

**H2020-JTI-EuroHPC-2019-2**

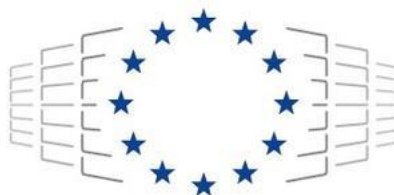


**Coordination and Support for National Competence Centres on a European Level**

**Project Number: 951740**

**D4.1**

**Report on Support of the NCCs on Industrial Interaction  
and Business Development**



**EuroHPC**  
Joint Undertaking

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## List of abbreviations

AI	Artificial Intelligence
CC	Competence Centre
CoE	Centre of Excellence
DIHs	Digital Innovation Hubs
EC	European Commission
EDIH	European Digital Hubs
HPC	High Performance Computing
HPDA	High Performance Data Analytics
ISVs	Industry Software Vendors
IWG	Industry Working Group
JU	Joint Undertaking
MX	Month X of the project
NCC	National Competence Centre
PMT	Project Management Team
PTC	PRACE Training Centre
Qx	Quarter x of the project
WP	Work Package

## Executive Summary

CASTIEL is the Coordination and Support Action of the EuroCC<sup>1</sup> project which gathers 33 National Competence Centers (NCCs) in Europe. In order to identify and close the gaps due to the diverse levels of maturity between the different nations CASTIEL brings together a core consortium to setup a framework of activities that will support the evolution of all NCCs and facilitate their sharing of knowledge and expertise.

The Work Package 4 (WP4) of CASTIEL is about “Industrial Interaction and Business Development”. The two main objectives of this work package are:

- to provide support to the NCCs in the development of their service offerings and to their interaction with the industrial ecosystem. This will be done by organizing the exchanges between those entities with more experience in the interaction with industry and those which enter a new domain. WP4 will also support the transnational access to the NCC’s services.
- to support the NCCs in connecting to European projects and initiatives, which are relevant to their missions. It will identify the projects relevant for the NCCs and organize the interaction with other initiatives and projects, as for example with the consortium implementing the EuroHPC-05-2019 action, via the FF4EuroHPC<sup>2</sup> project.

One of the first tasks was to set up a working group with the appropriate expertise to identify and catalogue the current state-of-the-art in HPC, HPDA and AI regarding the interaction with industry in Europe. This Industry Working Group (IWG) consists of the 33 NCCs industry champions, who are the contact people chosen by their respective NCCs, and the CASTIEL WP4 partners.

To display an initial overview of the current state-of-the-art in HPC, HPDA and AI with regards to industry interaction, an industry questionnaire, transversal to all WP4 tasks was created and launched as a starting point for the WP4 activities in October-November 2020. Based on the results of this questionnaire, a strategy for the WP4 actions and a plan for each task of WP4 were built. WP4 implemented its global chosen strategy during the first year of the project, by organizing several workshops on various topics with the IWG and by managing additional other actions in interaction with the other WPs of CASTIEL to meet the NCCs needs in terms of industry interactions and business development.

The industry champions expressed their satisfaction with the various WP4 actions during or after the meetings and workshops, as these actions and events provided opportunities to connect with different stakeholders in the EU ecosystem through the interaction with the industry or SMEs. Through the industry working group, the champions could also hear and exchange useful feedback and lessons learned on potential connections with DIHs and CoEs in order to interact with industry and SMEs or regarding the management of services offerings.

This document is the first deliverable of work package 4. In this deliverable D.4.1, the strategy to support the NCCs on Industrial Interaction and Business Development as well as the first actions and outcomes carried out during the first year of EuroCC and CASTIEL are presented.

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[1] CASTIEL and EuroCC projects EuroCC ACCESS, <https://www.eurocc-access.eu/>

[2] FF4EuroHPC: <https://www.ff4eurohpc.eu/>

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## 1 Introduction

CASTIEL, as a Coordination and Support Action, aims to contribute to the success of the 33 National Competence Centres (NCCs) taking part in the EuroCC project. The goal of CASTIEL is to create the infrastructure necessary for strengthening and maintaining excellence in the broad spectrum of high-performance computing.

The Work Package 4 (WP4) of CASTIEL is about “Industrial Interaction and Business Development”. The two main objectives of this work package are:

- to provide support to the NCCs in the development of their service offerings and to their interaction with the industrial ecosystem. This will be done by organizing the exchanges between those entities with more experience in the interaction with industry and those which enter a new domain. WP4 will also support the transnational access to the NCCs’ services.
- to support the NCCs in connecting to European projects and initiatives, which are relevant to their missions. It will identify the projects relevant for the NCCs and organize the interaction with other initiatives and projects, as for example with the consortium implementing the EuroHPC-05-2019 action, via the FF4EuroHPC project.

This first deliverable of WP4 summarizes information about the actions achieved during the first year of the CASTIEL project: an initial industry questionnaire was created at end of 2020 to provide insights for the WP4 strategy, then actions were carried out by each task of WP4 during the first year with regards to the interaction with industry about services offerings, the interaction with the other EU initiatives and projects and the transnational access to the NCCs’ sectorial services.

The second section of this deliverable describes the initial industry questionnaire objectives, methodology, process and outcomes.

Section three presents the strategy and actions done by task 4.1 “Support for Industrial Interactions”.

The fourth section presents the strategy and actions done by task 4.2 “Connecting the NCCs to other European initiatives and projects”.

Section five presents the strategy and actions done by task 4.3 “Transnational access to sectorial services”.

Major achievements and concluding remarks are summarized in section six.

References and annexes with the used documents, detailed results and reports are the final sections of this document.



## 2 Initial industry questionnaire

### 2.1 Methodology

In order to get an initial picture of the status of the NCCs with regard to their interactions with the industry on various aspects (service offerings, business associations, EU funding, sectors of interaction, reasons of interaction...etc.), WP4 created and launched an industry questionnaire to be filled out by the industry champions of the NCCs. The deadline for filling out this questionnaire was November 23<sup>rd</sup>, 2020. To create this questionnaire and to process the results, each WP4 partner managed one section or one specific part relevant to each task of WP4. All the results were presented for discussion with the Industry Working Group during an online meeting on December 15<sup>th</sup>, 2020. The EU tool “EU survey” was used to create this questionnaire, to collect the answers of the champions and to process the results (see the complete questionnaire template in Annex 01). The questionnaire included mandatory and non-mandatory questions; some specific questions were asked only after specific previous answers.

These initial results provided WP4 with an overview of the status of the NCCs regarding their interaction with industry and their potential needs or opportunities (at this specific point in time when the NCCs started). The results of this questionnaire contributed to the reflexion of WP4 in order to shape the best next steps with the IWG relevant to each task of WP4 to efficiently support the NCCs.

### 2.2 Results from the questionnaire

The next sub-sections show the results for the questions asked in the initial industry questionnaire.

#### 2.2.1 Contributions to the industry questionnaire

31 out of 33 NCCs replied and filled out the questionnaire (even despite the support from the PMT, it was impossible to get answers from two NCCs in the given timeframe). These answers provided WP4 with an instant picture that summarizes the information available at this moment-about the industry interactions of the NCCs.

#### 2.2.2 Main outcomes

The detailed results, which included confidential information like the names of the NCC affected by each category of questions or results, were shared directly with the industry champions during an Industry Working Group meeting on December 15<sup>th</sup>, 2020. To avoid any confidentiality issue, this paragraph 2.2.2 only displays non-confidential information and generic results.

Regarding the general aspects of interacting with industry at the national level, it appeared that maturity varied within the NCCs, and a few NCCs that could be considered as novices or “Newbies” with less experience, (3 NCCs for HPC and 4 NCCs for HPDA) were internally recommended to CASTIEL-WP3 in order to potentially benefit from the twinning and mentoring actions on industry topics with some more mature NCCs. With regards to the service offerings with industry, it appeared necessary for the NCCs to exchange best practices and know-how, at least for HPC and HPDA.

The questionnaire results then showed that the maturity level for AI was higher on average than for HPDA, as there are presumably more investments done in AI. General awareness about the business associations and the digital innovation hubs (DIH), what they are and how the NCCs can connect with them, was low in November 2020. They needed to be presented to the IWG, to create and increase awareness about.

Regarding the EU ecosystem, most NCCs were already actively using EU initiatives in HPC/HPDA/AI (85%) but not all NCCs were aware or actively participating to all the usual EU initiatives like FF4EuroHPC, ETP4HPC<sup>3</sup>, PRACE<sup>4</sup>, BDVA<sup>5</sup> and CoEs, therefore interaction and sharing of information about these initiatives will be needed during the EuroCC and CASTIEL projects.

Regarding the sectorial services, the results showed that the network of the whole EuroCC displays a rich offer in various sectors but transnational access to the services will be needed with a process to cope with requests in the local NCC for services that are available in another NCC.

### **2.2.3 WP4 chosen strategy and first actions planned following the results of the initial questionnaire**

Using the initial generic overview provided by these results of the industry questionnaire, several workshops were planned and have been held between the NCCs' industry champions, the European Commission (EC), some representatives of the Joint Undertaking<sup>6</sup> (JU), DIHs representatives, EC supervisors and CoEs partners (Centres of Excellence), during the first year of the project (see Section 3 and Section 4 for more details). A dedicated IWG workshop was organized to allow sharing of best practices and knowledge in relation to services offerings with industry. In addition, WP4 has taken additional steps to meet the identified needs of the NCCs for industry interactions and business development: for example, there is an interaction with WP3 for twinning & mentoring to share some NCC knowledge in these fields and interaction with WP5 is also ongoing to create a section on EuroCC ACCESS to display EU initiatives and funding opportunities. Finally, an analysis of the NCC roadmaps (created by the NCCs by the 4th month of the EuroCC project) with regards to the sectorial services was carried out in order to obtain an initial overview of the status of the NCCs on this topic (see section 5 for more details).

## **3 Task 4.1 “Support for Industrial Interactions”**

### ***3.1 Objectives and strategy chosen for task 4.1***

The objective of task 4.1, set in the CASTIEL Grant Agreement, is to coordinate the exchange among the NCCs on best practices for a fruitful interaction with industry, and on their respective service offerings. To achieve this objective, an Industry Working Group was set up with “industry champions” from the 33 NCCs who act as contacts and intermediaries with the NCCs on industry-related topics. Moreover, several external experts were invited to workshops of the IWG to share relevant information, for instance regarding the European vision on the Digital Innovation Hubs (DIHs) or to interact with the Joint Undertaking (JU) group.

### ***3.2 First actions undertaken during year 1 and first results***

WP4- task 4.1 organized IWG meetings and workshops on specific topics. First the topics were identified thanks to the initial industry questionnaire or at the request of the EC, then they were collected through the discussions held during the first meetings and workshops with the industry champions to tailor the exchanges in the IWG to the expressed needs of the industry champions.

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[3] ETP4HPC: <https://www.etp4hpc.eu/>

[4] PRACE SHAPE: <https://prace-ri.eu/hpc-access/shape-access/>

[5] BDVA: <https://www.bdva.eu/>

[6] EuroHPC Joint Undertaking : <https://eurohpc-ju.europa.eu/>

The workshops for the IWG that were organized during year 1 of the projects by task 4.1 were the following:

- **Workshop #1 EC/JU interaction, on February 16<sup>th</sup>, 2021:** following the request of the EC/JU to interact with the industry champions on the architecture needs topics (by industrial end-users), workshop #1 was organized with 66 participants, the detailed agenda is available in Annex 02.
- **Workshop #2 about “EU ecosystem” on March 18<sup>th</sup>, 2021:** this event was organised by task 4.2 with 68 participants, see section 4.2 for more details about this event.
- **Workshop #3 DIH workshop, on April 15<sup>th</sup>, 2021:** (DG Connect<sup>7</sup>, DIHnet<sup>8</sup>, FF4EuroHPC<sup>9</sup>, NCC Italy & DIH Innomine<sup>10</sup>) to learn more about the DIHs & the EU vision with regards to interaction with industry, and about possible links with the NCCs, this event was organized with 67 participants. This workshop was useful for the NCCs as several of them were either interested in starting a DIH or starting a EDIH <sup>11</sup>(European Digital Hubs: the new types of DIHs). As a follow-up, website updates from the European Commission (EC) on this topic were shared by WP4 with the industry champions by email and through Slack. Moreover, a privileged interaction with EDIH and DIHnet has been initiated by WP4 with the manager of DIHnet and is now under development at the level of the CASTIEL project management team (PMT) and the general coordination of EuroCC. The detailed agenda of this workshop #3 is available in Annex 02.
- **Workshop #4 ‘Best practices interaction w. industry regarding services offerings - HPC & HPDA, AI’, on June 17<sup>th</sup>, 2021:** NCCs Slovakia, Romania, Latvia and Belgium presented specific questions and issues with regards to services offerings, followed by discussions with industry champions from all NCCs in order to share experiences or lessons learned and potential advice. The workshop #4 had 63 participants. This new format of exchange (with presentations from NCC newbies and subsequent discussions with some more experienced NCCs) was particularly appreciated by the industry champions as it allowed them to better present the problems and needs and to directly collect specific detailed feedbacks from more experienced NCCs. This workshop was also open to the training, twinning and mentoring champions as this topic is common to WP3 of CASTIEL. The detailed agenda is available in Annex 02.

Following a need expressed by the industry champions during the workshop #4 for information on how to interact with SMEs, and interacting with the FocusCoE <sup>12</sup>project partners, the material (slides, recordings) issued from a FocusCoE webinar series done in 2020 on this specific topic was shared with the industry champions using the BSCW <sup>13</sup>tool on July 13<sup>th</sup>, 2021.

In addition to these workshops and actions, WP4 held bi-weekly telcos for only WP4 partners to organize the IWG events and the various actions, to monitor the progress of work of the three WP4 tasks and to ensure interactions with the other work packages of CASTIEL in order to coordinate the efforts and share useful information for our WP4 actions. In parallel with the email distribution list, a slack channel is also used for the Industry Working Group to ensure that all

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[7] DG Connect: [https://ec.europa.eu/info/departments/communications-networks-content-and-technology\\_en#related](https://ec.europa.eu/info/departments/communications-networks-content-and-technology_en#related)

[8] DIHnet: <https://dihnet.eu/>

[9] FF4EuroHPC project: <https://www.ff4eurohpc.eu/>

[10] DIH innomine: <https://innomine.com/digital-innovation-hub>

[11] EDIH: <https://digital-strategy.ec.europa.eu/en/activities/edihs>

[12] FocusCoE project: <https://www.hpccoe.eu/about/>

[13] BSCW platform, <https://bscw.hlrs.de/sec/bscw.cgi/39284>

information is passed on to all industry champions, and to allow these champions to interact between themselves.

### ***3.3 Plans for the next steps***

The workshop series initiated by task 4.1, and described in Section 3.2, will be continued. For instance, a **workshop #5 "Licencing & software"** is in preparation for end of September 2021 with talks from ISVs providers and experts of these topics. Task 4.1 will continue to support the NCCs in connecting to relevant business associations and to various stakeholders of the EU ecosystem at national and European level, supporting the NCCs with regards to their industrial interactions and business development. This will always be done in interaction with the industry champions to fulfil their requests and specific needs relevant for this topic.

## **4 Task 4.2 "Connecting the NCCs to other European initiatives and projects"**

### ***4.1 Objectives and strategy chosen for task 4.2***

The objectives of task 4.2 set in the CASTIEL Grant Agreement are to identify other European initiatives and projects which can be of support to the NCCs in fulfilling their missions and establish connections between the NCC and the identified European initiatives. The strategy for this task was divided into two phases. In the first year, the NCCs should be introduced and connected to those EU projects, that either structure the HPC landscape (e.g. FocusCoE) or connect HPC to industry (e.g. FF4EuroHPC). In the second phase, the needs of the NCCs will be matched with the corresponding specific EU projects through a series of events, where projects can introduce themselves, as well as material provided by this task. During both phases, the exchange among the industry champions regarding EU projects is fostered.

### ***4.2 First actions undertaken during year 1 and first results***

In year 1, an analysis of EU projects in HPC was conducted. Two formats of workshops were started and an additional one was planned for year 2:

1. **Industry champions & various projects:** This is a format where EU projects can introduce themselves and offer possibilities for Q&A session. In the first iteration, the Centres of Excellence (CoEs) via FocusCoE, FF4EuroHPC and PRACE SHAPE were presented during **an Industry working group workshop #2** about "EU ecosystem" on March 18<sup>th</sup>, 2021 which gathered 68 participants (external speakers and industry champions from the NCCs) The detailed agenda is available in Annex 02. These projects offer either a possibility to work with SMEs in the scope of HPC or access to specific expertise.
2. **CoEs meet NCCs:** As the CoEs have been identified as very relevant points of contact for the NCCs, a series of workshops has been started where representatives from each side can present ideas or requests for cooperation and open matchmaking can take place. For example, if a NCC has a customer in a certain field that a CoE covers, they can collaborate with codes, knowledge etc., thus achieving a mutual beneficial cooperation. The first workshop of this kind took place on July 8<sup>th</sup> with 37 participants and presentations from the CoEs MaX<sup>14</sup> and Trex<sup>15</sup>. The detailed agenda is available in Annex 02

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[14] MaX-CoE: <http://www.max-centre.eu/>

[15] Trex CoE : <https://www.trex-coe.eu/>

- 3. Exchange among the NCCs (planned for year 2):** The experiences and familiarity with EU projects vary widely among the NCCs. Thus, workshops will take place in which individual NCCs can request and share information in smaller groups on specific types of projects, application processes and much more.

These workshops target the need for information and familiarity with EU initiatives and projects detected by the NCCs and derived from the results of the initial industry questionnaire (transversal to all WP4 tasks) described in Section 2.2. In addition to these meetings or workshops, a subpage on the project web portal where NCCs can share their project involvements with each other and the public was conceptualised in interaction with WP5 of CASTIEL; this will be implemented by end of 2021 in addition to the already existing possibilities offered by CASTIEL to the industry champions (Slack for WP4, direct emails, meetings and workshops of the IWG ...) to exchange knowledge and learn about potential funding opportunities for interaction with industry by the European Commission (EC).

### ***4.3 Plans for the next steps***

The workshop series presented in Section 4.2 will be continued and optimised. Also, in interaction with WP5 of CASTIEL a EuroCC ACCESS section listing EU initiatives/ projects is in finalisation. The global aim of task 4.2 is to provide a comprehensive overview of the EU projects and initiatives, easily accessible by the industry champions. Therefore, the working group will regularly get in touch with the champions to keep sharing feedback and news and thus shaping this task in the most beneficial way for the NCCs.

## **5 Task 4.3 “Transnational access to sectorial services”**

### ***5.1 Objectives and strategy chosen for task 4.3***

The objective of the task 4.3 is to foster the transnational access to the most relevant sectorial expertise proposed by the network of NCCs for companies for which the local Competence Centre (CC) cannot offer support. In order to attain this objective, an exhaustive inventory of each NCC’s service portfolio has to be done first. As a consequence of this exercise, the different maturity levels within EuroCC would be established and duplications/gaps identified. This would lead to a complete ‘sectorial expertise map’ of the entire eco-system.

Two methodologies are developed to carry out the task:

- 1- Analysis of roadmaps (project year 1)
- 2- Creation of ‘CASTIEL Cluster Map’ (project year 2)

### ***5.2 First actions undertaken during year 1 and first results***

Each NCC had to provide an extensive roadmap as the first deliverable of the EuroCC-project in M4 of EuroCC (December 2021). The roadmap had to show how the NCC intends to achieve the desired status after two years during the project period. Among other aspects such as for example ‘Training/Skills Development’ or ‘Awareness Creation’, the NCCs were also asked to elaborate on their outlook in ‘Technology Transfer/Business Development’ and ‘Collaboration with Industry’.

Task 4.3 took this extensive bulk of information and worked on filtering the parts of the 33 texts which are of interest in terms of sectorial services (cf. the report in Annex 03). The heart of the implemented process was a checklist (see the checklist template in Annex 03- Appendix 01) which was designed to have a uniform matrix for reading the texts. It consisted of the components ‘Industry Sectors’ and ‘Services’. The first listed all industry sectors which the NCC in question

mentioned in its roadmap. ‘Services’ was divided in four sectors, namely ‘Infrastructure-as-a-service’, ‘Support of Infrastructure-as-a-Service’, ‘Expertise Services’ and ‘Business Service Proposals’.

As stipulated in the CASTIEL Grant Agreement, the leader of task 4.3 coordinated the task with WP2 (Competences Mapping) from the start, e.g. by attending WP2 weekly team meetings as an ‘observer’. Consequently, the last review versions of the checklist were double-checked by WP2 in order to eliminate possible double-ups at an early stage.

The filled-out checklists were then the basis of a summary report. As such, the summary is a good indicator of the NCC’s priorities at the start of the project and a stepping stone to ensure the completeness and efficiency of the measures which will be executed in collaboration with the industry champions as the next steps in project year 2. It became apparent in the summary that the 33 NCCs together possess an expansive range of service offerings and plan to target a broad range of industry sectors. On a transnational scale, the entire CC-ecosystem covers a large and diverse array of a total of twenty-nine industry sectors. The number is likely to further grow in year 2 of the project when the ‘industrial sector map’ will be established together with the industry champions. With regards to technological maturity, the NCC roadmaps show that it is already well-developed at the project start and that it will gain further positive momentum during the project duration because of the ecosystem’s willingness to improve and expand its technical capabilities. As a first conclusion, the eco-system can build its market access strategies, paired with its competencies and technological excellence, on very solid grounds.

### ***5.3 Plans for the next steps***

The next step will be to interact with all industry champions via a series of workshops with the aim to build an exhaustive transnational service inventory. This will lead to a ‘sectorial expertise map’ of EuroCC. It is planned to merge it at the end with the ‘competence map’ created by WP2.

Ultimate outcome of task 4.3 is the ‘CASTIEL Cluster Map’ which will be designed in close collaboration with the industry champions in project year 2, and a process to cope with requests from companies for sectorial services available in the whole EuroCC network, due in M24 of the project. The ‘CASTIEL Cluster Map’ is a tool both for Business Development and Account Management. It will enable the NCCs to reply all inquiries from all industry sectors in Europe. It is built for a real business life scenario in which an NCC may not be able to accommodate an inquiry in the home country itself. With the help of the tool, the inquiry can be escalated to a different country, which in return possesses the necessary expertise. An example of the possible usage of the ‘CASTIEL Cluster Map’ is illustrated hereafter in Figure 1:

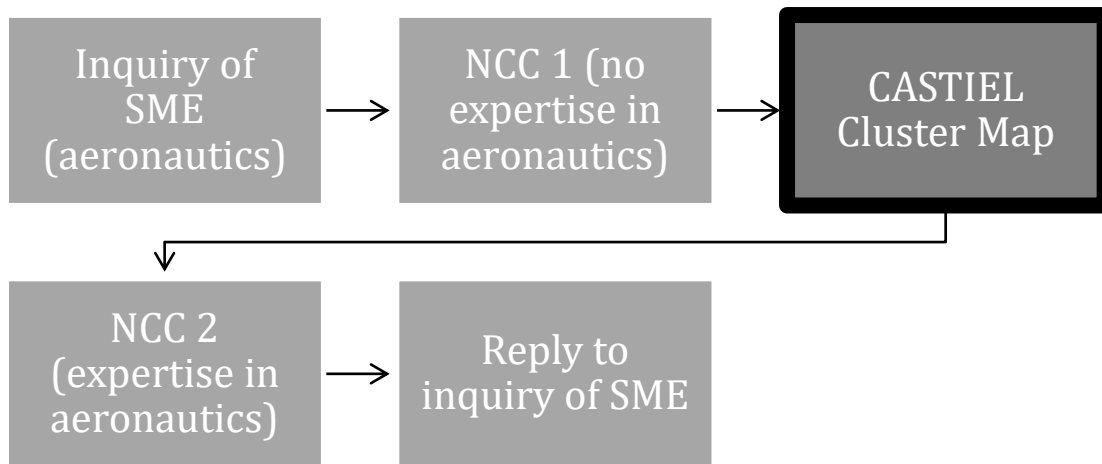


Figure 1: Possible future usage of the future ‘CASTIEL Cluster Map’

In order to set up this tool, in depth interactions with the industry champions will be needed to fine-tune and update the initial plans outlined in the roadmaps. It also remains to be seen on which platform the tool will be used by the NCCs. Discussions with WP2 and WP5 are foreseen in year 2 to find the most user-friendly and efficient technological environment.

Hereafter is the time-line for year 2 of the CASTIEL-project:

- Fall 2021
  - Alignment of strategy with WP2, WP3 and WP5
  - Presentation of results of roadmap-analysis and strategy to industry champions in order to obtain their buy-in, to see with them how to best proceed with the next steps regarding the “CASTIEL Cluster Map -sectorial services” and the process to support companies looking for sectorial services in Europe.
- Fall 2021 / Winter 2022
  - Fine-tuning of information: questionnaires, workshops, etc.
  - Prepare ‘sectorial expertise map’
- Spring 2022
  - Design of ‘sectorial expertise map’
  - Merge ‘sectorial expertise map’ with ‘competence map’ of WP2
- Fall 2022 (end of project)
  - CASTIEL Cluster Map

## 6 Major achievements and concluding remarks

During the first year of the CASTIEL project, WP4 implemented its global chosen strategy, by organizing several workshops on various topics with the Industry Working Group, i.e., with the industry champions of EuroCC and by managing additional other actions in interaction with the other WPs of CASTIEL to meet the needs of the NCCs in terms of industry interactions and business development.

Using the results of the initial industry questionnaire, filled out by the industry champions during the first quarter of the project Q1 (September – November 2020), and following the plans elaborated with the Industry Working Group during Q2 (December 2020-February 2021), WP4 organized four workshops:

- Workshop #1 to interact with JU representatives in February 2021
- Workshop #2 was held between the NCCs’ industry champions and representatives of other EU initiatives in March 2021 to present useful information about EU initiatives,

and to see and discuss the different funding opportunities regarding industry that could be interesting for the NCCs

- Workshop #3 was held between the NCCs' industry champions and representatives from DIH and EDIH networks in April 2021 to share the DIHs & the EU vision on how to interact with industry, and how there could be links with the NCCs
- Workshop #4 was organized to share best practices and knowledge between the NCCs on service offerings in June 2021
- A first meeting with CoEs took place in July 2021

The industry champions expressed their satisfaction with the various WP4 actions during or after the meetings and workshops, as these actions and events provided opportunities to connect with different stakeholders in the EU ecosystem through the interaction with the industry or SMEs. Through the industry working group, the champions also heard and exchanged useful feedback and lessons learned on potential links with DIHs, CoEs to interact with industry and SMEs or regarding the management of service offerings.

Other workshops are in preparation for September 2021 and fall 2021 and additional actions are ongoing: there are interactions with WP2 to coordinate the task 4.3, interactions with WP3 for information or outcomes that are also useful for twinning & mentoring, and interactions with WP5 to create a section on EuroCC ACCESS to display EU initiatives and funding opportunities. Finally, during the second year of the project, there will be an intensive exchange with the industry champions with the aim of creating an exhaustive transnational service inventory and setting up a process to cope with request of companies for sectorial services. The aim is to create a 'sectorial expertise map' of EuroCC by the end of the EuroCC project.



## References and Applicable Documents

- [1] CASTIEL and EuroCC projects EuroCC ACCESS, <https://www.eurocc-access.eu/>
- [2] FF4EuroHPC: <https://www.ff4eurohpc.eu/>
- [3] ETP4HPC: <https://www.etp4hpc.eu/>
- [4] PRACE SHAPE: <https://prace-ri.eu/hpc-access/shape-access/>
- [5] BDVA: <https://www.bdva.eu/>
- [6] EuroHPC Joint Undertaking : <https://eurohpc-ju.europa.eu/>
- [7] DG Connect : [https://ec.europa.eu/info/departments/communications-networks-content-and-technology\\_en#related](https://ec.europa.eu/info/departments/communications-networks-content-and-technology_en#related)
- [8] DIHnet: <https://dihnet.eu/>
- [9] FF4EuroHPC project: <https://www.ff4eurohpc.eu/>
- [10] DIH innomine: <https://innomine.com/digital-innovation-hub>
- [11] EDIH: <https://digital-strategy.ec.europa.eu/en/activities/edihs>
- [12] FocusCoE project: <https://www.hpccoe.eu/about/>
- [13] BSCW platform, <https://bscw.hlr.de/sec/bscw.cgi/39284>
- [14] MaX-CoE: <http://www.max-centre.eu/>
- [15] Trex CoE : <https://www.trex-coe.eu/>

## Annex 01 - The initial industry questionnaire



### Industrial Interaction and Business Development questionnaire (October - November 2020)

Fields marked with \* are mandatory.

\* Name

\* Email

### Industrial Interaction and Business Development questionnaire - Initial elements for interaction with the Working Group regarding Industry Questions between EuroCC and CASTIEL

October - November 2020

#### **Guidelines**

Each NCC in EuroCC is preparing its own roadmap to map its industry interactions. In the meantime, as part of CASTIEL, we would like the NCCs champions for the Industry interactions to answer this initial survey to give us the first idea of the NCCs industrial interactions. Later on we will interact with the Industry Working Group during the CASTIEL-EuroCC projects to specify several elements and to get more detailed information.

#### **1** Section 1 : Interaction with Industry – General aspects on national level

---

1.1 Domain of interaction :

1.1.1 Regarding HPC

\* Is Industry involved with HPC in your country ?

Yes  No

Regarding projects with Industry on topics related to HPC in your country, how many projects are underway

:

Only a few projects (between 1 and 5)  Many projects (more than 5)

Provide a number if available:

Provide a number if available (starting from 5) :

Regarding your current projects with Industry on topics related to HPC in your country, what is the timeframe of these projects:

Short-term (< 6 months)  Long-term (> 6 months)

Provide a number of short-term projects if available :

Provide a number of long term projects if available :

Are some of these industrial projects linked to EU projects & initiatives ?

Yes  No

Provide a number of projects currently underway thanks to EU projects & initiatives:

Please indicate which EU initiatives these projects are linked to (Centers of Excellence CoEs, Fortissimo, PRACE, EuroCC, CASTIEL, FF4EuroHPC....)

Provide a number of projects underway independently from EU projects & initiatives:

If available, please provide some more info about the current industrial projects (projects names, website, short description...)

1.1.2 Regarding HPDA (High Performance Data Analysis, High performance data analytics (HPDA) uses high performance computing (HPC) combined with data analytics to quickly examine large data sets and draw conclusions about the information they contain. )

\* Is Industry involved with HPDA in your country ?

Yes  No

Regarding your projects with Industry on topics related to HPDA in your country, how many projects are currently underway:

Only a few projects (between 1 and 5)  Many projects (more than 5)

Provide a number if available:

Provide a number if available (starting from 5):

Regarding your current projects with Industry on topics related to HPDA in your country, what is the timeframe of these projects:

Short-term (< 6 months)  Long-term (> 6 months)

Provide a number of short term projects if available :

Provide a number of long term projects if available :

Are some of these industrial projects linked to EU projects & initiatives ?

Yes  No

Provide a number of projects underway thanks to EU projects & initiatives:

Please indicate which EU initiatives these projects are linked to (Centers of Excellence CoEs, Fortissimo, PRACE, EuroCC, CASTIEL, FF4EuroHPC....)

Provide a number of projects underway independently from EU projects & initiatives:

If available, please provide some more info about the current industrial projects (projects names, website, short description...)

### 1.1.3 Regarding AI

\* Is Industry involved with AI in your country ?

Yes  No

Regarding your current projects with Industry on topics related to AI in your country, how many projects are underway:

Only a few projects (between 1 and 5)  Many projects (more than 5)

Provide a number if available:

Provide a number if available (starting from 5) :

Regarding your current projects with Industry on topics related to AI in your country, what is the timeframe of these projects:

Short-term (< 6 months)  Long-term (> 6 months)

Provide a number of short term projects if available :

Provide a number of long term projects if available :

Are some of these industrial projects linked to EU projects & initiatives ?

Yes  No

Provide a number of projects underway thanks to EU projects & initiatives:

Please indicate which EU initiatives these projects are linked to (Centers of Excellence CoEs, Fortissimo, PRACE, EuroCC, CASTIEL, FF4EuroHPC....)

Provide a number of projects underway independently from EU projects & initiatives:

If available, please provide some more info about the current industrial projects (projects names, website, short description...)

#### 1.1.4 Regarding HPC/HPDA/AI

\* Sector concerned: in what sector(s) are there interactions with the Industry in your country ?

- Agriculture  Banking /Finance  Chemistry
- Defence  Energy
- Environment/Climate  Health care
- Life sciences  Manufacturing  Meteorology
- Space/Aeronautics  Transport/Mobility
- Other, please specify  None

Other sector

\* What are the objectives/reasons of the interactions with the Industry in your country (Please select all that apply)

- Training
- Consulting/expertise
- R&D projects or studies
- use/provision of equipment  other, please specify
- None

Other reason of interaction with the Industry in your country

[Training] How important is this aspect in your country (evaluation between 1 weak to 10 strong)

*Only values between 1 and 10 are allowed*

[Consulting/expertise] How important is this aspect in your country (evaluation between 1 weak to 10 strong)

*Only values between 1 and 10 are allowed*

[R&D, studies] How important is this aspect in your country (evaluation between 1 weak to 10 strong)

*Only values between 1 and 10 are allowed*

[Use/Provision of equipment] How important is this aspect in your country (evaluation between 1 weak to 10 strong)

*Only values between 1 and 10 are allowed*

[Other] How important is this aspect in your country (evaluation between 1 weak to 10 strong)

*Only values between 1 and 10 are allowed*

Type of R&D projects or studies

- partnership  
 subcontracting

## 2 Section 2 : Services offerings at national level

---

### 2.1 Regarding the services offerings that your country provides for the Industry [Please tick relevant boxes]

#### 2.1.1 Concerning HPC

Type of services offerings provided:

- Software solutions  
 Infrastructure solutions  Consulting/expertise  
 Others -> please specify

Other types of provided services offerings

About the services Providers :

- The services are in general offered by academic providers (potential services on which information are or will be collected by the NCCs)
- The services are in general offered by industrial providers (potential services on which information are or will be collected by the NCCs)

About the type of customers or users

- Academic
- Technology providers
- Technology end-users
- Others -> please specify

Other types of customers or users

Size of users or customers companies

- SMEs
- Large companies

### 2.1.2 Concerning HPDA

Type of services offerings provided:

- Software solutions
- Infrastructure solutions
- Consulting/expertise
- Others -> please specify

Other types of provided services offerings

About the services Providers :

- The services are in general offered by academic providers (potential services on which information are or will be collected by the NCCs)
- The services are in general offered by industrial providers (potential services on which information are or will be collected by the NCCs)

About the Type of customers or users

- Academic
- Technology providers
- Technology end-users
- Others -> please specify

Other types of customers or users

Size of users or customers companies



- SMEs
- Large companies

### 2.1.3 Concerning AI

#### Type of services offerings provided:

- Software solutions
- Infrastructure solutions  Consulting/expertise
- Others -> please specify

Other types of provided services offerings

#### About the services Providers :

- The services are in general offered by academic providers (potential services on which information are or will be collected by the NCCs)
- The services are in general offered by industrial providers (potential services on which information are or will be collected by the NCCs)

#### About the Type of customers or users

- Academic
- Technology providers  Technology end-users  Others -> please specify

Other types of customers or users

Size of users or customers companies

- SMEs
- Large companies

## 3 Section 3 : Business associations and national entities that foster industrial interactions

---

\* Are there **business associations at national level** that could be involved to support innovation in HPC

/HPDA/AI technologies in industries?

- Yes  No

Estimation of number of business associations at national level

Please provide names of these business associations (national level)

Are there **business associations at EU level** of interest for your country that could be involved to support innovation in HPC/HPDA/AI technologies in industries?

- Yes  No

Estimation of number of business associations at European level of interest for your country

--

Please provide names of these business associations (EU level)

--

\* Are there **digital innovation hubs** at national level that could be involved to support innovation in HPC /HPDA/AI technologies in industries?

Yes  No

Please provide names of these digital innovation hubs at national level

--

Are these entities mature in the ecosystem ?

For HPC

Yes  No

For AI

Yes  No

For HPDA

Yes  No

If there are **other entities or associations promoting HPC/HPDA/IA in your country (which are neither business associations nor digital innovation hubs)**, please indicate the names:

--

#### 4 Section 4 : EU initiatives

---

\* Are you **aware** of any EU initiatives and financing opportunities in HPC/HPDA/AI ?  
 Yes  No

Are you a **member/participant** of any EU initiatives and financing opportunities in HPC/HPDA/AI ?

Yes  No

If Yes, please list the initiatives you are a member/participant of:

Do you have access to general information on EU initiatives in HPC?

Yes  No

How do you hear about such projects (national newsletter, national EU contact points, personal network...)?

Where do you look to find out about these projects (Websites, professional newspapers...)?

Are you aware of FF4EuroHPC (EU-HPC-RIA-05) for the promotion of HPC within industry and in particular SMEs?

Yes  No

Are you part of FF4HPC or using it/benefiting from it ?

Yes  No

Are you aware of the ETP4HPC actions?

Yes  No

Are you part of ET4HPC or using it/benefiting from it ?

Yes  No

Are you aware of the PRACE actions?

Yes  No

Are you part of PRACE or using it/benefiting from it ?

Yes  No

Are you aware of the BDVA actions?

Yes  No

Are you part of BDVA or using it/benefiting from it ?

Yes  No

## 5 Section 5 : Needs and suggestions to improve interactions with Industry

---

Potential needs : In your opinion, what could be developed at national level to enhance interaction with industry in your country

for academic people :

for Large companies :

for SMEs :



for start-ups :

If you have other specific needs regarding Industry interactions or business development, please indicate this here:

## Annex 02 – Workshops and meeting agendas of the Industry Working Group

Time	Topic	Speaker
13:00 – 13:15	Opening/Welcome/Setting the Scene	Thomas Skordas/Claus-Axel Müller/Bastian Koller
13:15 – 13:30	Industrial Participation in EuroHPC	Claus-Axel Müller
13:30 – 13:50	INFRAG Industry Working Group findings	Daniel Verwaerde/Zoe Cournia
13:50 – 14:10	CASTIEL presentation on first findings of the Industrial champions Working Group	Marie-Françoise Gerard, Miriam Koch
14:10 – 14:20	Break	
14:20 – 16:00	Open Discussion (baseline: the four questions imposed by email).	

Table 1: Agenda - Workshop #1 EC/JU interaction, on February 16<sup>th</sup>, 2021

Time	Topic	Speaker
14:15 – 14:25	Introduction	Alexander Hektor
14:25 – 14:45	EUHubs4Data	Claudio Arlandini
14:45 – 15:15	PRACE SHAPE	Wahid Rofagha
15:15 – 15:30	---- Coffee break, networking	
15:30 – 16:00	FF4EuroHPC	Samir Ben Chaabane
16:00 – 16:30	Centres of Excellence / Focus CoE	Guy Lonsdals/Bastian Kohler
16:30 – 17:00	Q&A, discussion	

Table 2: Agenda - Workshop #2 about “EU ecosystem” on March 18<sup>th</sup>, 2021

Time	Topic	Speaker
10:00 – 10:15	Introduction - Presentation of EuroCC & CASTIEL	Marie-Françoise Gerard, Teratec
10:15 – 10:45	What are DIH / EDIH & what is the EU vision/plans about this	Anne-Marie Sassen, DG Connect (European Commission)
10:45 – 11:15	Presentation about DIHnet project and actions	Maurits Butter, DIHnet
11:15 – 11:30	---- Coffee break, networking	
11:30 – 12:00	NCC Italy & BI-REX DIH: a success story	Claudio Arlandini, CINECA

12:00 – 12:30	Example of a DIH interacting with Industry / SMEs in the HPC/HPDA/AI fields -> Hungarian DIH	Gábor Vicze, Innomine
12:30 – 13:00	Interaction DIHs and other projects -> FF4EuroHPC	Samir Ben Chaabane, Teratec
13:00 – 13:05	CCI & Wrap-up	Castiel-WP4

Table 3: Agenda - Workshop #3 DIH workshop, on April 15<sup>th</sup>, 2021

Time (CET)	Title	Speaker
9:00 - 9:10	Introduction by WP4	Marie-Françoise Gerard
9:10 - 9:35	NCC LATVIA	Kristaps Bergfelds
9:35 - 10:00	NCC ROMANIA	Bogdan Stroe
10:00 - 10:20	Q&A - Discussion following the two first talks	
10:20 - 10:30	Coffee break	
10:30 - 10:55	NCC BELGIUM	Tim Jaenen
10:55 - 11:20	NCC SLOVAKIA	Lukas Demovic
11:20 - 12:00	40 min Q&A-discussion (for the last two talks ) additional questions or comments to interact with some experienced NCCs	

Table 4: Agenda - Workshop #4 ‘Best practices interaction w. industry regarding services offerings - HPC & HPDA, AI’, on June 17<sup>th</sup>, 2021

Time (CET)	Title and speaker	Speaker
9:00 - 9:05	Introduction by Miriam Koch (WP4) and Guy Lonsdale (FocusCoE)	Miriam Koch (WP4) and Guy Lonsdale (FocusCoE)
9:05 - 9:20	Introduction by CoEs	CoEs
9:20 - 09:30	Introduction and questions from NCCs	NCCs
09:30- 09:45	Open Discussion/Matchmaking	

Table 5: Agenda - Meeting #1 – “CoEs meet NCCs” 1st session

## **Annex 03 - Internal report by task 4.3 for the analysis of the roadmaps produced by the NCCs (M4), including the checklist created by WP4 and a summary of the results**

### **TASK 4.3 - Report: Analysis of the roadmaps in terms of sectorial services**

#### Background of the NCC - roadmaps within EuroCC

Each NCC had to provide an extensive roadmap as the first deliverable of the EuroCC-project in M4 of EuroCC (December 2021). The roadmap had to outline how the NCC plans to attain during the project duration the status it envisages after two years. Among other aspects such as f.e.g. ‘Training/Skills Development’ or ‘Awareness Creation’, the NCCs were also asked to elaborate on their outlook in ‘Technology Transfer/Business Development’ and ‘Collaboration with Industry’.

#### Objective of roadmap-analysis

Following requests of some EuroCC-industry champions to use the content of the roadmaps, WP4 Task 3 took this extensive bulk of information and engaged in the process of filtering the parts of the text which are of interest in terms of sectorial services. The aim is to get an overview of the status quo and to see how to prepare a sectorial expertise map of the competence centres.

#### Methodology used to analyse the NCCs roadmaps

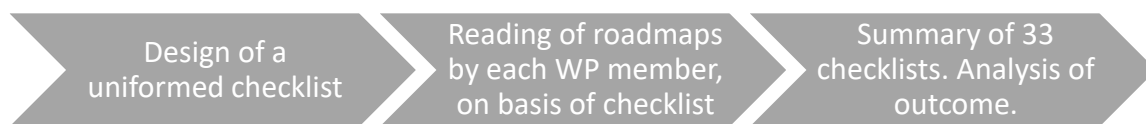


Figure 2: Process implemented by CASTIEL-WP4 to analyse the roadmaps with regards to sectorial services

The heart of the implemented process is the checklist (cf. Appendix 01) which consists of the components ‘Industry Sectors’ and ‘Services’. ‘Industry Sectors’ lists all industry sectors which the NCC in question mentions in its roadmap. ‘Services’ is divided in four sectors, namely ‘Infrastructure-as-a-service’, ‘Support of Infrastructure-as-a-Service’, ‘Expertise Services’ and ‘Business Service Proposals’.

As stipulated in the CASTIEL Grant Agreement, the leader of WP4 Task 3 coordinated the tasks with WP2 (Competences), since the beginning, by attending f.e.g. WP2 weekly team meetings as ‘Observer’. Consequently, the last review versions of the checklist were double-checked by WP2 in order to eliminate possible double-ups at an early stage.

The thirty-three roadmaps were reviewed to look for indications of the NCC’s priorities at the start of the project and to make strategic shortcomings apparent to set up a proper action plan for the second project year. As such, this summary of the roadmaps is a jumping board to ensure

the completeness and efficiency of the measures which will be executed in collaboration with the industry champions.

The goal, by the end of EuroCC and CASTIEL projects, is to have a complete inventory of the available services in each country of the ecosystem (sectorial expertise map) before putting in place, in close collaboration with the industry champions a mechanism (CASTIEL Cluster Map) where interested end users could be led to the appropriate NCC which offers the best service proposal.

## Results of analysis

### Industry Sectors

The roadmaps indicate that the NCCs have generally a pragmatic outlook when it comes to addressing industry sectors. Some opt for only a few sectors to serve them in a focused manner. Others, probably with a higher maturity level or because of their country's bigger industrial infrastructure, target many sectors.

Three NCCs have a broad and diverse horizon of seven or more industry sectors they are planning to serve. Nineteen out of thirty-three mention one up to three industry sectors, with nine of them mentioning none or one sector.

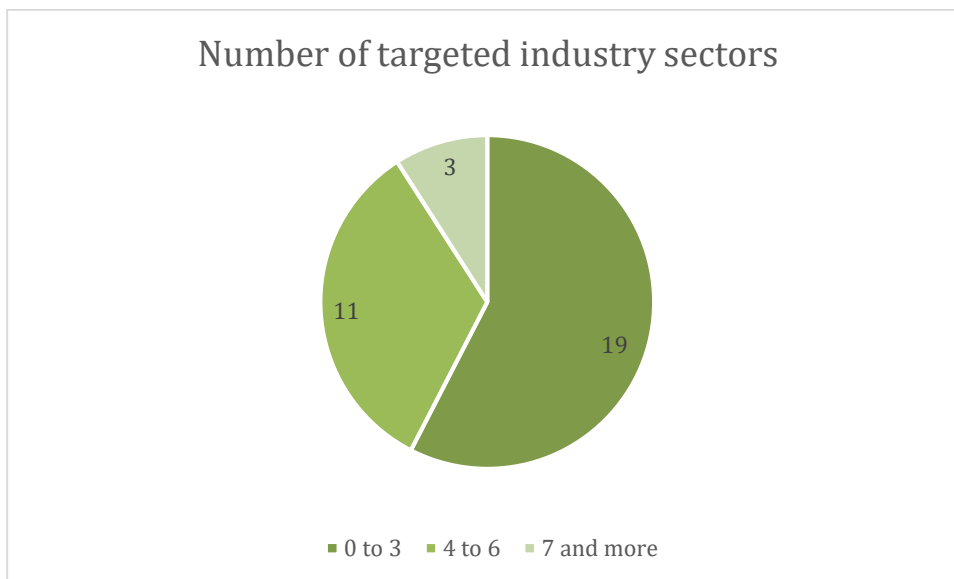


Figure 3: Number of targeted industry sectors by NCCs

It has to be noted that in many cases it was not entirely clear if work in a specific sector mentioned in some roadmaps was in the industrial or the scientific domain. One of the future actions of WP4 T3 should therefore be to clarify this in collaboration with the industry champions.

On a transnational scale, the entire CC-ecosystem covers a large and diverse array of twenty-nine industry sectors overall. The number is likely to further grow in year 2 of the project when the 'industrial sector map' will be established together with the industry champions.



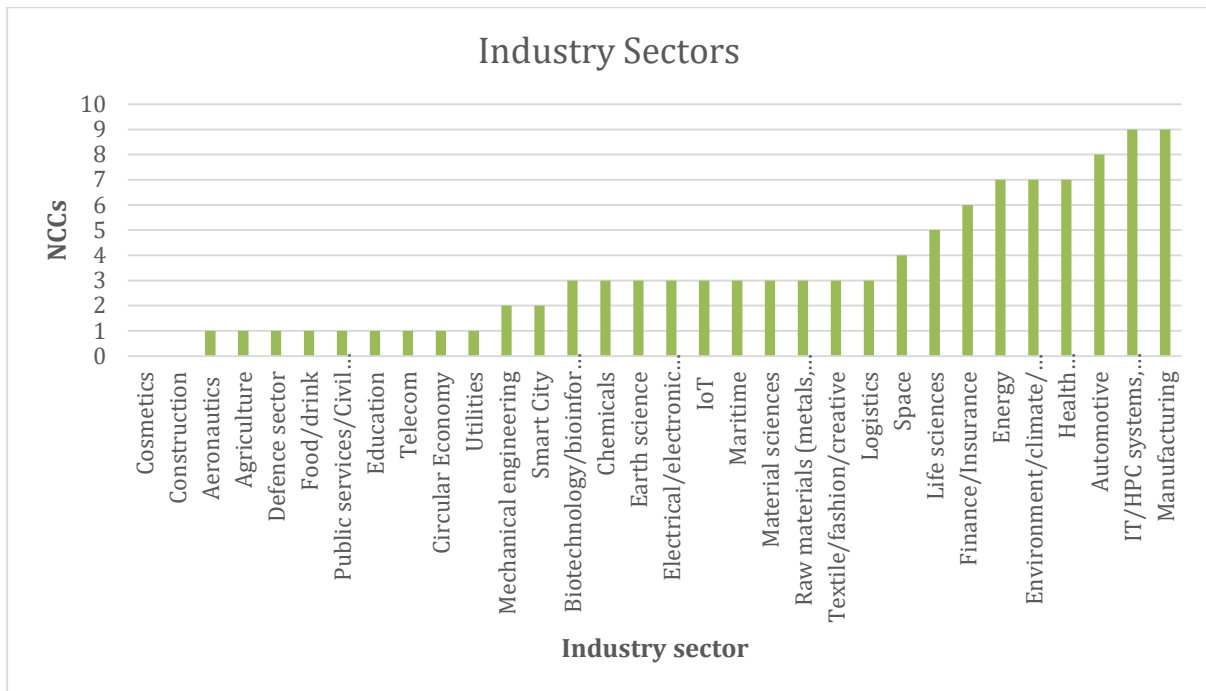


Figure 4: Number of NCCs addressing specific industry sectors or planning to address them during the EuroCC project, according to their M4 roadmap

The diversity of the ecosystem in regard to the industry sectors it covers is a good basis for the ‘CASTIEL Cluster Map’, a tool which will be developed in the second half of year 2 of the project to facilitate the exchange of industrial sectorial expertise between the NCCs. In order to set up this tool, in depth interactions with the industry champions will be needed to fine-tune and update the initial plans outlined in the roadmaps.

### Infrastructure-as-a-Services

According to the roadmaps, the provision of HPC-infrastructure as a Computing Centre is the core business proposal of twenty-eight NCCs. Ten NCCs in the eco-system are active in cloud-technology.

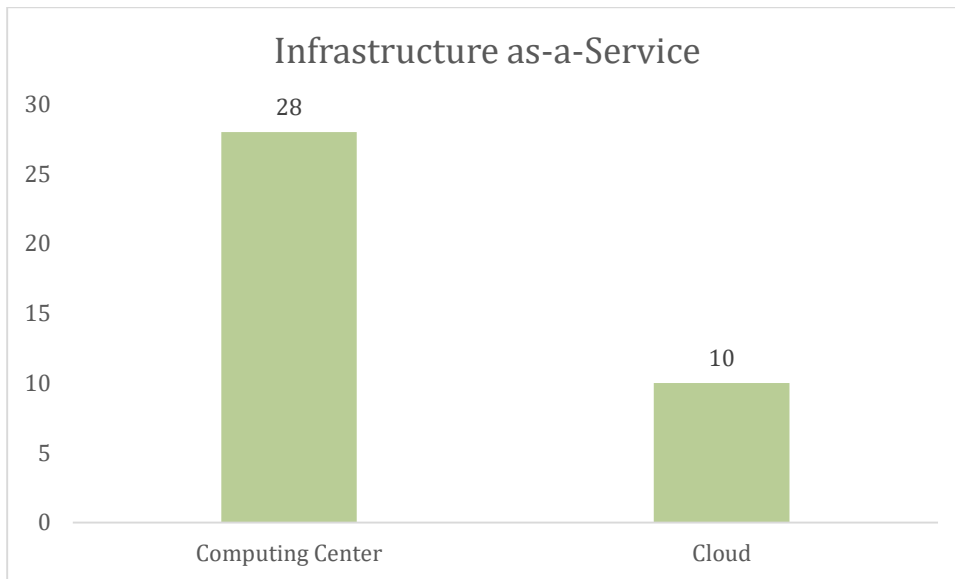


Figure 5: Number of NCCs addressing infrastructure-as-a Service in their roadmaps

A closer look at possible commonalities between the technologies shows that ten NCCs choose a dual approach in proposing both options. Eighteen NCCs propose only one technology. The scan of the roadmaps also showed that five NCCs don't mention any of the technologies.

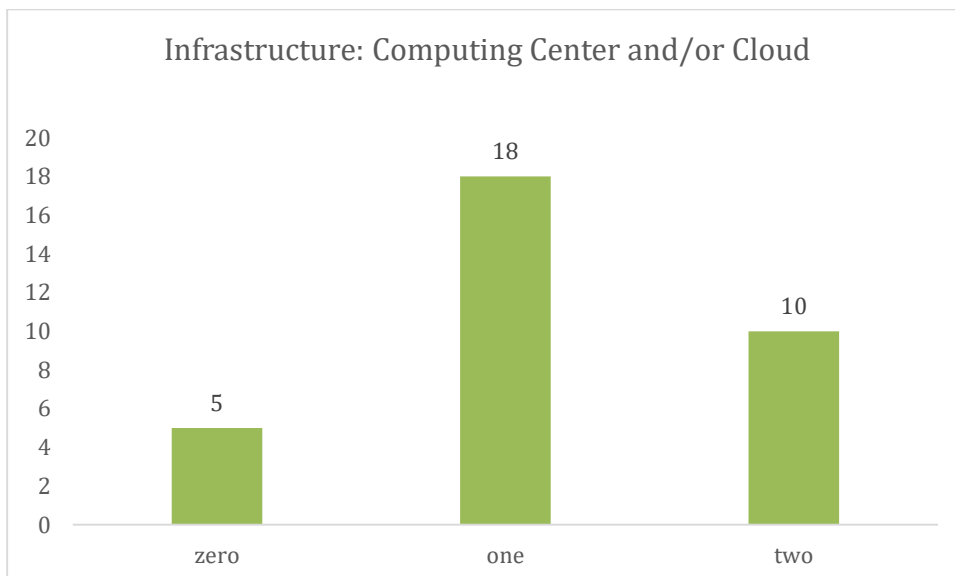


Figure 6: Number of NCCs covering Computing Centre or Cloud or both technologies as Infrastructure-as-a-Service in their roadmaps

#### Support of Infrastructure-as-a-Service

The analysis of the roadmaps in regard to the support function of their national centres provided a somewhat dispersed picture. From thirty-three NCCs, only fourteen explicitly mention technology consultancy as part of their service proposition. Eleven of them have some sort of software licence model in place. Ten NCCs didn't mention any of the two.

Despite the fact that the competence centres rely heavily on their technical competences so that ‘infrastructure’ plays a vital role in their business plan, for the moment, the formulation of a service proposal for industry represents a considerable challenge for some. As one NCC puts it: « We have practically no experience with the private sector ». On the other hand, the CCs with a high maturity level already seem to take into account that a competence is not automatically a service proposal, but that a solid service proposal is always based on competence.

Many NCCs are aware of this mismatch and want to use the CASTIEL-project to bring structure to their current plans or ideas. For example, they engage in market research with support of WP2 to better understand the client needs. Some express explicitly their desire to use the knowledge exchange mechanisms of CASTIEL to learn from best practices of their peers in other countries.

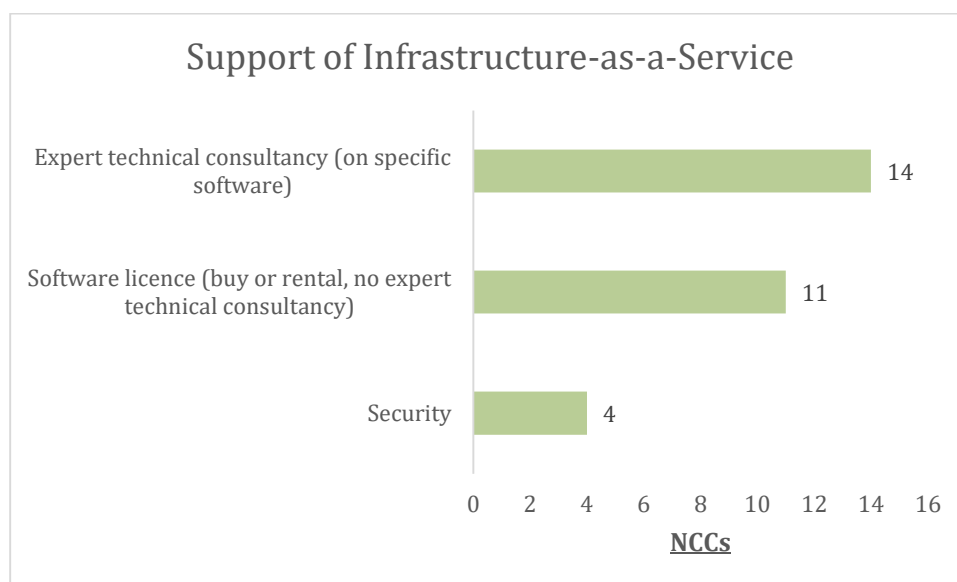


Figure 7: Number of NCCs having or planning to propose support of Infrastructure-as-a-Service to their current or future users, either with Expert technical consultancy, with software licence or with support regarding the security questions

#### Technical Consulting / Expertise Services

According to the roadmaps, all NCCs see HPC as their core technological domain. Only three and respectively four NCCs are not planning to complement their existing technical consulting/service-portfolio with HPDA/Data analytics and/or AI by M24. The results for Quantum Computing show that only six computer centres plan to move into this arena.

A closer look at the technological evolution that the NCCs envisage during the project gives an interesting picture. Some state f.eg. that at the beginning of the project they have zero expertise in HPC, but that they will use the CASTIEL-project to develop at least one technology. Others claim to possess expertise already in HPC in M1 and foresee a large portfolio of three or four technologies by M24. Out of the six NCCs looking at Quantum Computing, only one possesses the expertise right at project start. The remaining five will use the EuroCC-project to gain that expertise.

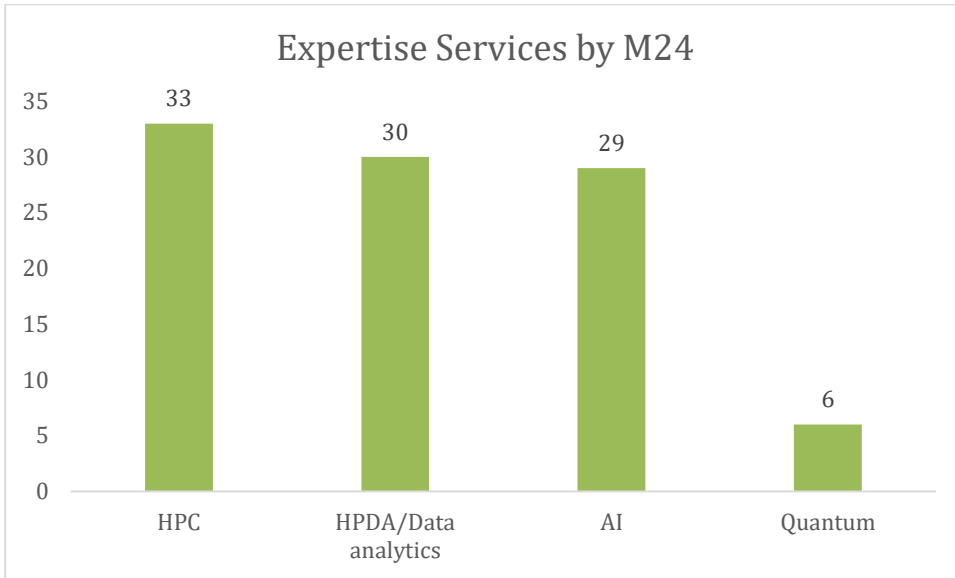


Figure 8: Technologies in which NCCs are planning to propose expertise services

It becomes apparent in the roadmaps that the trend clearly leads to a multiple technology approach within EuroCC. A very large majority looks at least at three technologies by M24, with some even expecting a complete technology mix of four (JPC, HPDA, AI and quantum technology).

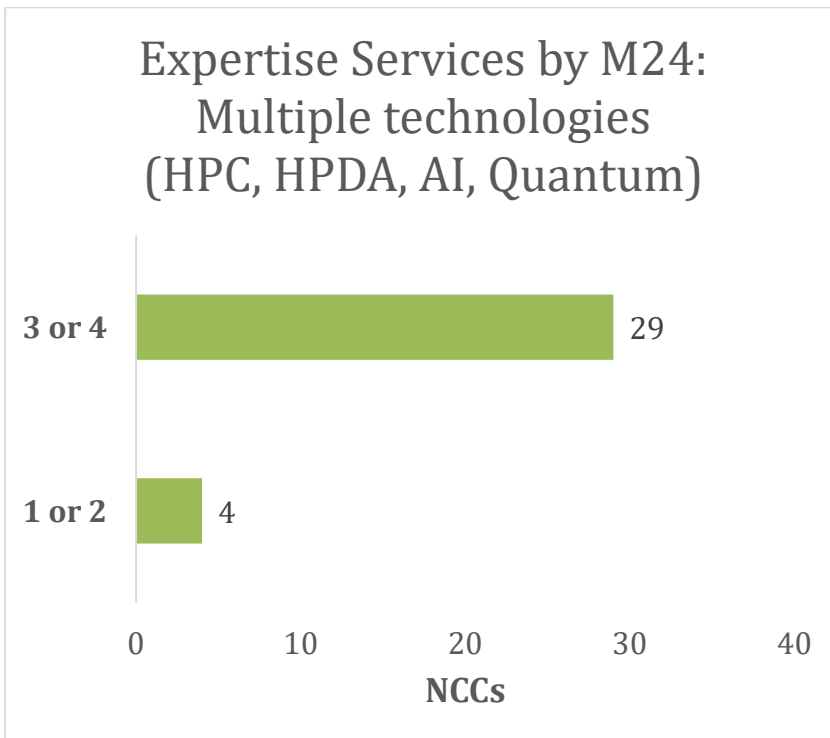


Figure 9: Number of NCCs being active in multiple technologies by M24

As a conclusion, the NCC roadmaps show that technology is already well-developed at the project start and will gain further positive momentum during the project duration because of the ecosystem's willingness to improve and expand its technical capabilities.

### Business Service Proposals

The review of the roadmaps in regard to the service proposals showed a broad range which exists within the NCC-ecosystem. In fact, with the help of the checklist their services can be broken down into twenty areas (cf. Appendix 02). Each CC offers at least one of these services with some areas being covered by 50% and more of the centres.

‘Training’ is the service proposal which is provided by almost every NCC according to the roadmaps. This finding is also coherent with the fact that many competence centres mention in their roadmaps that educational programmes are the best instrument to raise awareness for HPC and overcome barriers in their national markets.

More than 50% of the NCCs actively support ‘Knowledge transfer from science to industry’. As it became apparent in the roadmaps that many competence centres have their roots rather in the scientific arena and to a much lesser degree in industry applications, ‘knowledge transfer’ might be a good solution to accommodate requests from industry.

In the same context, it is also worth noting that around half of the centres plan to adjust their business model to better serve industry needs. Industry-specific business development or technical support is ensured through a dedicated staff member or by modifying the internal operations to that end.

Overall, the diversity of service proposals of the NCCs is not only a good indicator for the depth of expertise which is embedded in the ecosystem but is also a promising starting-point for the planned actions in year 2 of WP4 Task 3.

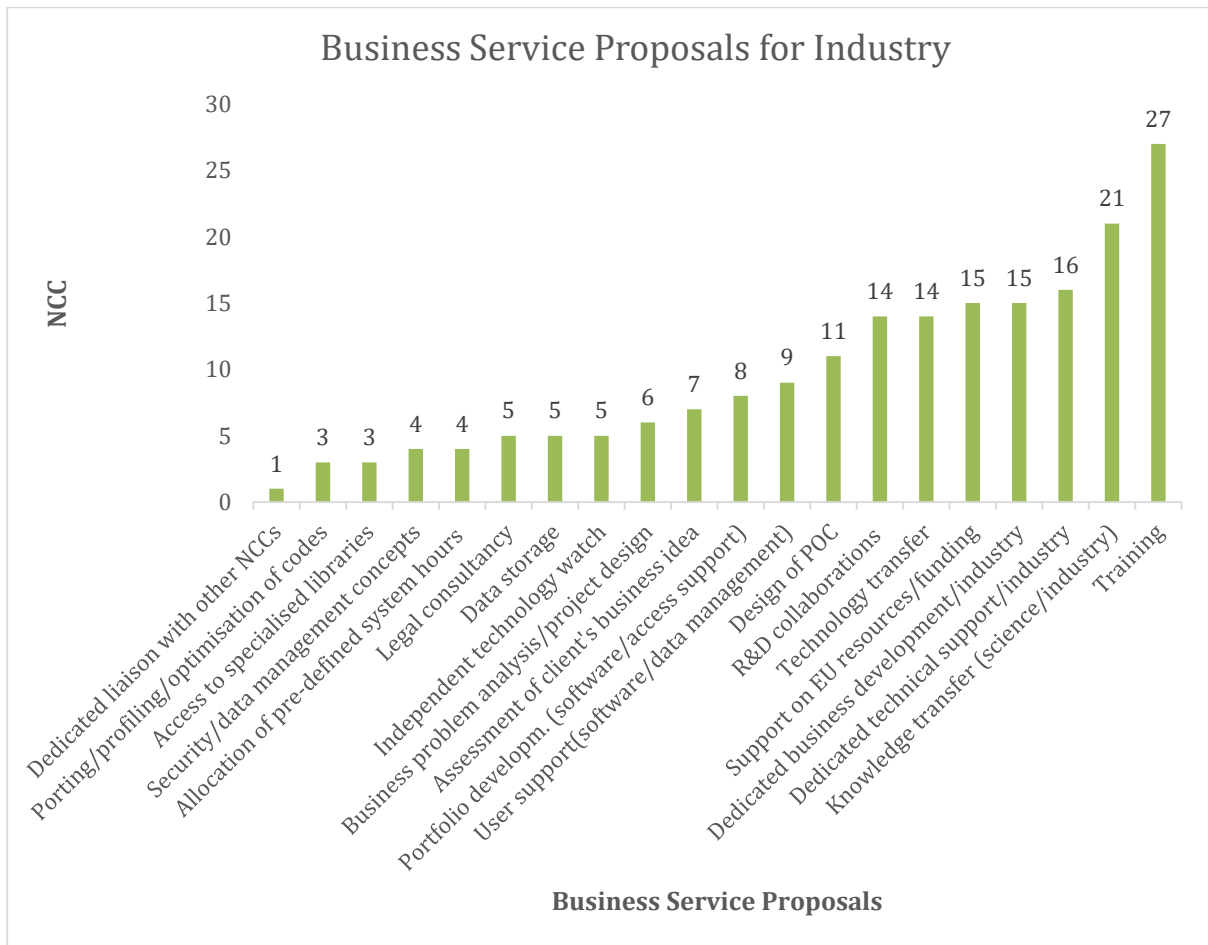


Figure 10: Overview of business service proposals by NCCs mentioned in the roadmaps

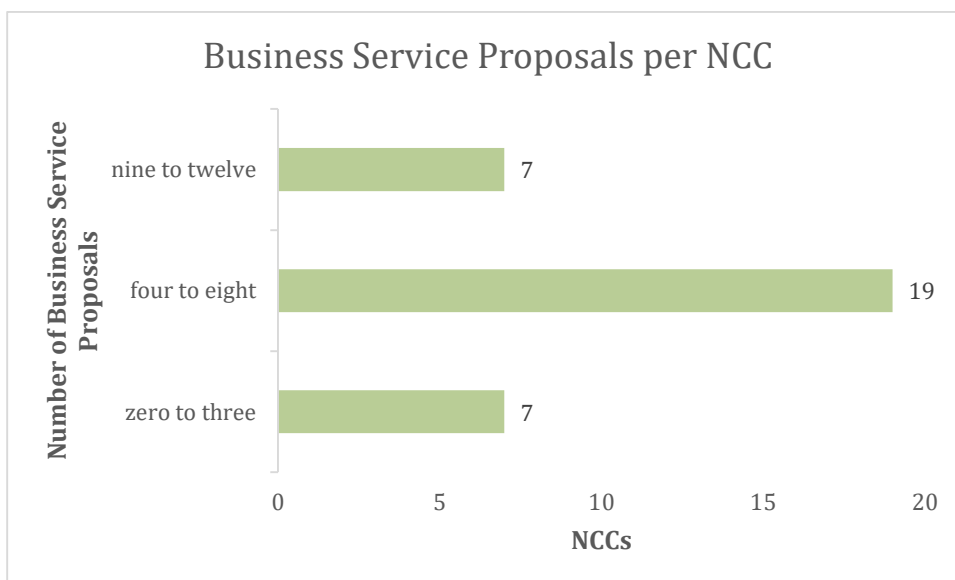


Figure 11: Size of business service portfolio of NCCs

**Conclusions. Next steps.**

The 33 NCCs possess together an expansive wealth of service proposals and target a broad range of industry sectors. As a consequence, the eco-system can build its market access strategies, paired with its competencies and technological excellence, on very solid grounds.

The roadmaps gave a valuable first snapshot of the status quo of the NCCs. The next step will be to interact with all the industry champions in year 2 with the aim to build an exhaustive transnational service inventory in order to cope with transnational requests. This will lead to the ‘sectorial expertise map’ which is to be merged with the ‘competence map’ of WP2. Ultimate outcome of WP4 T3 is ‘CASTIEL Cluster Map’, which will be designed in close collaboration with the industry champions, and a process to cope with requests from companies for sectorial services available in the whole EuroCC network in M24 of the project.

The ‘CASTIEL Cluster Map’ is a tool both for Business Development and Account Management. It will enable the NCCs to reply to any inquiries from all industry sectors in Europe. It is built for a real business life scenario where a NCC might not be able to accommodate an inquiry in the home country itself. With the help of the tool, the inquiry can be escalated to a different country which in return possesses the necessary expertise.

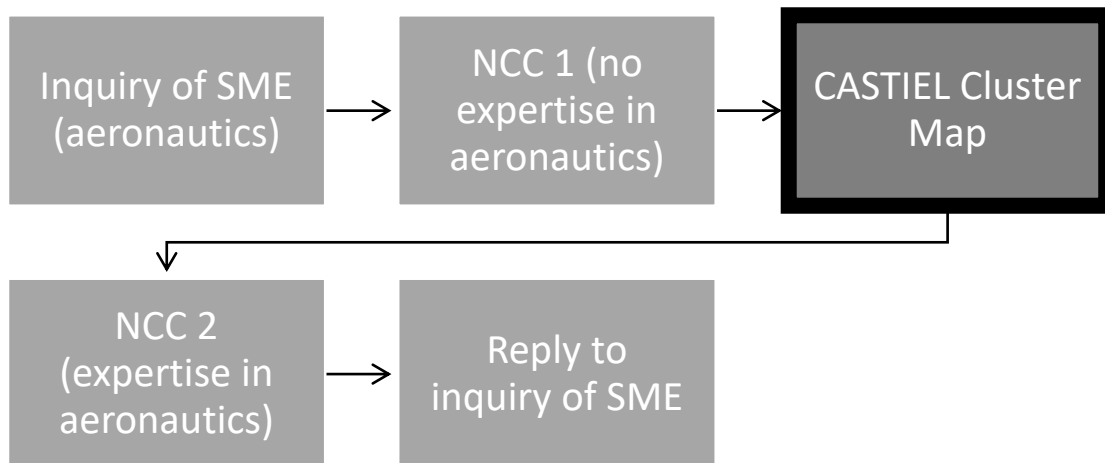


Figure 12: Example of possible usage of ‘CASTIEL Cluster Map’

**Task 4.3 Report - Appendix 01 (CHECKLIST SERVICES template)**

Infrastructure-as-a-Service	Box to be ticked or not (or to provide comments)
Computing Center	
Cloud	
<b>Support of Infrastructure-as-a-Service</b>	
Software licence (buy or rental, no expert technical consultancy)	

Expert technical consultancy ( <u>on specific software</u> )	
Security	
<b>Technical Consulting / Expertise services</b> <i>(Technology in which NCC can provide technical consulting/service, independent from any infrastructure or software)</i>	
<b>HPC</b>	
(f.ex. parallelization-optimization, parallel images using virtual reality, urgent computing workflow, etc.)	
<b>HPDA/Data analysis</b>	
(f.ex. Data processing and visualization, data analysis, etc.)	
<b>AI</b>	
(f.ex. Machine Learning, Deep Learning, Digital Twins, etc.)	
<b>Quantum Computing</b>	
<b>Payable business service proposals, specific for SMEs and/or industry</b>	
Portfolio development (software support, access support, etc.)	
Assessment of client's business idea	
Design of POC	
Knowledge-transfer from academia/science to industry programmes	
Dedicated technical support track for industry/SME - needs	
User support service for software and data management	
Support about EU resources and potential funding	
R&D collaborations - partnerships	
Training	
Technology transfer (HPC/AI/HPDA - as-a-Service)	
Legal consultancy	
Business problem analysis and project design	
Security / data management concepts	
Data storage	
Porting/profiling/optimisation of codes	
Technology watch (evaluation independent from vendors)	
Access to specialised libraries	
Allocation of pre-defined amount of system hours	
Orchestrators (solutions combining different technologies)	
Dedicated business development for SME / industry	





*Please put hereafter services which are not listed'*

**Task 4.3 Report – Appendix 02 (CHECKLIST SECTORS)**

<b>Sector</b>	<b>Box to be ticked or not (or to provide comments)</b>
Aeronautics	
Agriculture	
Automotive	
Biotechnology/Bioinformatics	
Chemicals	
Cosmetics	
Construction	
Defence sector	
Earth science	
Electrical and electronic engineering	
Energy	
Environment/climate/weather	
Food and drink	
Finance/Insurance	
Health care / Pharmaceuticals / Medical devices	
IoT (Internet of things)	
IT/HPC systems, services & software providers	
Life sciences	
Manufacturing & engineering	
Maritime	
Material sciences	
Mechanical engineering	
Public services/Civil protection	
Raw materials, metals, minerals and forest-based	
Space	
Smart City	
Textile, Fashion and creative	
<i>Please put hereafter sectors which are not listed'</i>	

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