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**Concerted action for the European HPC CoEs**

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**D5.6 – Final Report on Communication, Dissemination  
and Innovation and Event Management**

**WP5 – Promoting EU HPC CoEs**



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**List of abbreviations**

CoE.....	<i>Centre of Excellence</i>
CSA.....	<i>Coordination &amp; Support Action</i>
EU.....	<i>European Union, European Union</i>
HPC.....	<i>High-Performance Computing</i>
KPI.....	<i>Key Performance Indicators</i>
WP.....	<i>Work Package</i>

## Executive Summary

This deliverable constitutes the final update on the communication and dissemination activities of FocusCoE's Work Package 5. It presents the strategy optimisations and Covid-19 pandemic related mitigations that enabled Work Package 5 to meet its ultimate goal of promoting the EU HPC CoEs' competences and services while simultaneously establishing and promoting the independent EU HPC CoE "brand". Lastly, it summarises the current and ongoing added value of these achievements for the active and future EU HPC Centres of Excellence.

The websites for FocusCoE and the EU HPC CoE brand that were initially envisioned as separate, were combined into a single central hub for accessing information on all EU HPC CoEs. This action has generated uniquely comprehensive tools for activities such as finding (training) events, industry-specific codes and their related CoEs, meaningful results from the CoEs, and materials written for a non-technical audience explaining the significance of HPC to science, industry, and society. The website performance has strongly improved when [hpccoe.eu](http://hpccoe.eu) was created and the web presence was combined. The overarching unique value of this central hub is its suitability for guiding people unfamiliar with the EU HPC ecosystem to the correct contacts and resources. This central website, and especially the original materials created by FocusCoE WP5, serves the EU HPC CoEs moreover as a repository of models for how to reach a diverse and even non-technical audience.

A significant part of this repository is comprised of the online FocusCoE newsletters, success stories, and use cases which were highly curated and edited by FocusCoE WP5 to appeal to a broader audience beyond each CoE's individual sector. In particular, the success stories and use cases that were originally envisioned as booklets have had far further reach as digital collections. Moreover, in digital form the collections can continue to be updated by CoEs, the FocusCoE created independent HPC CoE Council (HPC3), or a follow-on Coordination and Support Action (CSA) via the convenient and standardised online templates.

WP5 provided event support in conjunction with WP3, which both decreased the logistical burdens and increased the audience reach of events for individual CoEs over the course of the project. WP5 generated both EU HPC CoE branded graphical material templates suitable for in person and virtual events. Therefore, they will have continued utility to CoEs participating in any joint CoE activities and can be modified by CoEs as necessary.

All of the communications, be it related to events, web articles, training, news, or newsletters, were further boosted via FocusCoE's social media accounts on Twitter, LinkedIn (added in April 2020 with a focus on industry), and YouTube for a collection of video content generated by the CoEs and FocusCoE.

Finally, as a proof of this work package's success in adapting strategy to changing circumstances, most of the KPI target values were achieved (sectorial events, (web) booklet editions) or overachieved (training events & participants, newsletter issues & subscribers, Twitter engagement rate, website visitors).

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# 1 Introduction

The European Union (EU) has selected FocusCoE as a Coordination and Support Action (CSA) in order to support the European Centres of Excellence (CoE) for high-performance computing in their mission to contribute to a globally competitive HPC ecosystem. The main objective of work package 5 within the FocusCoE project is to promote the EU HPC CoEs competences and services and to establish and promote the independent EU HPC CoE “brand”.

This document provides an overview of Work Package (WP) 5 tasks 5.1-5.3 achievements, modifications and optimisations made to mitigate impacts of the Covid-19 pandemic, and the outlook for capitalising on FocusCoE achievements after project end. Each section describing a FocusCoE tool or material also includes a “FocusCoE Added Value” section describing the unique value of project activities. As this document is an update of D5.3 [1], it similarly does not include updates on task 5.4 activities. For updates on innovation management, please refer to deliverable 5.5 Final Innovation Management Report [2].

Beginning with tools for external communication, this document presents the final iterations of key parts of the EU HPC branded [hpccoe.eu](http://hpccoe.eu) Website (section 2.1.1), continues with the FocusCoE Social Media activities (section 2.1.2), provides an explanation of optimisations made to enhance the utility of the FocusCoE bi-monthly Newsletter (section 2.1.3), and closes with explanations of strategic changes made to ensure the utility of Success Stories and Use Cases (section 2.1.4 and Graphic Materials (section 2.1.5) in a virtual world, as well as providing a summary of Media Relations (Section 2.1.6).

Event related activities are presented in section 2.2 and the Communication Performance as evaluated through Key Performance Indicators (KPIs) is detailed in section 2.3. The last section (2.4) in chapter 2 is a brief report on Tools used for Internal Communication.

Section 3 provides conclusions on FocusCoE project achievements and their ongoing added value to the EU HPC CoE community after project end. The durable and established pan-EU HPC CoE brand, all associated templates and tools ready to use, and especially the repository of FocusCoE edited and original work provides a firm basis and model to ongoing and future CoEs for reaching out to a broad and not necessarily technical audience. This conclusion also briefly touches on possible support that can be provided by the independent HPC3, which was created by FocusCoE and will continue independent operations after FocusCoE project end.



## **2 Communication and Dissemination (as of March 2022: M40)**

Since D5.1 and D5.3 the following changes have been made to the overall communication strategy in order to strengthen the HPC CoE brand and adapt to the restrictions imposed by the Covid-19 pandemic.

- All FocusCoE, HPC CoE Council, and HPC CoE branded materials were consolidated on a single website
- Codes and Software Packages online tool was re-envisioned as a central hub for searching software by sector in order to connect with the appropriate CoEs
- Year 2 use case and year 3 industrial success story booklets were released in a digital format
- Focus CoE produced more original content
- Social media strategy was altered to capitalise on the proliferation of online events

Given the unforeseen duration of the pandemic and its associated restrictions, these modifications have been vital to achieving project goals. Particularly concerning external communication with the EU HPC ecosystem and potential industrial contacts, producing exclusively digital materials and concentrating our online presence on the EU HPC CoE brand instead of splitting online attention between it and the FocusCoE brand has been essential in an often-oversaturated virtual environment. This modified strategy has met the ultimate project goal: promoting the EU HPC CoEs' competencies and services while establishing and promoting an EU HPC CoE brand capable of persisting beyond this project.

## 2.1 Tools for External Communication

### 2.1.1 Hpccoe.eu Website

Based on CoE feedback at the first project meeting in February 2019, FocusCoE Work Package 5 (WP5) originally planned to create two separate websites: one for FocusCoE and the second for the collective HPC CoE brand and associated HPC CoE Council. However, as project activities progressed, it became clear that the best way to promote the HPC CoE brand to stakeholders both inside and outside of the EU HPC ecosystem was to consolidate both HPC CoE and Focus CoE activities in a central website [4]. This new website was further optimised with a more attractive and dynamic magazine style layout (see Figure 1). Over the course of these consolidations and updates, website metrics have demonstrated marked improvement as shown in Figure 2.

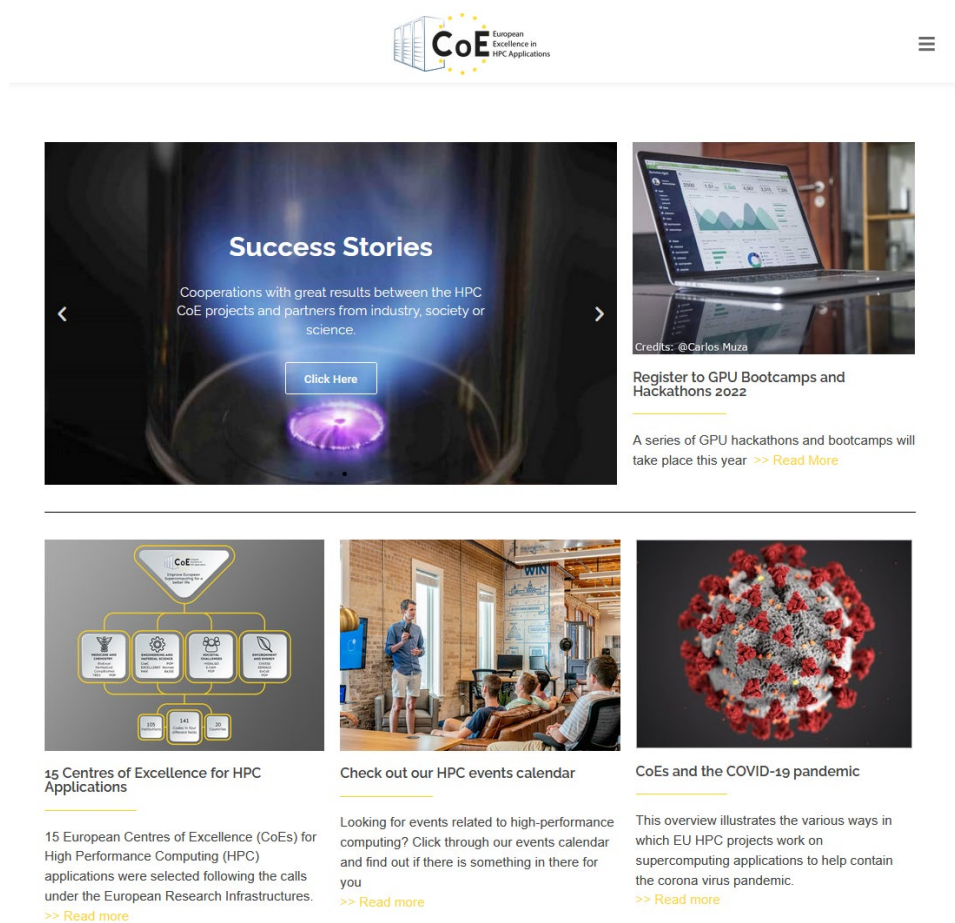
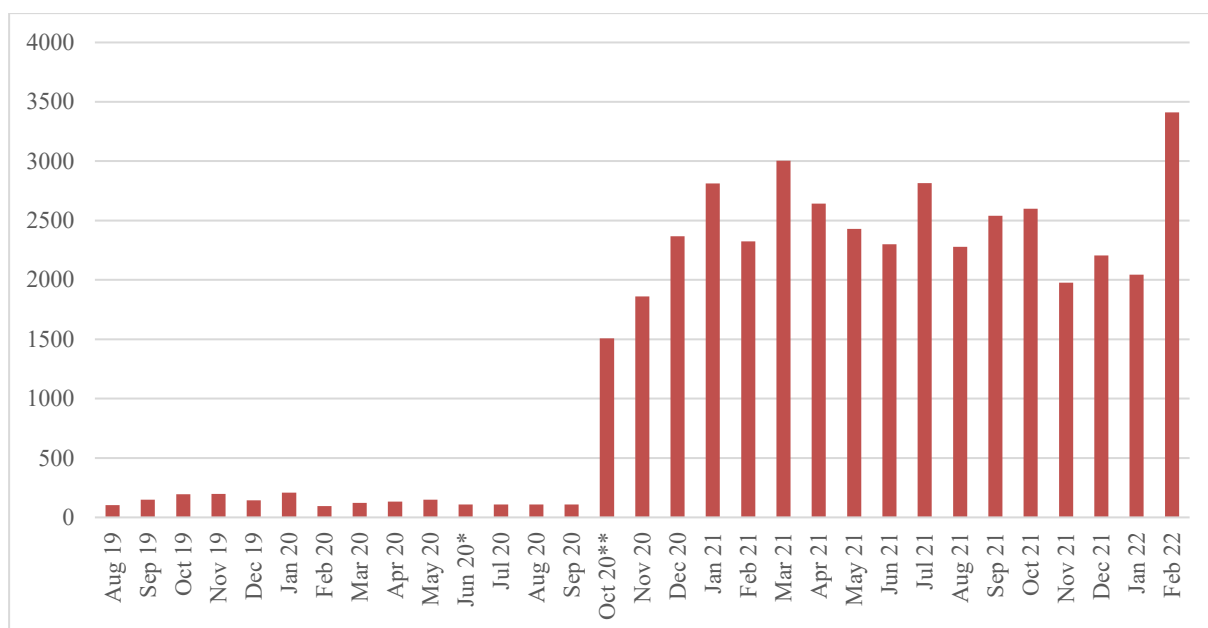


Figure 1: Screenshot of magazine style homepage of hpccoe.eu



**Figure 2: Evolution of unique website visitors**

\* hpccoe.eu website initialised

\*\* focus-coe.eu switched off on Oct 16th, redirecting to hpccoe.eu

### ***FocusCoE Added Value***

In addition to building and managing the web pages of the all-CoE training events registry frontend (section 2.1.1.1), unique Codes and Software Packages listings and search tool (section 2.1.1.2), HPC3 About page (section 2.1.1.3), FocusCoE About page (section 2.1.1.4), as well as the digital “Use Case” and “Success Story” web pages (section 2.1.4), FocusCoE WP5 has provided dissemination guidance to CoEs and intensive editorial services for all text on the hpccoe.eu website. In particular, WP5 revised content written by any given CoE for their sector to resonate with the broader EU HPC audience. This work directly strengthens the EU HPC CoE brand by ensuring that every CoEs work is both readily accessible and relatable beyond a single sector to the EU HPC ecosystem and industry at large.

Moreover, FocusCoE WP5 has generated a variety of original content available throughout hpccoe.eu including on the magazine style homepage (see Figure 1). This original content takes numerous forms such as introductions of new CoEs or announcements and recaps of CoE participation in key events like the AI Web Café in March 2022 shown in Figure 3. Where available, these articles also include event materials like slides and embedded videos as with an Intel oneAPI event also in March 2022. WP5 also created resources like the FAQ section about HPC, new dissemination materials, and some articles directed specifically at a non-scientific general audience.

# AI Café: How can HPC technologies help AI

On March 17<sup>th</sup>, FocusCoE participated in a live AI for Media Web Café alongside the three Centres of Excellence: [RAISE](#), [CoEC](#), and [HiDALGO](#). The virtual session brought together the CoEs working in AI sectors to explain how HPC technologies can help AI. In all, over 40 participants from industry and research joined the hour and a half café.

Starting off the presentations, Xavier Salazar introduced FocusCoE and the resources available at the “one stop shop” of our website such as [technological offerings](#). Here, anyone from industry or research who wants to learn more can also read up on [use cases](#), search available [codes and software packages](#), and link directly to the CoEs of interest.

Next, the CoEs presented several case studies on how they are using AI in combination with HPC technologies to solve real-life problems. Although each CoE’s application of AI differed, some common themes emerged in answer to the question, “How can HPC help AI?” Firstly, AI is now benefitting from the increasing availability of large and even “big” data sets but often can’t use them in their entirety due to excessive processing time. This is by far the clearest example of how HPC can help. In a use case described by Andreas Lintermann on behalf of CoE RAISE, a dataset that was estimated to take over 300 hours to process using 4 GPUs was modified to run on HPC systems theoretically as large as 2000 GPUs in as little as 45 minutes! With the ability to more quickly train AI models using more data, it is also possible to increase the accuracy of the resulting models or surrogates. In turn, building more accurate surrogates speeds up the ability to run accurate simulations since one no longer needs to build the simulation models by hand.

Using AI to build data model surrogates also has benefits for data privacy, as discussed by Christoph Schweimer from HiDALGO. When modelling how messages spread across social media, researchers initially had to build social network graphs manually from data harvested from real social media users, whose privacy had to be strictly protected. However, with HPC computing resources, HiDALGO researchers were able to use those real graphs to train AI to build simulated social network graphs instead. These simulated graphs share the same characteristics of real graphs but require far less time to create and don’t rely on any real-user data: thus holding no privacy risks to users.

The experience gained through these use cases has naturally brought several opportunities and challenges to light, which were also discussed over the course of the program. For instance, Temistocle Grenga from CoEC highlighted the existing bottleneck of moving data between different types of processors (CPU and GPU, as examples).

Lastly, CoEs summarized the numerous resources in terms of services and training opportunities they provide to help AI experts learn to exploit the benefits of HPC. As an immediate example, CoEC will participate this week in [South-East Europe Combustion Spring School 2022](#). For ongoing information on training like this, make sure to bookmark our [training calendar](#), which shows events from all the EU HPC CoEs.

For the full recording of this event, check out the video below!

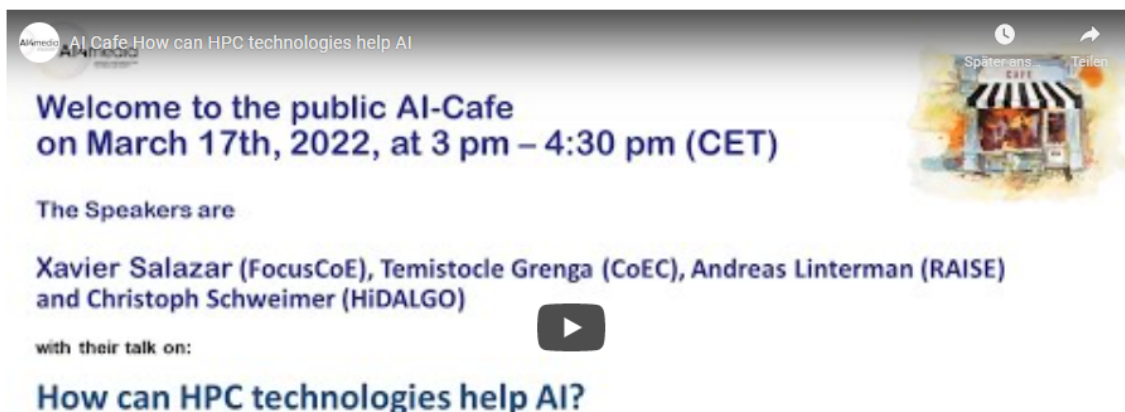
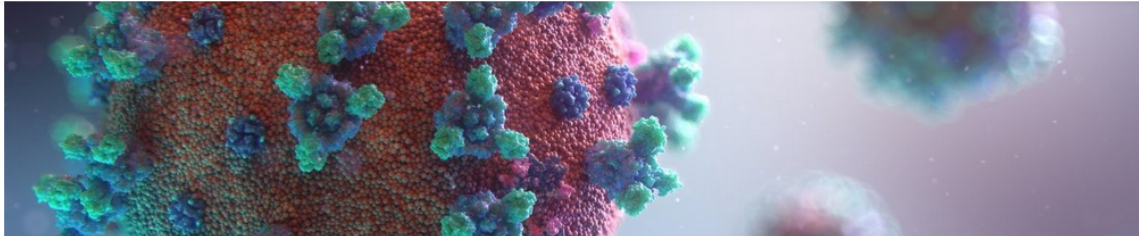


Figure 3: AI Web Café article on [hpccoe.eu](#)

The purpose of the general interest articles has been to synthesise the work of various CoEs to describe how smaller activities overcoming industrial or scientific challenges add up to addressing broader societal concerns: an answer to the question, “Why should my taxes be supporting EU CoEs?”

- How EU projects work on supercomputing applications to help contain the corona virus pandemic [3], see extract in Figure 4

- Mitigating the Impacts of Climate Change: How EU HPC Centres of Excellence Are Meeting the Challenge [4]
- Impact brochure: European HPC Centres of Excellence – Supporting European Science, Industry & Society [5]



## How EU projects work on supercomputing applications to help contain the corona virus pandemic

The [Centres of Excellence in high-performance computing](#) are working to improve supercomputing applications in many different areas: from life sciences and medicine to materials design, from weather and climate research to global system science. A hot topic that affects many of the above-mentioned areas is, of course, the fight against the corona virus pandemic.

There are rather obvious challenges for those EU projects that are developing HPC applications for simulations in medicine or in the life sciences, like CompBioMed (Biomedicine) BioExcel (Biomolecular Research), and PerMedCoE (Personalized Medicine). But also other projects from scientific areas, that you would, at first sight, not directly relate to research on the pandemic, are developing and using appropriate applications to model the virus and its spread, and support policy makers with computing-heavy simulations. For example, did you know that researchers can simulate the possible spread of the virus on a local level, taking into account measures like closing shops or quarantining residents?

This article gives an overview over the various ways in which EU projects are using supercomputing applications to tackle and support the global challenge of containing the pandemic.

### Simulations for better and faster drug development

[CompBioMed](#) is an EU-funded project working on applications for computational biomedicine. It is part of a vast international consortium across Europe and USA working on urgent coronavirus research. "Modelling and simulation is being used in all aspects of medical and strategic actions in our fight against coronavirus.



In our case, it is being harnessed to narrow down drug targets from billions of candidate molecules to a handful that can be clinically trialled", says Peter Coveney from University College London (UCL) who is heading CompBioMed's efforts in this collaboration. The goal is to accelerate the development of antiviral drugs by modelling proteins that play critical roles in the virus life cycle in order to identify promising drug targets.

Secondly, for drug candidates already being used and trialled, the CompBioMed scientists are modelling and analysing the toxic effects that these drugs may have on the heart, using supercomputing resources required to run simulations on such scales. The goal is to assess the drug dosage and potential interactions between drugs to provide guidance for their use in the clinic.

Finally, the project partners analysed a model used to inform the UK Government's response to the pandemic. It has been found to contain a large degree of uncertainty in its predictions, leading it to seriously underestimate the first wave. "Epidemiological modelling has been and continues to be used for policy-making by governments to determine healthcare interventions", says Coveney. "We have investigated the reliability of such models using HPC methods required to truly understand the uncertainty and sensitivity of these models." As a conclusion, a better public understanding of the inherent uncertainty of models predicting COVID-19 mortality rates is necessary, saying they should be regarded as "probabilistic" rather than being relied upon to produce a particular and specific outcome.

+ [CompBioMed: Additional Information](#)

**Figure 4: Extract from hpccoe.eu article on Covid-19**

In conclusion, the added value of these activities is multifaceted. First, they strengthen and broaden awareness of the EU HPC brand by reshaping CoE and sector specific texts into resources relatable to the EU HPC ecosystem and across research and industry sectors. Additionally, they address the societal portion of the D5.1: Initial Strategy for Communication, Dissemination and Innovation and Event Management “soft ‘cognitive’ communication goals: Raise awareness of the importance of HPC applications for society, science, and industry” [6]. These articles have also contributed to building media relations as discussed in section 2.1.6. Lastly, the FocusCoE WP5 edited materials and original articles all serve ongoing and future CoEs as a blueprint of communication techniques for reaching a broad audience.

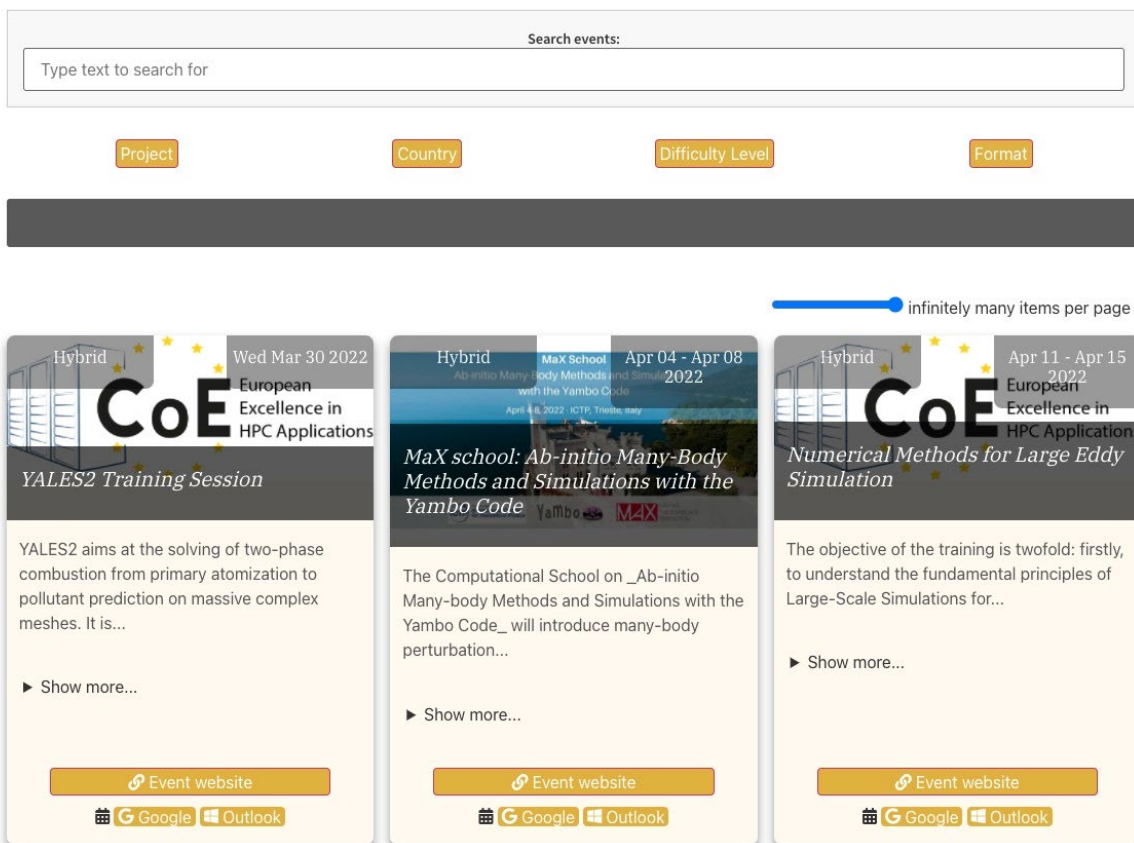
### **2.1.1.1 Training Events Registry Frontend**

This registry of training events goes beyond a simple merge of training calendars from the individual CoEs but aligns with a pan-European goal. Rather than creating a CoE-specific training registry and platform, WP4 pursued to work in collaboration with other European projects to develop a pan-European training registry that would cater for any HPC training provider. Importantly, this avoids fragmentation and duplication of efforts across different projects. And with the approach taken to develop the registry, the [hpccoe.eu](http://hpccoe.eu) training calendar remains to be the only reference for finding all upcoming CoE hosted training events in one location. It is a considerable technical challenge to integrate training events metadata (now annotated by a common vocabulary) from different projects and institutions offering HPC training, e.g. PRACE, FocusCoE, and EuroCC. However, the training registry/calendar was conceived (initially by PRACE but joined by FocusCoE and EuroCC/CASTIEL) with this goal in mind, and some of the technical details are described in the FocusCoE deliverable D4.2: Final Training Report [7].

By default, all CoE training events are visible. Filter menus along the top allow users to search for courses from a particular CoE (the “Project” filter), whether a course is in-person or online (the “Format” filter), etc. The same interface also allows CoEs to quickly add an event to the calendar registry by completing a custom online form that collects all the training events-specific metadata. This convenient online entry enables CoEs to easily broaden the reach of their events.



## CoE Training Registry



The screenshot displays the CoE Training Registry interface. At the top, there is a search bar labeled "Search events:" with the placeholder text "Type text to search for". Below the search bar are four filter buttons: "Project", "Country", "Difficulty Level", and "Format". A dark grey bar is positioned below the filters. To the right of the main content area, there is a slider control labeled "infinitely many items per page".

Three event cards are shown in a grid. Each card features the CoE logo and the text "European Excellence in HPC Applications".

- Event 1:** "YALES2 Training Session" (Hybrid, Wed Mar 30 2022). Description: "YALES2 aims at the solving of two-phase combustion from primary atomization to pollutant prediction on massive complex meshes. It is..."
- Event 2:** "MaX school: Ab-initio Many-Body Methods and Simulations with the Yambo Code" (Hybrid, Apr 04 - Apr 08 2022). Description: "The Computational School on \_Ab-initio Many-body Methods and Simulations with the Yambo Code\_ will introduce many-body perturbation..."
- Event 3:** "Numerical Methods for Large Eddy Simulation" (Hybrid, Apr 11 - Apr 15 2022). Description: "The objective of the training is twofold: firstly, to understand the fundamental principles of Large-Scale Simulations for..."

Each card includes a "Show more..." link, an "Event website" button, and social media icons for Google and Outlook.

**Figure 5: Screenshot of training registry based on the HPC in Europe portal, co-developed by FocusCoE WP4**

While the initial version of this calendar was reliant upon a third-party service (time.ly), the second half of the FocusCoE project has invested efforts to develop an independent, pan-European solution that would provide similar functionalities (see Figure 5). This involved collaboration with the PRACE-6IP [8] and EuroCC/CASTIEL projects [9], with FocusCoE working to ensure that the system being used, and the metadata being collected, remained suitable for CoE training events and their target audience. The new training registry is independent of time.ly and instead uses the HPC in Europe Portal as a central source of metadata. Further details are described in D4.2.

The HPC in Europe portal provides the central metadata aggregator that powers the integrated calendar/registry, which will need to be supported and sustained in the future beyond this FocusCoE project. Currently the portal is hosted and maintained by the PRACE-6IP project; CASTIEL also has expertise to maintain this system and currently uses the same for its registry of EuroCC training events. Hence the system will likely persist until the end of 2022 for use by the CoEs beyond the lifetime of this FocusCoE project. Beyond that time the

stakeholders (FocusCoE, PRACE and CASTIEL) have expressed to the EC that the HPC in Europe portal, among other platforms, are part of valuable pan-European infrastructure that needs continuous funding and support to be sustainable.

### ***FocusCoE Added Value***

The value of creating this pan-European HPC event registry is the consolidation of efforts and reduction of fragmentation of the EU HPC ecosystem. Additionally, working across projects during the design phase makes it easier for a tool to be sustained across numerous projects in the future. Beyond FocusCoE WP4s contribution to these consolidation and unification goals, their involvement ensured that the end product would work as well for EU HPC CoEs as for other EU HPC projects. Embedding this registry in the EU HPC CoE branded [hpccoe.eu](http://hpccoe.eu) website further guarantees that visitors to this website have the unique opportunity to access all CoE training opportunities in a central location.

#### **2.1.1.2 Technical Offerings: Codes and Software Packages Section**

During the first half of the project a web tool was designed and implemented to describe and categorise the Technological and Scientific Offerings made available by the various CoEs in terms of infrastructures, codes, and services, and make the information easily accessible to a wide range of stakeholders: industry, academic and scientific organisations, public administrations.

Tools and services offered by CoEs were classified in the following categories:

- Codes & Software Packages
- Support to Code Optimisation
- Consulting
- Code Repository
- Data Catalogues

In this section of the [hpccoe](http://hpccoe.eu) website, the visitor was provided with a description of what resources are being offered for each category, and was given access to a set of web pages where the resources are listed, described, and linked to, with contact details provided where relevant. In the first iteration, the information was primarily organised per each CoE, with each CoE listed on the left-hand side of the page, and resources on the right.

After having completed this initial setup of the Technological Offerings section of the website, interactions with the FocusCoE Project Coordinating Committee, CoE representatives, and feedback from users showed that more in-depth information on the Codes and Software currently in use and being developed by the CoEs would make a significant addition, enabling the visitor to obtain, in a single place, a more precise level of information on what the CoEs are working with as well as the direction of their research activity.

Moreover, it was also deemed useful to have a web area in which navigation is not closely linked to each CoE. In principle, a visitor does not know which CoE uses a specific code, or is active in a specific research domain.



The currently active 15 CoEs address a wide variety of subjects and use, on the whole, several dozen codes and software instruments to achieve their results. A visitor unfamiliar with the EU HPC ecosystem landing on [hpccoe.eu](http://hpccoe.eu) might have found it confusing to quickly find relevant resources among a great number of obscure names and acronyms. In order to better support potential users looking for solutions for a specific field of application, a different approach was implemented allowing visitors to browse by CoE (as before), browse by scientific-technical topic, and also to perform a full-text search on the whole set of information.

After the new design was implemented, the “Codes and Software Packages” section now offers a set of different opportunities to search for the information desired by a wider array of visitors. By navigating to the “Codes and Software Packages” page under “Technical Offerings” [10], the visitor lands on a web page in which all the current operating CoEs are listed. For each of these, a quite exhaustive list of the codes and software packages in use or under development is provided. By clicking on the code’s name, a short, concise description of what the code or tool is about and is capable of performing can be viewed. For more detailed information, the user is directed to CoE contacts or directly to the websites of CoEs and code developers. To this end, contacts and direct links to web resources of the individual CoEs are also provided (see Figure 6).

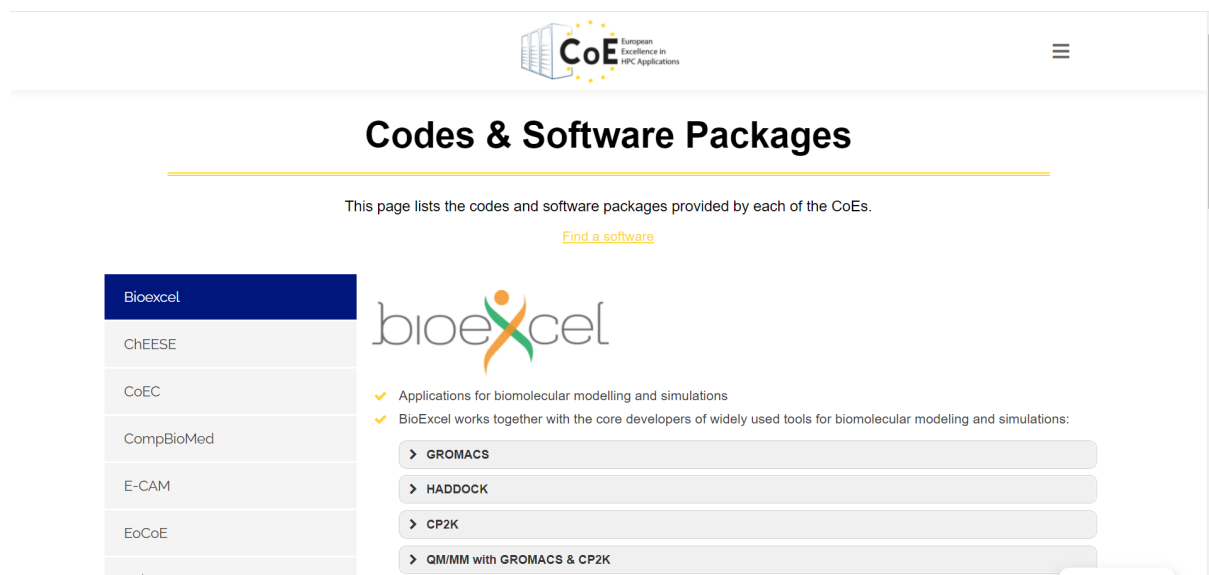
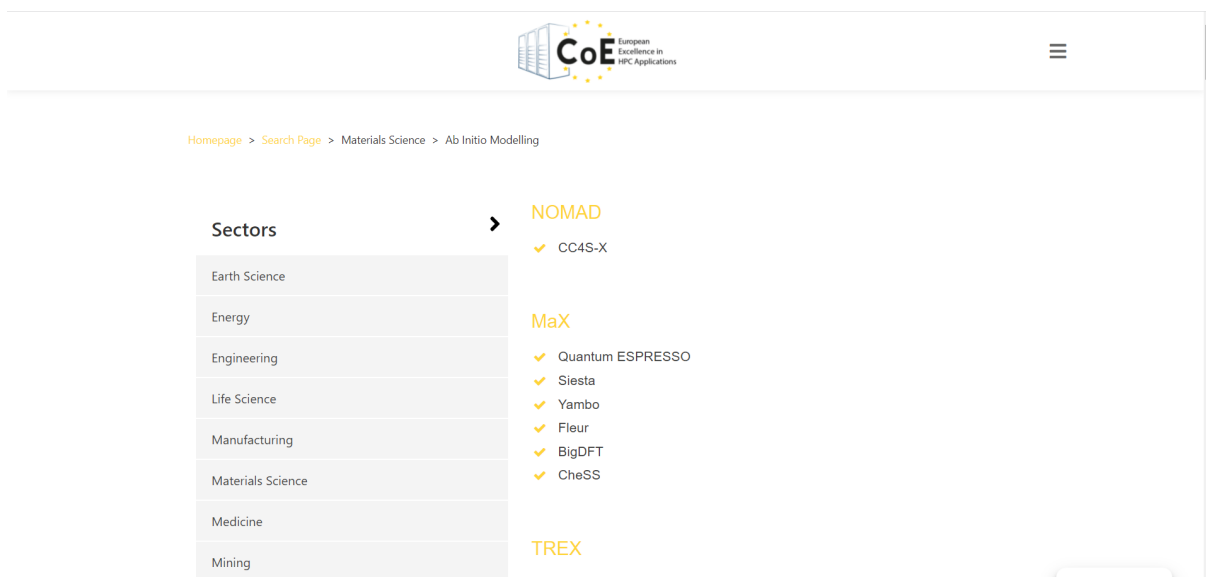


Figure 6: Codes and Software Packages page

Further tools added to the website section offer the visitor the additional opportunity to perform searches in the database. By clicking on “Find a software” a different web page is accessed in which all codes and software are classified according to a set of sectors and sub-domains [11]. Selecting a keyword from the menu yields a result highlighting all codes dealing with the topic and the CoEs operating with them (see Figure 7).



**Figure 7: Example of result of a keyword search**

In order to set up this feature, a two-tier taxonomy of Sectors and Sub-domains was set up by task 5.3, and each code and software package was labelled with these keywords. Table 1 shows the first level of the taxonomy employed, whereas the full taxonomy is available in Annex A: Sector and sub-domain taxonomy. This taxonomy does intend to be exhaustive of all the possible sub-domains pertaining to a given sector, but includes only those addressed in the CoE ecosystem.

Sector
Earth Science
Energy
Engineering
Life Science
Manufacturing
Materials Science
Medicine
Mining
Physics
Social
Software Development

**Table 1: Sector taxonomy**

Selecting a sub-domain yields all codes and software packages labelled with the chosen terms, and the usual set of information: code description, CoEs employing it, useful links, etc.

Finally, visitors can also find further results performing a full-text search on the descriptions of codes and software. Inserting a term in the search engine yields a result highlighting all codes and software packages with descriptions including the search term and the information set described before.

After the initial deployment of this new search tool, the website section was presented to the CoE representatives and corrections and suggestions for improvement were collected and implemented by task 5.3.

### ***FocusCoE Added Value***

This information area can uniquely satisfy the needs of a wide variety of visitors, and especially of companies, research institutions and public administrations that are beginning to access the world of High-Performance Computing and are not yet familiar with the EU HPC ecosystem. This tool can be a compass to guide non-expert users and point out to them which opportunities are available and with whom to get in touch within the CoE network, guiding them to the CoE web sites and contacts for fuller information.

Furthermore, the website section was set up using standard WordPress tools, and no specific code was developed, with the goal of allowing it to be easily updated and used also after the end of the FocusCoE project, e.g. by a CSA coordinating the new set of Centres of Excellence currently being launched, or by another organisation. Adding a new CoE would take approximately one day.

#### **2.1.1.3 EU HPC CoE Council (HPC3) Page**

Originally known as the General Assembly, the EU HPC CoE council (HPC3) is a forum for all active HPC CoEs which was established by FocusCoE in May 2019. The work of HPC3 covers coordination across CoEs, development of common positions in the field of HPC application research, and organisation of joint activities. The dedicated HPC3 section of [hpccoe.eu](http://hpccoe.eu) presents the history, structure, and purpose of the HPC3 [12]. In addition to a contact form, this page features the HPC3 general presentation as well as FocusCoE own content related to HPC3 organised and co-organised CoE centric workshops at events such as EuroHPC Summit Week [13].

Lastly, this page offers an additional way to access the download page for all HPC3 and FocusCoE materials such as the end of project impact brochure (see further details in section 2.1.5 Graphic Materials) [14].

### ***FocusCoE Added Value***

The added value of this section is a dedicated space on the EU HPC CoE brand website to provide concise information on the work, goals, and outputs of HPC3 with stakeholders from the broader EU HPC landscape. It also provides a direct contact point for stakeholders to reach the HPC3 with inquiries. This is particularly vital because the HPC3 will continue operation after FocusCoE project end supporting some tasks previously maintained by the project.

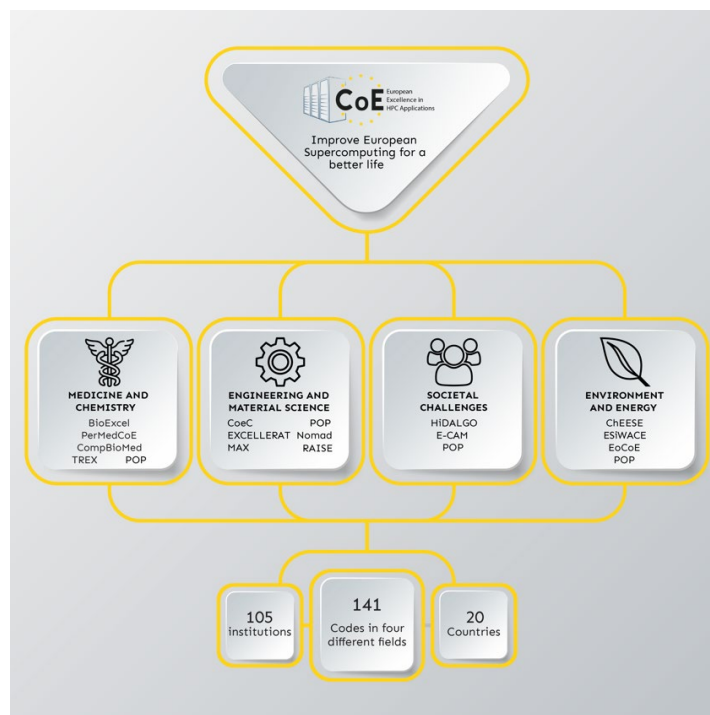
#### **2.1.1.4 FocusCoE Page**

As described in section 2.1.1 and originally in D5.3: Intermediate Strategy Revision for Communication and Dissemination and Event Management [2], the stand alone FocusCoE website no longer exists in its original form. Instead, the URL redirects to a sub-page of the dedicated CoE portal at [hpccoe.eu](http://hpccoe.eu) [15]. Most of the content such as the Success Stories, use cases, newsletter archive and subscription module, events calendar, and training registry now appears in EU HPC CoE branded sections of the website, although the content is still created by FocusCoE WP5. This change further strengthens the EU HPC CoE brand and its capacity for persistence beyond the FocusCoE project.

However, the FocusCoE “about” web page continues to provide information on the project, its activities, and the resources it provides to a variety of stakeholders [15]. It also hosts the unique HPC FAQ resource written by WP5 to address a non-technical general audience and an embedded instance of FocusCoE YouTube videos further described in section 2.1.2.

The “About” page, as well as the [hpccoe.eu](http://hpccoe.eu) main menu, also contains a link to the shared “Downloads” page where stakeholders can conveniently download graphical materials, public deliverables, and other resources produced by FocusCoE.

One asset of the downloads section is an infographic (see Figure 8) that has been created by WP5 to give an overview of the CoEs, their sectors, some figures related to the CoEs, and to explain the common goal of all HPC CoEs to a broader audience. This infographic has also been added to the website’s homepage and disseminated via the newsletter and social media accounts of FocusCoE, reaching a good resonance. Two tweets published in June and July 2021 about this infographic were ranked as top tweets of the respective months, with a total of 38 likes, 21 retweets, and 5,206 impressions). The two analogous LinkedIn posts achieved 15 reactions, 13 shares, and 324 impressions, which is a good result in consideration of the smaller community and more business-oriented nature of LinkedIn.



**Figure 8: HPC CoE Infographic**

### ***FocusCoE Added Value***

The “About,” “Downloads,” and related “contact” page provide three distinct benefits:

1. to explain the role of FocusCoE in the context of the EU Centres of Excellence and Horizon 2020 more generally.
2. to clearly summarise and link to FocusCoE own content.
3. to do both of these in non-scientific language to the benefit of stakeholders from the general public.

### **2.1.2 Social Media**

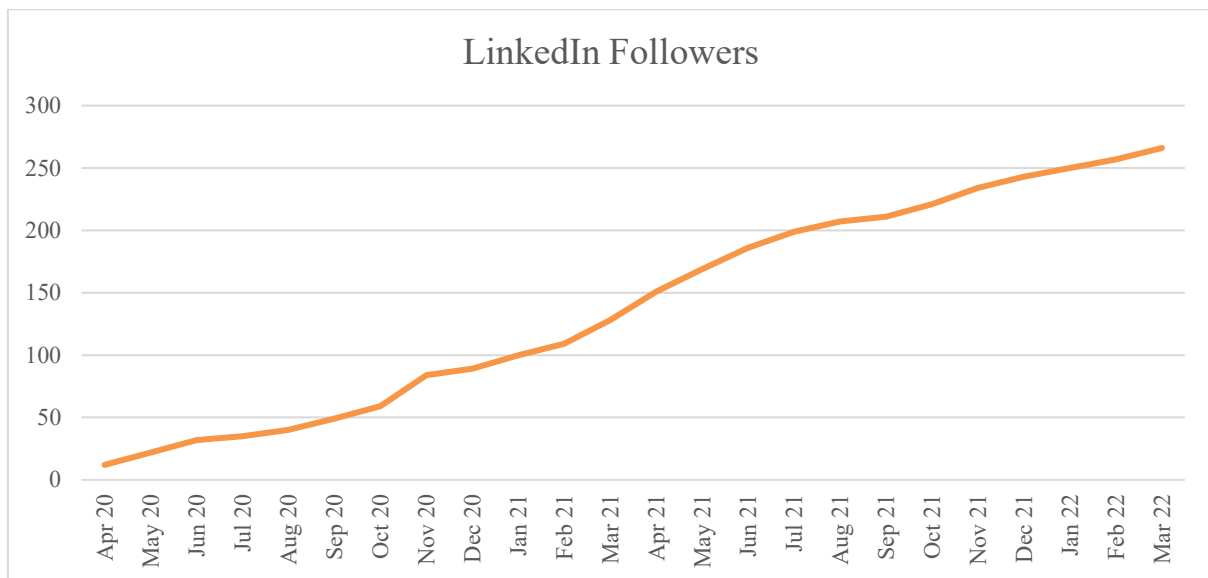
As described in D5.1 [6], the appropriate social media platforms to be used by FocusCoE were **Twitter**, **LinkedIn**, and **YouTube**. The accounts, their contents, and performance are described in the following paragraphs.

WP5 has continued managing the FocusCoE **Twitter** channel that was set up in February 2019 under the handle @FocusCoE [16]. Additionally, a **LinkedIn** company page was created in April 2020 [17] based on early project learnings and in consultation with FocusCoE WP3. The overall goals of FocusCoE’s social media presences were to:

- drive traffic to the hpccoe.eu website and the CoEs’ own accounts/websites – more than 42,000 visitors in total
- build and establish the HPC CoE brand within the EU HPC ecosystem

- show the connection and the joint goals of the HPC CoEs and to position the CoEs' activities in line with the European HPC strategy [18]
- inform stakeholders about upcoming events and encourage participation, share news of the CoEs, newsletter issues, success stories, use cases of the CoEs, and further activities
- engage and interact with the online community (HPC/EU)

Via its Twitter and LinkedIn accounts, FocusCoE has continued to support the CoEs' social media communications by liking, sharing/retweeting their content, tagging their accounts, distributing information about individual CoE activities, and posting additional content about the CoEs produced by FocusCoE. These WP5 original content contributions have taken forms such as articles about the CoEs' contributions to solving global challenges section 2.1.1), sharing sectorial events and joint activities of the CoEs (section 2.2), publishing our bi-monthly newsletters (section 2.1.3, see Figure 11 for an example), news on the [hpccoe.eu](http://hpccoe.eu) website, and publishing articles about CoE joint events e.g. the NAFEMS World Congress [19] or the joint CoEs panel at EHPCSW in March 2022 [20] (see Figure 12 for an example). FocusCoE's numbers of followers have significantly increased over the course of the project runtime, particularly since M18 (see Figure 9 and Figure 10).



**Figure 9: Evolution of FocusCoE's LinkedIn Followers**

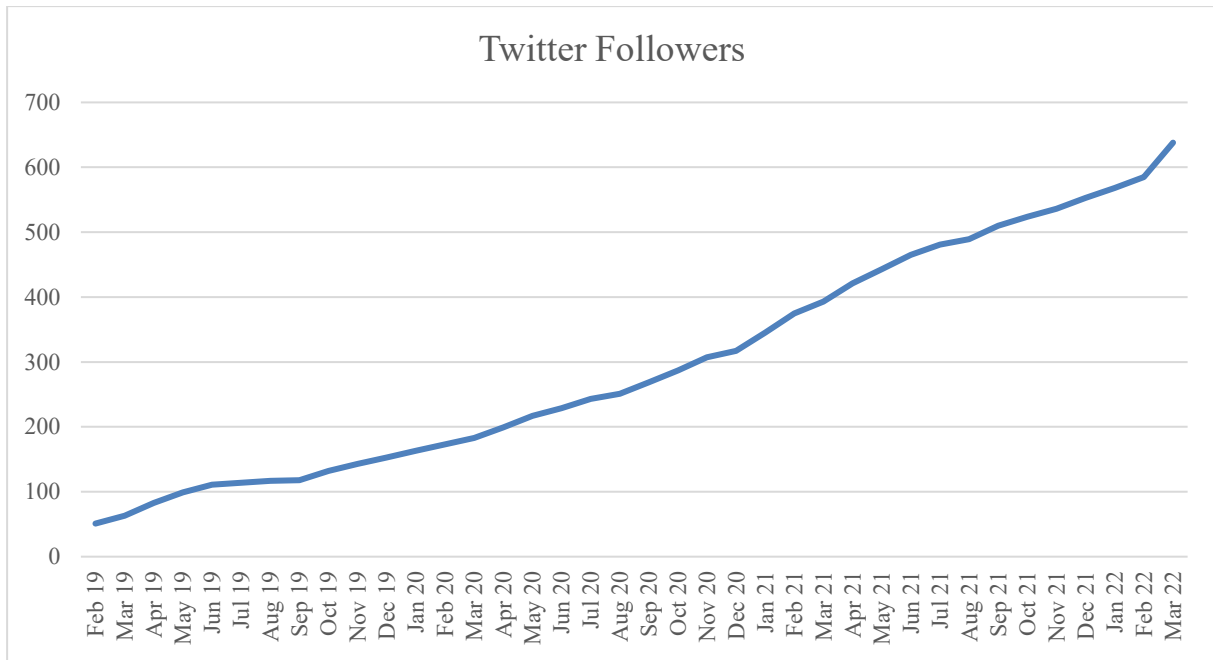
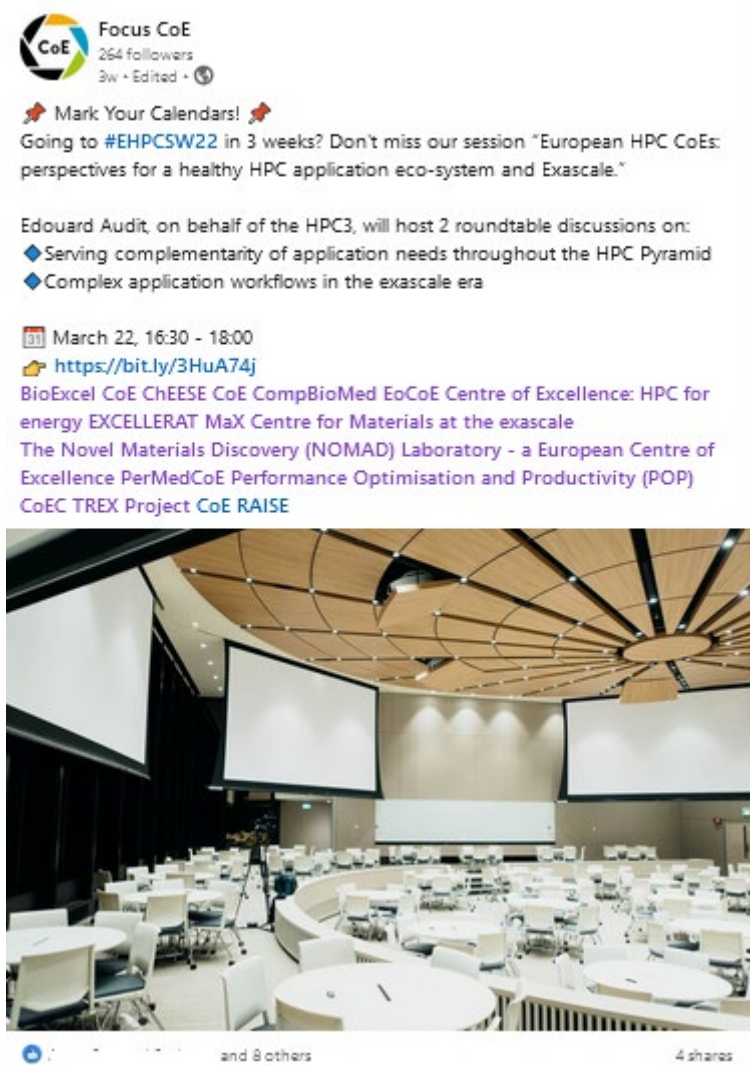


Figure 10: Evolution of FocusCoE's Twitter Followers



Figure 11: Screenshot from a Tweet Releasing Newsletter Issue #14



**Figure 12: Screenshot from a LinkedIn post announcing EHPCSW 2022**

To make best use of the CoEs’ work (LinkedIn, YouTube / video content) and their changed focus during the pandemic (e.g. more recorded webinars), FocusCoE developed a strategy which was continuously refined in close collaboration with the CoEs’ Communication and Dissemination contacts. For LinkedIn, this implied:

- LinkedIn Brand Ambassadors: Discussing the idea of rolling out a LinkedIn brand ambassador programme for the CoEs with their Communication and Dissemination representatives, most of the CoEs had no interest in this. As a compromise for the interested CoEs, a pilot brand ambassador article was published in collaboration with ChEESE [21]. Subsequent data analytics have been shared with CoEs to inform their future decisions on using brand ambassadors.
- Also as agreed with the CoEs, FocusCoE has investigated sectorial LinkedIn groups relevant to the CoEs, shared this “living document” list with the persons in charge of their dissemination activities [22], and encouraged them to share their content in these groups,



interact with other institutions, and establish meaningful relationships in place of FocusCoE members joining these groups themselves.

- As webinars became increasingly relevant under pandemic restrictions, all CoEs began posting both complete videos and slide decks for webinars on their own websites. As such, instead of using LinkedIn's slide share to publish a fraction of the information available, FocusCoE posted the CoE's own links to full webinar materials/videos. Posting direct links to CoE websites had the two additional advantages of directing LinkedIn traffic to CoE websites and negating any need to consider slide copyrights.

In the latter half of this project and likely in part due to the persistent Covid-19 pandemic, CoEs have increased the number of webinars and online tutorials shared on **YouTube**. The pandemic related increase in virtual events has greatly accelerated the production of online video resources. In response to this change, WP5 has maintained and restructured the FocusCoE YouTube channel [23] with continuously updated versions of the playlists (see a screenshot of the project's YouTube channel structure and its categories in Figure 13) first proposed in D5.3:

- Introductions to the CoEs: General information explaining the purpose / focus of CoE research (11 videos)
- Tutorials: CoE online tutorials (combination of saved existing playlists from CoEs and added own playlists, 5 playlists with a total of 102 videos)
- Webinars: CoE recorded webinars (saved existing playlists from CoEs, 4 playlists and a total of 22 videos)
- Uploads: Own videos for the FocusCoE Webinar "Opportunities and Challenges for Industrial Applications" in February 2020, HPC CoE Technical Workshop in January 2021, and the Intel oneAPI Workshop FocusCoE organised for the CoEs in March 2022 (a total of 27 videos)
- The Centres of Excellence: A saved list of the YouTube channels of those 11 CoEs who have a YouTube account
- Channel information: General information about FocusCoE and links to the website and other social media accounts of the project

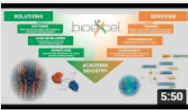

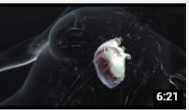
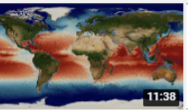


FocusCoE has continued to encourage CoEs to promote their work to the general public via videos that would also appeal to a wider non-scientific audience. To this end, the YouTube playlist of existing general information videos was shared with all CoEs as examples of best practices in communicating with a general audience. Furthermore, WP5 offered support to CoEs with developing storyboards and a concept for attractive, engaging, and informative video clips. Most CoEs outsourced video production (or had good in-house support), thus little support from WP5 was necessary.

ÜBERSICHT VIDEOS PLAYLISTS KANÄLE KANALINFO

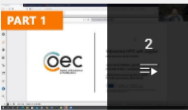

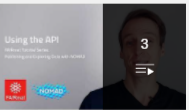

### Introductions to the CoEs

ALLE WIEDERGEHEN



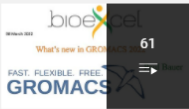
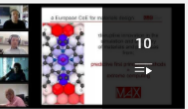

This playlist is a collection of videos produced by the European Centres of Excellence in High-Performance Computing (HPC CoE). The videos focus is on explaining the CoE's work and purpos...

 5:50	 1:23	 6:21	 11:38	 4:00	 2:00
<b>Presenting BioExcel: A central hub for biomolecula...</b> BioExcel CoE 755 Aufrufe · vor 4 Jahren	<b>ChEESE: Saving lives and mitigating the effects of...</b> BSC CNS 1268 Aufrufe · vor 2 Jahren	<b>CompBioMed Virtual Humans Film</b> Computational Biomedicine 13.767 Aufrufe · vor 4 Jahren Untertitel	<b>ESIWACE - the Centre of Excellence in Simulation of...</b> ESIWACE 1134 Aufrufe · vor 2 Jahren Untertitel	<b>EoCoE Project Movie (short version)</b> EoCoE CoE 599 Aufrufe · vor 3 Jahren	<b>EXCELLERAT: The European Centre of Excellence for...</b> BSC CNS 538 Aufrufe · vor 4 Monaten Untertitel

### Tutorials







 2	 11	 3	 8
<b>RAISE - CoE Training Course - "Interactive HPC with...</b> Focus CoE KOMPLETTE PLAYLIST ANSEHEN	<b>POP Training</b> POP HPC KOMPLETTE PLAYLIST ANSEHEN	<b>NOMAD - FAIRmat tutorials</b> Focus CoE KOMPLETTE PLAYLIST ANSEHEN	<b>Aida Virtual Tutorial 2021</b> MaX Centre eXascale KOMPLETTE PLAYLIST ANSEHEN

### Webinars

 24	 13	 61	 10	 7
<b>POP Webinars</b> POP HPC KOMPLETTE PLAYLIST ANSEHEN	<b>EoCoE HPC webinars</b> EoCoE CoE KOMPLETTE PLAYLIST ANSEHEN	<b>Webinars</b> BioExcel CoE KOMPLETTE PLAYLIST ANSEHEN	<b>MaX Webinars</b> MaX Centre eXascale KOMPLETTE PLAYLIST ANSEHEN	<b>MaX Codes - Webinar</b> MaX Centre eXascale KOMPLETTE PLAYLIST ANSEHEN

### Uploads

ALLE WIEDERGEHEN

 22:43	 1:02:27	 50:23	 16:40	 32:11	 1:02:49
<b>Intel oneAPI Workshop   A Cross-Architecture Application Debugger</b> Intel oneAPI Workshop   A Cross-Architecture... 10 Aufrufe · vor 3 Wochen	<b>Intel oneAPI Workshop   Performance Analysis Tools</b> Intel oneAPI Workshop   Performance Analysis Tools 9 Aufrufe · vor 3 Wochen	<b>Intel oneAPI Workshop   Case Study GROMACS</b> Intel oneAPI Workshop   Case Study GROMACS 13 Aufrufe · vor 3 Wochen	<b>Intel oneAPI Workshop   Performance Libraries</b> Intel oneAPI Workshop   Performance Libraries 5 Aufrufe · vor 3 Wochen	<b>Intel oneAPI Workshop   Compatibility tool for portin...</b> Intel oneAPI Workshop   Compatibility tool for portin... 5 Aufrufe · vor 3 Wochen	<b>Intel oneAPI Workshop   Heterogenous Programmin...</b> Intel oneAPI Workshop   Heterogenous Programmin... 16 Aufrufe · vor 3 Wochen

### The Centres of Excellence







 2300 Abonnenten ABONNIEREN	 1020 Abonnenten ABONNIEREN	 178 Abonnenten ABONNIEREN	 15 Abonnenten ABONNIEREN	 15 Abonnenten ABONNIEREN	 369 Abonnenten ABONNIEREN
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Figure 13: Screenshot of Focus CoE YouTube channel overview

Lastly, FocusCoE distributed a living list of all CoE social media handles and channels to help CoEs support each other's social media presences going forward [24]. This measure was particularly useful for the newest CoEs.

### ***FocusCoE Added Value***

Overall, the added value of these measures has been threefold: Firstly, to broaden awareness of each CoE's own activities especially with industrial and scientific audiences through sharing and cross-posting to FocusCoE's diverse follower base. Secondly, to raise non-scientific awareness of CoEs' activities through the YouTube playlists and Focus CoE original content that synthesises scientific progress across numerous CoEs into practical societal contributions. In combination, these measures strengthen the CoEs' position on social media and leverage the outreach potential on these platforms. Lastly, each CoE's participation in these measures has provided them with valuable experience in social media strategies and best practices, which will persist beyond project end.

### **2.1.3 Newsletter**

The objective of the newsletter was to distribute a snapshot of all CoE activities and planned events in an easily to follow and attractively designed format. With the first two newsletters published in April 2019 [25] and September 2019 [26], publication frequency has been improved following the increased rate of CoE output such that subsequent newsletters have been published on a bi-monthly basis since March 2020 [27].

In terms of dissemination, the newsletter has been shared on an ongoing basis via the following distribution channels with the addition of LinkedIn since the May 2020 newsletter:

- newsletter subscribers (subscription possible via website)
- newsletter documents shared on website in HTML format [27]
- shared via Twitter
- shared via LinkedIn

Over the course of the project, newsletter sections have been condensed in order to maintain balance among CoEs. Given that some CoEs publish news or scientific articles more or less frequently than others, combining the news and publications sections ensured better balance among CoEs in a given newsletter period. As such, newsletter sections were amended to be

- Editorial: Switching among partners from the EU HPC CoE ecosystem to provide the greetings.
- News including:
  - Call for: Papers, Workshop submissions, Birds of a Feather sessions, etc. (everything that supports the dissemination activities of each CoE)
  - Publications: scientific publications, linked to the respective CoE via logo-implementation and direct links to their websites.
  - Short News: also linked to each CoE by logo and direct links to their own websites.

- Software update releases and introductions: Although software updates were not released often enough to ensure that each newsletter would highlight new releases, this newsletter section was expanded to include short introductions to CoE codes. In this way, each bi-monthly newsletter contained two features on either an introduction to a CoE code or the announcement of a new CoE code update release. This modification had the additional value of making it possible to ensure greater balance among all CoEs instead of favouring only the CoEs whose codes were frequently updated.
- Upcoming events: comprised of trainings, conferences, workshops...

The format was switched from PDF to an HTML-based presentation (see an example in Figure 14) that allows easier and more efficient maintenance via mailing templates, as well as a tracking and subscription opportunity in line with the General Data Protection Regulation (GDPR) requirements. The opening and click rates were evaluated as excellent by the MailPoet plugin [28]. The newsletter archive as well as the online subscription module have been moved to a new location as part of the migration of FocusCoE content to the EU HPC brand [hpccoe.eu](http://hpccoe.eu) website [27].



## Contents

1. Introduction
2. News from the Centres of Excellence
3. Introducing the CoE Flagship Codes
4. Trainings, Webinars, Workshops & Events

## 1. Introduction

Dear reader,

In this issue we present [ESIWACE](#) - the Centre of Excellence in Simulation of Weather and Climate in Europe.

The Earth's climate is changing at a rate that is unprecedented in at least the last 2000 years. Earth's globally averaged near-surface air temperature is already about 1.1 degrees warmer than during the pre-industrial era, and we are certain that the warming will continue. How will this influence our local weather, in particular the amount and distribution of extreme weather conditions and thus our lives and our economy?

New tools are needed to answer those questions. We are confident that a new class of weather and climate models, so-called Storm Resolving Models (SRM), will enable a step change in our ability to simulate the effects of climate change down to regional scales. These new models have computational grids with a mesh size of 3km or less, which is much finer than the grids of traditional climate models, and allows for a better and more physical representation of atmospheric and oceanic circulation systems. SRM will be an indispensable element of the Digital Twins of the Earth to be implemented within the [EU's Destination Earth initiative](#).

Storm and Cloud Resolving Models will only become possible with Exascale Computing. A central objective of ESIWACE is to prepare European flagship codes for the upcoming EuroHPC supercomputers. This does not only include the model code itself, but also dealing with the associated data deluge and complex workflows.

For more information on ESIWACE and our activities visit [our website](#).

*Author: Joachim Biercamp (DKRZ), project coordinator*

**Figure 14: Screenshot of exemplary newsletter intro**

### ***FocusCoE Added Value***

The added value of the FocusCoE newsletter has mainly been to build a broader EU HPC CoE brand and community of subscribers beyond the individual industrial sectors and academic target audiences of each CoE. This included in particular the contribution to informing the HPC ecosystem of bundled news from all CoEs. The links available in the newsletter issues aimed to generate further traffic to the CoEs' websites and dedicated activities, e.g. event subscription. Overall, gathering news, (training) events, and code updates, enabled FocusCoE to highlight commonalities of the CoEs, outline cross-CoE collaboration, and to reflect a balanced image of all Centres of Excellence.

## 2.1.4 Success Stories and Use Cases

The three booklets initially described and planned in the Grant Agreement were not printed in reaction to in-person gathering restrictions related to the Covid-19 pandemic. The Year 1 booklet, focussing on CoE Services, was designed as a classical PDF brochure [29] and incorporated into the downloads section of hpccoe.eu. The first booklet (see Figure 15) gathered all services offered by the CoEs based on the taxonomy developed in D5.2 [30] that defined seven service categories. Each CoE was presented according to their respective offerings in those categories.



**Figure 15: Cover of the Service Booklet**

Based on the growing experience with the digital environment, WP5 in conjunction with WP3 decided to more naturally directly incorporate the second and third booklets into the hpccoe.eu website: As part of the measures adopted to ensure viability of the year 2 and year 3 booklets in a virtual environment, both use cases [31], which describe a new application of HPC technology and success stories [32], which describe the achievements and impact of specific HPC implementations were published on the CoE portal website under the “Impact” menu alongside “Innovations” [33]. Moreover, success stories and use cases have also been published in the bi-monthly newsletters and disseminated on FocusCoE social media channels.

It would be easy to think that the two digital booklets will have limited use and benefits to CoEs with a return to in person events. However, with the established EU HPC CoE brand and associated logos, creating small printed materials such as bookmarks or even goodies such as lens cleaners that link to the digital booklets via a QR code would require minimal effort on behalf of the HPC3 or a potential subsequent CSA. These QR code graphic materials would then also have the capacity for always being up to date with the latest success stories or use cases because the website can continue being updated and the QR code will continue to work as long as the URL does not change.

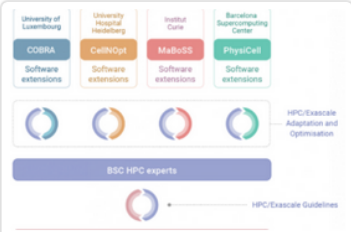
Overall, the digital year 2 and 3 booklets on use cases and success stories have had far greater reach than would have been possible in a printed form under pandemic restrictions. See Annex B for an overview on the success stories and Annex C for a list of use cases. The success stories (including the overview page) achieved a total of 746 visits, and the use cases (including the overview page) 1,203 visits.

### ***FocusCoE Added Value***

Furthermore, publishing the use cases and success stories digitally on the EU HPC CoE website has the added benefit of minimising the effort necessary to add new content on an ongoing basis after project end. For a representative example of both the Use Case and Success Story overview pages, see a screenshot of the overview page for success stories in Figure 16. The reasons for this minimised effort are twofold. First, the EU HPC CoE website's online success story and use case templates are organised similarly to templates used by many other CoEs websites, such that stories can be quickly ported to the EU HPC CoE branded site to diversify readership. Secondly, the digital template can be far more flexible with character limits than a printed equivalent, which is limited by page sizes and layout. Therefore, CoEs have the ability to both broaden dissemination of their use cases and success stories by cross-publishing on the EU HPC CoE website and save the effort of ensuring that content fits a predefined page size. Overall, CoEs thereby experience a net increase of dissemination and decrease of effort as compared to print distribution, especially after FocusCoE project end.

# Success Stories

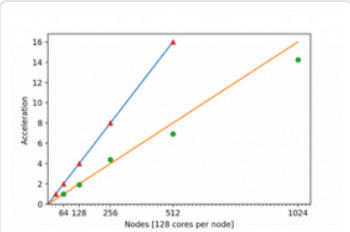
Each of the success stories below is a summary of a successful experiment that has been conducted within one of the HPC CoE projects and one or more partners from industry, society and / or science. The summary focuses on the business benefits resulting from the experiment.



**POP and PerMed Centers of Excellence are Getting Cell-Level Simulations Ready for Exascale**

POP and PerMed Centers of Excellence are Getting Cell-Level Simulations Ready for Exascale Collaboration of CoEs workflow Success story # Highlights: Industry sector: Computational biology Key codes used: PhysiCell Keywords:


[» Read More](#)



**Excellerat: Bringing industrial end-users to Exascale computing: An industrial level combustion design tool on 128K core**

Excellerat Success Story: Bringing industrial end-users to Exascale computing: An industrial level combustion design tool on 128K cores CoE involved: Strong scaling for turbulent channel (tri) and rocket engine simulations

[» Read More](#)



**Excellerat: Enabling High Performance Computing for Industry through a Data Exchange & Workflow Portal**

Excellerat Success Story: Enabling High Performance Computing for Industry through a Data Exchange & Workflow Portal CoE involved: Success story # Highlights: Keywords: Data Transfer Data Management Data Reduction Automatisations,

[» Read More](#)

Figure 16: Screenshot of the success stories overview page



## 2.1.5 Graphic Materials

In the first half of this project WP5 supported and strengthened the European HPC CoE brand by developing the brand's initial design as described in D5.1 [6], and associated print materials (poster template, roll-up) that could be distributed at in-person conferences, workshops, and other events. However, with the transition to virtual events in March 2020, printed material no longer provided the desired support to CoEs. In response, FocusCoE pivoted to creating digital materials that could be distributed in the new virtual environment. As an example, WP5 created a visual element (see Figure 17) that could be used as a background for presenters at virtual conferences and workshops (e.g. for GoToMeeting, Zoom, and Webex). In addition, as described in section 2.2, FocusCoE concentrated on organising and participating in online events. Therefore, the focus of graphic materials was directed towards these. A template for social media visuals to announce events was designed and applied to all relevant events (see Figure 18). In addition, graphic materials for virtual booths (banners, informative PDFs, visual elements) that several CoEs participated in under the roof of FocusCoE (WP3), like CAE Conference 2020 and NAFEMS World Congress 2021, were created in line with the requirements of the conferences' organisers and the CoEs' wishes and provided by WP5. For a wider communication of the participation in virtual events, WP5 also developed visual content (video from virtual booths, screenshots or adjusted recordings) from these events for use on behalf of FocusCoE and the CoEs themselves on social media(see D3.4 for details [34]).

WP5 also supported WP3 in the designing of two best practice booklets on 1) physical events and 2) online events. These booklets were promoted on social media and are available along with many of the earlier documents for download in PDF-format on the “downloads” section of the [hpccoe.eu](http://hpccoe.eu) website [14]. As some events return to the in-person environment and others remain virtual, CoEs will be able to conveniently access whichever documents best fit their needs in a given situation.




**Figure 17: HPC CoE background for virtual conferences**



Figure 18: Example of social media visual for a virtual event

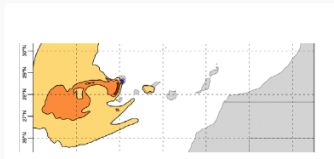
Lastly, WP5 supported the HPC3 and WP2 in the creation of the impact brochure “European HPC Centres of Excellence – Supporting European Science, Industry & Society” (see Figure 21), directed towards the layperson and highlighting all of the 15 CoEs’ most impactful, comprehensive outcomes. Together with WP2, WP5 was responsible for developing a template to be filled by the CoEs and for editing the texts and images the CoEs’ provided, especially to make them understandable and relatable to the target audience. In addition, WP5 created a graphical concept and layouted the final texts, images, title and end page of the brochure. This brochure is disseminated via the [hpccoe.eu](http://hpccoe.eu) sub-page “Impact”[5].

# CHEESE



**THE MISSION**  
Earthquakes, landslides, tsunamis and volcanic eruptions (“geohazards”) pose a threat of widespread damage or loss of property and life. What if we could predict where coast needs to be evacuated, fast enough before the Tsunami reaches the beach? One key aspect is to use “urgent computing” approaches in order to deliver the planning support in time for effective mitigation actions to be implemented.  
The aim of Center of Excellence in Solid Earth (ChEESE) is to prepare key applications for geohazard predictions to get ready for that job. One of the core ChEESE examples is the prediction of volcanic ash dispersal, which helped local authorities during the outbreak on La Palma 2021.

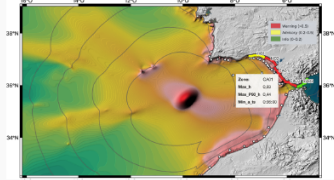
**CORE ACTIVITIES**  
ChEESE works with 10 key geohazard codes forming the core of 12 pilot demonstrators for several geohazard challenges. Multiple layers of parallelism are exploited (details being thread parallelism combined with task parallelism and in conjunction with vectorization and fine-grained parallelism for use of accelerators) and at the same time, the possibilities or constraints of memory hierarchies, interconnects and input-output features are taken into consideration. Generally, the TRL of those demonstrators is increased, to be applicable for production use. Pilot Exascale Demonstrators are tested on Exascale hardware prototypes.



The ChEESE volcanic ash forecast PD running on MareNostrum 4 computes the circulation of the ash in the atmosphere and the gases emitted by the volcano in the hours and days after the eruption.

**THE CHALLENGE**  
In order to be ready for urgent computing, application codes and the related workflows have to be able to effectively exploit Europe’s current and future leading supercomputers – pre-Exascale and later Exascale. In order to keep the longer-term application code maintenance and development manageable, performance portability needs to be considered: the expectation is that future supercomputing systems will employ a variety of heterogeneous architectures and the Geohazard flagship codes must run effectively on as many of these as possible. This entails the solution of many technical challenges, including the adaptation of the software (and potentially also the algorithms implemented) to ensure effective use of the hierarchical and in many cases heterogeneous computer architectures; extending the software stacks required to deliver the workflows needed by Geohazard analysis and prediction services. A key aspect to enable this is collaboration with the other European HPC ecosystem actions in the sense of co-design encompassing application possibilities and needs.

**ACHIEVEMENT / KEY RESULTS**  
ChEESE’s service on urgent computing was used during the Cumbre Vieja volcano eruption on La Palma Island in the Canary Islands (September to December 2021). Using the MareNostrum 4 supercomputer based in the Barcelona Supercomputing Center, ChEESE was able to cover a number of possible eruption scenarios. With the resulting forecast information, local authorities could make informed decisions such as rerouting flights that might be affected by volcanic ash, as well as implementing confinement orders based on the air quality. Another success story is ChEESE’s live demo of its pilot demonstrator on Faster Than Real-Time (FTRT) Tsunami Simulations, which was coordinated between Instituto Geográfico Nacional (IGN), the Spanish Tsunami Warning Center and ChEESE partners from the University of Málaga.  
Using ChEESE flagship code Tsunami-HySEA, the FTRT workflow was performed in the framework of a real TEWS environment using the computational resources of the Tier-0 MARCONI100 supercomputer. This, together with post-processing, also in real time, made it possible to provide alert levels in coastal segments and automatic message generation, what represents a great advance that National Tsunami Warning Centers could incorporate in order to make better and more supported decisions.



Tsunami warning map obtained from the results of the 125 simulations performed by including variability in the parameters of the seismic source model from the reference scenario. Forecast points and target areas are colored by alert level.

**GET IN TOUCH WITH US**

- » Website: [cheese-coe.eu](http://cheese-coe.eu)
- » Twitter: [CHEESE CoE](https://twitter.com/CHEESE_CoE)
- » LinkedIn: [CHEESE CoE](https://www.linkedin.com/company/cheese-coe)

Figure 19: Example from FocusCoE impact brochure

## ***FocusCoE Added Value***

The benefit FocusCoE provided with developing a graphical concept and implementing it by creating several graphic materials was that, from a bird's eye perspective, FocusCoE could create a common EU HPC CoE brand and make sure that it represented all of the CoEs in a uniform, recognisable way, e.g. at joint events or for inter-CoE collaborations that would later be disseminated. This underlined the unique connection between the CoEs towards the general EU HPC environment and the more general public. Providing templates to the CoEs furthermore supported them in their own communication and dissemination activities, as they could simply adapt these templates to their own needs.

### **2.1.6 Media Relations**

At the beginning of the project, a first press release which generated two press clippings was distributed. Aligned with the strategy to focus on the CoE brand as originally described in D5.3 section 2.1 [1], the project FocusCoE itself has since concentrated more on its function as a Coordination and Support Action, for example by supporting CoE exhibitions at events or building out the HPCCOE website and brand, as detailed above. With the further optimization of the FocusCoE LinkedIn industry group outreach strategy developed in close communication with CoEs, FocusCoE has also pivoted to supporting media relations more indirectly through its original content like the articles directed at the general public, which synthesize the work of various CoEs on the key social challenges such as Covid-19 and climate change.

Nevertheless, additional press clippings continued to be generated throughout the project. Ultimately, we anticipate that press coverage will culminate with the end of project press release, which should enable FocusCoE to meet the original press clipping targets while simultaneously elevating press awareness of the EU HPC CoEs who were supported.

Table 2 is an overview of all media coverage that included FocusCoE.

<b>Source</b>	<b>Link</b>
Garnnews	<a href="https://www.garnnews.it/la-voce-della-comunita-20/673-focuscoe-al-via-progetto-per-una-rete-di-eccellenza-nel-supercalcolo-in-europa">https://www.garnnews.it/la-voce-della-comunita-20/673-focuscoe-al-via-progetto-per-una-rete-di-eccellenza-nel-supercalcolo-in-europa</a>
e-Infrastructure reflections Group News Magazine Spring 2019	<a href="http://e-irg.eu/documents/10920/12770/e-IRG+Magazine+2019-1+Print+version+%2820+Mbyte%29.pdf#page=41">http://e-irg.eu/documents/10920/12770/e-IRG+Magazine+2019-1+Print+version+%2820+Mbyte%29.pdf#page=41</a>
Corriere Comunicazioni	<a href="https://www.corrierecomunicazioni.it/tech-zone/horizon-2020-il-supercomputer-europeo-fa-networking-enea-in-campo/">https://www.corrierecomunicazioni.it/tech-zone/horizon-2020-il-supercomputer-europeo-fa-networking-enea-in-campo/</a>
Il Denaro	<a href="https://www.ildenaro.it/enea-focuscoe-rete-decellenza-supercalcolo-europa/">https://www.ildenaro.it/enea-focuscoe-rete-decellenza-supercalcolo-europa/</a>
Il Messaggero	<a href="https://www.ilmessaggero.it/economia/news/ict_al_via_progetto_per_rete_di_supercalcolo_in_europa-4348600.html">https://www.ilmessaggero.it/economia/news/ict_al_via_progetto_per_rete_di_supercalcolo_in_europa-4348600.html</a>
Corriere Nazionale	<a href="https://www.corrierenazionale.it/2019/03/03/supercalcolo-europa-unisce-le-forze-con-focuscoe/">https://www.corrierenazionale.it/2019/03/03/supercalcolo-europa-unisce-le-forze-con-focuscoe/</a>
Primeur Magazine	<a href="http://primeurmagazine.com/weekly/AE-PR-04-19-79.html">http://primeurmagazine.com/weekly/AE-PR-04-19-79.html</a>
InSide Magazine	<a href="https://online.fliphtml5.com/jlbvy/keab/#p=6">https://online.fliphtml5.com/jlbvy/keab/#p=6</a>
SNAM	<a href="https://www.snam.it/en/Media/energy-morning/20190304_1.html">https://www.snam.it/en/Media/energy-morning/20190304_1.html</a>
Controluce	<a href="https://www.controluce.it/notizie/ict-al-via-progetto-per-una-rete-di-eccellenza-nel-supercalcolo-in-europa/">https://www.controluce.it/notizie/ict-al-via-progetto-per-una-rete-di-eccellenza-nel-supercalcolo-in-europa/</a>

Il Sole 24 Ore	<a href="https://www.ilsole24ore.com/art/ecco-supercomputer-che-prevede-cambiamenti-climatici-e-l-inquinamento-AB5EPQcB?refresh_ce=1">https://www.ilsole24ore.com/art/ecco-supercomputer-che-prevede-cambiamenti-climatici-e-l-inquinamento-AB5EPQcB?refresh_ce=1</a>
Teleborsa	<a href="https://www.teleborsa.it/News/2019/03/08/ict-al-via-progetto-per-rete-di-supercalcolo-in-europa-123.html#.XvC03GgzaUk">https://www.teleborsa.it/News/2019/03/08/ict-al-via-progetto-per-rete-di-supercalcolo-in-europa-123.html#.XvC03GgzaUk</a>
I-com.it	<a href="https://www.i-com.it/2019/11/03/intelligenza-artificiale-italia/">https://www.i-com.it/2019/11/03/intelligenza-artificiale-italia/</a>
HPCwire	<a href="https://www.hpcwire.com/off-the-wire/prace-and-icei-fenix-join-forces-to-service-european-researchers/">https://www.hpcwire.com/off-the-wire/prace-and-icei-fenix-join-forces-to-service-european-researchers/</a>
Cordis News	<a href="https://cordis.europa.eu/article/id/428617-how-eu-projects-work-on-supercomputing-applications-to-help-contain-the-corona-virus-pandemic">https://cordis.europa.eu/article/id/428617-how-eu-projects-work-on-supercomputing-applications-to-help-contain-the-corona-virus-pandemic</a>
Scientific-computing.com	<a href="https://www.scientific-computing.com/feature/developing-skills-hpc">https://www.scientific-computing.com/feature/developing-skills-hpc</a>
Top500.org	<a href="https://www.top500.org/news/prace-software-strategy-for-european-exascale-systems/">https://www.top500.org/news/prace-software-strategy-for-european-exascale-systems/</a>
Corrierenazionale.it	<a href="https://www.corrierenazionale.it/2021/06/03/supercomputer-progetto-textarossa/">https://www.corrierenazionale.it/2021/06/03/supercomputer-progetto-textarossa/</a>
Agendadigitale.eu	<a href="https://www.agendadigitale.eu/cultura-digitale/il-software-matematico-cose-e-tutte-le-sfide-della-ricerca-sui-supercalcolatori/">https://www.agendadigitale.eu/cultura-digitale/il-software-matematico-cose-e-tutte-le-sfide-della-ricerca-sui-supercalcolatori/</a>

**Table 2: List of clippings**

As an additional outreach activity, not strictly towards the press, WP5 supported the annual ETP4HPC Handbook of European HPC Projects [35] with text and graphic contributions to a project page in the section “Centres of Excellence in computing applications”, with annual updates from 2019 until 2021.

Furthermore, FocusCoE presented CoEs with the idea of editing the Wikipedia article, “Supercomputing in Europe” [36] with information about the Centres of Excellence, which was supported by all CoEs in order to expand their online presence. See Figure 20 for the Wikipedia article before the edits made by FocusCoE. To that end, FocusCoE submitted an initial set of updates that provided the first mention of CoEs in the article and highlighted the scope of CoE work as well as both scientific and real-world benefits already produced by CoEs. Given the rigorous standards of the Wikipedia editorial board, especially for revisions submitted by an institutional account, the success of WP5 edits is notable. The edits shown in Figure 21 will additionally serve as a foundation for any future edits and is a vital first step in updating EU HPC information on this platform widely used by the general public. This alternate measure directly addresses the soft cognitive communication goal from D5.1 of raising awareness of the importance of HPC applications for society, science, and industry.

#### Pan-European HPC organisation [\[ edit \]](#)

There have been several projects to organise supercomputing applications within Europe. The first was the [Distributed European Infrastructure for Supercomputing Applications](#) (DEISA). This ran from 2002–2011. The organisation of supercomputing has been taken over by the Partnership for Advanced Computing in Europe (PRACE).

From 2018-2026 further supercomputer development is taking place under the [European High-Performance Computing Joint Undertaking](#) within the Horizon 2020 framework.

#### High performance computing tiers [\[ edit \]](#)

PRACE provides “access to leading-edge computing and data management resources and services for large-scale scientific and engineering applications at the highest performance level”.<sup>[11]</sup> PRACE categorises European HPC facilities into 3 tiers: tier-0 are European Centres with petaflop machines, tier 1 are national centres, and tier 2 are regional centres. PRACE details that they have 7 tier-0 systems: [Marconi](#) (Italy), [Hazel Hen](#) (Germany), [JUQUEEN](#) (Germany), [SuperMUC](#) (Germany), [Piz Daint](#) (Switzerland), [CURIE](#) (France), and [MareNostrum](#) (Spain).<sup>[11]</sup>

**Figure 20: Wikipedia Article on Supercomputing in Europe before FocusCoE edits**

## Pan-European HPC organisation [\[ edit \]](#)

There have been several projects to organise supercomputing applications within Europe. The first was the [Distributed European Infrastructure for Supercomputing Applications](#) (DEISA). This ran from 2002–2011. The organisation of supercomputing has been taken over by the [Partnership for Advanced Computing in Europe](#) (PRACE).

From 2018-2026 further supercomputer development is taking place under the [European High-Performance Computing Joint Undertaking](#) within the [Horizon 2020](#) framework. Under Horizon 2020, European HPC Centres of Excellence are being funded to promote Exascale capabilities and scale up existing parallel codes in the domains of renewable energy, materials modelling and design, molecular and atomic modeling, climate change, global system science, and bio-molecular research <sup>[1]</sup> <sup>[12]</sup>.

In addition to advances being shared with the HPC research community such as the "Putting the Ocean into the Center" visualization <sup>[13]</sup> <sup>[14]</sup> and progress on the "Digital Twin" that is already being used to run in silico clinical trials <sup>[15]</sup> <sup>[16]</sup>, EU countries are already beginning to directly benefit from work done by the Centres of Excellence under Horizon 2020: In summer 2021, software from a European Centre of Excellence was used to forecast ash clouds from the La Palma volcano <sup>[17]</sup>. Additionally, EU Centres of Excellence are providing support throughout the Covid19 pandemic creating models to guide policy makers, expediting the discovery of possible treatments, and generally facilitating the sharing of research data during the race to understand the corona virus <sup>[18]</sup> <sup>[19]</sup> <sup>[20]</sup>.

**Figure 21: Wikipedia Article on Supercomputing in Europe after FocusCoE edits**

### *FocusCoE Added Value*

The added value of FocusCoE media relations is that through press coverage, a diverse audience to all of the CoEs regardless of their sector can be drawn. Similar to other activities, the tight relationship between FocusCoE and the EU HPC CoE brand ensures that anyone reading about FocusCoE gets exposure to the EU HPC CoE brand and has the opportunity to learn about CoE activities outside of the reader's sector or original interest. Lastly, this increases the CoEs' overall visibility and the readers' awareness for them.

## **2.2 Events**

The objective of this task was to promote the participation of the CoEs in various events related to the HPC ecosystem. A total of 185 events were published on the events calendar including HPC-related events, CoE specific events, and sectorial events [37]. This task was done in collaboration with WP3. Unlike the training calendar in section 2.1.1.1, this calendar has been manually maintained by task 5.2 and served as a reference for the CoEs when looking for potential dissemination or networking opportunities. Due to the Covid-19 outbreak, the strategy for events has been to attend online events instead of physical ones.

WP5 further encouraged all CoE dissemination leaders to annually participate in other project related events such as the EuroHPC Summit Week, PRACE booths at ISC/SC conferences or HiPEAC events by sending them the call for participations or contributions by email and Slack, as well as explaining the added value for the CoEs of participating in those particular events. In addition, the WP5 event task leader encouraged in a few occasions various CoEs to organise a joint workshop such as, for example, the joint event organised for the HiPEAC2021 conference titled "HPC CoE services and applications" [38] where six CoEs participated actively followed by a transversal panel about Co-design. The recorded session on the HiPEAC YouTube channel was also viewed by 78 interested visitors and promoted on FocusCoE social media channels [39].





**Figure 22: HiPEAC workshop organised by FocusCoE**

With regards to ISC2021, the CoEs were offered the opportunity to give short talks on the online booth of PRACE [40]. Six CoEs participated: EXCELLERAT, ChEESE, RAISE, TREX, POP, and EoCoE. A similar strategy was used at SC21 [41], where PerMedCoE and EXCELLERAT were active on this occasion. As discussed with the CoEs at several Communication and Dissemination Teleconferences, WP5 continued to focus on supporting digital events. Rather than organising an additional webinar series, WP5 planned the participation in existing events, as this was the CoEs' preference.

During the European HPC Summit Week 2022 [20], on Tuesday 22 March 2022 FocusCoE hosted a session titled "European HPC CoEs: perspectives for a healthy HPC application ecosystem and Exascale"[42] involving most of the CoEs. Although all CoEs were interested in participating, the enduring pandemic situation did not allow for all of the representatives to travel to the in-person event in Paris. More information can be found in the associated news article [43].



**Figure 23: EuroHPC Summit Week 2022**

The following table shows a list of events for which FocusCoE organised participation of the CoEs:

Event	Intention	When	Where	Status
HPC CoE Workshop	Internal Workshop	February 2019	Frankfurt, DE	Successfully organised
EOSC-hub week	Presentation	April 2019	Prague, CZ	Successfully held
EuroHPC Summit Week 2019	Workshop	May 2019	Poznan, PL	Successfully organised
Teratec Forum	Industry Outreach	June 2019	Palaiseau, FR	Attended
HPC Training Stakeholder Workshop 1	Workshop	October 2019	Brussels, BE	Attended
BioFit	Industry Outreach	December 2019	Marseille, FR	Attended
European HPC Training Stakeholder Workshop 2	Workshop	March 2020	Porto, PT	Targeted
CAE2020	Industry Outreach	December 2020	Online	Attended
Hannover Messe	Industry Outreach	April 2020	Hannover, DE	Removed from the WP3 list of events following COVID-19 & the repeated postponements by the organiser (event replaced by NAFEMS in October 2021)
Expoquimia	Industry Outreach	June 2020	Barcelona, ES	Removed from the WP3 list of events following COVID-19 & the repeated postponements by the organiser (event replaced by AI4EU webcafe in March 2022)
HiPEAC conference 2021	Workshop	January 2021	Online	Successfully organised
Thematic webinar about „Opportunities and Challenges for Industrial Applications“	Thematic webinar for Industry Outreach	February 2021	Online	Successfully organised
European Materials	Industry	March 2021	Online	Attended

Modelling Conference	Outreach			
Thematic webinar during HiPEAC Spring sessions 2021	Thematic webinar for Industry Outreach	May 2021	Online	Successfully organised
SIMAI	Industry Outreach	September 2021	Hybrid (Parma, IT + online)	Attended
European Sustainable Energy Week	Industry Outreach	October 2021	Online	Attended
NAFEMS	Industry Outreach	October 2021	Online	Attended
Medica2021	Industry Outreach	October 2021	Online	Attended
Enlit2021	Industry Outreach	December 2021	Online	Interaction with organiser and CoEs information registered in the event database
AI4EU web cafe	Industry Outreach	March 2022	Online	Successfully organised
European HPC Summit Week 2022	Workshop	March 2022	Paris, FR	Successfully organised

**Table 3: Events with engagement from FocusCoE**

### ***FocusCoE Added Value***

The added value of these activities is twofold. Maintaining the calendar and providing various event reminders or recommendations lowered the barriers and activation energy needed by CoEs to finding and participating in relevant events. The subsequent communication support via the FocusCoE slack channels and social media also helped to maximise event impact by boosting awareness of the event beyond the CoEs directly involved. This combined with the work of WP3 significantly reduced the logistical burdens of event participation for CoEs while enhancing each event's reach.



## 2.3 Communication Performance Evaluation via KPIs

In order to measure and evaluate the communication and dissemination actions of this WP, a set of KPIs was defined in D5.1 [6]. Their final status in M40 is shown in Table 4:

Tool	Communication activities	KPI target	Status M40
<b>Publication</b>	Newsletter issues	12	15
	Newsletter subscribers	100	120
	Booklet editions (CoE Services, Use cases, Success stories)	3	3
<b>Events</b>	Presence at sectorial industrial events (organised by WP3 with WP5 support)	8-10	11 (incl. 2 webinars)
	Number of training events for CoEs organised by WP4*	3-4	6
	No. of participants per training event (avg.)*	25	32
	Total no. of participants (synthesised <sup>1</sup> )*	100	219
<b>Social Media</b>	Number of followers on Twitter	750	640
	Average engagement rate on Twitter	1%	1.9%
	Number of followers on LinkedIn	N/A	269
<b>Website</b>	Number of visitors / year	10,000	15,000
	Total number of visitors (synthesised)	33,333	42,920
<b>Media Relations</b>	Press Clippings	20	19

**Table 4: Status of FocusCoE communication KPIs**

With more than 260 posts, FocusCoE's LinkedIn account achieved a total of more than 34,000 impressions, 269 followers, and an average engagement rate of 5.7% despite only being added to the project in April 2020. Posts that performed best included the newsletter releases, own content from hpccoe.eu that was promoted via LinkedIn (e.g. Codes & Software Packages page, news articles, list of innovations by the CoEs), major events (and announcements) that involved several CoEs, and posts that showed practical applications of the CoEs' codes. Throughout the project runtime (counting from the relaunch of the website in June 2020), LinkedIn was in 6<sup>th</sup> place of the top referral pages that visitors of the hpccoe.eu website came from. This means that LinkedIn was one of the drivers of our website's traffic.

FocusCoE's Twitter account released more than 640 tweets (more than 1,450 including retweets) in total with over 475,000 impressions overall and an average engagement rate of 1.9%. Achieving an engagement rate twice as high as initially set in the KPIs underlines that the followers interacted a lot with the content provided by FocusCoE and was thus relevant for the Twitter community. The account achieved 640 followers. This means that, despite the slight deviation from the target of 750, both social media accounts have a combined number of 909 followers. The qualitative analysis of FocusCoE's tweets results in a trend that is mostly in line with the LinkedIn posts, although several kinds of posts dealing with events

<sup>1</sup> Not part of the original KPIs, but synthesised from existing KPIs for better comparison.

\* These KPIs are originally from WP3 and WP4, but WP5 has contributed to their dissemination.

(announcements, promotion, reports) were part of the top tweets in almost all months, with the events organised by FocusCoE performing best. Twitter held 3<sup>rd</sup> place of the top references to the hpccoe.eu website. Thus, Twitter was driving the website traffic even more than LinkedIn.

Despite the initial deviation from D5.1 regarding the frequency of newsletter publication, the subsequent increase in results produced by CoEs made it possible to surpass our KPI target value and publish 13 newsletters in 36 months. Furthermore, two additional newsletters were published during the project extension for a total of 15 newsletters in the project's 40 months.

Since the first set of success stories were prepared in collaboration with WP3, 6 additional success stories have been published for a total of 9 in the final year of the project, achieving a total of 746 visits. Additionally, a total of 24 use cases have been published since December 2020 with 1,205 visits in total.

## **2.4 Tools for Internal Communication**

At the Focus CoE project internal level, communication for WP5 has been facilitated both by Work Package 5 bi-weekly meetings and Work Package 1 provided email lists. Moreover, WP5 also cultivated direct communication channels among Focus CoE and all 15 CoEs via Slack and bi-monthly Communication and Dissemination Teleconferences with CoE communication and dissemination representatives.

### **2.4.1 Slack**

As described in deliverable 5.3 [1], a workspace of the web-based instant messaging provider Slack [44] has been set up to establish a direct link between all CoEs. Main use cases include the easy exchange of messages, news, and announcements, the agile assembling of group chats, and the exchange of files between the project partners.

Slack offers a number of clear benefits in comparison to mailing lists, namely being faster, more transparent, and more flexible. With regard to communication and dissemination, it has proven most useful as a back-up to more traditional email communications. With regards to collaboration, it has often been the quickest way to reach some partners. Although not all the registered persons from the CoEs are regular users of the tool, it is still highly preferred and effective with a meaningful subset of users because of its brevity and immediacy. Additionally, the Slack workspace would require minimal resources to maintain, which could easily be taken over by other CoE representatives after FocusCoE project end. It could, therefore, be an excellent tool for sustaining communication and collaboration between CoEs beyond this project.

### **2.4.2 Bi-Monthly Communication and Dissemination Teleconferences**

Following the project mid-term review, communication with the CoE representatives was intensified. In addition to the communication channels discussed before, regular bi-monthly

Communication and Dissemination meetings were used for exchange with the CoE communications and dissemination contacts. Their purpose was primarily to update CoEs on the progress of Work Package 5 activities, and ask for their feedback, as well as their opinion on and buy-in for new ideas. They have also provided a unique opportunity for real-time multi-CoE group discussions with WP5 on how to best fulfil changing CoE needs, which facilitated a more agile support.

### 3 Outlook and Conclusion

The first year of this project was dedicated to the definition of strategy and its set-up, establishing and extending the internal and external communication tools, and implementing CoE feedback from the FocusCoE organised EU HPC workshop: namely to strengthen the promotion of the independent EU HPC CoE brand. Almost immediately in year two, FocusCoE, along with all other CoEs, then had to prioritise pivoting to entirely virtual environments for an indeterminate length of time. In the last year of this project, those strategic changes have held FocusCoE activities and capacity for support in good stead as the Covid-19 pandemic has continued disrupting in-person events.

An overview of the submitted deliverables can be found in Table 5.

Number	Title	Due	Status
D5.1	Initial Strategy for Communication, Dissemination and Innovation and Event Management	PM 3	Submitted
D5.2	Report on the proposed information system to support dissemination and outreach	PM 9	Submitted
D5.3	Intermediate Strategy Revision for Communication and Dissemination and Event Management	PM 14	Submitted
D5.4	Intermediate Innovation Management Report	PM 18	Submitted
D5.5	Final Innovation Management Report	PM 40	To be submitted
D5.6	Final Report on Communication, Dissemination and Innovation and Event Management	PM 40	To be submitted

**Table 5: Overview of deliverables in WP 5**

FocusCoE has created an EU HPC CoE brand with online resources capable of remaining active and relevant to CoEs after project end. Furthermore, the online resources can be seamlessly maintained by successor initiatives like a CSA regardless of their scope and structure specifically because of the independence of the EU HPC brand. For the immediate future, HPC3 will continue operations and provide coordinating support via these existing tools. Later on, the original FocusCoE content such as the cross CoE articles on Covid-19 and Climate Change response, the FAQ webpage, and impact brochure will serve as a firm basis

and model to ongoing and future CoEs for reaching out to a broad and not necessarily technical audience.

The hpccoe.eu domain is paid for through February 2023. The training registry and the powerful codes and software packages web area can be maintained as described in sections 2.1.1.1 and 2.1.1.2. Sections 2.1.4 and 2.1.5 explain how the existing use case and success story pages can be leveraged to boost online and in-person dissemination of ongoing CoE activities. In fact, the combination of a continuously updated website and QR code linked to a stable URL would provide a formerly impossible form of continuously updated graphic material for the return to in-person events.

Lastly, the knowledge and experience gained from participating in FocusCoE communication and dissemination activities will persist in the institutional memory and practices of all 15 CoEs supported by FocusCoE over the last 40 months. The FocusCoE produced live online lists of CoE relevant groups on LinkedIn and all CoE social media handles has increased the CoEs' capacity to leverage these online tools to support themselves and each other. Even the necessity of moving inter-CoE communication online with tools such as Slack (section 2.4.1), has set the precedent for collaboration on communication and dissemination tasks in the absence of face-to-face meetings. Therefore, EU HPC Centres of Excellence will benefit from tools and experience that make their communication and dissemination strategies more resilient and versatile in the future.

## 4 References

- [1] “Deliverable 5.3: Intermediate Strategy Revision for Communication and Dissemination and Event Management.” Project month (resubmitted: -10-20 2020).
- [2] “Deliverable 5.5: Final Innovation Management Report.” Project month 40.
- [3] “How EU projects work on supercomputing applications to help contain the corona virus pandemic.” <https://www.hpccoe.eu/2020/12/07/how-eu-projects-work-on-supercomputing-applications-to-help-contain-the-corona-virus-pandemic/> (accessed Feb. 18, 2022).
- [4] “Mitigating the Impacts of Climate Change: How EU HPC Centres of Excellence Are Meeting the Challenge.” <https://www.hpccoe.eu/2022/03/25/mitigating-the-impacts-of-climate-change-how-eu-hpc-centres-of-excellence-are-meeting-the-challenge/> (accessed Mar. 25, 2022).
- [5] “Impact.” <https://www.hpccoe.eu/impact>
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## Annex A: Sector and Sub-domain Taxonomy

Sector	Sub-domain
<b>Earth Science</b>	Weather and Climate Modelling
	Ocean Modelling
	Air Quality
	Microclimate Modelling
	Seismology
	Volcanology
	Tsunami Science
<b>Energy</b>	Wind Farms
	Fusion
	Water
	Sustainable Fuels
	Batteries
	Solar Cells
	Energy Storage
<b>Engineering</b>	Aerospace
	Automotive
	Combustion
	Wind Turbines
	Acoustics
	Uncertainty Quantification
<b>Life Science</b>	Biomolecular Simulation
	Bioinformatics
	COVID
	Drug Design
	Epidemiology
	Genomics
	Molecular Dynamics
	Proteomics
	Quantum Chemistry
	Workflows
	Electronic Structure Modelling
Cell-level Simulation	
<b>Manufacturing</b>	
	Additive Manufacturing
<b>Materials Science</b>	
	Quantum Chemistry
	Molecular Dynamics
	Electronic Structure Modelling
	Quantum Chemistry
Novel Materials	



	Ab Initio Modelling
	Quantum Mechanics
<b>Medicine</b>	
	Epidemiology
	Oncology
	Personalized Medicine
	Cardiovascular Medicine
	Neuro-musculoskeletal Medicine
	Omics
<b>Mining</b>	
	Seismic Imaging
<b>Physics</b>	
	High-energy Physics
<b>Social</b>	
	Migration
	Clean Energy
	Clean Environment
	Social Networks
<b>Software Development</b>	
	Code Coupling
	Performance Analysis
	Performance Optimization
	Scalability
	Workflows
	Ensembles
	Data & I/O
	Load Balancing
	Libraries

## Annex B: Success Stories

Release date	CoE(s)	Title	URL
		Overview page	<a href="https://www.hpccoe.eu/success-stories">https://www.hpccoe.eu/success-stories</a>
06.10.2020 (on new website)	<u>CompBioMed</u>	Drug Discovery with Janssen Pharmaceutica NV	<a href="https://www.hpccoe.eu/2020/10/06/drug-discovery-janssen-pharmaceutica-nv/">https://www.hpccoe.eu/2020/10/06/drug-discovery-janssen-pharmaceutica-nv/</a>
06.10.2020 (on new website)	EoCoE	Renewable Energy - harness the power of vorticity	<a href="https://www.hpccoe.eu/2020/10/06/industry-sector-renewable-energy/">https://www.hpccoe.eu/2020/10/06/industry-sector-renewable-energy/</a>
06.10.2020 (on new website)	E-CAM	Designing control pulses for superconducting Qubit systems with local control theory	<a href="https://www.hpccoe.eu/2020/10/06/designing-control-pulses-for-superconducting-qubit-systems-with-local-control-theory/">https://www.hpccoe.eu/2020/10/06/designing-control-pulses-for-superconducting-qubit-systems-with-local-control-theory/</a>
12.10.2020	ESiWACE	Improving weather and climate forecasting with a new NEMO configuration	<a href="https://www.hpccoe.eu/2020/10/12/coes-success-stories-focus-on-esiwace-improving-weather-and-climate-forecasting-with-a-new-nemo-configuration/">https://www.hpccoe.eu/2020/10/12/coes-success-stories-focus-on-esiwace-improving-weather-and-climate-forecasting-with-a-new-nemo-configuration/</a>
02.12.2020	MaX	AiiDA Platform Accelerates Materials Discovery	<a href="https://www.hpccoe.eu/2020/12/02/coe-success-stories-focus-on-max-coe-nccr-marvel-aiida-platform-accelerates-materials-discovery/">https://www.hpccoe.eu/2020/12/02/coe-success-stories-focus-on-max-coe-nccr-marvel-aiida-platform-accelerates-materials-discovery/</a>
19.03.2021	HiDALGO	Assisting decision makers to solve Global Challenges with HPC applications – Migration issues	<a href="https://www.hpccoe.eu/2021/03/19/hidalgo-assisting-decision-makers-to-solve-global-challenges-with-hpc-applications-migration-issues/">https://www.hpccoe.eu/2021/03/19/hidalgo-assisting-decision-makers-to-solve-global-challenges-with-hpc-applications-migration-issues/</a>
19.03.2021	HiDALGO	Assisting decision makers to solve Global Challenges with HPC applications – Covid-19 modelling	<a href="https://www.hpccoe.eu/2021/03/19/hidalgo-assisting-decision-makers-to-solve-global-challenges-with-hpc-applications-covid-19-modelling/">https://www.hpccoe.eu/2021/03/19/hidalgo-assisting-decision-makers-to-solve-global-challenges-with-hpc-applications-covid-19-modelling/</a>
23.07.2021	EXCELLERAT	Enabling High Performance	<a href="https://www.hpccoe.eu/2021/07/23/excellerat-enabling-high-performance-computing-for-">https://www.hpccoe.eu/2021/07/23/excellerat-enabling-high-performance-computing-for-</a>

		Computing for Industry through a Data Exchange & Workflow Portal	<a href="#">industry-through-a-data-exchange-workflow-portal/</a>
23.07.2021	EXCELLERAT	Bringing industrial end-users to Exascale computing: An industrial level combustion design tool on 128K cores	<a href="https://www.hpccoe.eu/2021/07/23/excellerat-bringing-industrial-end-users-to-exascale-computing-an-industrial-level-combustion-design-tool-on-128k-core/">https://www.hpccoe.eu/2021/07/23/excellerat-bringing-industrial-end-users-to-exascale-computing-an-industrial-level-combustion-design-tool-on-128k-core/</a>
28.10.2021	POP & PerMedCoE	POP and PerMed Centers of Excellence are Getting Cell-Level Simulations Ready for Exascale	<a href="https://www.hpccoe.eu/2021/10/28/pop-and-permed-centers-of-excellence-are-getting-cell-level-simulations-ready-for-exascale/">https://www.hpccoe.eu/2021/10/28/pop-and-permed-centers-of-excellence-are-getting-cell-level-simulations-ready-for-exascale/</a>

## Annex C: Use Cases

Release date	CoE	Title	URL
		Overview page	<a href="https://www.hpccoe.eu/use-cases">https://www.hpccoe.eu/use-cases</a>
21.03.2022	BioExcel	Electronic Interaction Phenomena: Proton Dynamics and Fluorescent Proteins	<a href="https://www.hpccoe.eu/2022/03/21/electronic-interaction-phenomena-proton-dynamics-and-fluorescent-proteins/">https://www.hpccoe.eu/2022/03/21/electronic-interaction-phenomena-proton-dynamics-and-fluorescent-proteins/</a>
26.07.2021	EoCoE	EoCoE: Performance Portability on HPC Accelerator Architectures with Modern Techniques: The ParFlow Blueprint	<a href="https://www.hpccoe.eu/2021/07/26/eocoe-performance-portability-on-hpc-accelerator-architectures-with-modern-techniques-the-parflow-blueprint/">https://www.hpccoe.eu/2021/07/26/eocoe-performance-portability-on-hpc-accelerator-architectures-with-modern-techniques-the-parflow-blueprint/</a>
27.04.2021	ESiWACE	ESiWACE: OBLIMAP ice sheet model coupler parallelization and optimization	<a href="https://www.hpccoe.eu/2021/04/27/esiwace-oblimap-ice-sheet-model-coupler-parallelization-and-optimization/">https://www.hpccoe.eu/2021/04/27/esiwace-oblimap-ice-sheet-model-coupler-parallelization-and-optimization/</a>
27.04.2021	ESiWACE	ESiWACE: GPU Optimizations for Atmospheric Chemical Kinetics	<a href="https://www.hpccoe.eu/2021/04/27/esiwace-gpu-optimizations-for-atmospheric-chemical-kinetics/">https://www.hpccoe.eu/2021/04/27/esiwace-gpu-optimizations-for-atmospheric-chemical-kinetics/</a>
17.03.2021	CompBioMed	CompBioMed: In silico trials for effects of COVID-19 drugs on heart	<a href="https://www.hpccoe.eu/2021/03/17/compbio-med-in-silico-trials-for-effects-of-covid-19-drugs-on-heart/">https://www.hpccoe.eu/2021/03/17/compbio-med-in-silico-trials-for-effects-of-covid-19-drugs-on-heart/</a>
17.03.2021	CompBioMed	CompBioMed: CT2S – Digital twin application for patient treatment & Bone Strength: In Silico trials solution	<a href="https://www.hpccoe.eu/2021/03/17/compbio-med-ct2s-digital-twin-application-for-patient-treatment-bone-strength-in-silico-trials-solution/">https://www.hpccoe.eu/2021/03/17/compbio-med-ct2s-digital-twin-application-for-patient-treatment-bone-strength-in-silico-trials-solution/</a>

17.03.2021	CompBioMed	CompBioMed: Strong scaling performance for human scale blood-flow modelling	<a href="https://www.hpccoe.eu/2021/03/17/compbio-med-strong-scaling-performance-for-human-scale-blood-flow-modelling/">https://www.hpccoe.eu/2021/03/17/compbio-med-strong-scaling-performance-for-human-scale-blood-flow-modelling/</a>
17.03.2021	CoEC	CoEC: Fuel atomization and evaporation in practical applications	<a href="https://www.hpccoe.eu/2021/03/17/coec-fuel-atomization-and-evaporation-in-practical-applications/">https://www.hpccoe.eu/2021/03/17/coec-fuel-atomization-and-evaporation-in-practical-applications/</a>
17.03.2021	CoEC	CoEC: Plasma assisted combustion	<a href="https://www.hpccoe.eu/2021/03/17/coec-plasma-assisted-combustion/">https://www.hpccoe.eu/2021/03/17/coec-plasma-assisted-combustion/</a>
17.03.2021	CoEC	CoEC: Detailed chemistry DNS calculation of turbulent hydrogen and hydrogen-blends combustion	<a href="https://www.hpccoe.eu/2021/03/17/detailed-chemistry-dns-calculation-of-turbulent-hydrogen-and-hydrogen-blends-combustion/">https://www.hpccoe.eu/2021/03/17/detailed-chemistry-dns-calculation-of-turbulent-hydrogen-and-hydrogen-blends-combustion/</a>
17.03.2021	ESiWACE	ESiWACE: DYAMOND intercomparison project for storm-resolving global weather and climate models	<a href="https://www.hpccoe.eu/2021/02/17/esiwace-diamond-intercomparison-project-for-storm-resolving-global-weather-and-climate-models/">https://www.hpccoe.eu/2021/02/17/esiwace-diamond-intercomparison-project-for-storm-resolving-global-weather-and-climate-models/</a>
17.02.2021	CoEC	CoEC: Prediction of pollutants and design of low-emission burners	<a href="https://www.hpccoe.eu/2021/02/17/coec-prediction-of-pollutants-and-design-of-low-emission-burners/">https://www.hpccoe.eu/2021/02/17/coec-prediction-of-pollutants-and-design-of-low-emission-burners/</a>
17.02.2021	CoEC	CoEC: Prediction of soot formation in practical applications	<a href="https://www.hpccoe.eu/2021/02/17/coec-prediction-of-soot-formation-in-practical-applications/">https://www.hpccoe.eu/2021/02/17/coec-prediction-of-soot-formation-in-practical-applications/</a>
15.02.2021	ESiWACE	ESiWACE: Optimization of Earth System Models in the path to the new generation of Exascale high-	<a href="https://www.hpccoe.eu/2021/02/15/esiwace-optimization-of-earth-system-models-in-the-path-to-the-new-generation-of-exascale-high-performance-computing-systems/">https://www.hpccoe.eu/2021/02/15/esiwace-optimization-of-earth-system-models-in-the-path-to-the-new-generation-of-exascale-high-performance-computing-systems/</a>

		performance computing systems	
12.02.2021	PerMedCoE	PerMedCoE: HPC-enabled multiscale simulation helps uncover mechanistic insights of the SARS-CoV-2 infection	<a href="https://www.hpccoe.eu/2021/02/12/permedcoe-hpc-enabled-multiscale-simulation-helps-uncover-mechanistic-insights-of-the-sars-cov-2-infection/">https://www.hpccoe.eu/2021/02/12/permedcoe-hpc-enabled-multiscale-simulation-helps-uncover-mechanistic-insights-of-the-sars-cov-2-infection/</a>
10.02.2021	EXCELLERAT	EXCELLERAT: Increasing accuracy in the automotive field simulations	<a href="https://www.hpccoe.eu/2021/02/10/excellerat-increasing-accuracy-in-the-automotive-field-simulations/">https://www.hpccoe.eu/2021/02/10/excellerat-increasing-accuracy-in-the-automotive-field-simulations/</a>
10.02.2021	ChEESE	ChEESE: Geomagnetic forecasts	<a href="https://www.hpccoe.eu/2021/02/10/cheese-geomagnetic-forecasts/">https://www.hpccoe.eu/2021/02/10/cheese-geomagnetic-forecasts/</a>
10.02.2021	ChEESE	ChEESE: Physics-Based Probabilistic Seismic Hazard Assessment (PSHA)	<a href="https://www.hpccoe.eu/2021/02/10/cheese-physics-based-probabilistic-seismic-hazard-assessment-psha/">https://www.hpccoe.eu/2021/02/10/cheese-physics-based-probabilistic-seismic-hazard-assessment-psha/</a>
10.02.2021	ChEESE	ChEESE: Faster Than Real-Time Tsunami Simulations	<a href="https://www.hpccoe.eu/2021/02/10/cheese-faster-than-real-time-tsunami-simulations/">https://www.hpccoe.eu/2021/02/10/cheese-faster-than-real-time-tsunami-simulations/</a>
05.02.2021	ChEESE	ChEESE: Probabilistic Volcanic Hazard Assessment (PVHA)	<a href="https://www.hpccoe.eu/2021/02/05/probabilistic-volcanic-hazard-assessment-pvha/">https://www.hpccoe.eu/2021/02/05/probabilistic-volcanic-hazard-assessment-pvha/</a>
05.02.2021	ChEESE	ChEESE: High-Resolution Volcanic Ash Dispersal Forecast	<a href="https://www.hpccoe.eu/2021/02/05/cheese-high-resolution-volcanic-ash-dispersal-forecast/">https://www.hpccoe.eu/2021/02/05/cheese-high-resolution-volcanic-ash-dispersal-forecast/</a>
05.02.2021	E-CAM	E-CAM: Mesoscale simulation of billion atom complex systems using thousands of	<a href="https://www.hpccoe.eu/2021/02/05/e-cam-mesoscale-simulation-of-billion-atom-complex-sys-tems-using-thousands-of-gpgpus/">https://www.hpccoe.eu/2021/02/05/e-cam-mesoscale-simulation-of-billion-atom-complex-sys-tems-using-thousands-of-gpgpus/</a>

		GPGPUS's	
05.02.2021	EXCELLERAT	EXCELLERAT: Enabling parallel mesh adaptation with Treadapt	<a href="https://www.hpccoe.eu/2021/02/05/enabling-parallel-mesh-adaptation-with-treadapt/">https://www.hpccoe.eu/2021/02/05/enabling-parallel-mesh-adaptation-with-treadapt/</a>
03.12.2020	EXCELLERAT	EXCELLERAT: Full Airplane Simulations On Heterogeneous Architectures	<a href="https://www.hpccoe.eu/2020/12/03/full-airplane-simulations-heterogeneous-architectures/">https://www.hpccoe.eu/2020/12/03/full-airplane-simulations-heterogeneous-architectures/</a>