation is mainstreamed in all relevant parts of the work programme.

As indicated in the Model Grant Agreement (Article 6.2.D.4), the methodology for charging capitalised and operating costs of "*large research infrastructures*", defined in this same Article, is not applicable for grants awarded under this call.

Proposals are invited against the following topic(s):

INFRAINNOV-01-2017: Fostering co-innovation for future detection and imaging technologies

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. Opportunities provided by the development of components, instruments, services and knowledge for the implementation and upgrade of research infrastructures, could be better exploited to push the limits of existing technologies. There is a clear innovation potential associated with procurement from industry during the construction and upgrade of research infrastructures.

A co-innovation approach to continuously generate, scale and deploy breakthrough technologies with market and social value needs to be adopted by research infrastructures.

Scope: The aim is the establishment of an open initiative oriented towards a novel research and innovation collaborative framework engaging both the research communities in Europe using Research Infrastructures and the industry (including SMEs), for the mutual benefit of these stakeholders and the European society at large.

This initiative should address:

- The identification of a wide spectrum of technology opportunities with breakthrough potential across Europe; the assessment of the feasibility and scalability of the identified opportunities; the selection and clustering of those opportunities with a clear potential for industrial implementation; and the support of those opportunities towards industrial applications having societal value;
- The support of technology and innovation transfer and joint development measures of high-tech components;

- The enabling of the best conditions for full exploitation by industrial partners of the innovation potential of Research Infrastructures (e.g. in the field of instrumentation and detectors);

As a pilot initiative, the proposals should mainly address the development of future detection and imaging technologies, which have applications in the fields of medicine, manufacturing industry, aerospace, ICT, engineering, environmental sciences and beyond, and should constitute a driver enabling the transfer of fundamental research towards industrial application.

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. The financial support to third parties is the primary aim of the action.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 20 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:

- establish a co-innovation platform in the field of detection and imaging technologies
- provide financial support and guidance towards industrial applicability to the identified co-innovation opportunities
- increase the capacity to generate, absorb and use new technologies in Europe;
- enhance the innovation capability of European Research Infrastructures;
- increase the involvement of industry (including SMEs) in the development of research infrastructures, raising the technological level and competitiveness of European companies and generating market opportunities for them;
- 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: Research and Innovation action

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

INFRAINNOV-02-2016: Support to Technological Infrastructures

Specific Challenge: Pan-European Research Infrastructures use more and more sophisticated technologies that can only be hosted in large-scale platforms combining R&D (Research and Development), integration and validation. These platforms can be viewed as Technological Infrastructures: they form a distributed network across Europe and provide Research Infrastructures with advanced key technologies and integration services. They also provide longer-term visibility and involvement of industry in scientific and technological advancements and therefore ensure greater socio-economic impact. The coordination of Technological Infrastructures working in a given technological domain and their networking will contribute to harmonise their operation conditions and increase their operation efficiency. This will permit the creation of a more efficient integrated ecosystem between academic laboratories, focussed on technological R&D needs of Research Infrastructures, large companies as well as SMEs, motivated by the innovative environment and the market opportunities created by the Research Infrastructure needs. Being focussed on innovation and on higher Technology Readiness Level (TRL) than usually targeted by Research Infrastructures, i.e. from TRL4 (technology validated in lab) to TRL6 (technology demonstrated in relevant environment), these networks of Technological Infrastructures should contribute to bridging the gap between the academic world and industry, and to the training of high-level engineers and technological scientists in Europe.

Scope: Funding will be provided for the coordination and networking of Technological Infrastructures involving research infrastructures, industry and SMEs.

Proposals should address:

- the definition of key techniques and trends which are crucial for the further development of Research Infrastructures, in close partnership with the industrial partners, especially with innovative SMEs;
- the definition of roadmaps and/or strategic agendas together with industrial sector actors for key technologies for R&D and for the construction and upgrade of Research Infrastructures as well as for key technologies to be explored by industries;
- the identification of the domains of societal applications and potential markets beyond Research Infrastructures;
- the implementation of a strategy addressing the training of young engineers, technicians and scientists in an environment of strong industrial relevance and scientific excellence;
- the exchange of good practices between user communities and managers of research infrastructures as regard benchmarking performance of technology platforms, harmonisation of tests, standards, reference materials, interoperability and data handling.

Proposals should cover a broad technological domain of interest for pan European Research Infrastructures such as but not restricted to components for accelerator based facilities, laser, high-field magnets, vacuum and cryogenic systems, or components for oceanic investigation.

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

Expected Impact: The implementation of a coordinated ecosystem of Technological Infrastructures as key components of the European Research Infrastructure landscape, will help ensure both the scientific competitiveness of European Research Infrastructures in the long-term and the further development of innovative companies.

In particular this activity will:

- Establish technology roadmaps and identify market opportunities shared between Research Infrastructures and Technology Infrastructures and socio-economic partners for a better positioning of Europe in the global Research Infrastructure sector;
- Facilitate the creation of both large and viable markets and structuring industrial partners in a critical mass to enable European industry to respond to demands from international Research Infrastructures;
- Established links between universities and industrial companies of such a technology cluster to ensure the dissemination of the acquired knowledge and the training of top-level engineers and technicians;
- Support the integration of research infrastructures into local, regional and global innovation systems; the competitive nature of such a technology cluster-based approach will facilitate the development of synergies and complementarities across Europe and avoid duplication of work.

Type of Action: Coordination and support action

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

Conditions for the Call - Fostering the innovation potential of Research Infrastructures

Opening date(s), deadline(s), indicative budget(s):²⁰

Topics (Type of Action)	Budgets (EUR million)		Deadlines
	2016	2017	
Opening: 08 Dec 2015			
INFRAINNOV-02-2016 (CSA)	10.00		30 Mar 2016
Opening: 08 Dec 2016			
INFRAINNOV-01-2017 (RIA)		20.00	29 Mar 2017
Overall indicative budget	10.00	20.00	

Indicative timetable for evaluation and grant agreement signature:

For single stage procedure:

- Information on the outcome of the evaluation: Maximum 5 months from the final date for submission; and
- Indicative date for the signing of grant agreements: Maximum 8 months from the final date for submission.

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

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

Evaluation Procedure: The procedure for setting a priority order for proposals with the same score is given in General Annex H of the work programme.

The full evaluation procedure is described in the relevant [guide](#) published on the Participant Portal.

Consortium agreement: Members of consortium are required to conclude a consortium agreement, in principle prior to the signature of the grant agreement.

²⁰ The Director-General responsible for the call may decide to open the call up to one month prior to or after the envisaged date(s) of opening.

All deadlines are at 17.00.00 Brussels local time.

The Director-General responsible may delay the deadline(s) by up to two months.

Call - Support to policy and international cooperation

H2020-INFRASUPP-2016-2017

This call focuses on reinforcing European research infrastructures policy and international cooperation.

In addition to this call, development of policy and international cooperation are encouraged in any proposal where these activities appear relevant.

The e-infrastructures topic for 2016-2017 foresees support to the implementation and monitoring of the Open Research Data Pilot²¹. It will provide support for coordination of European, national and/or regional policies and programmes. International co-operation will promote the European leadership in the development of new e-infrastructure capacity on research data, high performance computing and networking, ensuring interoperability at global level. It will enable European communities to be linked with third countries, have access to unique research infrastructures and contribute to standardisation activities in international *fora*, aligning strategic developments and sharing best practices.

For grants awarded under this call, capitalised and operating costs of "*large research infrastructures*", as defined in the Article 6.2.D.4 of the Model Grant Agreement, are not eligible.

Proposals are invited against the following topic(s):

INFRASUPP-01-2016: Policy and international cooperation measures for research infrastructures

Specific Challenge: In the context of the communication for a reinforced ERA partnership for excellence and growth²², the focus of the policy support measures is related to the effective investment and use of research infrastructures. Following the communication of the Commission on International Cooperation in Research and Innovation (COM(2012)497), international cooperation for research infrastructures is needed with a number of key third countries/regions seen as strategic for the development, exploitation and management of world-class research infrastructures necessary to address research challenges with a global dimension.

Scope: Proposals will address one of the following areas:

1. Support Research Infrastructure policy development in terms of exchange of best practices for national Roadmap drafting and evaluation procedures for research infrastructures in order to promote comparability and synchronisation of national procedures and a possible harmonisation of ex-ante and ex-post evaluation mechanisms.

²¹ Further information on the Open Research Data Pilot is made available on the Participant Portal.

²² COM (2012) 392 final

The full lifecycle of research infrastructure funding should be duly taken into account. The proposals shall foresee the conduction of an analysis of existing national roadmaps so to extrapolate common trends that could be then proposed as best practices in terms of criteria for inclusion, and for addressing societal needs with cross-cutting/multi-disciplinary approaches. The activity should foresee, amongst other, the organisation of dedicated workshops with the relevant key players both at national and European level (with specific reference to ESFRI and the e-IRG) for validation of the findings and recommendations.

2. Conduct an International landscaping exercise for Research Infrastructures to support the EU strategy of International cooperation in this field. Such exercise should build on the ESFRI landscaping exercise. The proposals should demonstrate the added value of the pan European investments in terms of establishing, as appropriate, complementarities to non-European initiatives and should link, as appropriate, to the relevant European and International bodies (i.e. ESFRI, GSO, OECD/GSF).
3. Support to trans-disciplinary bilateral cooperation on research infrastructures with Africa. The proposal will build on the past experience and achievements gained in the FP7 project PAERIP (Promoting African – European Research Infrastructure Partnerships), taking also into account the recommendations deriving from the EU-Africa High Level Policy Dialogue (HLPD) on science, technology and innovation that has initially focused on food and nutrition security and sustainable agriculture. Proposals should allow to further landscape the research infrastructure dimension in Africa and identify domains in which cooperation between research infrastructures would be beneficial to consequently developing roadmaps for cooperation. Appropriate involvement of African participants is encouraged and will be taken into account during evaluation. The proposals should in particular:
 - o Identify and promote opportunities (access and data sharing) available to European scientists in these research infrastructures;
 - o Help to develop better coordination and cooperation of European research infrastructures with their non-European counterparts, ensuring their global interoperability and reach, and pursuing international agreements on the reciprocal use, openness or co-financing of infrastructures;
4. Support the training needs of the Synchrotron light for Experimental Science and Applications (SESAME) facility located in Jordan and the staff exchange with other European light source infrastructures to ensure its optimal use by the research community for world-class research.

A balanced coverage of the various areas is expected as outcome of this topic. The Commission considers that proposals requesting a contribution from the EU of between EUR 1.5 and 2 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:

- 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, funding bodies, academia and industry and promote the development of appropriate monitoring tools for decision making;
- Contribute to the emergence of sustainable approaches 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.
- Develop cooperation with key international partners for research infrastructures;
- Contribute to the development of a competitive high performance ERA in the global research environment;
- Enhance the role of the Union in international organisations and multilateral fora;
- Contribute to capacity building and research infrastructures human capital development in targeted/relevant regions.

Type of Action: Coordination and support action

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

INFRASUPP-02-2017: Policy and international cooperation measures for research infrastructures

Specific Challenge: In the context of the communication for a reinforced ERA partnership for excellence and growth²³, the focus of the policy support measures is related to the effective investment and use of research infrastructures. Following the communication of the Commission on International Cooperation in Research and Innovation (COM(2012)497), international cooperation for research infrastructures is needed with a number of key third countries/regions seen as strategic for the development, exploitation and management of world-class research infrastructures necessary to address research challenges with a global dimension.

²³ COM (2012) 392 final

Scope: Proposals will address only one of the following areas:

1. Develop a model describing the socio-economic impact of Research Infrastructures and of their related financial investments. The model should be adaptable to a broad range of scientific domains and types of infrastructures. It should contribute to a common approach at international level and facilitate investments in Research Infrastructures by funding agencies and other stakeholders. Proposals will take stock of the different existing models for research infrastructures and integrate, as appropriate, their findings in one single model. The activity should take into account the work of the Research Infrastructure Socio-Economic Impact Working group, being established by the OECD Global Science Forum, and involve major key international players in this domain.
2. European support to the Research Data Alliance, RDA: Proposals are expected to support the development of global interoperable research data infrastructures that will greatly benefit the coordination at European level addressing all the points below. The objective is (a) support to the RDA secretariat for logistics, open access to RDA reference documents and dissemination activities (b) support the emergence of building blocks of an open, interoperable data infrastructure fostering interoperability across regions, organisations and scientific disciplines (c) support ESFRI infrastructures and new communities to engage in Open Science and data sharing principles. In particular, the proposal activities should provide financial support of the organisation and coordination of European stakeholders' active participation and contribution to the Research Data Alliance²⁴.

At least a proposal per area will be selected. The Commission considers that proposals requesting a contribution from the EU of up to EUR 1.5 million for the first area and between EUR 3 and 3.5 million for the second area (RDA) 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 help to:

- Develop cooperation with key international partners for research infrastructures;
- Enhance the role of the Union in international organisations and multilateral fora.

For the first area (model for socio-economic impact) further expected impact of the action is the enhancement of partnerships between policy makers, funding bodies, academia and industry and the promotion of the development of appropriate tools in support of decision making.

For the second area (European support to RDA) further expected impact of the action is the following: 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

²⁴ In line with the conditions set out in Part K of the General Annexes

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 action

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

INFRASUPP-03-2016: Support to policies and international cooperation for e-infrastructures

Specific Challenge: Fostering targeted international co-operation is essential to promote e-infrastructure interoperability at global level allowing European communities to link with third countries, contribute to standardisation activities in international *fora*, to align strategic developments and share best practices. To optimise e-infrastructure 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 related EU policies.

Scope: *Proposals will address part (a) or (b), but not both:*

(a) Research and Innovation Actions for International Co-operation on high-end e-infrastructure requirements

Together with other countries in the world, European Member States are leading partners in the construction of the forthcoming Square Kilometre Array (SKA) radio telescope. SKA will generate huge amounts of data and a significant part will be made available online. Efficient processing and computation of the large volume of data are significant challenges and global co-operation is essential. SKA has the potential to drive innovation in query and knowledge creation on large databases, high performance computing, and communications and networking technologies.

Proposals bringing together key international partners should address all of the following aspects:

- Define and test the high-speed networking e-infrastructure architecture, components and services to respond to the bandwidth requirements for SKA data dissemination channels.
- Define and test computational requirements and architectures in terms of High-Performance Computing, distributed computing, storage e-infrastructures and services in order for the scientific community to be able to exploit SKA data.

- Foster global co-operation on management e-infrastructure and services for the exploitation of SKA data through joint efforts on global interoperability in the context of the Research Data Alliance (RDA).

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 with these provisions will be taken into account during evaluation.

The Commission considers that proposals requesting a contribution from the EU between EUR 1.5 and 3 million would allow this activity to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

(b) Coordination and Support actions for international co-operation and policy development

Proposals will address only one of the points below. At least one proposal for each point will be selected:

1. International Co-operation on e-infrastructure supporting major societal challenges:

International cooperation involving different third countries, to facilitate the development of globally interoperable e-infrastructures ensuring their global reach, innovation, skill development and sharing of lessons learned. Co-operation with third countries on interoperability of e-infrastructures for networking, computing and data in order to support joint-efforts on one or more major societal challenges (e.g.: health, agriculture, education/skills, etc.). Innovation and spin-off of technology for developing and developed countries and emerging economies to establish a platform for sharing information and best practices on e-infrastructure development, deployment and operation.

Proposals should address all the following aspects:

- Define one or more key societal challenge that has significant potential of maximising benefit of e-infrastructure across developing, developed and emerging economies,
- Organise a platform for sharing information and best practices,
- Identify and explore spin-off and innovation, in particular with the co-operation of developing and developed countries.

The Commission considers that proposals requesting a contribution from the EU between EUR 0.5 and 1 million would allow this activity to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

2. Policy support to e-infrastructure programme: Support the e-IRG²⁵ secretariat. The activities should include the collection and aggregation of relevant policy information with impact on the development of EC-funded e-infrastructures, including KPIs and cost-related

²⁵ e-Infrastructure Reflection Group

information, in coordination with the funded e-infrastructure initiatives and made available in open formats for reuse. The collected information will enable the e-IRG with the support of independent expert panels to provide strategic advice on the evolution of the European e-infrastructure landscape and associated costs.

The Commission considers that proposals requesting a contribution from the EU between EUR 0.5 and 1 million would allow this activity to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

3. Support to dissemination for the e-infrastructure programme: Develop and maintain dissemination and collaboration activities for information sharing among projects and stakeholders. They should include a web-portal to convey updated information related to the evolution of e-infrastructure at regional, national and European levels, with a special focus on e-infrastructure projects funded under Horizon 2020. The portal will be a vehicle to present to experts and the wider public the catalogue of services offered by e-infrastructure as well as service-related KPIs and costs (see point above). It should support monitoring activities on take-up of open science and e-infrastructure policies (e.g. Horizon 2020 Open Research Data Pilot by research communities and citizens, per country, region and research domain).

The Commission considers that proposals requesting a contribution from the EU between EUR 1 and 1.5 million would allow this activity to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

4. Support to small-size foresight roadmaps for the e-infrastructure programme: Support small-size foresight roadmaps for research and education communities and operators of e-infrastructure services to define long-term requirements, community-building and identification of potential collaboration from stakeholders across different geographic areas and scientific domains.

The Commission considers that proposals requesting a contribution from the EU between EUR 300 and 400 thousand would allow this activity to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: (a) **Research and Innovation Actions for International Co-operation on high-end e-infrastructure requirements:** The impact of successful proposals will lead to the improvement of co-operation on e-infrastructure with European partners that are joining efforts in major research infrastructure undertakings. It will help the identification of benefits of joint technology development, standardisation and sharing risks.

(b) **Coordination and Support Actions for International Co-operation and Policy Development:**

International Co-operation on e-infrastructure supporting major societal challenges: will exploit the potential for further economic and educational co-operation between Europe and third countries. It will also improve the identification of areas for further co-operation on

scientific development and innovation. The actions will provide mechanisms to assess measurable benefits of co-operation on major societal challenges in the developing countries.

Policy support to e-infrastructure programme: Support actions provide solid ground for future choices for a comprehensive European Research Infrastructure and especially e-infrastructure policy and enable decision making and deployment of e-infrastructures. Successful collaboration between all projects under the H2020 e-infrastructure funding brings together all key stakeholders, and enables finding further synergies towards a harmonised European e-infrastructure approach.

Support to dissemination for the e-infrastructure programme: improve awareness and knowledge about priorities of e-Infrastructures activities and strategies increasing the transparency and accountability of the workprogramme implementation.

Support to small-size foresight roadmaps for the e-infrastructure programme: improve the knowledge base for setting long-term e-infrastructure strategies and objectives.

Type of Action: Research and Innovation action, Coordination and support action

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

Conditions for the Call - Support to policy and international cooperation

Opening date(s), deadline(s), indicative budget(s):²⁶

Topics (Type of Action)	Budgets (EUR million)		Deadlines
	2016	2017	
Opening: 08 Dec 2015			
INFRASUPP-01-2016 (CSA)	8.00		30 Mar 2016
INFRASUPP-03-2016 (CSA)	4.50		
INFRASUPP-03-2016 (RIA)	3.00		
Opening: 08 Dec 2016			
INFRASUPP-02-2017 (CSA)		5.00	29 Mar 2017
Overall indicative budget	15.50	5.00	

Indicative timetable for evaluation and grant agreement signature:

For single stage procedure:

- Information on the outcome of the evaluation: Maximum 5 months from the final date for submission; and
- Indicative date for the signing of grant agreements: Maximum 8 months from the final date for submission.

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

Evaluation criteria, scoring and threshold: The criteria, scoring and threshold are described in General Annex H of the work programme. The following exceptions apply:

INFRASUPP-03-2016	<p>(a) For the criterion <i>Excellence</i> the third and fourth sub-criteria are substituted by:</p> <ul style="list-style-type: none"> • The extent to which the proposed activities will improve, in quality and/or quantity, the services provided by state of the art e-infrastructures.
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²⁶ The Director-General responsible for the call may decide to open the call up to one month prior to or after the envisaged date(s) of opening.

All deadlines are at 17.00.00 Brussels local time.

The Director-General responsible may delay the deadline(s) by up to two months.

	<i>(b) Standard sub-criteria apply</i>
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Evaluation Procedure: The procedure for setting a priority order for proposals with the same score is given in General Annex H of the work programme.

The full evaluation procedure is described in the relevant [guide](#) published on the Participant Portal.

Consortium agreement: Members of consortium are required to conclude a consortium agreement, in principle prior to the signature of the grant agreement.

Other actions²⁷

1. Presidency event: Launch of 2016 ESFRI Roadmap

The Research Infrastructure action would support in the first semester of 2016 the ESFRI Roadmap launch event organised under the Dutch Presidency.

Legal entities:

Koninklijke Nederlandse Akademie van Wetenschappen – KNAW, Kloveniersburgwal, 29 Het Trippenhuis, Amsterdam, Netherlands.

Type of Action: Grant to identified beneficiary - Coordination and support actions

The standard evaluation criteria, thresholds, weighting for award criteria and the maximum rate of co-financing for this type of action are provided in General Annexes D and H of the work programme.

Indicative timetable: First quarter of 2016

Indicative budget: EUR 0.10 million from the 2016 budget

2. External expertise

This action will support:

- The use of appointed independent experts for the monitoring of running projects, where appropriate.
- The use of appointed independent experts to advise on or assist with the implementation of Union research and innovation policy or programmes including Horizon 2020, as well as the achievement and functioning of the European Research Area (e.g. the monitoring of EP Pilot project REIsearch or the assessment of complementarities and potential synergies of retained proposals for topics with complementary grants). A special allowance of EUR 450/day will be paid to the experts appointed in their personal capacity who act independently and in the public interest.
- The use of appointed independent experts for the interim evaluation of the Research Infrastructures Part of Horizon 2020. A special allowance of EUR 450/day will be paid to the experts appointed in their personal capacity who act independently and in the public interest.
- The use of independent experts to advise on the design and implementation of EU research policy and for the assessment of ERIC applications, as required under the ERIC

Regulation²⁸. A special allowance of EUR 450/day will be paid to the experts appointed in their personal capacity who act independently and in the public interest.

Type of Action: Expert Contracts

Indicative budget: EUR 0.80 million from the 2016 budget and EUR 0.80 million from the 2017 budget

3. GÉANT Partnership projects²⁹

Within the GÉANT Framework Partnership Agreement (FPA) awarded under topic EINFRA-8-2014 of the e-Infrastructures call, the consortium will be invited to submit proposals for two Specific Grant Agreements (SGA) addressing objectives defined in the FPA and action plan. The proposals will be evaluated according to the criteria established in the invitation from the Commission, complying with the Horizon 2020 general requirements of evaluation and selection procedures.

Proposals will address part (a) or (b), but not both.

*(a) **Research and Education Networking – GÉANT** (proposals will cover all points below)*

Integration and consolidation of e-infrastructure platforms supporting European policies and research and education communities. Effectively support data and computing-intensive collaborative research and education anywhere in Europe and beyond, through reliable networking services and operational excellence. Supply dependable, secure around the clock, high-speed internet access to research and education communities, enhancing the quality of service improving geographical coverage and support cooperation of emergency response teams at European level. Deploy short and medium-term investments to extend geographic network coverage and prepare capacity to integrate new services to be included in the mainstream service bouquet of future generations of the infrastructure. Deploying the 100 Gbits/s technology across Europe and improving peering; decisions for investing in new networking services should be based on a clear business case and commitment by National Research and Education Networks.

Only platforms and services based on systems and technologies that have achieved at least TRL 8 before the start of the project will be supported.

The operation of e-infrastructure services will be funded by supporting virtual access activities provided to researchers. Those service activities shall comply with the conditions set out in Article 14.2 for virtual access to research infrastructures of the Model Specific Agreement for Framework Partnerships (identical to Article 16.2 of the General Model Grant Agreement). Capital investments (i.e. costs of renting, leasing, purchasing depreciable

²⁸ Council Regulation (EC) No 723/2009 of 25 June 2009 on the Community Legal Framework for a European Research Infrastructure Consortium.

²⁹ Awarding of specific grants in a FPA will follow the rules and procedures established in the Financial Regulation.

equipment, infrastructure or other assets) will be eligible costs for this specific partnership project, in accordance with the general eligibility conditions of the Model Grant Agreement.

The services offered under this point must be adequately documented in an open catalogue of services and shall be periodically assessed by an external board approved by the Commission and common to all EC funded e-infrastructure services.

The activities funded under this point should establish links with all projects funded under theme 1 "Integration and consolidation of e-infrastructure platforms supporting European policies and research and education communities" of the call H2020-EINFRA-2016-2017, in order to collaborate and work on potential synergies, overlaps and gaps in the overall service offering.

The investment at the European level in GÉANT is expected to: maximise the value of innovation in a cooperative, open and multi-domain eco-system; the cooperation at European and global levels will minimise the risk of divergent, redundant, overlapping and incompatible investments on the whole REN chain; it will stimulate advancement of the combined REN infrastructures to tackle cross-border links. The GÉANT network is an essential resource to address the digital divide in Europe through a common cost sharing model effectively enabling equal access to IT resources in Europe. It will create economies of scale in procuring/brokering access to cross-border resources at European level and to optimise costs of cross-border links. GÉANT will continue to contribute to the effective European research enterprise making Europe the best connected region in the world.

Prototyping innovative e-infrastructure platforms and services for research and education communities, industry and the citizens at large. Enhance future generations of GÉANT platform by prototyping network components, modules, services and applications accessing wired/wireless infrastructures and networked resources. In particular these should respond to the needs of extreme-scale systems (e.g. requiring massive data transfer capacity). They should develop further and test network resilience, trust and security in scenarios pushing network performance to the limits. Prototype and customise network services to manage the movement of large data files (i.e., PetaByte, ExaByte) between data sources and computing sites. Develop operator and user interfaces for easy deployment, customisation and test of new networking services. Analyse legal, economic, policy evolution scenarios related with use of open network architectures.

Only platforms and services based on systems and technologies that have achieved at least TRL 6 before the start of the project will be supported and it is expected that they will have achieved at least TRL 8 by the end of the project.

The above objectives ensure GÉANT's excellent barrier infrastructure in support of coherent, scalable, integrated, secure and reliable networking service; keeping it based on open and flexible architecture that made the Internet such a powerful societal game changer. It is the basis of an open eco-system of innovative usages of e-infrastructures services ensuring a smooth collaboration among e-infrastructures as well as with global scientific communities.

(b) Trans-Atlantic submarine cable

Improve the global footprint of the European research and education high-speed network through co-funding of bandwidth in a submarine cable to enrich GEANT backbone infrastructure. It will connect Europe with South America offering collaboration opportunities to European research and innovation communities.

This action will directly support inter-continental research and education collaborations with long term low cost view, and will have extended socio-economic impacts for Europe notably in improving the connectivity of the major European internet exchanges and European data-based services, helping addressing emerging markets in Latin America, Africa and East Asia.

Considering the prospect of acquiring a long term indefeasible right of use, the option for full cost of purchasing equipment, infrastructure or other assets of Article 5.2.D.2 of the Model Specific Agreement for Framework Partnerships (identical to Article 6.2.D.2 of the General Model Grant Agreement) may be used instead of the standard model of depreciation costs.

A maximum of EUR 5 million from the total indicative budget is foreseen for point (b).

Further conditions and requirements that applicants should fulfil when drafting a proposal under (a), or (b), are given in part D of the section “Specific features for Research Infrastructures”. Compliance with these provisions will be taken into account during evaluation.

Type of Action: Specific Grant Agreement

7-years GÉANT2020 Framework Partnership Agreement with identified beneficiary and specific grants awarded to identified beneficiary for Research and Innovation Action under the Framework Partnership Agreement.

The standard evaluation criteria, thresholds, weighting for award criteria and the maximum rate of co-financing for this type of action are provided in parts D and H of the General Annexes with the following exceptions for the evaluation criteria of:

SGA (a) Research and Education Networking – GÉANT

For the criterion Excellence the third and fourth sub-criteria are substituted by:

- The extent to which the activities addressing the point "Integration and consolidation of e-infrastructure platforms supporting European policies and research and education communities" demonstrate that the concerned platforms and services are based on systems and technologies that have reached at least TRL 8.
- The extent to which the Service Activities (Trans-national and/or Virtual Access Activities) addressing the point "Integration and consolidation of e-infrastructure platforms supporting European policies and research and education communities" will offer access to state-of-the-art infrastructures and high quality services, and will enable

users to conduct excellent research as demonstrated, inter-alia, by both the quality of the associated catalogue of services and the baseline and expected future measurements of related KPIs

- The extent to which the activities addressing the point "Prototyping innovative e-infrastructure platforms and services for research and education communities, industry and the citizens at large" demonstrate that the concerned platforms and services are based on systems and technologies that have reached TRL 6 before the start of the project and will be brought to at least TRL 8 by the end of the project.
- The extent to which the activities addressing the point "Prototyping innovative e-infrastructure platforms and services for research and education communities, industry and the citizens at large" will improve, in quality and/or quantity, the services provided by state of the art e-infrastructures and enhance capacity for innovation and production of new knowledge.

Indicative timetable: First quarter of 2016

Indicative budget: EUR 64.00 million from the 2016 budget

4. Interactive Computing e-infrastructure for the Human Brain Project FET Flagship (FPA)³⁰

Within the Human Brain Project (HBP) Framework Partnership Agreement (FPA) awarded under topic FETFLAG 1 - 2014 of the Call FET Flagships, the selected consortium will be invited to submit a proposal for a Specific Grant Agreement (SGA) that will define and deliver the e-infrastructure providing the interactive computing capacity that the HBP Flagship needs in the context of its large brain simulation activities, as indicated in the HBP FPA³¹.

The proposal will support the Action Plan of the FPA by making available a computing and memory system with an expected peak performance of 50 PetaFlop/s and 20 PetaByte of memory footprint as required for HBP simulations and for an indicative period of five years. The components of the targeted system addressing interactive visualization and steering of large-scale brain simulations and their scalable integration are expected to comply with the capabilities and features defined during the Pre-Commercial Procurement (PCP) of technology readiness demonstration that was launched in the ramp-up phase of the HBP Flagship.

³⁰ This action is related with the objective to address e-Infrastructure pilots responding to community specific challenges, bringing a user-driven e-infrastructure innovation perspective.
Awarding of specific grants in a FPA will follow the rules and procedures established in the Financial Regulation

³¹ This action allows for the provision of financial support to third parties in line with the conditions set out in the part K of the General Annex

The specifications of the targeted system should also take into account progress in technology and the needs from other scientific communities having similar requirements for data integration (e.g. climate change, geophysics, earth systems, agriculture/meteorology, energy, medicine, etc.) or for close visual monitoring and steering of simulations (e.g. large-scale numerical flow, turbulence, car crash, complete aircraft, evacuation and mass event security, etc.).

The proposal should detail the acquisition process from elicitation of system requirements to system validation and acceptance. It should also explain how potential system suppliers will be consulted, how capacity will be made available to users as well as the financial plan to cover the total cost of ownership.

The proposal should also describe the coordination with the other HBP computing and data storage facilities and the transition from the ramp-up phase main simulations system.

In order to fulfil the HBP mission a programmatic access to 25% of this e-infrastructure capacity must be reserved for the HBP research activities. In addition the related resource allocation model should be explained and include a peer-review process.

The proposal should explain how the novel features and capabilities of this infrastructure will also be made available to the Pan-European High Performance Computing (HPC) Tier-0 infrastructure and services (see EINFRA-11-2016), by guaranteeing at least another 15% of this new capacity to European researchers at large.

This action will contribute to the targeted impacts defined in the action plan of the HBP FPA. It will also contribute to diversify the available leading-class HPC capabilities in the Tier-0 Pan-European HPC infrastructure, and to the adoption and use in Europe of the most advanced HPC technology.

Type of Action: Specific Grant Agreement

6-years Human Brain Project Framework Partnership Agreement with identified beneficiary and specific grants awarded to identified beneficiary for Research and Innovation Action under the Framework Partnership Agreement.

The standard evaluation criteria, thresholds, weighting for award criteria and the maximum rate of co-financing for this type of action are provided in parts D and H of the General Annexes.

The standard evaluation criteria, thresholds, weighting for award criteria and the maximum rate of co-financing for this type of action are provided in parts D and H of the General Annexes.

Indicative timetable: First quarter of 2017

Indicative budget: EUR 25.00 million from the 2017 budget

5. International Conference on Research Infrastructures

Following the International Conference on Research Infrastructures (ICRI 2016), held in South Africa in October 2016, the Research Infrastructure action would support in the second semester 2018 one major *International Conference on Research Infrastructures* organised under the Austrian Presidency. The objectives of the conference are (1) to provide an international forum for the discussion on the development of global research infrastructures as well as on issues of common interest such as the long-term sustainability of Research Infrastructures and their innovation potential; (2) to facilitate strategic international cooperation between European Research Infrastructures and their International counterparts. An associated event would be the launch of the 2018 ESFRI roadmap.

Legal entities:

Federal Ministry of Science, Research and Economy (BMWFV), Minoritenplatz 5, 1014 Wien, Austria

Type of Action: Grant to identified beneficiary - Coordination and support actions

The standard evaluation criteria, thresholds, weighting for award criteria and the maximum rate of co-financing for this type of action are provided in General Annexes D and H of the work programme.

Indicative timetable: Fourth quarter of 2017

Indicative budget: EUR 0.30 million from the 2017 budget

6. Conference on the opening up of research infrastructures to new regions in the context of their long-term sustainability

In the context of the planned publication of an action plan on long-term sustainability of research infrastructures, the action will support in the first semester of 2018 a major conference organised under the Bulgarian Presidency of the Council. The principal objective of the conference is to follow-up on the action plan with a view to practical implementation of measures aimed at broadening the research infrastructure base in Europe and opening up to new regions.

Legal entities:

Bulgarian Ministry of Education and Science, Kniaz Dondukov Blvd. 2A, 1000 Sofia, Bulgaria

Type of Action: Grant to identified beneficiary - Coordination and support actions

The standard evaluation criteria, thresholds, weighting for award criteria and the maximum rate of co-financing for this type of action are provided in General Annexes D and H of the work programme.

Indicative timetable: Fourth quarter of 2017

Indicative budget: EUR 0.10 million from the 2017 budget

HORIZON 2020 - Work Programme 2016 - 2017
European Research Infrastructures (including e-Infrastructures)

Budget³²

	Budget line(s)	2016 Budget (EUR million)	2017 Budget (EUR million)
Calls			
H2020-INFRADEV-2016-2017		72.00	34.00
	<i>from 08.020103</i>	72.00	34.00
H2020-INFRAIA-2016-2017		96.00	146.00
	<i>from 08.020103</i>	96.00	146.00
H2020-EINFRA-2016-2017		36.00	86.00
	<i>from 09.040102</i>	36.00	86.00
H2020-INFRAINNOV-2016-2017		10.00	20.00
	<i>from 08.020103</i>	10.00	20.00
H2020-INFRA SUPP-2016-2017		15.50	5.00
	<i>from 08.020103</i>	8.00	2.50
	<i>from 09.040102</i>	7.50	2.50
Other actions			
Expert Contracts		0.80	0.80
	<i>from 08.020103</i>	0.30	0.30
	<i>from 09.040102</i>	0.50	0.50
Grant to Identified beneficiary		0.10	0.40
	<i>from 08.020103</i>	0.10	0.40
Specific Grant Agreement		64.00	25.00
	<i>from 09.040102</i>	64.00	25.00
Estimated total budget		294.40	317.20

³² The budget figures given in this table are rounded to two decimal places.

Specific Features for Research Infrastructure

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) and on the Responsible Research and Innovation dimension 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, Article 20 of the Horizon 2020 Regulation and Article 37 of the 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 region³³ and explore potential for synergies with the relevant Managing Authorities in charge of the ESI Funds in their territory³⁴.

In addition, activities carried out under this Work Programme should be in respect with the Responsible Research and Innovation policy (RRI) engaging society, integrating the gender and ethical dimensions, ensuring the access to research outcomes and encouraging formal and informal science education. The alignment with the values, needs and expectations of the society will allow to identify and to deliver new solutions to the objectives of this Work Programme.

The ethical dimension of the activities undertaken should be analysed and taken into account, including relevant socioeconomic implications. This implies the respect of ethical principles and related legislation during the implementation. Whenever possible, the activities should also include in their objectives a better understanding and handling of the ethical aspects as

³³ see: <http://s3platform.jrc.ec.europa.eu/eye-ris3>

³⁴ 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

well as the promotion of the highest ethical standards in the field and among the actors and stakeholders. The most common issues to be considered include: personal data protection and privacy, protection of participants and researchers, ensuring informed consent, dual use and potential misuse of the research results, fair benefit sharing when developing countries are involved, environment protection etc.

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 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 support to ESFRI projects and other world class research infrastructures

Individual support to ESFRI projects and other world class research 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).

- 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;
- promotion of long-term sustainability, including e.g. the involvement of funders, enlargement of the membership, the preparation of business plans beyond the end of the grant, clear assessment of the costs for serving a user and for dealing with and making available the produced data;
- 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;
- limited pilots of access provision to research communities following the rules specified for *integrating activities*, in order to test reliability and increase user trust;
- outreach;
- 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), facilitating their involvement as partners of the research infrastructures for technological developments, developing customised services for industry and SMEs, dissemination of research outcome and technology transfer.

C. 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, exchange of personnel and training of staff, consultancy;
- outreach and training courses to new users, with specific attention to increase participation of women to science;
- activities to attract young people to science careers;
- 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 access³⁵ activities.

Trans-national access activities

³⁵ As defined in the Article 16 of the Model Grant Agreement

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 issues 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, which 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*³⁶ incurred by the access provider for the provision of access to the selected researchers as well as the travel and subsistence incurred to support the visits to the infrastructure of these researchers.

³⁶ 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 C(2013)8199. 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.

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. In addition statistics on the access provided shall be given to the Commission. Virtual access activities will be supported through the 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 and knowledge sharing through co-creation of needed technical solutions. 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.

D. Guidance on submission of proposals to e-infrastructure topics

The following conditions shall be met by proposals for research e-infrastructure:

Proposals should consider existing operational services to the greatest extent possible (such as authorisation and authentication systems, service registry, etc.) to use or extend them with new applications and functionalities. 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 developed under e-infrastructures should be open source with appropriate licenses, 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.

A detailed list of activities, structured as *networking activities*, *service activities* and *Joint Research activities* may be supported in proposals in the e-infrastructure part of the work programme.

While proposals in theme 1 "*Integration and consolidation of e-infrastructure platforms supporting European policies and research and education communities*" shall put their main focus on *service activities* and *networking activities*, proposals in theme 2 "*Prototyping innovative e-infrastructure platforms and services for research and education communities, industry and the citizens at large*" can combine any of the three activity types as appropriate to an effective work plan.

(i) Networking activities (NA); foster a culture of co-operation between the participants in the project (service providers, users and other relevant stakeholders) and with complementary and other related projects. Through NA, scientific communities and e-infrastructure operators are empowered to benefit from e-infrastructure services, industrial partnerships and cooperation with relevant stakeholders. NAs 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 (SA): are at the core of the e-infrastructure development and operation. They provide e-infrastructure related services based on at least TRL 8 systems and technologies to the scientific community. Proposals addressing theme 1 "*Integration and consolidation of e-infrastructure platforms supporting European policies and research and education communities*" need to comply with the conditions set out in the model grant agreement on trans-national³⁷ and/or virtual access activities and must provide an adequate description of the services provided in the form of a catalogue of services.

Activities 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;

³⁷ Trans-national 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 C(2013)8199. 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.

- 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 (JRA): are innovative activities to explore new fundamental technologies or techniques, which have already reached at least TRL 6 and have the potential to underpin the efficient and joint use, co-design and provision of e-infrastructure services. JRA activities shall aim to develop platforms and services based on at least TRL 8 systems and technologies. 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.