



Helix Nebula – The Science Cloud

Deliverable D3.2: Summary report of the design stage and lessons learned

Partner Responsible: CNRS

Work Package: 3

Submission Due Date: 28.02.2017

Actual Submission Date: 28.02.2017

Distribution: Public

Nature: Report



Abstract: This report presents how the design phase of the HNSciCloud Pre-Commercial Procurement project was organised, focusing on the communication and interactions between the Buyers Group and the Contractors. A number of lessons were learned during this phase and are used to propose improvements for the subsequent phases of the project and possible future projects.

Document Information Summary

Deliverable number:	D3.2
Deliverable title:	Summary report of the design stage and lessons learned
Editor:	Renaud Vernet
Contributing Authors:	Bob Jones, Renaud Vernet
Reviewer(s):	
Work package no.:	WP3
Work package title:	Design Platform
Work package leader:	CNRS
Work package participants:	CERN CNRS, EMBL/EBI, ESRF, DESY, INFN, KIT, IFAE, SURFsara
Distribution:	Public
Nature:	Report
Version/Revision:	28 February 2017
Draft/Final:	Final
Keywords:	HNSciCloud, PCP, hybrid cloud, design phase

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

Duration: 30 Months

Log Table

Issue	Date	Description	Author/Partner
V0.1	16.01.2017	First draft	Bob Jones
V0.2	24.02.2017	Intermediate draft	Renaud Vernet
V0.3	28.02.2017	Final draft	Renaud Vernet
V0.4	01.03.2017	Reviewed	Bob Jones
V1.0	03.03.2017	Final Version	Renaud Vernet
V1.1	06.03.2018	Table of contents updated	Anita Bens

Executive summary

During the three months dedicated to the first phase of the HNSciCloud Pre-Commercial Procurement project design phase, the four contractors: T-Systems, IBM, RHEA and Indra were expected to produce solution designs addressing the challenges of the hybrid cloud and the computing needs of the scientific use-cases identified by the research institutes of the Buyers Group.

In order to ensure a successful outcome of this phase, the Buyers Group undertook a close monitoring of the contractors' activities, and organized the communication and several milestones and events to facilitate the information flow between contractors and use case representatives and experts.

Based on the feedback received from the Buyers Group and the contractors, this report presents the lessons learned during this process.

After introducing the context of the HNSciCloud design phase in section 1, this report explains how the phase was executed, with its main events and milestones (section Error! Reference source not found.). The lessons learned during this period are presented in section Error! Reference source not found., concluded with a final summary (section Error! Reference source not found.) which includes a set of recommendations for subsequent phases of the project and any possible future projects:

- The Buyers Group should prepare detailed information about each use-case before the tender is launched, including the desired performance and any technical constraints
- An owner who is capable of responding to questions should be identified for each use-case
- The dialogue between the Buyers Groups and the Contractors should start at the beginning of the phase and be maintained during the whole period
- An intermediate milestone during which each Contractor presents their progress should be foreseen
- The buyers Group effort planning should be revised when the Request for Tender is published to take into account the number of milestones and deliverables to be assessed as well as the need for a continuous dialogue with the Contractors.

Table of Contents

1 Introduction	7
2 Execution of the design phase	8
2.1 Preparatory meeting before the tender information session.....	8
2.2 Establishment of the monitoring team.....	8
2.3 Preparation of the kick-off meeting.....	8
2.4 Award Ceremony and kick-off meeting	8
2.5 Weekly WP3 meetings	8
2.6 Mid-term review.....	9
2.7 Access to the VMs for testing.....	10
2.8 Weekly meetings with contractors.....	10
2.9 OneData webinar	11
2.10 RHEA demo	11
2.11 End of Phase review	11
3 Lessons learned about the design phase.....	12
3.1 Objectives	12
3.2 Participation.....	12
3.3 Communication.....	13
3.4 Collaboration tools	14
3.5 Schedule	14
3.6 End of phase review.....	14
3.7 Deliverables.....	14
3.8 Human resources and organisation.....	15
4 Summary	16

1 Introduction

In the context of the HNSciCloud PCP, the design phase was the first step towards the implementation of the solutions proposed by the four cloud providers (contractors) selected after the first call of tender. At the end of this phase, each contractor provided a set of deliverables that showed how each solution proposed is designed. These deliverables were assessed by the buyers group and the best designs were selected for the next phase, the Prototype.

The HNSciCloud Work Package 3 (WP3) was responsible for guiding the contractors all along the design phase and for assessing the final deliverables produced by the contractors. WP3 was composed of members of the following institutes belonging to the buyers group: CERN, INFN, DESY, CNRS, KIT, SURFsara, STFC, ESRF, EMBL-EBI and IFAE. At the end of the design phase, WP3 produced two deliverables:

- the first intermediate evaluation report (D3.1), that provides the assessment of the designs produced by the contractors;
- the present document (D3.2): summary report on the lessons learned during the design phase.

The four consortia selected for the phase were led by T-Systems, IBM, RHEA and Indra. Each of them was asked to produce a set of deliverables including:

- the project abstract and the list of pre-existing IPs;
- the technical deliverables, which is the technical core of the solution proposed, with time schedule, results obtained and R&D effort assessment;
- non-technical deliverables, including innovation assessment and legal and administrative data.

The design phase lasted for three months, from November to January, starting with a face-to-face kick-off meeting, followed by a mid-term review taking place 1.5 months after the start, and finishing with the face-to-face end of phase review.

This document first describes the execution of the design phase and its main steps, then presents the lessons learned from that phase, and finally summarizes the main conclusions.

2 Execution of the design phase

2.1 Preparatory meeting before the tender information session

Prior to the Tender Information Day that took place at CERN on 7 September 2016, the buyers group met in order to prepare and agree on several aspects related to the design and Prototype phases, including the evaluation procedure, schedule, meeting places and organization.

2.2 Establishment of the monitoring team

The interaction between the contractors and the procurers was done through a monitoring team, composed of members of the buyers group, called the supervisors. This team was the main communication point between contractors and procurers; it also ensured that the activities related to each phase progressed steadily, and that the milestones and delays were respected.

It was agreed within the buyers group that the monitoring team would be composed of the Technical Committee, the WP3 coordinator, the Project Office and the Procurement Officer.

2.3 Preparation of the kick-off meeting

After the Information Day in September, the buyers group prepared the organization and the technical content to be presented to the awarded contractors during the design phase kick-off meeting. A rehearsal via phone conference was held in order to review the presentations related to the scientific use cases involved in the project, in particular.

Work Package 7 prepared the event communication and publication.

2.4 Award Ceremony and kick-off meeting

The kick-off meeting was co-located with the webcast award ceremony at the CNRS premises in Lyon on 2-3 November 2016. This arrangement reduced the travel requirements for the procurers and contractors. The kick-off meeting consisted of a plenary session during which the procurers presented information about the planning of the design phase, details of the use-cases, requirements for federated identity management and provisions for the establishment of Service Level Agreements to all of the contractors. Experts from the AARC and CloudWatch2 projects were invited to contribute to the discussions on federated identity management and service level agreements.

Separate parallel sessions were organised with each contractor during which they could ask questions and provide information that they did not want to make publicly available. A debriefing session amongst the procurers was held after the event to assess its effectiveness and in order to prepare the responses to the question raised by the contractors.

2.5 Weekly WP3 meetings

From the end of October 2016, a weekly teleconference internal to WP3 was set up to start gathering the members of WP3 on a regular basis. This was necessary for various reasons:

- to prepare the organization of the various meetings with the contractors (kick-off meeting and reviews);
- to agree on the information to be provided to the contractors (mainly about technical requirements);
- to agree on procedures (tests on infrastructures, communication).

Those meetings were recorded and the summary was made available to all WP3 participants.

2.6 Mid-term review

The mid-term review of the design phase was organised as a telephone meeting on 12 and 13 December 2016. The procurers held successive sessions with each contractor during which the contractor presented the designs and raised outstanding questions for the procurers. A debriefing session amongst the procurers was held after the event to assess its effectiveness and in order to prepare the responses to the question raised by the contractors.

The mid-term review proved to be very useful in helping the procurers better understand the directions being taken by each of the contractors. In particular, it became clear that two key domains were proving critical to the success of the design phase: data management and federated identity management.

Both of these domains were listed as part of the PCP challenges in the tender documents and it was necessary for the procurers to provide more detailed information about their expectations and constraints during the design phase.

Beyond the technical challenges, both of these domains raised questions that could impact the strategic direction of the project:

Data management - it became evident during the mid-term review that some of the contractors were envisaging different solutions for each use-case. While some variations was acceptable, the procurers did not want to have a separate solution for each use-case since this would not be compatible with the concept of a common platform. It also became evident that the same component, OneData, was being considered by several consortia as a key element in their data management solution design. OneData is an open source software development by Cyfronet that is being actively pursued via several research activities, including Indigo-DataCloud and EGI-Engage H2020 projects.

From a project risk point of view, this situation implied that if the OneData component proved unsuitable then several solution designs could be compromised. It also raised questions about which sub-contractors in each of the consortia would be able to support OneData once it was deployed. As a consequence, a dedicated session was organised on 11th January with T-Systems and Cyfronet so that they could present OneData to the procurers.

Federated identity management – Several of the contractors had highlighted outstanding issues in supporting the range of use-cases identified by the procurers. All the 4 contractors selected in the design phase agreed to support a SAML based Federated Authentication model (as described

in the RfT) for authentication and authorisation of the cloud services to be provided. The support for CLI, API access and group authorisation management were agreed to be the main issues to address, both by procurers and contractors. The IAM/WaTTS service developed by the Indigo-DataCloud H2020 project was identified as one of the possible solutions solving those outstanding issues. The service has been presented and demonstrated during a dedicated meeting between HNSciCloud procurers and Indigo-DataCloud on 21 December 2016. A written commitment to maintain and support the service through to the end of the HNSciCloud project had also been agreed with the institutions developing the service (KIT & INFN). Due to the strict requirements in the identity, authentication and authorisation (AAI) domain for one of the procurers (EMBL) supported use cases (ELIXIR and ELIXIR LToS), it was agreed that both eduGain Federated AAI and ELIXIR AAI should be supported in the proposed designs. In order to extend functionality to CLI support and other services, the procurers can facilitate the contact between contractors and parallel initiatives that clearly bring added value to the Federated AAI challenge, such as the Indigo-DataCloud IAM services, however the responsibility for this integration remains with the contractors themselves.

The mid-term review made it clear that the event needed participants that could provide input/feedback on the requirements for each of the 17 use-cases.

The mid-term review also highlighted that we would need more regular contact with the contractors to ensure that the design decisions being made were consistent with the detailed requirements. Consequently, weekly telephone meetings were organised with each contractor starting in January 2017.

2.7 Access to the VMs for testing

As one of the milestones to be achieved during the design stage, the contractors were asked to provide, by December 2016, the procurers with access to their infrastructure, in order to test VM provisioning and deletion, make use of the web interface and APIs, assess the helpdesk and ticketing system, add and remove users and group in the same tenancy etc.

All the contractors provided the access and credentials in due time and the procurers found no serious issues. This milestone gave the opportunity to the Buyers Group testers to get an initial impression of the contractors' infrastructure. This also permitted an interaction between procurers and contractors on well-defined topics and issues, as well as Q/R sessions during the weekly meetings organized in January. This milestone contributed substantial arguments for the end of phase assessment.

2.8 Weekly meetings with contractors

Weekly meetings between each contractor and procurers were organized in January. These meetings were requested by the contractors to have more interactive feedback on both technical and administrative questions. Some contractors also gave status reports on their work and on observed issues.

From the buyers perspective, those meetings were not only an opportunity to remind the contractors of the instructions and schedule for the end of the phase, but also a way to make sure

they understood what was expected from the final deliverables and on some of the important solution components like data management tools, in particular.

2.9 OneData webinar

OneData can be an interesting solution for data management in a hybrid cloud, and it appeared to be a common denominator in the solution design of two contractors out of four. It became clear to the procurers that a deep understanding of OneData would be essential to the final assessment of the design. In that objective, T-Systems organized a webinar in January for the procurers on OneData in order to explain how the system would be used in the context of this project.

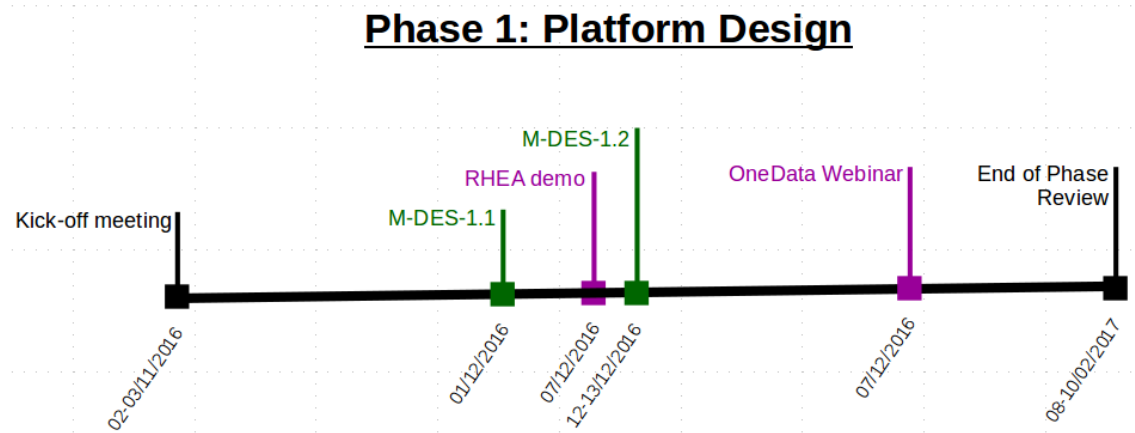
2.10 RHEA demo

RHEA gave a detailed demonstration of their platform and tools, including the use of the APIs available to interact with it. This session proved to be very useful for the procurers.

2.11 End of Phase review

The contractors and the buyers met at CERN for the end of the design phase review, on 8-10 February 2017. Four consecutive half days were booked to give each contractor the opportunity to present to the procurers the work performed during the design phase, including a description of the technical deliverables. Each of those sessions were composed of an hour of presentation of the solution design by the contractor, followed by an hour of discussion with the buyers group. After each review, the buyers group met to agree on the scores to give on the challenges described in deliverable D3.1.

3 Lessons learned about the design phase



3.1 Objectives

The main purpose of the design phase was to give the contractors three months to prepare their solution design and deliverables. That phase was the start of the implementation work and interaction between buyers and providers. Although the main objectives of the design phase were globally understood by the participants from all parties, it appeared throughout the phase that a lot of clarification was needed on both sides, especially from the contractors' side, to supplement the information provided in the Request for Tender. Performance metrics and technical requirements in particular required more detailed definitions. More generally, the missing information essentially concerned:

- technical data on scientific workflows (I/O, VM duration, amount of resources needed, security level, network configuration)
- administrative questions (deliverables templates, interaction procedure with the procurers, requests for meetings and webinars)

In addition (and probably due to the variety of use cases) it was not understood by all contractors that the procurers were expecting them to provide one single solution able to address all the scientific needs together, instead of a list of available services to choose from a service catalogue. The mid-term review and the regular meetings helped the contractors understand this aspect and take an appropriate direction.

3.2 Participation

It was important that the design phase participants from the group of procurers (WP3) were able to provide information for all of the identified use-cases. This implies it is essential to identify an 'owner' for each use case and they should be active through all phases of the project.

A number of the proposed design phase solutions included the results or outputs of H2020 R&D projects, some of which were still on-going. While the inclusion of such components represents a very interesting exploitation opportunity for the R&D projects, it was important to remind the contractors of their responsibility under the terms of the framework contract concerning the integration and support of such components. This means it was necessary to highlight that the responsibility lie with the contractor and not the H2020 R&D project to ensure the component is well suited for its designated role or purpose.

3.3 Communication

The webcast of the award ceremony at the start of the design phase was highly appreciated by the contractors and attracted large audiences for both the live event and for the recordings which were made available shortly afterwards. Similar webcast events should be organised for the subsequent phases of the project.

Ensuring that the same information was provided to each contractor was an important aspect in the organisation of the design phase. The design phase raised many detailed questions about the procurers' requirements and constraints and a procedure was adopted that was similar to that used during the tender information day in the preparation phase: requests for clarifications were collected from each contractor, responses prepared by the group of procurers and the written answers made available to all contractors.

Due to the complexity and heterogeneous use cases it has been difficult for the companies to fully understand the scientific workflows. Also, for some of the procuring institutes, it is necessary to understand what the companies can offer in order to adapt their needs. It was found to be difficult to detail the use cases requirements in commonly understood terms. For future interactions it would be useful to have a common and precise glossary in order to ease the understanding between the procurers and the contractors.

The regular weekly meetings with the contractors were very useful and effective. They made it possible for the contractors to have direct feedback on their questions, propositions and directions. All the four contractors mentioned during the end of phase review that those regular meetings were essential.

The contractors also expressed the need to be able to exchange directly with key personnel from the buyers group, instead of going through the monitoring team. This concerns in particular situations when input from use case representatives or testers from the buyers group is needed. In such cases, it was suggested by some contractors that an access to common collaborative tools with the buyers, such as documents or contact list, would improve the information flow.

It was also suggested that the procurers should improve clarity in the requirements and objectives related to IPR.

To summarize, dialogue between procurers and contractors is essential. For the next phases, we should start the dialogue with regular weekly teleconferences immediately after the kick-off meeting.

3.4 Collaboration tools

The IT tool used to support the assessment process was changed from Microsoft SharePoint to Google Sheets because the real-time collaborative aspects were considered more appropriate. The final results were archived on the project's SharePoint installation.

3.5 Schedule

Although the three-month duration of the design phase was fine for some contractors, some others expressed that it was too short, in particular because of the Christmas break in the middle of the period.

It was also said that for SMEs, having one final payment causes cash flow issues.

3.6 End of phase review

The assessment of the designs were performed at the end of phase review, during which the contractors had two hours to present their solution design and to answer questions from the buyers group. The format of this review was considered appropriate and shall be retained for future phases.

More detailed guidance about the assessment criteria and their scope should be provided in advance to the assessment team. For example, it should be clear whether the assessment covers only the next phase, or the whole project, or the whole project and its future commercialisation.

During the review, the contractors presented their reassessment of the resources needed for the prototype phase and determined that more development effort would be needed to meet the challenges. Testing these new developments will not require large-scale deployments and hence progressively ramping-up the capacity would help offset the increased development costs but will not cover the additional management costs caused by an extended prototype phase.

Making drafts of the call-off documents for the prototype phase available to the contractors so that they could provide feedback proved to be very productive.

3.7 Deliverables

It was necessary to provide guidelines about the expected contents and maximum length of each of the deliverables requested to the contractors. The fact that the buyers group made documents templates available for most of them was appreciated.

There is potential overlap in the material requested from the contractors for the end of design phase deliverables and the bids for the prototype phase call-off. The procurers should look for ways to reduce such duplication.

Some companies dedicated a significant part of their effort in paperwork. It was asked to find ways to reduce it, so that more time can be devoted to technical aspects.

3.8 Human resources and organisation

Due to the various activities of the WP3 members outside the scope of the project, it was difficult to organize events and meetings in a way that would allow everyone's attendance. In such a phase where time lines are short, it was even more difficult, consequently events and meeting dates should be fixed as early as possible. It appeared globally that the contractors were more flexible than the buyers group to adapt their agenda.

In general, in order to be able to represent their own use cases, the institutes belonging to the buyers group put more effort in this phase than they initially had planned to commit. Some did not realize the amount of work to be done in this PCP between the start and the time when cloud resources are ready for use. As a result, the gap between the expected and actual effort was, for some institutes, substantial. For many of the WP3 members, the design phase represented a daily task. The main time-consuming tasks appeared to be the reading of the various documents and deliverables related to the project, the participation in regular and ad hoc meetings, including face-to-face events and travel.

Also, among the main objectives of the project, it appeared to be necessary to clarify a lot of the use cases requirements and to decide how to provide the contractors with relevant performance metrics and quantitative indicators. This work should have probably been carried out prior to the start of the phase, in order to leave more room for the buyers and WP3 to better manage the time and effort to dedicate to the design phase itself. In case of a future PCP project, the Buyers Group should establish a dedicated technical team of 2-3 individuals that would collect input from the procurers on use-cases, requirements, interact with the contractors and perform the tests.

Nevertheless, globally the WP3 members put a sufficient effort in these tasks to make the design phase a success. The general feeling is that investing more effort from the buyers group would not be desirable, as the activities are already quite time consuming.

4 Summary

The objectives of the design phase were successfully met. The deliverables provided by the contractors at the end of the phase were of sufficient quality, which indicates that the main purpose of this PCP and the use cases requirements were globally understood. Nevertheless, pieces of information were found to be missing or unclear for some aspects, especially for what concerns technical requirements and performance expectations. Providing more information on use cases application workflows as early as possible would be useful.

The buyers group put significant effort in following the activities led by the contractors by means of the mid-term review and the regular phone meetings. In addition, the milestone M-DES-1.1 made it possible for the buyers to get qualitative elements about the state-of-the-art infrastructure production environment, including helpdesk support, VM provisioning, API support and user/group management.

The weekly meetings between procurers and contractors proved to be an essential element for the success of this phase. The buyers should probably have proposed to put them in place sooner, since the start of the design phase in early November.

The planning of the phase was respected: the milestones were achieved and the reports were provided in due time.

The design phase proved to be very instructive in terms of organisation, planning and communication, and the lessons learned during these three months will serve as a solid base for the future phases.

Based on the experience and lesson learned during the HNSciCloud PCP design phase, the following recommendations are proposed for the subsequent phases of the project and any possible future projects:

- The Buyers Group should prepare detailed information about each use-case before the tender is launched, including the desired performance and any technical constraints
- An owner who is capable of responding to questions should be identified for each use-case
- The dialogue between the Buyers Groups and the Contractors should start at the beginning of the phase and be maintained during the whole period
- An intermediate milestone during which each Contractor presents their progress should be foreseen
- The buyers Group effort planning should be revised when the Request for Tender is published to take into account the number of milestones and deliverables to be assessed as well as the need for a continuous dialogue with the Contractors.
- In case of a future PCP project, the Buyers Group should establish a technical team of dedicated individuals to collect input from the procurers on use-cases, requirements, interact with the contractors and perform tests.