



## Helix Nebula – The Science Cloud

### The HNSciCloud Early Adopter Group



**Abstract:** This document proposes to establish an Early adopter group of research organisations that have expressed an interest in becoming procurers of the cloud services developed via the HNSciCloud project. It outlines the benefits for the stakeholders, the conditions under which this procurement could be undertaken and a set of key steps for its implementation. The appendices explain the procurement rules under which the services were developed, the Cloud Service Agreement under which access is provided and includes a template for Early adopters to describe their use-cases.

## Disclaimer

Helix Nebula – The Science Cloud (HNSciCloud) with Grant Agreement number 687614 is a Pre-Commercial Procurement Action funded by the EU Framework Programme for Research and Innovation Horizon 2020.

This document contains information on the HNSciCloud core activities, findings and outcomes and it may also contain contributions from distinguished experts who contribute to HNSciCloud. Any reference to content in this document should clearly indicate the authors, source, organisation and publication date. This document has been produced with co-funding from the European Commission. The content of this publication is the sole responsibility of the HNSciCloud consortium and cannot be considered to reflect the views of the European Commission.

**Grant Agreement Number:** 687614

**Start Date:** 01 January 2016

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## Background

Since its creation in 2011, Helix Nebula has grown to become a leading public-private partnership between public research actors and cloud service providers. The Initiative has brought together cloud infrastructure providers and large scientific user communities to overcome barriers to adoption of Infrastructure as a Service (IaaS) for scientific use. The initiative has undertaken the first joint Pre Commercial Procurement (PCP<sup>1</sup>) tender called Helix Nebula Science Cloud (HNSciCloud). This €5.3 million joint tender, led by CERN, will establish a European hybrid cloud platform that will support high-performance, data-intensive scientific use-cases sponsored by 10 of Europe's leading public research organisations (CERN, CNRS, DESY, EMBL-EBI, ESRF, IFAE, INFN, KIT, STFC, SURFSara) and co-funded by the European Commission.

The objective of the HNSciCloud PCP is to create **a common hybrid science cloud platform for the European research community**. The Hybrid Cloud Platform will combine several sub-challenges requiring a suite of services at the IaaS level integrated into an environment supporting the full lifecycle of science workflows. The cloud platform must be available to users distributed around the world in an on-demand and elastic manner with Reliability, Availability and Security (RAS).

The procurers and the other participants have established a set of common requirements for IaaS level cloud services addressing the needs of multiple data-intensive research communities. The HNSciCloud PCP will contribute to a set of **joint standardisation and certification based requirements** allowing a wider market introduction.

The procured cloud services are being integrated with the procurers' in-house resources and publicly funded e-Infrastructures (GEANT network and EGI Fed Cloud) to provide a hybrid platform for end-users from a wide range of scientific fields<sup>2</sup> including high energy physics, life sciences, astronomy, neutron/photon sciences and the long tail of science. The set of use-cases that will be supported by the procurement include those directly connected to 7 Research Infrastructures that appear in the ESFRI 2016 roadmap, namely:

- **Euro-BioImaging:** European Research Infrastructure for Imaging Technologies in Biological and Biomedical Sciences
- **CTA:** Cherenkov Telescope Array
- **BBMRI:** Biobanking and BioMolecular resources Research Infrastructure
- **ELIXIR:** A distributed infrastructure for life-science information
- **ESRF Upgrades:** Extremely Brilliant Source
- **European-XFEL:** European X-Ray Free-Electron Laser Facility
- **HL-LHC:** High-Luminosity Large Hadron Collider

The HNSciCloud tender was published during 2016 and the procurement process has completed with contracts awarded for the design phase to four consortia. The three most promising design have been carried forward into the prototype phase where they are being implemented and tested. The procured services will be competitively evaluated during prototype and pilot phases

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<sup>1</sup> <https://ec.europa.eu/digital-single-market/en/pre-commercial-procurement>

<sup>2</sup> <http://www.hnscicloud.eu/hnscicloud-user-groups>

with the end-users through 2017 and 2018 after which the most successful services will be commercialised and made generally available.

At the start of the project HNSciCloud took on-board an additional procurer, ESRF that together with the initial set of procurers, made a procurement commitment and contributed to the requirements definition phase by providing use-cases. The project then focused on preparing and executing the tender process. The consortium has promoted the objectives of the project to groups of research communities, organisations and ESFRI research infrastructures across Europe. A number of these organisations have shown interest in participating in the procurement group and this document proposes forming an 'Early adopter group' to expand the set of procurers.

## Objective

HNSciCloud will establish an Early adopter group of research organisations that have expressed an interest in becoming procurers for the resulting services of the project.

Early adopter group members will benefit from the results of the HNSciCloud project which will offer them advantages when compared to performing cloud service evaluations and procurements independently.

The advantages for a research organisation to become a member of the HNSciCloud Early adopter group include:

- Opportunity to evaluate the use of commercially supported cloud services that have been selected and tested by the group of HNSciCloud procurers against a range of use-cases that are directly relevant for the research community.
- Make use of the legal framework and access conditions established by HNSciCloud.
- Be able to fund the use of the cloud services via their regional, national or EC projects (subject to EC's project officer's approval).

## Implementation

The HNSciCloud project will work with the service providers contracted via the PCP tender process to propose a mechanism by which members of the Early adopter group can procure the innovative cloud services in parallel with the HNSciCloud pilot phase.

The procurement funds engaged via the Early adopter group are the responsibility of the individual members. Such Early adopter group procurements are in addition to, and separated from, the HNSciCloud PCP itself.

### Conditions of access to procured services for Early adopter group members

Access to the cloud services by the members of the Early adopter group will take into account the following conditions:

- Each Early adopter will execute a mini-competition and subsequently sign a contract with the service providers. The contracts signed between the Early adopter and a service provider are not obliged to terminate at the same time as the HNSciCloud pilot phase (i.e. they can be shorter or longer in duration than the pilot phase).
- The services offered to an Early adopter will be delivered according to the cloud services agreement (see appendix 2 of this document) and service payment models proposed to address sub-challenge 3 of the HNSciCloud tender<sup>3</sup>.
- Early adopter access to the pilot services will be performed outside of the scope of the HNSciCloud grant and consortium agreements as well as the framework agreement and Work Order signed by CERN as lead procurer.
- Early adopter access to the pilot services must not adversely affect the activities of the HNSciCloud project including the capacity, availability and quality of the services committed during the pilot phase.
- The use-cases proposed by Early adopters should be satisfied by the HNSciCloud cloud services as deployed without requiring additional developments by service providers.
- CERN will not act as lead procurer for the Early adopter group and payment for the pilot services consumed by an Early adopter must be settled directly with the service providers through a direct agreement.
- Early adopter group members remain responsible for their network connectivity to GEANT and the deployment of their applications and associated data.
- Each adopter will be requested to share their experiences and feedback about their use of the services with the HNSciCloud project. The Early adopter will grant permission to the HNSciCloud project to use this information for dissemination purposes and reporting to the EC and acknowledge the support of the project in any publications resulting from the use of the procured services.

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<sup>3</sup> Sub-Challenge 3: Service Payment Models; <http://www.hnscicloud.eu/the-hnscicloud-tender>

## Early adopter procurement process

It is the responsibility of the Early adopter to verify that the following process proposed by HNSciCloud is compatible with their organisation's and national procurement rules:

- The Early adopter summarises in writing the use-case they wish to deploy using the application form appended to this document then sends it to the HNSciCloud project office.
- The project office distributes the use-case description to the HNSciCloud Buyers Group and Contractors. A telephone meeting is then organised, to which the Early adopter is invited, during which the use-case is discussed to determine if it is compatible with the services developed within HNSciCloud and identify any existing use-cases to which it is closely related.
- Each Contractor prepares an offer to host the use-case and sends it to the project office. The project office forwards the offers to the Early adopter who then selects the most appropriate offer(s).

## Funding Early adopter procurements via H2020 projects

Ensuring the compatibility of the process described above with the grant agreement for a specific H2020 project is the responsibility of the Early adopter. Typically, such a procurement is classified as purchasing goods and services (Art. 10, Annotated Model Grant Agreement<sup>4</sup>) and the respective costs are budgeted and reported as "other direct costs". There are several conditions for the purchasing of services in order for it to be an eligible cost:

- The purchase represents best value for money<sup>5</sup>.
- A contract is established with the service provider.
- The purchase is limited in cost and scope – the procured services should be used exclusively for the objectives and activities of the H2020 project.

Such contracts to purchase services are usually foreseen in the H2020 project at the proposal stage. HNSciCloud Early adopters who are beneficiaries in an H2020 project through which they intend to charge the cost of the procured services are advised to document a justification for the purchase linking it to the project's description of work and raise the subject with their project officer before signing an agreement with the service providers. Unless otherwise agreed with the project officer, such procurements should not exceed 60,000€, above which the EC may impose additional conditions/constraints<sup>6</sup>.

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<sup>4</sup> [http://ec.europa.eu/research/participants/data/ref/h2020/grants\\_manual/amga/h2020-amga\\_en.pdf](http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/amga/h2020-amga_en.pdf)

<sup>5</sup> Article 10 of the Annotated Model Grant Agreement states that beneficiaries must make such purchases ensuring the best value for money or, if appropriate, the lowest price. In doing so, they must avoid any conflict of interests.

<sup>6</sup> The limit of 60,000€ is defined in article 10, of the Annotated Model Grant Agreement. Additional conditions may include ensuring that the Commission, the European Court of Auditors (ECA) and the European Anti-Fraud Office (OLAF) can exercise their rights under Articles 22 and 23 of the Annotated Model Grant Agreement also towards their contractors.

## Key Steps

The following are key steps in the process to successfully establish the HNSciCloud Early adopter group:

- Consensus achieved on the objectives and implementation of the Early adopter group by the stakeholders
  - The HNSciCloud consortium, service providers and candidate Early adopter group members must reach agreement in order to justify engaging their resources to establish the Early adopter group. The expectations of each stakeholder group for the proposed Early adopter group need to be clearly understood.
- Dialogue between the HNSciCloud project, service providers and the Early adopter group about the applications to be deployed by the Early adopters
  - By describing their applications using the form in appendix to this document, the Early adopter will benefit from feedback by the HNSciCloud procurers and service providers about similarities with the existing HNSciCloud use-cases and experience gained through their deployment. The dialogue will also permit the service providers to perform resource and capacity planning in order to support the Early adopter.
- Signature of contracts between the Early adopter group members and the service providers
  - From this point onwards the Early adopter group members will be able to make preparations to access the procured services.
- A regular dialogue between the Early adopter group stakeholders will be held during the execution of the contracts to assess the progress and determine whether their expectations have been met and identify possible future steps for the Early adopter group.

## Appendix 1: The HNSciCloud Pre-Commercial Procurement tender rules

This section explains the procurement rules under which the HNSciCloud Pre Commercial procurement tender has been performed.

The services to be made available to the Early adopter group members are the results of a Pre-Commercial Procurement (PCP). It comprises the procurement of R&D services pertaining to the design, development and pilot use of an innovative hybrid cloud platform (the “Hybrid Cloud Platform”) in the context of the “Helix Nebula – The Science Cloud” (HNSciCloud) project.

In a PCP, public procurers challenge innovative players on the market in an open, transparent and competitive way, to develop new solutions for a technologically demanding mid-long-term challenge of public interest that requires R&D services. PCP is a procurement method based on an open competition that enables public sector entities to engage with innovative businesses and research centres. The common goal is to obtain innovative solutions through R&D services that address specific public sector challenges and needs for which there is no solution on the market yet. The innovative solutions are developed through a Phased procurement approach and competitive development to reduce risks.

A PCP that is seeking to award contracts for R&D services falls outside the scope of the EU Public Sector Directive 2004/18/EU, Article 16 (f) and the EU Procurement Directive 2014/24/EC, Article 14. The R&D services will be financed at market price, thus providing business with a transparent, competitive and reliable source of early-stage funding, and the opportunity to attract customers early on, for a new solution. Since PCP focuses on specific identified needs, there is a substantial chance of exploitation for the solutions developed.

The PCP concept is explained in the following EU documents: PCP Communication COM/2007/799 and Staff Working document SEC/2007/1668. The PCP principles, the specific PCP conditions and the exemption of this PCP from the EU public procurement directives.

The HNSciCloud PCP is a joint procurement carried out by 10 legal entities and the lead procurer is the European Organization for Nuclear Research (CERN), an intergovernmental organisation, having its seat in Geneva, Switzerland. CERN is appointed to coordinate and lead the joint PCP, and to award and sign Framework Agreements and specific contracts (the Work Orders) for all Phases of the PCP, for the benefit of the following procurers, which together constitute the Buyers Group:

- European Organization for Nuclear Research (CERN), Switzerland;
- Istituto Nazionale di Fisica Nucleare (INFN), Italy;
- Deutsches Elektronen-Synchrotron (DESY), Germany;
- Centre National de la Recherche Scientifique, (CNRS), France;
- Karlsruher Institut für Technologie (KIT), Germany;
- SURFsara, the Netherlands;
- Science and Technology Facilities Council (STFC), United Kingdom;
- European Molecular Biology Laboratory (EMBL), Germany;
- Institut de Física d'Altes Energies (IFAE), Spain ;
- European Synchrotron Radiation Facility (ESRF), France.

All these procurers have contributed to the procurement budget of this PCP, have defined the functional and procurement requirements, and the award decision-making process for contracts.

### **PCP General Principles**

The exemption for R&D services foreseen in the legislation allow a more flexible approach in terms of tendering procedure, nevertheless the fundamental principles established in the EU Directives and Treaty must be respected: the free movement of goods, services and workers; the freedom of establishment and the free movement of capital. As well as the principles derived from the EU-treaty principles:

#### **(1) Transparency & Openness**

*PCP is open to all operators on equal terms, regardless of the size, geographical location or governance structure. There is, however, a place of performance requirement that they must perform a predefined minimum percentage of the contracted R&D services in EU Member States or Horizon 2020 associated countries.*

#### **(2) Non-discrimination and Equal Treatment**

The public procurer(s) will ensure EU wide publication in the OJEU and other information means. Not only the PCP call for tender but all the related decisions will be clearly motivated and communicated. The PCP contracts and the final procurement shall always be awarded to the tenders offering Best Value for Money.

The PCP procedure and the final procurement of the developed commercial solution must be completely separated.

Any potential subsequent Public Procurement of Innovative Solutions (PPI) to deploy commercial volumes of final end-solutions will follow a separate procurement procedure as applicable according to the EU public procurement directives. Service providers that didn't participate to the PCP and developed solutions through other sources of financing will thus still be able to compete on equal basis in any subsequent procurement to supply commercial volumes of solutions.

The clear separation between the procurement of R&D services from possible subsequent PPI procurements to deploy commercial volumes of final end-solutions, explains why PCP is exempted from the WTO Government Procurement Agreement. Nevertheless, PCP is open to all tenderers on equal terms regardless of company size, geographical location or governance structure. However there is a place of performance requirement to perform a predefined minimum of 50 % of the contracted R&D services in the EU Member States or countries associated to HORIZON 2020.

### **The Specific Pre-Commercial Procurement conditions**

In addition to the general principles some specific Pre-Commercial Procurement conditions have to be taken into account if the procuring entities want to apply the exemption for R&D-services. The utmost care was taken in the HNSciCloud Project to respect the conditions foreseen in the EC Communication on Pre-Commercial procurement and its accompanying Staff Working Document.

The conditions are:

- (1) The scope of Tender to be launched holds mainly R&D services.

The R&D-services that have to be deployed accounts for more than 50% of the overall total value of the contract.

(2) Competitive Development in subsequent phases

The PCP approach used by CERN is a phased model according to the Working Document of the EC. The PCP will be deployed in three phases: Solution Design, Prototyping (and connected tests in the premises of the contractors) and the development of a limited amount of first products (and connected tests, in the test facilities of CERN). In addition, the contract in each phase must be awarded to multiple contractors to compare different solution approaches. In the last phase, if the quality of the offers allow it, a minimum of two contractors should be awarded a contract in order to avoid vendors lock-in. The phased approach with gradually growing contract sizes per Phase facilitates also the participation of smaller companies to the PCP.

(3) PCP never include commercial development activities

The PCP ends with the production of a limited batch of products after having given the opportunity to the contracting authorities to test the developed solution. The R&D-phase is clearly separated from the final commercial tender. The procuring entities cannot purchase directly the developed solution in commercial volumes as part of the PCP tender. Therefore it is crucial for the procurers to anticipate the conditions under which the commercial procurement will take place and secure themselves access to the developed solution via user rights and licensing.

(4) The Risk-Benefit sharing-principle and related IPR-rights

One of the main advantages of PCP is the sharing of both opportunities and risks by both the public entities and the service providers. The procurer(s) do not reserve all benefits of the R&D outcome (IPR ownership) exclusively for themselves. The ownership rights generated by contractors will as much as possible remain with the contractors. In return the procuring entities will obtain a price reduction on the development cost and certain usage and licensing related rights.

The contractors retain IPR ownership rights and the associated commercialisation opportunities of developed solutions to other markets, the contractors themselves will be required to cover the expenses related to protection of and litigation on the IPRs. This way both parties (contractors and procurers) share both potential benefits and risks the development.

Tenderers are required to submit fixed price offers, meaning that Tenderers are responsible to cover at their own expense any additional unforeseen development costs in their individual solution approach that they may incur above the fixed price they have committed to in their bid. Innovations developed in the framework of this initiative will lead to the creation of important IPR rights generated by the suppliers. IPRs arising from the R&D developments will be vested as much as possible to the developing supplier(s). The Group of Procurers will receive as a minimum User rights on the developments to ensure continuity of its internal operations. The developing supplier(s) can be requested by the Group of Procurers to offer licenses to third parties under fair and reasonable condition. All contracts will foresee a call-back provision to ensure that IPRs allocated to companies that do not succeed to exploit them, will return back to the Group of Procurers.

For more information, see PCP on the [Europa website](#)

### **Exemption from EU procurement directives, the WTO Government Procurement Agreement (GPA) and EU state aid rules**

This procurement procedure is exempted from the **EU public procurement directives** because procurers do not retain all the benefits of the R&D (the IPR ownership stays with the contractors).<sup>7</sup>

It is also exempted from the **WTO Government Procurement Agreement (GPA)** because this Agreement does not cover R&D services<sup>8</sup> (the PCP being limited to such services — and any subsequent PPI procurements relating to commercial-scale supply of such solutions not being part of the PCP procurement).

The procurement does not constitute state aid under the **EU state aid rules**<sup>9</sup> because it follows an open, transparent, competitive procedure with risk- and benefit-sharing at market price. (The division of all rights and obligations (including IPRs) and all selection and award criteria for all phases are published at the outset; the PCP is limited to R&D services and clearly separated from any potential follow-up PPI procurements; PCP contractors are not given any preferential treatment in a subsequent procurement for provision of the final products or services on a commercial scale.)

### **EU funding**

This PCP procurement is part of a project that is funded by the European Union's Horizon 2020 Research and Innovation Programme, under grant agreement No 687614- HNSciCloud (<http://www.hnscicloud.eu/>)

The procurement must therefore comply with the rules imposed by the EU Horizon 2020 grant agreement.

The EU is not participating as a contracting authority in this procurement.

① For more information, see 'innovation procurement' and 'links to regional policy' in the [Participant Portal Online Manual](#).

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<sup>7</sup> See Article 16(f) of Directive [2004/18/EC](#) (Article 14 of Directive [2014/24/EU](#)), Article 24(e) of [Directive 2004/17/EC](#) (Article 32 of Directive [2014/25/EU](#)) and Article 13(f)(j) of Directive [2009/81/EC](#).

<sup>8</sup> See the EU's Annex IV of Appendix I to the [WTO GPA](#).

<sup>9</sup> See Point 33 of the [Commission Communication on a framework for state aid for research and development and innovation](#) (C(2014) 3282).

## Appendix 2: The HNSciCloud Cloud Service Agreement

The template Cloud Services Agreement that applies in the context of the HNSciCloud project prototype and pilot phases is shown below. It has been signed by each of the HNSciCloud contractors and each member of the Buyers Group. In the articles below, the term *country* refers to the national legislation of the Buyers Group member.

### Cloud Services Agreement

1. The Contractor shall allow access to and use of the Prototype Platform services by CERN/CNRS/EMBL/STFC/SURF-SARA/DESY/INFN/KIT/IFAE/INFN/ESRF (hereinafter the “Buyers Group member”), in accordance with the Framework Agreement and this Work Order, including the Cloud Services Agreement set out in this annex.
2. The Buyers Group member shall use the Prototype Platform services, in accordance with the Acceptable Use Policy set out in section 9 below.
3. The Buyers Group member shall take all reasonable steps to ensure that its users (employees, officers, consultants) observe and fully comply with the terms of the Acceptable Use Policy when using the Prototype Platform services.
4. If the Buyers Group member, including any of its users, breaches any of the terms and conditions of the Acceptable Use Policy (“AUP”), the Contractor shall have the right to suspend the Buyers Group member's access to the Prototype Platform services such upon two (2) working days prior notice and to ask the Buyers Group member to remedy the breach within a reasonable timeframe. The Contractor shall inform the Buyers Group member of the above users' breach as soon as it becomes aware of it. If the Buyers Group member fails to remedy said breach within the applicable timeframe, the Contractor shall have the right to remove the Buyers Group member data infringing the AUP.
5. If the Contractor has reasonable evidence of i) possible serious risks to its system or the Prototype Platform services provoked by the Buyers Group member data, or ii) fraudulent or illegal activities of the Buyers Group member, the Contractor is entitled to a) immediately suspend or terminate the accesses of the users involved and b) to remove the relevant Buyers Group member data. If the circumstances in points a) and b) are proven to be false, the Buyers Group member shall be indemnified for the damages suffered for the immediate suspension of the Prototype Platform services.
6. The Buyers Group member shall co-operate with the Contractor to such extent as is reasonably practicable and necessary to enable the Contractor to provide the Prototype Platform services.
7. The Contractor may suspend the provision of the Prototype Platform services, by giving the Buyers Group member no less than 3 (three) working days' notice, in circumstances where it is necessary for the Contractor to update or maintain its system. The Contractor shall, in its notice, inform the Buyers Group member of the timing, the duration and the reasons for the proposed suspension.
8. The Buyers Group member shall be entitled to request in writing a postponement of the suspension. The Contractor shall not unreasonably deny its consent to the above request of the Buyers Group member. Without limitations, the Contractor may reject the postponement if it is not feasible for technical reasons.

## 9. Acceptable Use Policy

The Buyers Group member and its users shall comply with the following terms of use of the Prototype Platform services:

### **While using the Services, the Buyers Group member and its users SHALL NOT:**

- 1) infringe any third party's Intellectual Property Rights;
- 2) infringe Contractors' Intellectual Property Rights;
- 3) breach any (country) law, regulations and order of the (country) authorities;
- 4) process third party's personal data illegally;
- 5) breach any other third party's rights which are different from above points 1) and 4);
- 6) upload or introduce malicious code, viruses, trojan horses, e-mail bombs, spyware, malware, and other similar software;
- 7) allow third-parties external to the Buyers Group member's organisation to use the Prototype Platform services unless authorised in writing by the Contractor;
- 8) send unsolicited e-mail or communications of any kind;
- 9) support in any way illegal activities;
- 10) misrepresent the identity of the Buyers Group member's users;
- 11) violate (country) export and re-export control legislation and regulations;
- 12) upload or introduce encryption software in violation of (country) and international exporting legislation;
- 13) use means which can cause a breach of security of the Contractor's equipment;
- 14) use means which can cause a disruption of the Prototype Platform services.

### **While using the Prototype Platform services, the Buyers Group member SHALL:**

- 15) adopt secure id and passwords in relation to the access to the Contractor's system in line with any possible instructions provided by the Contractor;
- 16) inform the Contractor in case of loss of the ID and passwords for accessing the Prototype Platform services not later than 3 (three) working days from the discovery;
- 17) inform the Buyers Group member's users of the terms and conditions of the AUP;
- 18) process personal data of third-parties in accordance with the (country) legislation (e.g. , if so required under the (country) law, provide full notice to the third parties and obtain their valid consent, notify the processing of personal data with the competent data protection authority, implement any security measures on its side of the Prototype Platform services to ensure full compliance with the legislation, monitor the Services);