



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 777533.

## PROviding Computing solutions for ExaScale Challenges

<b>D9.3</b>	<b>Updated DEP and market research Report</b>		
<b>Project:</b>	PROCESS H2020 – 777533	<b>Start / Duration:</b>	01 November 2017 36 Months
<b>Dissemination<sup>1</sup>:</b>	PU	<b>Nature<sup>2</sup>:</b>	R
<b>Due Date:</b>	31.01.2020	<b>Work Package:</b>	<b>WP 9</b>
<b>Filename<sup>3</sup></b>	PROCESS_D9.3_UpdatedDEPandMarketResearchReport_v1.0.docx		

### ABSTRACT

This report covers follow-up measures implemented by the PROCESS team to pave the way for the future exploitation of the project results which will be last for up to 12 months after the project lifetime, as well as the consequent generation of sustainable impacts emerging from up taking PROCESS exascale solutions:

- a) The market analysis of the High Performance Computing (HPC) space, as PROCESS targeted environment, to refine our understanding of the competitive challenges and window of opportunities for PROCESS enabled solutions. This analysis identifies the main components and behaviour of the HPC ecosystem and its players that include stage of maturity, trends shaping the competitive environment and key players' profiles.
- b) The Dissemination and Engagement Plan (DEP). It contains the strategy for dissemination and engagement with HPC ecosystem players, comprising the target groups, dissemination channels and key messages. It also defines certain KPIs to monitor the performance of such activities.
- c) D9.3 reports on how the communication channels have been leveraged as well as the dissemination actions already performed/planned.

<sup>1</sup> PU = Public; CO = Confidential, only for members of the Consortium (including the EC services).

<sup>2</sup> R = Report; R+O = Report plus Other. Note: all "O" deliverables must be accompanied by a deliverable report.

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### Document History

<b>Release</b>	<b>Date</b>	<b>Reasons for Change</b>	<b>Status<sup>7</sup></b>	<b>Distribution</b>
0.1	13.08.2019	Initial version	Draft	Consortium
0.2	28.10.2019	Structure updated	Draft	Consortium
0.3	17.12.2019	Change of focus	Draft	Consortium
0.4	30.12.2019	Incorporated details	Draft	Consortium
0.5	24.01.2020	Final draft	In Review	Consortium
0.6	29.01.2020	Implementation of review suggestions	In Review	Consortium
1.0	31.01.2020	Final Release	Released	Public

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<sup>6</sup> Typically, person(s) with appropriate expertise to assess the deliverable quality.

<sup>7</sup> Status = "Draft"; "In Review"; "Released".

## Table of Contents

Executive Summary .....	4
List of Figures.....	5
List of Tables .....	5
1 Introduction .....	6
2 Updated market analysis .....	7
2.1 Introduction.....	7
2.1.1 Key drivers for a future exascale HPC market .....	7
2.1.2 The HPC ecosystem market model .....	8
2.1.3 Current vision on the European HPC space.....	8
2.2 Major initiatives in the European HPC space .....	9
2.3 Key players in the HPC ecosystem.....	10
2.3.1 HPC centres .....	10
2.3.2 Potential users of future PROCESS solutions.....	10
2.3.3 PROCESS potential allies and/or competitors .....	11
3 Exploitation Strategy .....	14
3.1 Definition of PROCESS Legacy .....	14
3.2 Use Case lead ambassadors .....	15
3.3 SWOT Analysis .....	16
4 Dissemination and Engagement Plan (DEP) .....	17
4.1 DEP Objectives .....	17
4.2 The updated overall dissemination and engagement strategy .....	18
4.2.1 DEP Target Groups.....	18
4.2.2 Key messages to targeted audiences.....	18
4.2.3 Mapping communication channels to Target Groups.....	19
5 DEP activities .....	21
5.1 Direct marketing .....	21
5.2 Events.....	21
5.3 Online presence .....	23
5.3.1 Website strategy and framework. ....	23
5.3.2 Website results performance: .....	27
6 Ongoing Dissemination and engagement activities (third year) .....	34
6.1 Action Line 1: Engage early adopters.....	34
6.2 Action Line 2: Broaden outreach spectrum. ....	35
6.3 Action Line 3: Sustain updating and improving dissemination content in multiple online channels.....	35
7 Conclusion .....	37
Appendix.....	38
ANNEX 1: PROCESS Sister Projects Exascale update December 2019.....	38
ANNEX 2: PROCESS Dissemination activities: Nov 2017 – Nov. 2019 period.....	50
References .....	57

## Executive Summary

This report includes the second instalment of measures implemented by the PROCESS team to pave the way for the future exploitation of project results which will last up to 12 months after the project lifetime and to maximise impacts emerging from up-taking PROCESS's scalable solutions.

Along the second year of the project, work aiming at maximising impact has been centred on:

- a)** Analysing the HPC ecosystem at large, refining our understanding of the competitive challenges and windows of opportunity available for PROCESS's enabled solutions, this updated market analysis provides and refines the overview of the main components and behaviour of the HPC market (presented in D9.1 and D9.2): stage of maturity, trends shaping the competitive environment and key players profiles. These elements provide on the one hand the intelligence needed to make strategic decisions on PROCESS's value propositions and the consequent Business Model(s) and plans(s); and at a tactical level, provide key inputs to implement the project's dissemination and engagement activities
- b)** the updated Dissemination and Engagement Plan (DEP), refined, updated and implemented with the ultimate objective of promoting the uptake of project results. It contains the outreach strategy, comprising the target groups and key messages to be delivered to such audiences. It also reports on the launching of the communication channels and vehicles as well as the dissemination actions already performed in the second year of the project.

This document provides additional guidance for further market intelligence gathering, business modelling, outreach and engagement with targeted stakeholders. In turn, these tasks aim to provide insights for the validation of PROCESS results across the third year of the project lifecycle, when PROCESS outputs become available for showcasing their value beyond the consortium boundaries.

Given its nature and purpose, this deliverable is primarily aimed at a) PROCESS Work Package leaders and members of the project management board in charge of decision making related to outputs production, and b) all project team members involved in the development of the PROCESS-enabled solutions, who will be likely engaged in the exploitation of project results.

## List of Figures

Figure 1: PROCESS's market model.....	8
Figure 2: Geographical distribution of European RI .....	11
Figure 3: Guiding principles for the third year of PROCESS DEP strategy .....	17
Figure 4: The website page view before.....	24
Figure 5: The website page view after.....	24
Figure 6: Contents of the website .....	24
Figure 7: Leibniz Supercomputing Centre in Munich .....	25
Figure 8: Latest News in PROCESS Website .....	25
Figure 9: Social Media Image .....	26
Figure 10: Example of news.....	26
Figure 11: Summary of statistics.....	27
Figure 12: Geographical Analysis of Web Performance .....	27
Figure 13 the most visited page.....	28
Figure 14: Screenshot of twitter home page.....	29
Figure 15: examples of PROCESS tweets .....	30
Figure 16: PROCESS Tweet list.....	30
Figure 17: Growth of Tweet Followers.....	31
Figure 18: Growth of Impressions per Day.....	32
Figure 19: Highlighted Tweets .....	32
Figure 20: Generated Highlighted Tweets (2) .....	33

## List of Tables

Table 1: HPC related EU projects.....	11
Table 2: Exploitable assets .....	14
Table 3: Website performance KPIs .....	27
Table 4: Twitter performance KPIs .....	31

# 1 Introduction

D9.3 is an update and integration of D9.1 and D9.2 that not only contains activities in dissemination but also in exploitation. Concrete dissemination actions in both online and offline activities have been concluded in this report, for instance, the website, social media accounts activities, participation to events, organization of workshops, update of HPC ecosystem in Europe, identification of key stakeholders in HPC in science, potential exploitation of use case studies and future sustainability action lines.

D9.1 and D9.2 have laid the fundamentals at the strategic level, in D9.3 those strategies have been filled with concrete action plans, moreover, early results of use cases and communication activities have been showcased also. Especially, D9.2 issued by the WP9, updates the Dissemination and Engagement Plan, taking into the account the targeted audiences, the communication channels and the results of the first set of dissemination and engagement actions achieved during the first year of the project.

In the Dissemination Engagement Plan, we have acted accordingly with the communication strategy to identify target audience, target direct marketing contacts, potential impactful events and PROCESS use case ambassadors. Competitor analysis has also been carried out to bring out a feasible prototype adopting PROCESS technology.

The results and actionable conclusions of these analyses and planning exercises will be assessed, refined and enhanced along the third year of the project, to enrich the definition of the go-to-market strategy and Business Plans, to be delivered by the end of the project, before M36.

The methodology of this report is based upon:

- The rationale underlying the creation of PROCESS
- Preliminary findings in the early consultations done on the first two years of the project with stakeholders, related to subjects such as the competitive landscape for future deployment of exascale HPC solutions
- Participation in HPC related events (more details in DEP activities), which allowed to gather insights directly from state-of-the-art presentations and debates among top level researchers, practitioners and domain experts as well as to identify and contact key interviews in a non-aggressive environment, thus fostering discussion engagements and facilitating further contacts.
- Desk research and bibliographic analysis to look at existing experiences and extract good practices that are relevant and could be applied to future PROCESS enabled exploitation paths. These analyses covered some purely competitive marketplace operations as well as public sector (e.g. EC policies) HPC related initiatives. Desk research and bibliographic analysis techniques, mainly used to identify best practices and lessons learnt. Desk research included the collection and review of a variety of published sources such as market research reports, white papers, articles in specialised publications, policy roadmaps and prospective studies, as well as statistics, directories and market players' databases. The review of these sources established the framework for the study with a description of HPC value chain and market trends, socio-economic conditions and structures, competition and innovation mechanisms.
- Socio-economic and market modelling (from D9.1 with a revision and update for the second year of the project): profiling the players acting along the HPC value chain, identifying the roles of the market players and their interdependencies and economic behaviour. This modelling has been framed within the context of the competitive landscape defined by external factors beyond the managerial control of HPC players.

## 2 Updated market analysis

*“European supercomputing infrastructure represents a strategic resource for the future of EU industry, SMEs and the creation of new jobs.”*

Mariya Gabriel, Commissioner for Digital Economy and Society

### 2.1 Introduction

According to HPC Wire report in 2019, during Hyperion Research's HPC market update session at the ISC19 conference, the industry analyst firm announced it has increased its five-year forecast to reach \$44 billion (€39 billion) in 2023, compared with the prior forecast of \$39 billion (€35 billion) for that year.

The updated market research and its exponentially increased value provided PROCESS with new significance in its market exploitation. Relevant tasks performed during the second year of the project aimed at:

- 1) Justify the relevance of PROCESS market analysis (in D9.1)
- 2) PROCESS solutions developed are potentially to be up taken and provide value to early adopters.

#### 2.1.1 Key drivers for a future exascale HPC market

HPC, comprising both computing and extreme/big data service terms, is deemed as a strategic resource for those societies engaging in the emerging global data economy. The dramatic increase in the amount and variety of Big Data creates new possibilities for sharing knowledge, carrying out research, doing business and developing public policies. Applications of HPC technologies are growing countless and citizens are already benefiting from them in their everyday life in sectors like health care, weather, clean energy and cybersecurity.

This is also key to ensuring that scientists reap the full benefits of data-driven science. Big industry as well as innovative SMEs are increasingly relying on the power of supercomputers to work on innovative solutions, reduce costs and decrease time to market for products and services. Finally, HPC allows/empowers governments/policymakers to develop new policies and better decision making improving the competitiveness of the economic tissues and the welfare of citizens and society as a whole. Regarding future development, **exascale class computing is recognised as the next step in the development of HPC capacities.**

These drivers have been recognised by the major economic and political blocks around the globe: USA, Japan, China, the BRIC and the EU have created their own policies, strategies and investment programmes to fight in the global race/battle/competition to become leading forces in the next generation -exascale- HPC space. While Europe has made substantial progress and built strengths for the development of its HPC ecosystem in the last few years, a recent study by the European Investment Bank<sup>8</sup> identified a relevant set of weaknesses that the EU must strategically address both to become (as politically declared) a global leading market force and to be able to seize unique opportunities around the next generation HPC. PROCESS is in a privileged position to become a net contributor to such endeavour.

<sup>8</sup> Financing the future of supercomputing. How to increase investments in high performance computing in Europe. European Investment Bank Advisory Services. 2018

### 2.1.2 The HPC ecosystem market model

To support market analyses, we defined a market model to depict the structure and key relationships inside the HPC market value chain. This model helps us to clarify who the players to be involved/engaged by DEP activities should be, as well as the relevant relationships and focal points or market gaps. The PROCESS market model is highlighted in Figure 1 below:

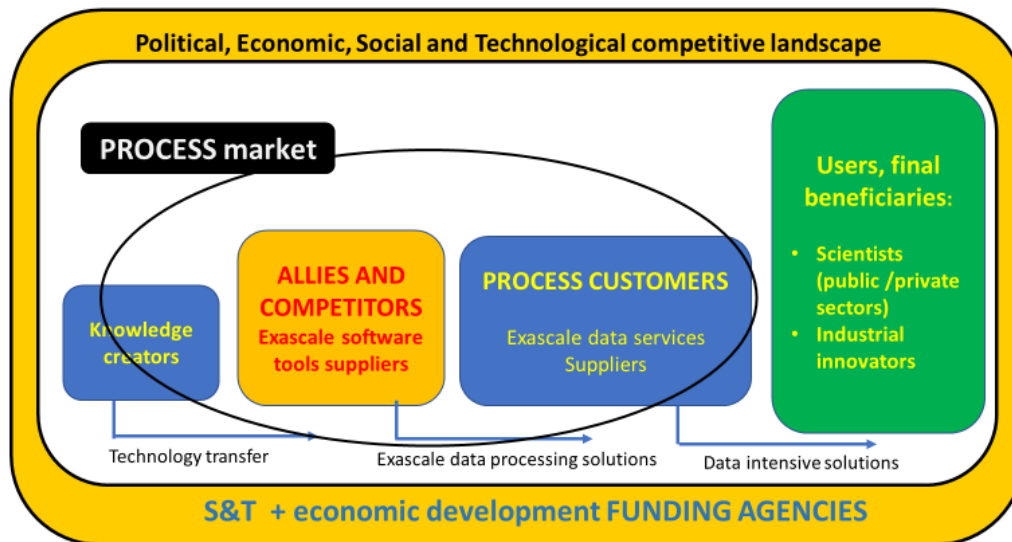


Figure 1: PROCESS's market model

The basic description of the model components is the following:

- The Political, Economic, Socio-cultural and Technological competitive landscape represents the combinations of external factors - the so-called PEST factors - shaping the creation and evolution of a market. The analysis of these macro-environment variables or Market Shaping Forces is a pre-requisite for establishing the contextual framework for the analysis of the HPC market. The future evolution of landscape trends and facts will largely shape the context for PROCESS's market opportunities.
- The Demand side: those who will potentially acquire and deploy exascale solutions in their organizations.
- The Supply side of the market: Companies and institutions offering technical, and particularly ICT-based solutions addressing one or more exascale challenges.

The current nature and dynamics of the relationships among these market model components are key for identifying windows of opportunity for developing a portfolio of services based upon the project's outputs, as described in the following sections.

### 2.1.3 Current vision on the European HPC space

Europe is a leading force in the use of HPC applications, but it has limited supercomputers in the global top 10, only Leibniz Supercomputing Centre (LRZ) ranked the 9<sup>th</sup> in Top 500 and Swiss National Supercomputing Centre (CSCS) ranked the 6<sup>th</sup>. USA and China are dominating the world leading supercomputers both in quality and quantity. As a result, European knowledge creators and innovators are increasingly using supercomputers outside the EU, which leads to important risks in terms of access, data protection, cybersecurity, and data privacy.

Europe's HPC landscape is driven by the public sector in terms of offering, usage and funding:

- The majority of HPC capacity and utilisation is installed at universities or academic research centres, whereas a minor portion serves commercial purposes and/or HPC end users. On the other hand, private and commercially oriented HPC providers are less common in Europe. The strong competition, particularly from US-based companies such as Amazon Web Services, Google and Microsoft, has left a relatively small landscape of European players offering HPC capacities on a commercial basis.
- Demand for HPC capabilities is rapidly increasing in key sectors of the European economy, but overall impact is still low. HPC commercial users are mainly large corporations who apply HPC to reduce research and development costs by simulating prototypes of new products instead of physically building and testing them. A number of these commercial users cooperate closely with academia, using academic HPC infrastructure and partly co-developing software solutions. But the vast majority of industrial players (the SMEs) are not reaping the benefits offered by HPC.
- Most EU HPC centres are attached to scientific research institutions and academia, predominately led by research interests and focused on the public good of scientific discovery. Their financing hinges on public subsidies with very limited commercial revenue streams. Overall, however, the industrial outreach of academic HPC centres is partly curtailed by the centres' statutory funding limitations.
- HPC use and application is visible across the European big industry, but not among SMEs. HPC has become a stable component of business processes, particularly within certain industrial sectors such as automotive, aerospace, defence, bio-sciences and environmental/renewable energy. The business case behind industrial HPC use is relatively clear-cut. Its main purpose is to upgrade companies' R&D processes and reduce the time to market of innovations.
- Presently, the HPC sector in Europe is largely being financed by national budgets, university funds/grants and through significant support from EU funds.

## 2.2 Major initiatives in the European HPC space

According to the initial market analysis done in the former deliverable, USA, Japan and China have taken a lead ahead in HPC technology development. Moreover, China claims to be the first country to implement HPC exascale technologies in the upcoming 18 months. To lessen this gap with acute competitors across the world, Europe has to synergise different initiatives in HPC technology to be able to excel in the future. It is also important to elaborate how PROCESS can benefit from the following ecosystem.

- Leverage the European HPC Funding Scheme. PRACE is the European HPC infrastructure for science that runs calls for academic projects to be executed in its network of supercomputing resources across Europe. It also runs an HPC programme for SMEs called SHAPE - SME HPC Adoption Programme in Europe. ETP4HPC is the HPC industry-led think tank. The CoEs are projects that consolidate the European HPC applications expertise.
- Take advantage of cPPP in exploitation and gather more fund for implication. Technology and the Applications pillar of the ecosystem form a contractual Public-Private Partnership (cPPP) with the EC. The declared objective of the cPPP is the development of European HPC technology and applications. The cPPP monitors the implementation of the European HPC strategy and its board meets twice a year. It serves as a forum in which the stakeholders involved have an opportunity to discuss this process with the EC and exchange mutual commitments.
- Follow closely the European HPC Technology Roadmap that delivered by a European HPC Technology Platform, which is now ETP4HPC.
- Explore opportunities for another funding by exploring the 700 Euro million committed to the development of HPC technology and applications within the Horizon 2020 programme.

- Contribute to realise the ambition of EuroHPC Joint Undertaking (JU), an initiative set up by Member States and the EC committing to the delivery of European world-class HPC systems. The target is to have at least two pre-exascale computers by 2020 and to reach full exascale performance by 2023. The objective is also to define testbeds for HPC and big data applications that make use of these supercomputers for scientific, public administration and industrial purposes.
- ESCO European Open Science Cloud. With the adoption of the Digital Single Markets strategy on 6 May 2015, the Commission announced the launch of a cloud for research data – the 'research open science cloud'. The 'European Open Science Cloud' aims to create a trusted environment for hosting and processing research data to support EU science in its global leading role.

## 2.3 Key players in the HPC ecosystem

PROCESS is focused on helping key players in the new data-driven ecosystem. It comprises top-level HPC centres, e-infrastructures and big data centres scientific communities and companies with mission-critical extreme scale data challenges.

In the former deliverable, the consortium has identified three groups of key stakeholders to engage with. We have carried out the following activities in the second period of the project:

- Identify HPC centres that lead the use of supercomputers and try to engage with them to install PROCESS enabled software and extreme data management solutions.
- Research Technology Centres that have research infrastructure and can be final users.
- Other European Commission project to strengthen the ecosystem dynamics in exascale class HPC capabilities. We have identified a wide set of related projects such as EUHPC-JU, ETP4HPC, COEs, etc, as potential early adopters of the technology, and started contacts with some of them.

### 2.3.1 HPC centres

The European landscape for HPC centres is largely dominated by publicly owned entities, mainly serving universities and research, and relying on public funding for both capital and operational expenditures. The main financial challenge for these players is the limited propensity towards commercially oriented models, and legal restrictions on increasing revenues from commercially oriented activities. As an initial round of identification of key members of this target group, we have extracted the European (in the wide sense) based HPC sites out of the Top500 listing (as per November 2019). A total of 76 Supercomputer centres have been found, 3 more than 2018. There are 40 being of a mainly scientific and academic nature while the other 36 are linked to industry. The latter belong to flagship corporations such as Atos, EDF, Total, BASF, ENI and Volvo, other non-identified Software companies (19 sites), manufacturing firms (4) and financial institutions (3) across Europe.

### 2.3.2 Potential users of future PROCESS solutions

A first group of potential users of services based on PROCESS exascale solutions is formed by the 1,000+ Europe based Research Infrastructures (RI) and their related research communities.

To address this vast and scattered group of stakeholders, we take advantage of the EU funded MERIL project, led by the European Research Foundation. MERIL has created a portal where currently 1,023 European RI (See figure 2) are mapped and are easily searchable and visualised. Inclusion in the MERIL database is not limited by size or profile, with the portal covering high quality facilities that provide access to European and international users. This can include from specialised university laboratories and historical archives to biobanks and experiments at large establishments such as CERN, home of the Large Hadron Collider.

## D9.3 Updated market analysis

The MERIL database relies on accurate information provided by all eligible research infrastructures across a wide range of scientific disciplines. Therefore, collaboration from research infrastructures to update information is very important for MERIL success as a useful source of information.

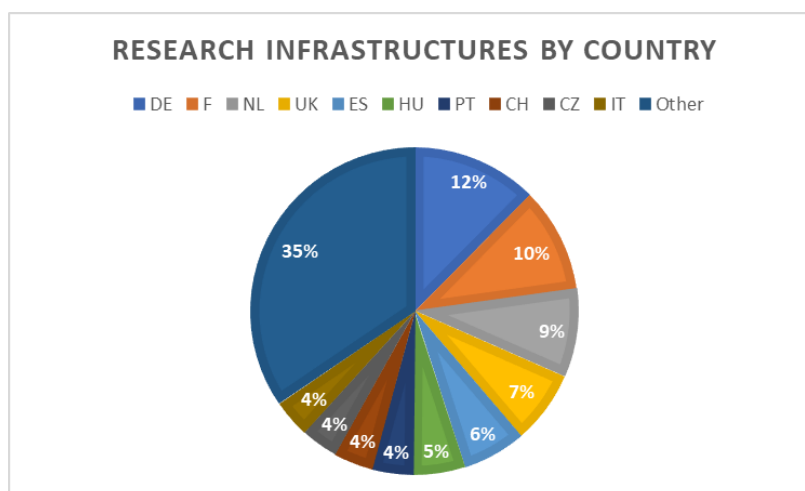


Figure 2: Geographical distribution of European RI

### 2.3.3 PROCESS potential allies and/or competitors

Since the beginning of the project, the range of HPC-related projects funded by the EU were identified as a very important component of PROCESS' competitive landscape, whether as potential competitors or as allies (see Table 1). Contacts have already begun, like workshops and other events (see Section 5.2, "Events"). An obvious first group of potential allies and competitors to PROCESS proposed exascale solutions comprises the projects (and their members) of the wide array of projects co-funded by the EU in relation with HPC. Out of different sources (e.g. CORDIS, ETP4HPC) we have identified 50+ projects materializing the political drive of the EC to promote the HPC and more specifically the exascale build up to speed up the expansion of the European HPC ecosystem (See Table 1).

Table 1: HPC related EU projects

ACRONYM	PROJECT TITLE
AARC2	Authentication and Authorisation for Research and Collaboration
AENEAS	Advanced European Network of E-infrastructures for Astronomy with the SKA
AGINFRA PLUS	Accelerating user-driven e-infrastructure innovation in Food Agriculture
ASPIDE	exAScale ProgramIng models for extreme Data procEssing
BioExcel	Centre of Excellence for Biomolecular Research
COEGSS	Center of Excellence for Global Systems Science
CompBioMed	A Centre of Excellence in Computational Biomedicine
DARE	Delivering Agile Research Excellence on European e-Infrastructures
DEEP	Designing and Enabling E-infrastructures for intensive Processing in a Hybrid DataCloud
E-CAM	An e-infrastructure for software, training and consultancy in simulation and modelling
eInfraCentral	European E-Infrastructure Services Gateway
e-IRGSP5	e-Infrastructure Reflection Group Support Programme 5
EoCoE	Energy oriented Centre of Excellence for computer applications
EPEEC	European joint Effort toward a Highly Productive Programming Environment for Heterogeneous Exascale Computing
e-ROSA	Towards an e-infrastructure Roadmap for Open Science in Agriculture

### D9.3 Updated market analysis

ACRONYM	PROJECT TITLE
ESCAPE-2	Energy-efficient SCalable Algorithms for weather and climate Prediction at Exascale
ESiWACE	Excellence in SImulation of Weather and Climate in Europe
EVER-EST	European Virtual Environment for Research - Earth Science Themes
EXA2PRO	Enhancing Programmability and boosting Performance Portability for Exascale Computing Systems
ExaQUte	EXAscale Quantification of Uncertainties for Technology and Science Simulation
EXDCI-2	European eXtreme Data and Computing Initiative - 2
FREYA	Connected Open Identifiers for Discovery, Access and Use of Research Resources
HIRMEOS	High Integration of Research Monographs in the European Open Science infrastructure
MSO4SC	Mathematical Modelling, Simulation and Optimization for Societal Challenges with Scientific Computing
MuG	Multi-Scale Complex Genomics
NoMaD	The Novel Materials Discovery Laboratory
OpenAIRE2020	Open Access Infrastructure for Research in Europe 2020
OpenAIRE-Advance	OpenAIRE Advancing Open Scholarship
OpenAIRE-Connect	OpenAIRE - CONNECTing scientific results in support of Open Science
OpenDreamKit	Open Digital Research Environment Toolkit for the Advancement of Mathematics
OpenRiskNet	OpenRiskNet: Open e-Infrastructure to Support Data Sharing, Knowledge Integration and in silico Analysis and Modelling in Risk Assessment
OPERAS-D	Design for Open access Publications in European Research Areas for Social Sciences and Humanities
PhenoMeNal	PhenoMeNal: A comprehensive and standardised e-infrastructure for analysing medical metabolic phenotype data
PPI4HPC	Public Procurement of Innovative Solutions for High-Performance Computing
PRACE-5IP	PRACE 5th Implementation Phase Project
RDA Europe 4.0	The European plug-in to the global Research Data Alliance
READ	Recognition and Enrichment of Archival Documents
RECIPE	REliable power and time-ConstraInts-aware Predictive management of heterogeneous Exascale systems
RI Impact Pathways	Charting Impact Pathways of Investment in Research Infrastructures
UBORA	Euro-African Open Biomedical Engineering e-Platform for Innovation through Education
VECMA	Verified Exascale Computing for Multiscale Applications
VESTEC	Visual Exploration and Sampling Toolkit for Extreme Computing
VI-SEEM	VRE for regional Interdisciplinary communities in Southeast Europe and the Eastern Mediterranean
VRE4EIC	Virtual Research Environment
West-Life	World-wide E-infrastructure for structural biology
XDC	eXtreme DataCloud
ALLScale	Exascale Programming, Multi-objective Optimisation and Resilience Management Environment
ANTAREX	AutoTuning and Adaptivity appRoach for Energy efficient eXascale HPC systems
DEEP-EST	DEEP - Extreme Scale Technologies
ECOSCALE	Energy-efficient Heterogeneous Computing at exaSCALE
EuroEXA	Co-designed Innovation and System for Resilient Exascale Computing in Europe
ExaFLOW	Enabling Exascale Fluid Dynamics Simulations

### D9.3 Updated market analysis

ACRONYM	PROJECT TITLE
ExaHyPE	An Exascale Hyperbolic PDE Engine
ExaNeSt	European Exascale System Interconnect and Storage
ExaNoDe	European Exascale Processor Memory Node Design
INTERTWINE	Programming Model INTERoperability ToWards Exascale
Mont-Blanc 3	European scalable and power efficient HPC platform
NEXTGenIO	Next Generation I/O for Exascale
NLAFET	Parallel Numerical Linear Algebra for Future Extreme-Scale Systems
READEX	Runtime Exploitation of Application Dynamism for Energy-efficient eXascale computing
Sage2	Percipient Storage for Exascale Data Centric Computing2

### 3 Exploitation Strategy

PROCESS has the ambition to help enable the early adopters of its technology to engage in the most comprehensive HPC portfolio for the exascale era. As it is seen across the globe, digital transformation is driving new intensive data flows and real time analytics operating at unprecedented scale. The core of PROCESS exploitation strategy will be highlighted and strengthen the communication of the existing PROCESS pilot demonstrators after the project lifetime, showcasing PROCESS technology value and extend the value to the vertical that the pilot is representing and encourage the pilots to be the ambassadors of PROCESS technologies in their vertical industry. In this cascade way, PROCESS legacy can be exploited in an organic way after the project lifetime.

#### 3.1 Definition of PROCESS Legacy

The legacy of PROCESS consists of the initial results and prototype of the five use cases: Exascale learning on medical image data; Square Kilometre Array / LOFAR; Ancillary pricing for airline revenue management; Data set releases and Agricultural analysis based on Copernicus data.

Therefore, main legacy to be exploited is:

- PROCESS infrastructure aimed to run certain exascale programmes in different verticals, for instant, e-health, airline pricing management, smart agriculture...
- PROCESS infrastructure at Cyfronet in Krakow to run exascale learning on medical image data and benchmark results in medical image learning field.
- A user portal for facilitated selection of data and a launched processing pipeline. This is empowered by Square Kilometre Array / LOFAR. A prototype of the user portal will be integrated with PROCESS infrastructure.
- A standard ancillary sales data set for airlines usable for airline revenue management which enables testing new service concepts without the need to obtain consent from actual users. A prototype will be deployed on Cyfronet.
- Agriculture analysis software based on Copernicus data.

As a result of the implementation of the project, a set of tangible assets is being developed. These assets will be exploited whether individually or jointly in future projects:

*Table 2: Exploitable assets*

Exploitable asset description	WP no	Work package (name)
Service prototype: specifications and underlying technical solutions and configurations	WP2	NA1: Use cases
Use case prototype for ancillary pricing (specific case)		
Performance modelling tool based on robust, experimentally validated mathematical models	WP3	NA2: Motivation, future requirements and emerging opportunities
Conceptual model of exascale service architectures		
Innovation potential report that can be used to steer future exascale data policy		
PROCESS architecture allowing exascale computational research for partners and other organizations	WP4	JRA1: Design and architecture
A reference architecture for exascale scientific applications		
Publications about the PROCESS architecture		
Pilot evaluation scenarios of the PROCESS architecture, for deployment outside of the project		

Data delivery service	WP5	JRA2: Extreme large data service-oriented infrastructure
Metadata storage for research datasets		
Secure and trust mechanisms for data services		
VFS driver and associated component for LOBCDER integration with DISPEL DMI processes		
Computational service for implementation, testing and reuse of mathematical methods and tools for data analysis in heterogeneous infrastructures	WP6	JRA3: Extreme large computing service-oriented infrastructure
Framework for benchmarking and monitoring performance for computational tools		
New method for programming multi-core architecture		
A set of fully parallelized services for Big Data processing and manipulation integrated into the PROCESS architecture		
An orchestration service for exascale data applications based on high-level, abstract, data-centric description of data integration and data mining processes	WP7	JRA4: Service orchestration and user interfaces
An integrated service deployment and orchestration solution for applications working with exascale data and service-oriented infrastructure		
Methodology for description of data integration and data mining processes for provision of on-demand data		
Methodology for deployment of web portal-based user interfaces for service infrastructure for exascale scientific applications		
An example of deployed web portal-based user interface for service infrastructure for exascale scientific applications		
Benchmark set for a collection of real world exascale applications		
Validation results showing the performance of PROCESS technology and infrastructure with real world exascale applications	WP8	SA1: Validation
Packaged, production-ready PROCESS software		
Baseline market studies depicting earliest adopters of PROCESS prototypes	WP9	NA3: Dissemination, engagement and exploitation
Educational material related to PROCESS (goals, architecture, infrastructure, service, pilots)		
Roadmap for exploiting PROCESS services prototypes		
Whitepaper to explain general algorithmic concepts of the airline ancillaries use case		

### 3.2 Use Case lead ambassadors

As mentioned in other technical deliverables, the five use cases are related to different fields, or “verticals”: medical, astronomy, data, airlines and agriculture.

To be able to encourage the lead ambassadors to foster interest in these industries, it is important to elaborate on a comprehensive SWOT analysis of the PROCESS technologies to get the ambassadors onboard to convince other significant stakeholders, such as HPE and other players in its ecosystem to agree on uptaking the PROCESS technologies.

### 3.3 SWOT Analysis

#### Strengths

- The political and financial support to exascale and HPC in general provided by the EU, due to the recognition of their strategic value for the future of the EU.
- The growing number of HPC initiatives across the EU and beyond, not only due to the availability of the support from public bodies, but also as another evidence of the digitisation of society and the economy.

#### Opportunities

- The widespread growth in the number of potential users and customers of PROCESS-enabled services. There are HPC-related organisations in all the major EU countries and the number should grow in the near future.
- Room for developing fit-for-purpose solutions. Market in a very early stage. Pioneering case-by-case solutions (built-for-purpose, project based, one of a kind). So far, there is no formally established and widely accepted -at market level- definition of what best of breed exascale solutions for the next generation HPC should be in terms of e.g. the value delivered to scientific communities, industry and public administration policymakers.

#### Weaknesses

- The major risks are centred around a failure -or a limited success- of the Euro HPC set of initiatives. This might even result ultimately in a strong reduction in the EU financial support to the HPC ecosystem. Given the predominant role of the EU as the funding source for HPC development, the evolution of the whole market will be under jeopardy. Although the political intention clearly shows commitment beyond 2020 and well into the next decade, adverse factors such as budget cuts derived from the UK withdrawal from EU might directly or indirectly (e.g. Cohesion and other Structural Funds) affect a critical mass of demand traction coming from EC HPC ecosystem and industry.
- The heterogeneous and fragmented HPC sector continue to hamper cross-border /pan-European practical critical mass/market development. For example: although the basic principles of public procurement are shared/common within the EU legal realm, there are many peculiarities still subject to national legal frameworks, idiosyncrasy, language, cultures, etc. We are still far from the vision of a Single European Public procurement market.
- Overall size and timely deployment of exascale HPC initiatives not triggering sustainable traction/business interest: lack of timely shifting exascale HPC build-up from strongly grant-funded and pilot-project based initiatives towards more sustainable industry-academic collaboration policies, budgetary allocations, implementation of data sharing policies, deployment of adequate HPC infrastructure and Data Science Teams.

#### Threats

- Concerns regarding data security and data privacy post potentially threat the HPC development.

## 4 Dissemination and Engagement Plan (DEP)

### 4.1 DEP Objectives

The updated DEP actions have been built upon the establishment of the initial DEP actions. Apart from building up the communication channel platform to enable the dissemination and communication actions, more concrete actions evolved around organising events, direct contact with target audience and proactive engagement with key stakeholders have been included into the action plan of the second half of the project. Therefore, the updated objectives of the updated DEP are:

- Continuing to secure and feed communication flows between the consortium and target stakeholder groups,
- Generate interest of up taking PROCESS technologies and extending the implementation of use cases established within the project,
- Guarantee the level of awareness among target groups about the benefits derived from PROCESS.
- Implement outreach actions to engage early adopters of PROCESS's results
- Pave the way for sustainable exploitation of PROCESS outputs after EU funding ends
- Support the design and implementation of the PROCESS-enabled Exploitation Strategy.

The operational objectives for the first project year were of a preparatory nature, i.e. setting up the components of the plan to be ready for performing the main part of the DEP once the results of the project start to be available for showcasing them to our targeted audiences.

As the project is under completion and achieving its first results, operational objectives of these activities must be adapted to the project's needs and gradually shift from preparatory tasks to a more active role in communicating the advances of PROCESS to its targets:

- First part of the project (months 1-18): already reported in D9.1 setting up the components of the Plan to be ready for performing the main part of the DEP along the way as the project is evolving and showing results. The initial dissemination and communication of PROCESS results were mainly shown in the website blog, tweet updates. PROCESS has managed to curate a small size community with significant impacts.
- Final part of the project (months 19-36): reacting according to the feedback and reaction from the Target Groups which are reflected in website visits, twitter followers, etc., to get a full understanding of PROCESS' real impact, thus adjusting the Dissemination and Exploitation Plan's objectives and developing actions guided by their priorities and areas of interest.

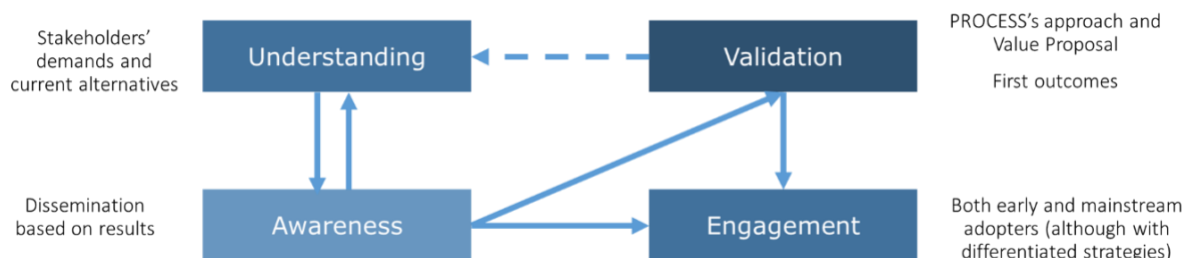


Figure 3: Guiding principles for the third year of PROCESS DEP strategy

## 4.2 The updated overall dissemination and engagement strategy

Based on what has been set up in the D9.1, this version has improved certain strategy based upon what has been implemented. As seen in the previous section, the incremental nature of PROCESS allows to adapt its main components related to the dissemination and engagement strategy as the project evolves and begins to fulfil its technical objectives. The DEP strategy continues to aim for guaranteed suitable interaction between potential demand and other audiences potentially interested in PROCESS (target groups) and the project itself, throughout an optimised combination of key messages and communication channels

### 4.2.1 DEP Target Groups

The priority audiences of PROCESS identified in the earlier stages of the project (Target Groups 1 to 3) remain unchanged. The following are the target group identified and upgraded built on the results attained in the first half of the project:

1. Technical suppliers and Users of PROCESS services prototypes
2. Stakeholders' Management/Decision Makers
3. HPC ecosystem policymakers and funding agencies
4. SMEs and SME associations
5. General public

The first three groups are perceived as catalyst of the DEP strategy, not only by the direct impact on them but as promoters and trendsetters for the final beneficiaries of HPC: scientists from public and private sectors; industrial innovators. In that sense, the inclusion of intends to ensure that awareness of the project is spread through medium and small companies, traditionally further from scientific progress than large private enterprise. All these groups are approached to make them aware of the PROCESS project and understand its concept, technical background, benefits and usage. Most important for PROCESS is to engage with the target groups that will potentially uptake the project results. The engagement accomplished with early adopters is highly relevant.

As the project begins to yield results, messages are aligned to the different decision makers and address them on existing solutions to their research problems. At this point we can deploy deeper actions promoting understanding, later engagement with target groups, and finally influence action taking.

Regarding these targets, the plan is to identify, personalize and establish contact points with representatives from each of them, to later carry out direct marketing actions, given that these market segments have a reduced number of players.

### 4.2.2 Key messages to targeted audiences

D9.1 has defined many "messages" as the following:

- a) PROCESS's philosophy and goals: making the impossible possible.
- b) PROCESS's value proposition is based on three pillars:
  - a. Help key players: top-level HPC, e-infrastructures and big data centres scientific communities and companies with mission-critical extreme scale data challenges
  - b. Boost scientific Progress: deliver ground-breaking services prototypes and tools, specially developed to speed up the uptake of future extreme-scale data processing offerings aimed at boosting scientific progress and disruptive business innovation.

## D9.3 Dissemination and Engagement Plan (DEP)

- c. Exascale Data Services: allow more intuitive and easier to use exascale data services for broader communities, fostering wider uptake and seeking to expand European e-infrastructure user bases, to secure stronger impact and sustainability.
- c) What PROCESS will offer researchers, e-infrastructures and big data centres and companies: services, prototypes and tools to boost innovation.
- d) Specific scientific progress the benefits adopters of PROCESS solutions will get

The process to generate content for the messages includes extracting facts and concepts from the project activities and results, to generate evidence and credibility to PROCESS' value proposition. Content is generated through work package progress and is reported in the project deliverables, relevant Whitepapers and Demonstrators. Some concrete examples of sources of content are the followings:

- Demonstrators of the main tangible outputs achieved in the different components of the project
- Information related to PROCESS' Use Cases: specific presentations, handbooks and other teaching materials
- Software repositories: practice guides, Research Software Directory
- Selected parts of deliverables to illustrate progress and/or benefits
- General information about the project: endorsements, acceptance, interest coming from third parties about PROCESS's works and results, including prizes, meetings with policy makers, endorsements by industry associations, etc.
- Lessons learnt, that contribute to understand what is relevant, attractive or even the basis for competitive advantage when adopting the PROCESS approach and results.

### Examples of content updated:

- A news post of the final publication of all the deliverables. <https://www.process-project.eu/results/first-set-of-project-results/>
- News post and summaries of different workshops organised to provide insightful advancement of the project and the technology for audience that couldn't attend the event.
- Real time tweets feed of the events.

Outgoing messages are selected prioritizing those with high publicity potential and consistency with the project's objectives. They include but are not limited to:

- News and additional info to be published on Twitter and the website
- Internal dissemination material (e.g. press releases, brochures)
- Articles from journal and magazines
- Presentations

### 4.2.3 Mapping communication channels to Target Groups

Communication channels mix adopted for PROCESS include:

- Direct marketing/one-to-one actions (Success stories - interviews)
  - Events (Conferences, workshops, webinars)
  - Online presence and social media (website, detailed web pages, twitter)
  - Specialised channels
- 
- One-to-one Marketing. As a basis to engage with Target Groups 1, 2 and 3, as well as with those individualized representatives of Target Group 4. Regarding these targets, the plan was to identify, personalise and establish contact points with representatives from each of them, enabled by PROCESS created databases to later carry out one-to-one outreach actions, through telematic media as well as through meeting them in events.

### D9.3 Dissemination and Engagement Plan (DEP)

All these groups are approached to make them aware of PROCESS project and understand its concept, technical background, benefits and usage. As the project is beginning to yield results, tangible outputs are used for a more personalised and down-to-earth dissemination. For this purpose, a role similar to PROCESS Ambassador is under study by the members of the consortium, whether it is more useful to clearly define responsibilities and objectives of activities, or instead to establish loose principles of action, given the heterogeneous nature of the project's areas of expertise and type of relationships.

- Events. Partners are taking part in several types of events such as conferences and workshops; organised by the project and/or third-parties to dialogue and network with potential users. Innovation focus groups are foreseen to gauge potential adopters. The project partners are attending relevant events of different kind:
  - Industry-led:
    - Infrastructure (HPC) and main applications, such as AI and Data Science B
    - Industries of Use Cases
  - The Scientific and academic community. The project integrates contributions from scientific disciplines and will participate in scientific seminars, conferences and workshops to disseminate the PROCESS concept and ideas, thus giving a solid overview of the project.
- Organised by third parties to have visibility at European-wide events to further disseminate PROCESS among the widest possible number of stakeholders. All partners will periodically evaluate participation in events based on interest and importance for the project, potential impact, audience and availability.
- Online channels, through the use of organic marketing (Website and social media) to support targeted actions and to provide access to the project to unidentified interested people. Actions are focused on two channels:
  - Website: it can be accessed through <https://www.process-project.eu>. The website comprises a collection of formal and informal documents useful to those also engaged in HPC.
  - Twitter: The Twitter account( @PROCESS\_H2020) is used to refer to the latest news from the project, with images from events and workshops. Retweets are made from related accounts on similar initiatives and “sibling” projects from ETP4HPC, as well as supercomputing centres, Universities and other relevant players. Retweeting content from partners and people in the industry is proving to be a good strategy to obtain visibility and increase our number of followers.
- Specialised dissemination channels, aimed to scientific and professional community, beyond sporadic publication of specific materials. Two complementary channels have been identified so far:
  - ResearchGate: in order to reach a broad community of scientists and researchers
  - SlideShare: aimed to professional presentations, suited for a more widespread audience (SMEs, public institutions -Hospital, independent

Different audiences call for the use of different channels to achieve successful dissemination results. Detailed scientific deliverables, specialised conferences and workshops, journal articles are oriented to researchers, technical staff and industrial practitioners who are those ones who will recommend and support the uptake of PROCESS results. Policy or decision makers are better addressed through whitepapers, public workshops, interviews, business cases reports and the website and social media.

## 5 DEP activities

During the second year of the project, DEP activities have been concentrated on the early project outcomes, as the first year's communication and dissemination have laid a solid foundation of awareness to the project and its concept. The second year's focus has been shifted to early results to increase credibility to PROCESS technical achievement, hence laying the foundation for its sustainability among audiences beyond the consortium boundaries.

The main tasks performed in the context of the DEP during this period are the following:

- 1) To update already created target players directory, including on-going and recently finished projects related to HPC, e-infrastructure innovation, extreme data processing, and exascale initiatives. See ANNEX 1: PROCESS Sister Projects Exascale update December 2019
- 2) Engagement with those responsible in research institutions and e-infrastructures that are our potential early adopters, to create awareness and pave the ground for future synergies and collaborations.
- 3) Identification and participation in relevant Events. See section 5.2 and ANNEX 2: PROCESS Dissemination activities: Nov 2017 – Nov. 2019 period
- 4) Development of the main online dissemination channels: the project website and the twitter account.

### 5.1 Direct marketing

Projects funded by the EC through the Horizon 2020 research and innovation program are a main source of contacts for potential allies. These projects are a clear main an opportunity for potential cooperation for PROCESS.

In order to support engagement, a directory of projects was created during the first year of the project, including the projects' basic information details of projects, such as the webpage, coordinator and the period they will be running.

In this second year, this directory has been updated and completed, including new projects that have started running (See Annex 1). The inclusion of finished projects has the purpose of contacting potential allies in view of the uptake of results after the end of the project.

### 5.2 Events

Presence at events organised by third parties has been useful for different purposes such us:

- To disseminate scientific progress: to present a project overview, and to showcase latest project outcomes.
- To develop networking actions leading to establish personal communication opportunities that emphasise further awareness towards better knowledge and possibly into action to adopt the project results.

Partners were present or contributed with papers or posters at these events and have shown the project's progress and interacted with other stakeholders. The type and size of audience, and target countries have been indicated where possible (See Annex 1).

The most important and significant impactful events attended by the consortium are the followings and their significance and impacts are also explained.

**eScience 2019 Workshop on Platform-driven e-Infrastructure Innovations  
Catamaran Resort, San Diego, CA, USA September 24, 2019**

This event welcomes the international community of researchers and software engineers from all disciplines to present and discuss their scientific practices involving data science and computing. The half-day workshop **Platform-driven e-infrastructure innovations** (EINFRA) invites Exascale projects and use cases to join.

40 conference attendees took part in the PROCESS organised workshop. 6 paper presentations and a keynote on Zettabyte Learning completed the session. The PROCESS partners had very interesting discussions and continued or started co-operations with other projects. Similar approaches were further discussed during the conference in several sessions.

**Impacts:** It generated hikes in social media impressions and effective engagement with audience participated in the events.

**EGI-Workshop: Design your e-Infrastructure  
Amsterdam, May 9th, 2019**

This interactive workshop looked into the design and setup of e-infrastructures for emerging scientific communities and their use cases. It is organised by members of the EGI User Community Support Team: Gergely Sipos and Yin Chen.

The event will bring together 7 scientific communities, projects, Research Infrastructures with service and technology providers from the EGI community.

After short introduction talks about the EGI services, the use cases brought by the participating scientific communities to the event were analysed, and suitable e-infrastructure setups and roadmaps were designed and defined using 'off-the-shelf' and customised solutions from the EGI community. Our use case was demonstrated. We worked with SKA/LOFAR dataset to demonstrate its applicability, so we presented the LOBCDER system for SKA use case (radio astronomy), to explore whether the infrastructure adopted by PROCESS can be easy to integrate with EGI and other existing e-infrastructures.

**Impacts:** participants got design and implementation plans for community-specific e-infrastructure use cases, answers to questions concerning EGI services and technologies, gained a better understanding of the participating scientific use cases, a social network formed between the use cases and the e-infrastructure service providers, understanding of the gaps in e-infrastructure offerings, and service candidates to fill these gaps, and connections among e-infrastructure communities.

**eScience 2018 Conference  
Amsterdam, The Netherlands, 2018**

35 eScientists joined a half-a-day workshop "**Platform-driven e-infrastructure innovations**" to discuss extreme data services and their impacts, development paths and the road towards sustainability. The workshop, organised by the PROCESS project, included contributions from ESCAPE-2, EPEEC, EOSC-hub and DEEP-HybridDataCloud projects. One of the main goals of the workshop was to bring together projects that had potential synergies and common interests that could serve as a starting point for future joint activities that could be both deeper and broader in nature.

**Impacts:** there was a strong consensus that further cross-project events like this initial workshop would be very useful tools for speeding up both to increase awareness of the solutions being developed and to encourage reuse and uptake of the existing solutions. Thus, in addition to possible joint publications and bilateral collaborations.

Other events participated by PROCESS:

- ICCS - International Conference on Computational Science (Faro, Algarve, Portugal - June 2019)
- HPDC - High Performance Parallel and Distributed Computing (June 2019)
- IPDPS - International Parallel and Distributed Processing Symposium (Brazil - May 2019)
- Euro-Par
- Supercomputing and International Supercomputing conferences (SC18) (Dallas, TX, USA - Nov. 2018)
- International Conference on Grid and Cooperative Computing (CCGrid) (Larnaca, Cyprus - May 2019.)
- ACM SIGMOD International Conference on Management of Data (SIGMOD) (Amsterdam, NL - June 30 - July 5, 2019)
- International conference on Very Large Databases (VLDB) (Los Angeles, CA, USA - August 2019)
- IATA World Passenger Symposium (or Airline Industry Retailing Symposium)
- Gesellschaft für Operations Research (GOR) Chemnitz, Germany - March 2019

Impacts: PROCESS consortium made a significant presence in the above-mentioned events, generated more leads for future direct marketing and brought more visibility of the project in the HPC ecosystem in Europe and beyond. Off line presence and visibility are vital in PROCESS dissemination and engagement plan.

## 5.3 Online presence

The website page and the twitter account were created to define the online presence of the project.

### 5.3.1 Website strategy and framework.

PROCESS's website was launched in March 2017 and can be accessed through <https://www.process-project.eu>.

The website presents the project's main traits, the use cases, and includes news and events about the project and publications originated in the project's activities.

This website has been fine-tuned at different levels: content and structure. Content mainly orient to blog posts, update of events and other informative activities regarding the project. In terms of structure, it is referring to the website framework, structure and navigator design of the website interface. In this way, the website has become easier for the visitors to navigate, find the information most relevant and serve their needs while they are visiting the website.

A. Content level:

- A.1. We uploaded the scientific publications, papers and other missed contents in the website.
- A.2. We improved the quality of the content that has been updated:
  - The content is more impacts oriented, rather than information and process oriented. We publish about concrete fact that has taken place, e.g. a summary, takeaway and instant impacts of a workshop that has been organized.
  - We focused the essential and core information of the project, for instant, lessons learnt in the project development, latest update of certain activities.
  - Concentrated information on a single post and spread it in different channels.

## D9.3 DEP activities

### B. Continent level (structure):

- B.1. Homepage: We have upgraded the previous look and feel to a more scientific oriented look and feel with cold shades of colours and neat fonts design. The main images have been upgraded to more avant-garde scientific look.

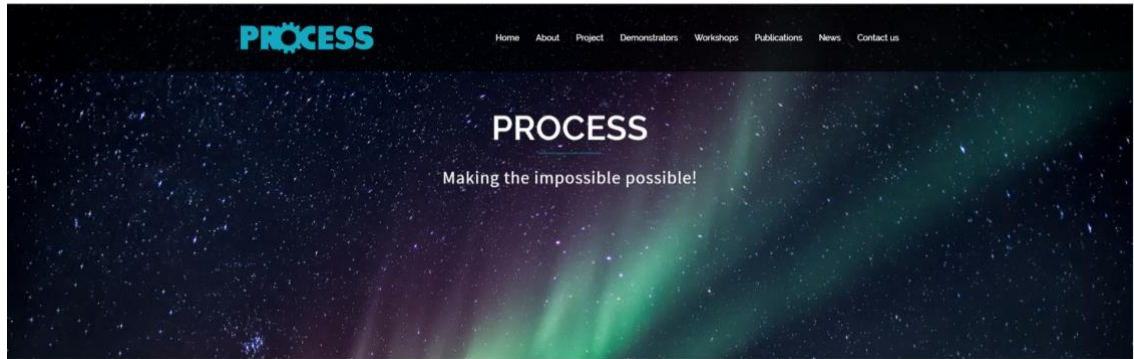


Figure 4: The website page view before

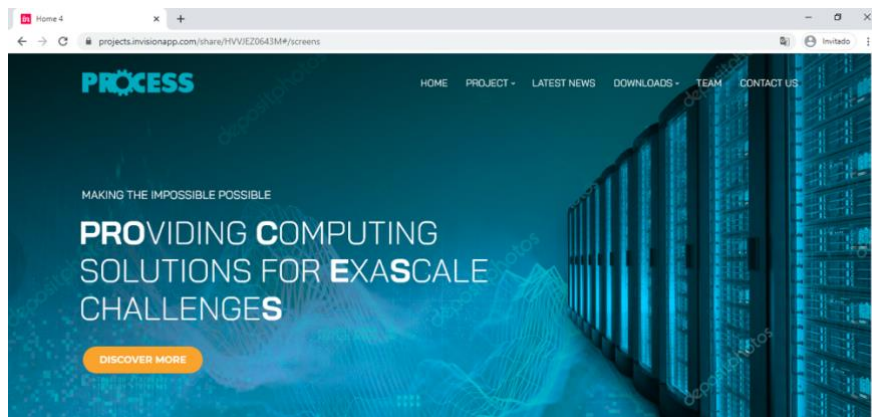


Figure 5: The website page view after

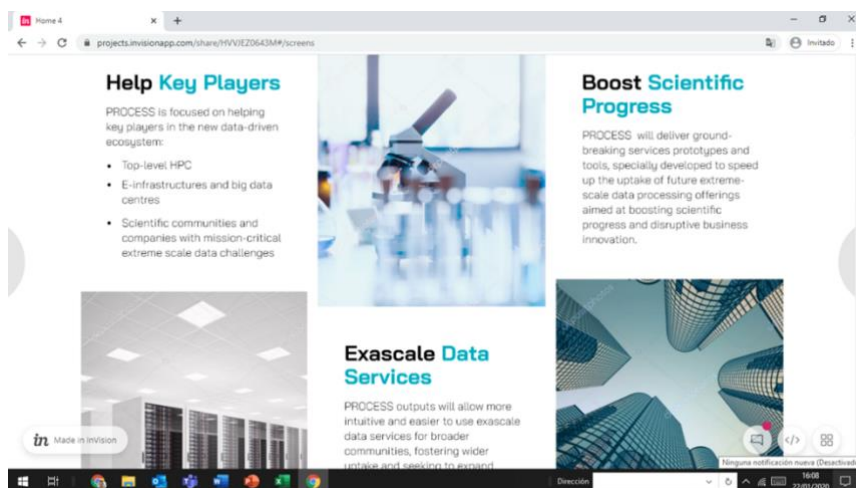


Figure 6: Contents of the website



Figure 7: Leibniz Supercomputing Centre in Munich

- B.2. Project
  - Two related sections ABOUT and PROJECT have been joined into a single one called PROJECT.
  - Three subsections have been created:
    - OVERVIEW: fine tuning previous information in “About”.
    - OBJECTIVES: developing previous ones.
    - OUTPUTS: different subsections have been joined: *Data Services Prototypes* and *Pilots/Use Cases* and *Prototypes* into a single one; including also some missing information about these topics, so that progress and developments on use cases are updated.
- B.3. Latest News

The sections Activities, Workshops and News have been joined into a single one called Latest News, where to inform about already happened activities, with a focus on the learnings (vs upcoming ones) – see *instructions about content above*.

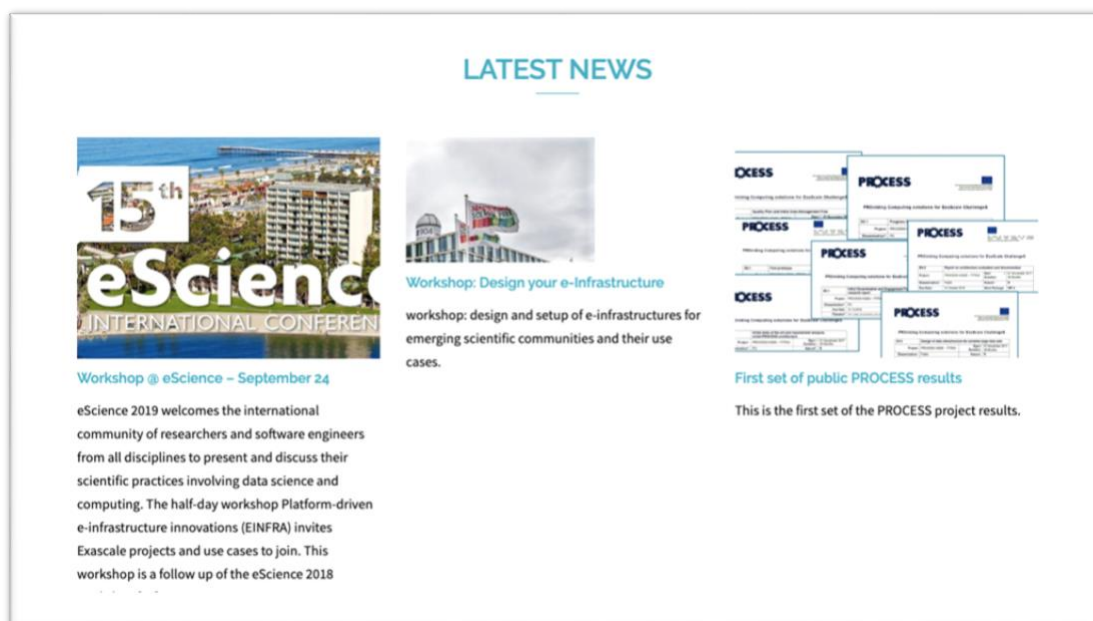


Figure 8: Latest News in PROCESS Website

## D9.3 DEP activities

- B.4. Publications

Section for public deliverables Publications: it has been updated with latest publications.

- B.5. Project Team

The team page has been updated with partners information and logos.

- B.6. Contact Us

Previous contact details have been updated, including personal e-mail addresses, besides the general one [contact@process-project.eu](mailto:contact@process-project.eu). The Twitter social button has also been located and linked in this section.

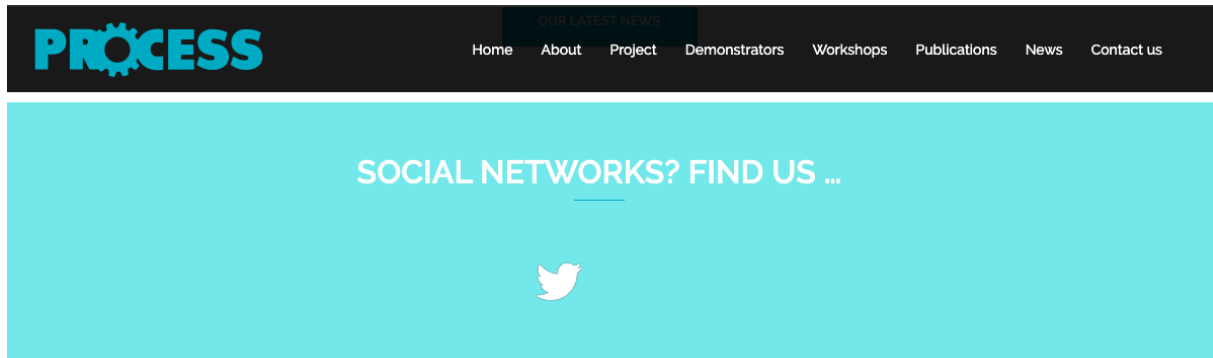


Figure 9: Social Media Image

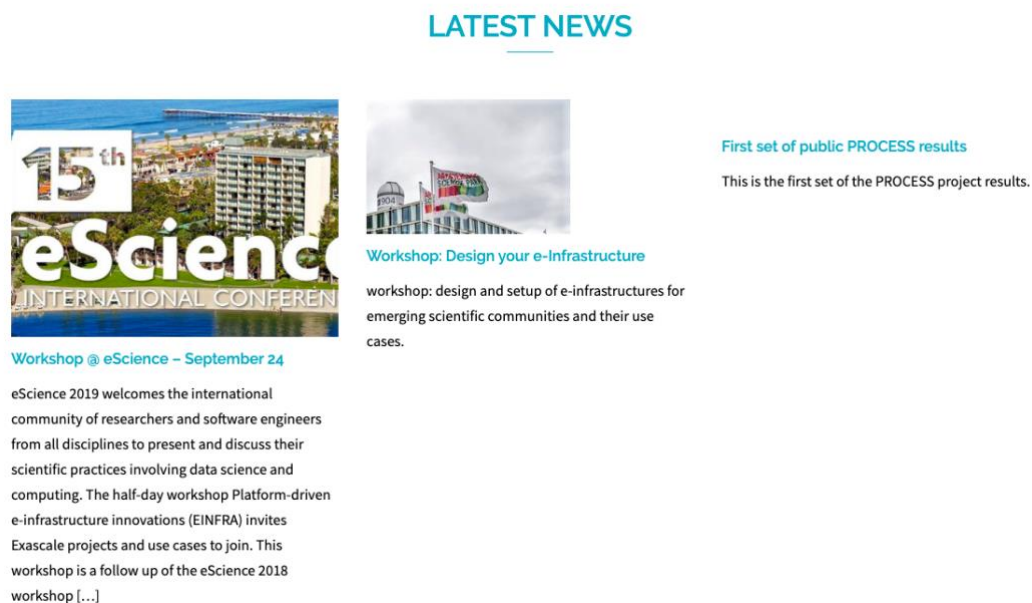


Figure 10: Example of news

- B.7. OTHERS (At the bottom)

Three different sections have been created:

- Latest updates
- Contact, including general email address + main contact persons' email addresses.
- Twitter, including both a social button and a link to last tweet in real time.

## D9.3 DEP activities

### 5.3.2 Website results performance:

#### Website global overview

Since metrics are available (October 31th 2019) there have been:

Table 3: Website performance KPIs

KPI	Number
Visitors	10.699
Website Visits	35.955

As we can observe from the figure below, in terms of visitors and visits, most active periods have been: from October to December 2018 and from April to May 2019 and July 2019.

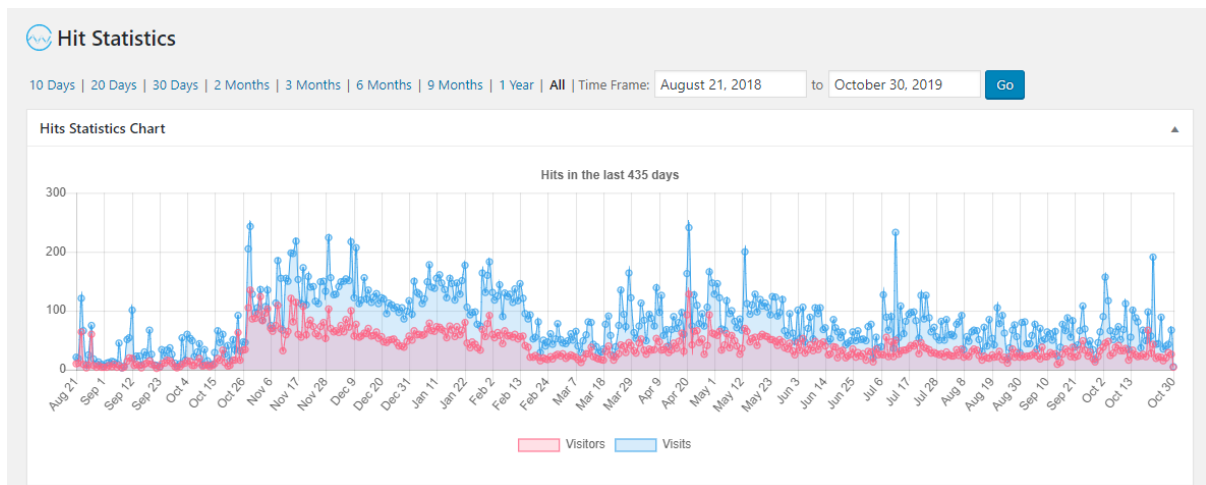


Figure 11: Summary of statistics

Geographical analysis: USA, Indian, Ukraine, China, France, The Netherlands, Russian Federation and Germany have appeared to be top visitors' countries. However, considering the distraction brought by bots, we did a further level analysis.

When we delete bots' distractions from India, China and Ukraine, we have come to conclusion that our top visitors come from **US, France, The Netherlands, Germany** and other countries.

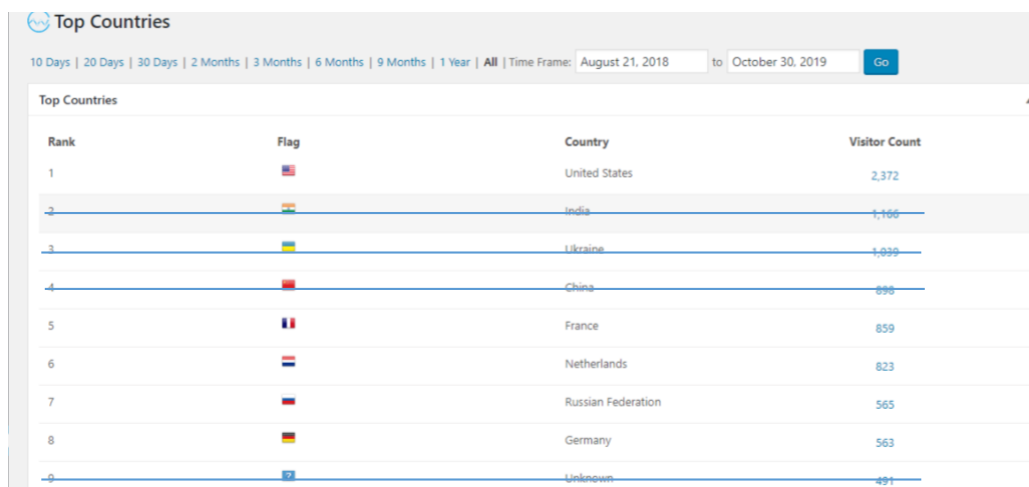


Figure 12: Geographical Analysis of Web Performance

### B. Pages view:

Based on the data shown in the figure below, we can conclude that the home page is logically the most visited page, followed by the Project Team, Workshops and more specific events pages like eScience2018 and Design your e-infrastructure 2019.

This data reflected that the most interested content from the website is:

- General information of the project and its significance to future HPC applications,
- The formation of the team behind the project, which is key to the success and sustainability of the project after its funding lifetime,
- Specific events and activities evolved around the project, especially the eScience2018 and Design your e-infrastructure 2019 which have proved to demonstrate bigger impacts compared with other events listed.

Top Pages			
ID	Title	Link	Visits
1	Home Page	/	19,869
2	Project Team	/project-team/	1,415
3	Workshops	/workshops/	1,218
4	Workshop: Platform-driven e-infrastructure innovations	/workshop/workshop-platform-driven-e-infrastructure-innovations/	897
5	Workshop: Design your e-infrastructure	/workshop/workshop-design-your-e-infrastructure/	670
6	Use Case 4 Ancillary pricing for airline revenue management	/projects/ancillary-pricing-for-airline-revenue-management/	622
7	Workshop summary of the Platform driven e-infrastructure innovations	/workshop/workshop-summary-of-the-platform-driven-e-infrastructure-innovations/	571
8	First set of public PROCESS results	/results/first-set-of-project-results/	568
9	Contact us	/contact-us/	528
10	About	/about/	483

Figure 13 the most visited page

### 5.3.3 Twitter

Twitter account is set up with the purpose to reach out to the general public audience and create more significant social impacts. To achieve this purpose, it is vital to keep the consistent visual identity with PROCESS website. Hence, the land-in page of PROCESS twitter account has been kept consistent with the look and feel of its website: @PROCESS\_H2020

As the PROCESS communication strategy doesn't aim to reach broader audience, rather it is focused on reaching the right and niche audience. Therefore, PROCESS twitter account doesn't focus on gaining millions of followers from the first place. At the end of the project lifetime, it has attracted the attention of 128 followers.



Figure 14: Screenshot of twitter home page

During the second half of the project, different actions have been carried out with the purpose to improve the performance of this tool to achieve better communication of the project impacts to the general public:

- Post tweets of project activities on a regular basis:
  - Self-generated tweets: latest news from the project such as events where the PROCESS Project has participated (about participation itself, the presentations carried out...), latest updates in the website. This is oriented to extend the influence of the PROCESS website. All the project updates, use case studies update, scientific publications update, events and engagement with target audience.
  - Retweets from other accounts wide variety of sources other Twitter accounts to generate synergies among PROCESS Project's partners, stakeholders and different target groups.
- The account profile page has been improved and fine-tuned in order to improve be more precise with targeting the end audience and improve its efficiency of communication the project results and impacts:
  - Tweet bio introduction: the information has been revised. #hashtag was added to improve the impressions of the account:
    - Original: *PROviding Computing Solutions for ExaScale ChallengeS to allow more intuitive & easier exascale data services. This project receives funding from @EU\_H2020*
    - New: @EU\_H2020 funded project PROviding #Computing Solutions for #ExaScale ChallengeS to allow more intuitive & easier exascale data services - #HPC #BigData.
  - Location: "Europe" has been selected to target the right geographical audience.
  - A tweet that introduce the project and the obligatory communicating information of the project has been pinned at the top of the account, taking into account the 200 characters limit in the bio. In this way, the audience can grasp the essence of the project in a glance.
    - "This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 777533".



Figure 15: examples of PROCESS tweets

Apart from updating the setup of the Twitter account, we also initiated multiple actions to attract more targeted audience to follow the account. The following actions have been taken:

- Followed the accounts of partners, stakeholders and different target groups (HPC related projects, Academic and research HPC centres in Europe...). For this, the twitter audience tool has been used because it recommends accounts to follow around specific keywords.
- Created two twitter lists associated to the project partners, stakeholders to improve their visibility and awareness; also, to make it easier to follow them.

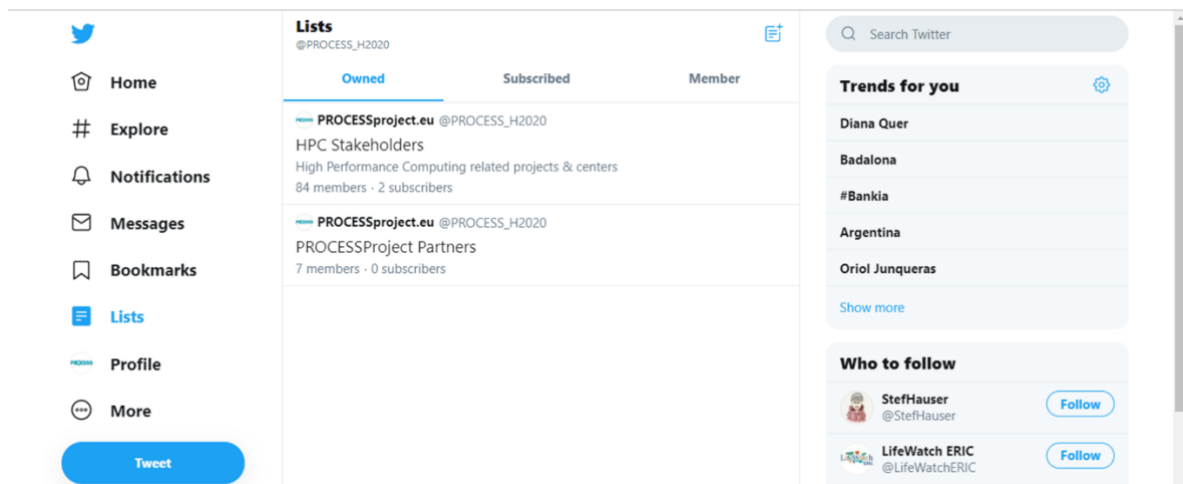


Figure 16: PROCESS Tweet list

- Updated the #hashtag policy, to generate more impressions. To improve the efficiency of this approach, RigeTag tool has been used to suggest the right and most powerful hashtags for us to use so as to maximise the impressions. For example, it suggests using #SuperComputing vs #SuperComputer, #DataCentre vs #DataInfrastructures, etc.
- Increased interactions and engagement with both current and potential followers by liking their posts and tweets, initiate conversations and comments with highly relevant account, retweet highly relevant tweets...
- Set 1 pm – 4 pm CET as the time range for intensive tweet post as Tweriod suggested us that this is the time range when the most followers are listening.

### D9.3 DEP activities

- Post information of upcoming events and logistics information of such event.

#### Twitter Performance Analysis – from April 2018 to October 2019

Twitter KPI performance can be observed from the conclusive table showcased below.

Table 4: Twitter performance KPIs

KPI	Number
Followers	128
Following account	317
Tweets	553
Impressions per day	30
Engagement rate	0,81%
Earned link clicks	2,3
Earned RTs	3,7
Earned likes	5,3

Some further observations about the KPIs:

#### A. Audience KPIs:

- A.1 Number of followers: current followers are 116; this figure has kept on growing from the first months of the project on; the increase has been especially intense in the last year (from Sep 2018 on); the highest increase has been observed in the last month, December 2019, with 10 new followers:

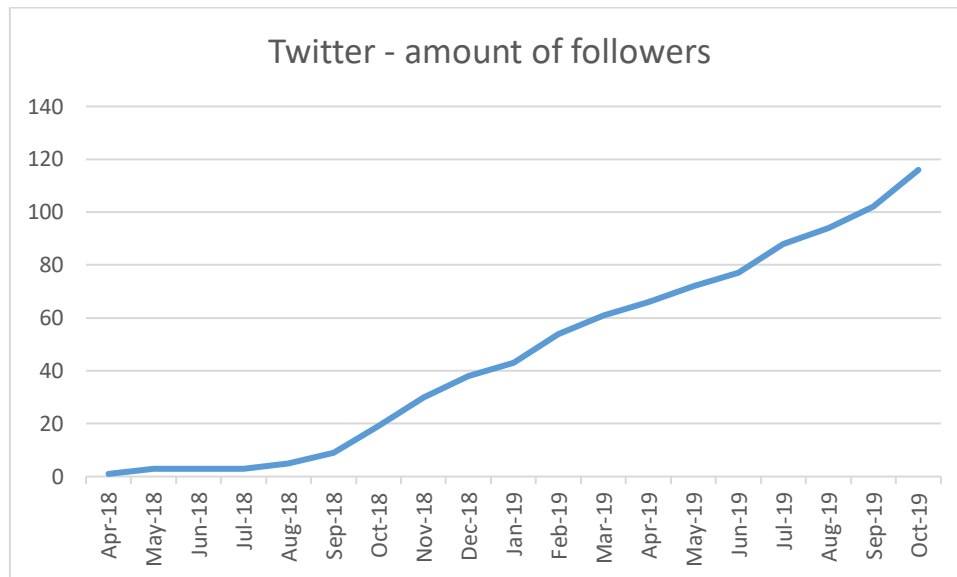


Figure 17: Growth of Tweet Followers

- A.2 Number of followings: current amount of followings are 317; this figure increased dramatically in June 2019 (from 164 to 317) in an effort to call potential followers' attention – related to the update of the directory with sister projects.

#### B. Tweets KPIs:

- B.1 Total number of tweets so far are: 553
- B.2 Impressions per day in this period are: 30 (monthly average). However, two peaks

## D9.3 DEP activities

are observed: mainly in October 2018 (136); also, to a lesser extent, in September 2019 (96).

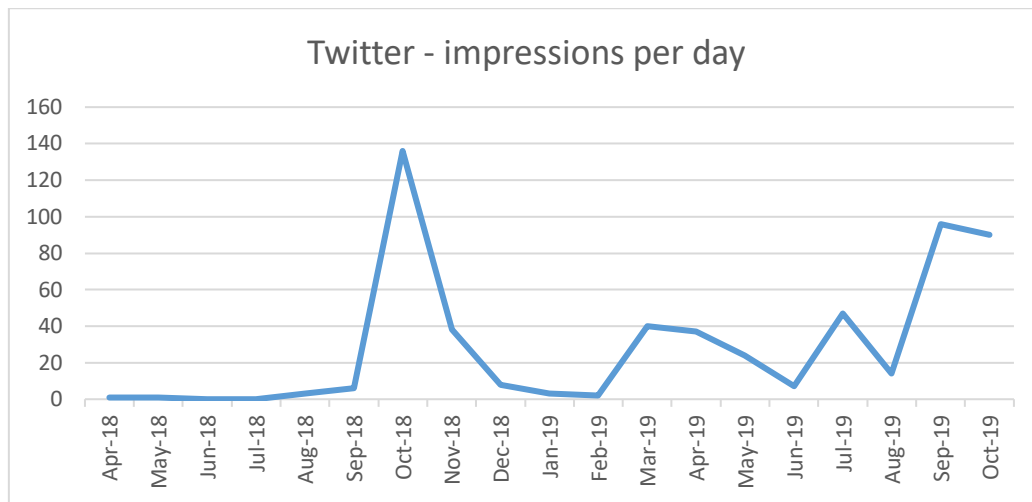


Figure 18: Growth of Impressions per Day

The hikes of impressions per day are associated two events organized by the project:

- Oct 2018: **“Platform driven e-infrastructure innovations”** at the eScience 2018 in Amsterdam. The top tweets in this month being:

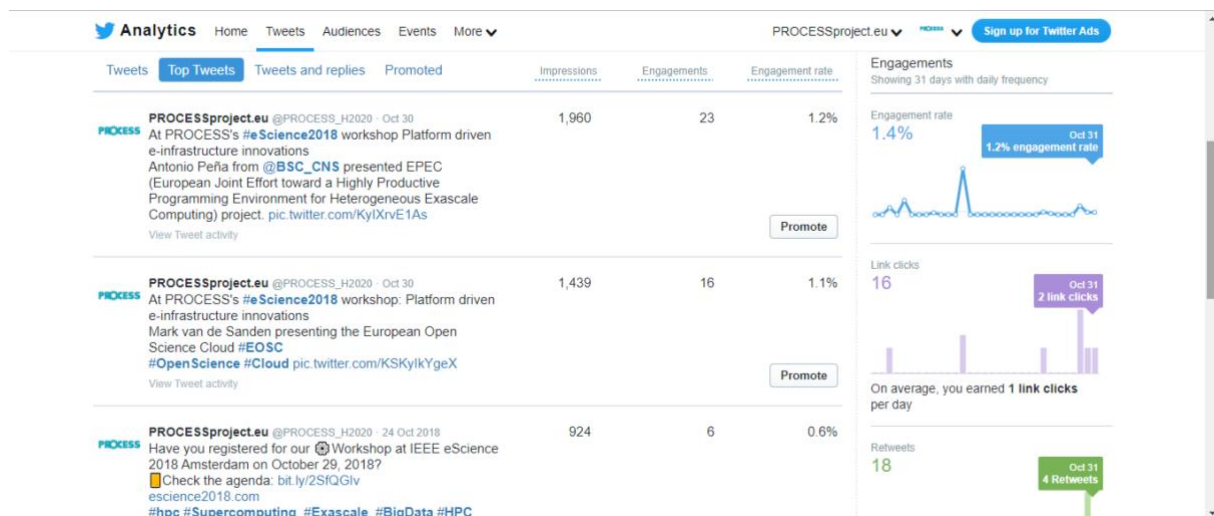


Figure 19: Highlighted Tweets

- Sep 2019: organizing the workshop “Platform driven e-infrastructure innovations” at the eScience2019 event in San Diego, CA, USA; attending the meeting on "Building EOSC through the H2020 projects - current status & future directions" in Brussels;

## D9.3 DEP activities

- “General Assembly and Executive Board Meeting for the Process Project” in Sierre, Switzerland.

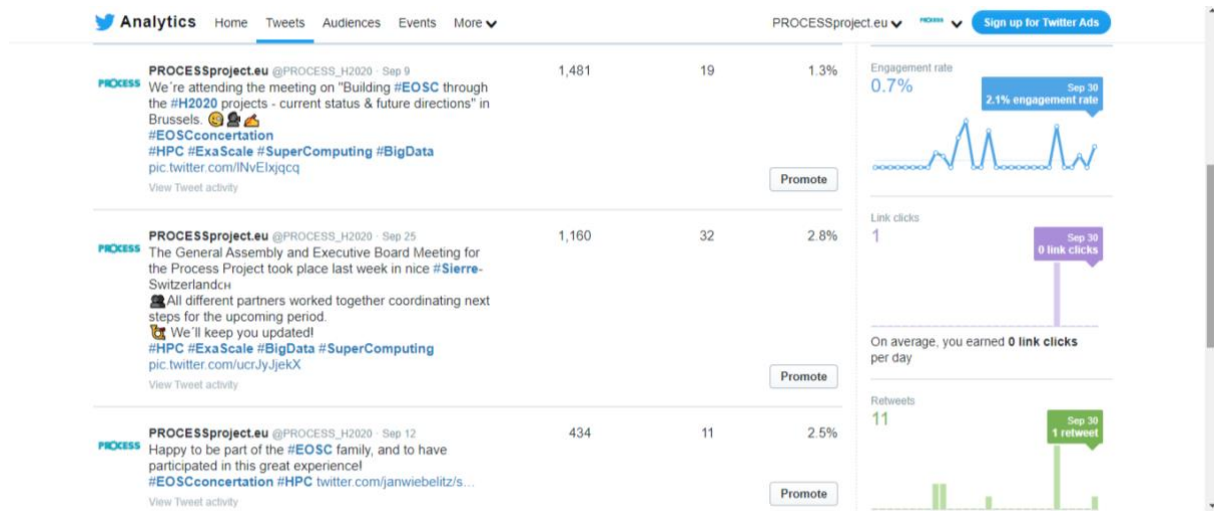


Figure 20: Generated Highlighted Tweets (2)

## 6 Ongoing Dissemination and engagement activities (third year)

During the third year of the project, the existing dissemination channels and direct marketing actions to events organized by PROCESS and any other third party will be reinforced. This is a lesson learnt from the past two years of dissemination and communication activities, as well as a very necessary step to broaden the reach of PROCESS target audience, increase the engagement, as well as improve the quality of the content being disseminated so as to gain higher credibility and trustworthiness of the project. They are the fundamental elements to improve the sustainability of the project after its funded lifetime.

The dissemination strategy should go hand in hand with the exploitation strategy. The continuous progressive delivery of new project results will be mainly focused on the use cases and its implementation in different verticals. The concrete updates of technology advances in use case can potentially generate higher interest in target audience, hence leading to a faster adopting of PROCESS HPC technologies in first batch up-takers.

The plan for dissemination and collaboration for the remaining period of the project includes:

- a) collect use case updates in implementation within the existing industries and any other potential verticals of interest,
- b) continue updating the website information and tweets to promote interest in the PROCESS services with the purpose of engaging PROCESS early adopters
- c) continue using the improved dissemination channels built up in the second year of the project to disseminate use case contents, broaden the impacts derived from direct marketing; and
- d) follow up closely with contacts and leads generated from the direct marketing and encourage to expand implementation of the PROCESS HPC technologies in other verticals.

The following aspects will be taken into account in different action lines that will be mentioned below:

- Follow-up Direct Marketing campaign that will engage a critical mass of prospects via personalised promotion and invitations using the Directory created previously, partners' contacts and participation in diverse collaborative initiatives. Participation to relevant events, focus groups and dedicated presentations in workshops and conferences.
- Dissemination events will be made interactive to enable the showcasing of project outputs and evidence arise from use cases and pilots, integrating internal participation with relevant external parties.
- Website and social media channels will accompany and augment the impacts of offline dissemination activities.

The activities to be carried out in the third year of the project are grouped in three Action Lines:

### 6.1 Action Line 1: Engage early adopters.

The results of the pilot case experiments provide tangible results which are relevant not only to knowledge creators but also to exascale data service suppliers and potential final users such as industry players who provide technological solutions.

Taking advantage of these tangible outputs, the Dissemination actions within this action line will be specifically aimed at the following elements:

- Encourage EU exascale data service suppliers and potential final users to check, experiment and eventually adopt some of the initial services to test their suitability.
- Invite solution suppliers that might be of value, while at the same time contribute to enhance the potential uses of the PROCESS results to be used as services.
- Invite institutions and organisations that are suppliers of technological solutions to learn about the collaboration opportunities to engage either in the direct use as an item in their own services or indirectly, creating other services by leveraging PROCESS results.

## **6.2 Action Line 2: Broaden outreach spectrum.**

This line of action aims at mobilising a community of market and non-market players around the PROCESS project. Under this line of action, the two key activities are:

- a) the co-operation with other projects and
- b) the dissemination of results in annual e-infrastructure events and eScience events.

Regarding the co-operation with other projects, the “natural” field of operations is, in a first instance, the group EU funded H2020 projects, possible joint/coordinated efforts to explore and pursue include:

- Technical cross-fertilisation
- Co-operation in promotional activities
- Collaboration in market intelligence gathering and/or analyses, community boosting, alliances with industry, etc.
- Cross-advertising, especially across online channels
- Distribution of relevant whitepapers through the contact base of project partners

Future events of interest are:

- SupercomputingAsia (SCA) 2020, 24 Feb 2020 - 27 Feb 2020, Singapore, Singapore
- EHPCSW 2020 — EuroHPC Summit Week, 23 Mar 2020 - 27 Mar 2020, Porto, Portugal
- ISC Frankfurt 2020 — International Supercomputing Conference, 21 Jun 2020 - 25 Jun 2020 • Frankfurt, Germany.
- ACM HPDC 2020 — 29th International Symposium on High-Performance Parallel and Distributed Computing, 23 Jun 2020 - 26 Jun 2020 • Stockholm, Sweden.
- PASC20 — Platform for Advanced Scientific Computing, 29 Jun 2020 - 01 Jul 2020 • Geneva, Switzerland.
- ICS 2020 — International Conference on Supercomputing, 29 Jun 2020 - 02 Jul 2020 • Barcelona, Spain.
- HPCS 2020 — 2020 International Conference on High Performance Computing & Simulation, 20 Jul 2020 - 24 Jul 2020, Barcelona, Spain.

## **6.3 Action Line 3: Sustain updating and improving dissemination content in multiple online channels.**

Online communication channels are relatively low maintaining cost channels, hence should be sustained and continuously improved based on learning experiences. The PROCESS website will be richer in content, especially in a sense that use case materials will be progressively updated according the technology adaptation advances made in different verticals. The results from various use cases will be showcased. Apart from use case updates, other related

### D9.3 Ongoing Dissemination and engagement activities (third year)

publications, essays and information of PROCESS presence in major dissemination events will be updated and directed to broadened audience.

Apart from the updates on the website, social media accounts such as Twitter will continue supporting targeted actions and provide access to the project to broader audience and the general public. In summary, the website will be enhanced with 1) blog posts describing and illustrating the use cases, as they start to show results; and 2) include publications and inform of our presence in major dissemination events.

In addition, whitepapers will be issued and published on the website to influence the decision-making processes of prospective customers will be included. As the project progresses the key messages will continue transmitting the main information whilst being updated with key use case results. As a result, all communication actions in the third year will be more streamlined and adapted to the different target audiences in broader channels.

Partners will continue helping to spread the word out in dissemination activities as soon as there were updates. Meta information about future events, including information about upcoming events, the number of audiences, the quality of engagement among audience. In the case of Twitter, we will continue applying the social media updating and posting strategy to maintain and improve engagement level. Same type of KPIs, for instance number of followers, tweets will be tracked as the project evolves by itself after its lifetime.

## 7 Conclusion

In this deliverable we have concluded the results we harvested during the project lifetime, both in terms of dissemination and of exploitation. The dissemination plan and actions have proved to give high awareness to the project in computer science, through the numbers shown in website visits, Twitter followers, direct contacts made through different events and industrial trade-shows. PROCESS has registered itself as an active player in Europe HPC ecosystem.

The exploitation plan has showcased several success stories in case studies, for instance, medical image data to speed up the visual inspection of the tissue specimens and reduce the subjectivity of grading process. Four other successful case studies have been presented. They have been successfully converted to the ambassador of PROCESS infrastructure and technology in the vertical of e-Health, radio astronomy, airline management.

In summary, it reviewed the results of the initial analyses of the competitive environment for the future exploitation of PROCESS outputs developed in the initial market analysis, and we have further elaborated on the threats and opportunities for PROCESS's results. This report also included the second edition of the DEP guiding the formulation and execution of outreach activities to support future exploitation of the project results. This report integrates the overall design of the DEP, the initial preparatory activities performed during the first year of the project, the actions taken during the second year of the project and the action plan for the next period of the PROCESS lifecycle. It sets out a comprehensive and inclusive approach that provides guidance and direction for all partners in their own actions to promote the usage of the project's results.

## Appendix

### ANNEX 1: PROCESS Sister Projects Exascale update December 2019

Project acronym	Project title	Web	Coordinator	Coordinator name	Coordinator e-mail	From... to...	EU contribution	Status (Dec-2019)	ETP4HPC classification
AARC2	Authentication and Authorisation For Research and Collaboration	<a href="https://aarc-project.eu/">https://aarc-project.eu/</a>	GEANT VERENIGING	Licia Florio	<a href="mailto:licia.florio@geant.org">licia.florio@geant.org</a>	From 2017-05-01 to 2019-04-30	2.999.893	Closed	
AENEAS	Advanced European Network of E-infrastructures for Astronomy with the SKA	<a href="https://www.aeneas2020.eu/">https://www.aeneas2020.eu/</a>	STICHTING ASTRON, NETHERLANDS INSTITUTE FOR RADIO ASTRONOMY	Dr. Michael Wise	<a href="mailto:wise@astron.nl">wise@astron.nl</a>	From 2017-01-01 to 2019-12-31	2.999.995	Open	
AGINFRA PLUS	Accelerating user-driven e-infrastructure innovation in Food Agriculture	<a href="http://www.plus.aginfra.eu/">http://www.plus.aginfra.eu/</a>	AGROKNOW IKE	Nikos Manouselis	<a href="mailto:nikosm@agroknow.com">nikosm@agroknow.com</a>	From 2017-01-01 to 2019-12-31	2.837.375	Open	
ALLScale	An Exascale Programming, Multi-objective Optimisation and Resilience Management Environment Based on Nested Recursive Parallelism	<a href="http://www.allscale.eu/home">http://www.allscale.eu/home</a>	UNIVERSITAET INNSBRUCK	Thomas Fahringer	<a href="mailto:tf@dps.uibk.ac.at">tf@dps.uibk.ac.at</a>	From 2015-10-01 to 2018-09-30	3.366.196	Closed	Basic Technology Projects started 2015
ANTAREX	AutoTuning and Adaptive approach for Energy efficient exascale HPC systems	<a href="http://www.antarex-project.eu/">http://www.antarex-project.eu/</a>	POLITECNICO DI MILANO	Cristina Silvano	<a href="mailto:cristina.silvano@polimi.it">cristina.silvano@polimi.it</a>	From 2015-09-01 to 2018-08-31	3.115.251	Closed	Basic Technology Projects started 2015
ASPID	exascale Programming models for extreme Data processing	<a href="https://www.aspid-e-project.eu/">https://www.aspid-e-project.eu/</a>	UNIVERSIDAD CARLOS III DE MADRID	J. Daniel Garcia	<a href="mailto:josedaniel.garcia@uc3m.es">josedaniel.garcia@uc3m.es</a>	From 2018-06-15 to 2020-12-14	2.464.094	Open	Basic Technology Projects starting 2018/2019

## D9.3 Appendix

Project acronym	Project title	Web	Coordinator	Coordinator name	Coordinator or e-mail	From... to...	EU contribution	Status (Dec-2019)	ETP4HPC classification
BioExcel	Centre of Excellence for Biomolecular Research	<a href="https://bioexcel.eu/">https://bioexcel.eu/</a>	KUNGLIGA TEKNISKA HOEGSKOLAN	Erwin Laure	erwinl@pd.c.kth.se	From 2015-11-01 to 2018-10-31	4.782.286	Closed	Centres of Excellence in computing applications started 2015
BioExcel 2	Centre of Excellence for Biomolecular Research	<a href="https://bioexcel.eu/">https://bioexcel.eu/</a>	KUNGLIGA TEKNISKA HOEGSKOLAN	Erwin Laure	erwinl@pd.c.kth.se	From 2019-01-01 to 2021-12-31	7.998.834	Open	Centres of Excellence in computing applications starting 2018
ChEESE	Centre of Excellence for Exascale and Solid Earth	<a href="https://cheese-coe.eu/">https://cheese-coe.eu/</a>	BARCELONA SUPERCOMPUTING CENTER	Arnau Folch	arnau.folch@bsc.es	From 2018-11-01 to 2021-10-31	7.683.241	Open	Centres of Excellence in computing applications starting 2018
COEGSS	Center of Excellence for Global Systems Science	<a href="http://coegss.eu/">http://coegss.eu/</a>	UNIVERSITAET POTSDAM	Prof. Dr. Carlo Jaeger	carlo.jaeger@globalclimateforum.org	From 2015-10-01 to 2018-09-30	4.469.663	Closed	Centres of Excellence in computing applications started 2015
COMPAT	Computing Patterns for High Performance Multiscale Computing	<a href="http://www.compat-project.eu/">http://www.compat-project.eu/</a>	UNIVERSITY OF AMSTERDAM	Hugh Martin	h.martin@cbkscicon.com	From 2015-10-01 to 2017-03-31	3.942.885	Closed	Basic Technology Projects started 2015
CompBioMed	A Centre of Excellence in Computational Biomedicine	<a href="http://www.compbiomed.eu/">http://www.compbiomed.eu/</a>	UNIVERSITY COLLEGE LONDON	Prof. Peter Coveney	p.v.coveney@ucl.ac.uk	From 2016-10-01 to 2019-09-30	4.938.216	Closed	Centres of Excellence in computing applications started 2015
CompBioMed2	A Centre of Excellence in Computational Biomedicine	<a href="http://www.compbiomed.eu/">http://www.compbiomed.eu/</a>	UNIVERSITY COLLEGE LONDON	Emily Lumley	e.lumley@ucl.ac.uk			Open	Centres of Excellence in computing applications starting 2018
DARE	Delivering Agile Research Excellence on European e-Infrastructures	<a href="http://project-dare.eu/">http://project-dare.eu/</a>	NATIONAL CENTER FOR SCIENTIFIC RESEARCH "DEMOKRITOS"	Dr. Vangelis Karkaletsis	vangelis@it.demokritos.gr	From 2018-01-01 to 2020-12-31	2.957.500	Open	

## D9.3 Appendix

Project acronym	Project title	Web	Coordinator	Coordinator name	Coordinator or e-mail	From... to...	EU contribution	Status (Dec-2019)	ETP4HPC classification
DEEP-EST	DEEP - Extreme Scale Technologies	<a href="http://deep-est.eu/">http://deep-est.eu/</a>	FORSCHUNGSZENTRUM JULICH GMBH	Estela Suarez	pmt@deep-projects.eu	From 2017-07-01 to 2020-06-30	15.873.341	Open	Co-design projects
DEEP-HybridData Cloud	Designing and Enabling E-infrastructures for intensive Processing in a Hybrid DataCloud	<a href="https://deep-hybrid-datacloud.eu/">https://deep-hybrid-datacloud.eu/</a>	AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS	Jesús Marco de Lucas	marco@ifca.unican.es	From 2017-11-01 to 2020-04-30	2.988.750	Open	Co-design projects
E-CAM	An e-infrastructure for software, training and consultancy in simulation and modelling	<a href="https://www.e-cam2020.eu/">https://www.e-cam2020.eu/</a>	ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE	Ana Catarina Mendonça	ana.mendonca@epfl.ch	From 2015-10-01 to 2020-09-30	4.836.896	Open	Centres of Excellence in computing applications started 2015
ECOSCALE	Energy-efficient Heterogeneous COmputing at exaSCALE	<a href="http://ecoscale.eu/">http://ecoscale.eu/</a>	TELECOMMUNICATION SYSTEMS INSTITUTE	Yannis Papaefstathiou	ygp@synelixis.com	From 2015-10-01 to 2018-09-30	4.237.398	Closed	Basic Technology Projects started 2015
eInfraCentral	European E-Infrastructure Services Gateway	<a href="http://einfracentral.eu/">http://einfracentral.eu/</a>	EUROPEAN FUTURE INNOVATION SYSTEM CENTRE	Dr. Jelena Angelis	contact@einfraCentral.eu	From 2017-01-01 to 2019-06-30	1.499.038	Closed	
e-IRGSP5	e-Infrastructure Reflection Group Support Programme 5	<a href="http://e-irgsp5.e-irg.eu/">http://e-irgsp5.e-irg.eu/</a>	GOTTFRIED WILHELM LEIBNIZ UNIVERSITAET HANNOVER	Jan Wiebelitz	wiebelitzchi@chi.uni-hannover.de	From 2016-12-01 to 2018-11-30	989.538	Closed	
EoCoE	Energy oriented Centre of Excellence for computer applications	<a href="https://www.eocoe.eu/">https://www.eocoe.eu/</a>	COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES	Edouard Audit	contact@eocoe.eu	From 2015-10-01 to 2018-09-30	5.403.491	Closed	Centres of Excellence in computing applications started 2015
EoCoEII	Energy oriented Centre of Excellence for computer applications	<a href="https://www.eocoe.eu/">https://www.eocoe.eu/</a>	COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES	Edouard Audit	contact@eocoe.eu	From 2015-10-01 to 2018-09-30	5.403.491	Closed	Centres of Excellence in computing applications starting 2018

## D9.3 Appendix

Project acronym	Project title	Web	Coordinator	Coordinator name	Coordinator e-mail	From... to...	EU contribution	Status (Dec-2019)	ETP4HPC classification
EPEEC	European joint Effort toward a Highly Productive Programming Environment for Heterogeneous Exascale Computing	<a href="https://epeec-project.eu/">https://epeec-project.eu/</a>	BARCELONA SUPERCOMPUTING CENTER	Antonio J. Peña	antonio.pena@bsc.es	From 2018-10-01 to 2021-09-30	3.990.709	Open	Basic Technology Projects starting 2018/2019
EPI	European Processor Initiative	<a href="http://www.european-processor-initiative.eu/">http://www.european-processor-initiative.eu/</a>	BULL SAS (ATOS GROUP)		contact@european-processor-initiative.eu			Open	Other HPC Projects
EPiGRAM-HS	Exascale Programming Models for Heterogeneous Systems	<a href="https://epigram-hs.eu/">https://epigram-hs.eu/</a>	KUNGLIGA TEKNISKA HOEGSKOLAN	Apostolos Vasileiadis	apovas@kth.se	From 2018-09-01 to 2021-08-31	3.998.741	Open	Basic Technology Projects starting 2018/2019
e-ROSA	Towards an e-infrastructure Roadmap for Open Science in Agriculture	<a href="http://www.erosa.aginfra.eu/">http://www.erosa.aginfra.eu/</a>	INSTITUT NATIONAL DE LA RECHERCHE AGRONOMIQUE	Dr. Odile Hologne	odile.hologne@inra.fr	From 2017-01-01 to 2018-06-30	399.056	Closed	
ESCAPE	Energy-efficient SCalable Algorithms for weather and climate Prediction at Exascale	<a href="http://www.hpc-escape.eu/">http://www.hpc-escape.eu/</a>	EUROPEAN CENTRE FOR MEDIUM-RANGE WEATHER FORECASTS	Dr. Peter Bauer	peter.bauer@ecmwf.int	From 2015-10-01 to 2018-09-30	3.977.953	Closed	Basic Technology Projects started 2015
ESCAPE 2	Energy-efficient SCalable Algorithms for weather and climate Prediction at Exascale	<a href="https://www.ecmwf.int/escape">https://www.ecmwf.int/escape</a>	EUROPEAN CENTRE FOR MEDIUM-RANGE WEATHER FORECASTS	Dr. Peter Bauer	peter.bauer@ecmwf.int	From 2018-10-01 to 2021-09-30	3.999.650	Open	Basic Technology Projects starting 2018/2019
ESIWACE	Excellence in Simulation of Weather and Climate in Europe	<a href="https://www.esiwave.eu/">https://www.esiwave.eu/</a>	DEUTSCHES KLIMARECHENZENTRUM GMBH	Dr. Joachim Biercamp	esiwave@lists.dkrz.de	From 2015-09-01 to 2019-08-31	4.951.049	Closed	Centres of Excellence in computing applications started 2015
ESIWACE 2	Excellence in Simulation of Weather and Climate in Europe	<a href="https://www.esiwave.eu/">https://www.esiwave.eu/</a>	DEUTSCHES KLIMARECHENZENTRUM GMBH	Dr. Joachim Biercamp	esiwave@lists.dkrz.de	From 2019-06-01 to 2022-12-31	8.035.064	Open	Centres of Excellence in computing applications starting 2018

## D9.3 Appendix

Project acronym	Project title	Web	Coordinator	Coordinator name	Coordinator e-mail	From... to...	EU contribution	Status (Dec-2019)	ETP4HPC classification
EuroEXA	Co-designed Innovation and System for Resilient Exascale Computing in Europe: From Applications to Silicon	<a href="http://euroexa.eu/">http://euroexa.eu/</a>	INSTITUTE OF COMMUNICATION AND COMPUTER SYSTEMS	Prof. Georgios Goumas	<a href="mailto:goumas@cs.lab.ece.ntua.gr">goumas@cs.lab.ece.ntua.gr</a>	From 2017-09-01 to 2021-02-28	19.949.023	Open	Co-design projects
EVER-EST	European Virtual Environment for Research - Earth Science Themes	<a href="https://ever-est.eu/">https://ever-est.eu/</a>	EUROPEAN SPACE AGENCY	Mirko Albani	<a href="mailto:Mirko.Albani@esa.int">Mirko.Albani@esa.int</a>	From 2015-10-01 to 2018-09-30	6.561.628	Closed	
EXA2PRO	Enhancing Programmability and boosting Performance Portability for Exascale Computing Systems	<a href="https://exa2pro.eu/">https://exa2pro.eu/</a>	INSTITUTE OF COMMUNICATION AND COMPUTER SYSTEMS	Prof. Dimitrios Soudris	<a href="mailto:dsoudris@microlab.ntua.gr">dsoudris@microlab.ntua.gr</a>	From 2018-05-01 to 2021-04-30	3.475.223	Open	Basic Technology Projects starting 2018/2019
ExaFLOW	Enabling Exascale Fluid Dynamics Simulations	<a href="http://exaflow-project.eu/">http://exaflow-project.eu/</a>	KUNGLIGA TEKNISKA HOEGSKOLAN	Erwin Laure	<a href="mailto:erwinl@pd.c.kth.se">erwinl@pd.c.kth.se</a>	From 2015-10-01 to 2018-09-30	3.312.235	Closed	Basic Technology Projects started 2015
ExaHyPE	An Exascale Hyperbolic PDE Engine	<a href="https://exahype.eu/">https://exahype.eu/</a>	TECHNISCHE UNIVERSITÄT MÜNCHEN	Prof. Dr. Michael Bader	<a href="mailto:bader@in.tum.de">bader@in.tum.de</a>	From 2015-10-01 to 2019-09-30	2.872.500	Closed	Basic Technology Projects started 2015
ExaNeSt	European Exascale System Interconnect and Storage	<a href="http://exanest.eu/">http://exanest.eu/</a>	FOUNDATION FOR RESEARCH AND TECHNOLOGY HELLAS	Manolis G.H. Katevenis	<a href="mailto:kateveni@ics.forth.gr">kateveni@ics.forth.gr</a>	From 2015-12-01 to 2018-11-30	8.442.548	Closed	Basic Technology Projects started 2015
ExaNoDe	European Exascale Processor Memory Node Design	<a href="http://exanode.eu/">http://exanode.eu/</a>	COMMISSARIAT À L'ÉNERGIE ATOMIQUE ET AUX ÉNERGIES ALTERNATIVES	Denis Dutoit	<a href="mailto:denis.dutoit@cea.fr">denis.dutoit@cea.fr</a>	From 2015-10-01 to 2018-09-30	8.629.248	Closed	Basic Technology Projects started 2015
ExaQute	EXAscale Quantification of Uncertainties for Technology and Science Simulation	<a href="http://exaqute.eu/">http://exaqute.eu/</a>	CENTRE INTERNACIONAL DE MÉTODES NUMÉRIQUES EN INGÉNIERIA	Cecilia Soriano	<a href="mailto:csoriano@cimne.upc.edu">csoriano@cimne.upc.edu</a>	From 2018-06-01 to 2021-05-31	3.124.255	Open	Basic Technology Projects starting 2018/2019

## D9.3 Appendix

Project acronym	Project title	Web	Coordinator	Coordinator name	Coordinator or e-mail	From... to...	EU contribution	Status (Dec-2019)	ETP4HPC classification
EXCAPE	Exascale Compound Activity Prediction Engine	<a href="http://excape-h2020.eu/">http://excape-h2020.eu/</a>	INTERUNIVERSITAIR MICRO-ELECTRONICA CENTRUM	Tom Ashby	ashby@imec.be	From 2015-09-01 to 2018-08-31	3.910.140	Closed	Basic Technology Projects started 2015
EXCELLE RAT	The European Centre of Excellence for Engineering Applications	<a href="https://www.excellerat.eu/wp/">https://www.excellerat.eu/wp/</a>	UNIVERSITAET STUTTGART	Dr.-Ing. Bastian Koller	koller@hlrs.de	From 2018-12-01 to 2021-11-30	7.884.758	Open	Centres of Excellence in computing applications starting 2018
EXDCI-2	European eXtreme Data and Computing Initiative - 2	<a href="https://exdci.eu">https://exdci.eu</a>	PARTNERSHIP FOR ADVANCED COMPUTING IN EUROPE AISBL	Serge Bogaerts	pmo-exdci@prace-ri.eu	From 2018-03-01 to 2020-08-31	2.440.000	Open	
EXTRA	Exploiting eXascale Technology EXTRA with Reconfigurable Architectures	<a href="https://www.extrahpc.eu/">https://www.extrahpc.eu/</a>	UNIVERSITEIT GENT	Prof. Dirk Stroobandt	Dirk.Stroobandt@UGent.be	From 2015-09-01 to 2018-08-31	3.989.931	Closed	Basic Technology Projects started 2015
FocusCoE	Concerted action for the European HPC CoEs	<a href="http://www.focuscoe.eu/">http://www.focuscoe.eu/</a>	SCAPOS AG	Guy Lonsdale	guy.lonsdale@scapos.com	From 2018-12-01 to 2021-11-30	1.997.921	Open	Centres of Excellence in computing applications starting 2018
FREYA	Connected Open Identifiers for Discovery, Access and Use of Research Resources	<a href="https://www.project-freya.eu/en">https://www.project-freya.eu/en</a>	SCIENCE AND TECHNOLOGY FACILITIES COUNCIL	Simon Lambert	info@project-freya.eu	From 2017-12-01 to 2020-11-30	4.998.650	Open	
Green Flash	Green Flash, energy efficient high performance computing for real-time science	<a href="http://greenflash-h2020.eu/">http://greenflash-h2020.eu/</a>	OBSERVATOIRE DE PARIS	Damien Gratadour	damien.gratadour@obspm.fr	From 2015-10-01 to 2018-12-31	3.760.794	Closed	Basic Technology Projects started 2015
HiDALGO	HPC and Big Data Technologies for Global Challenges		ATOS SPAIN SA	Francisco Javier Nieto	francisco.nieto@atos.net			Open	Centres of Excellence in computing applications starting 2018
HIRMEOS	High Integration of Research Monographs in the European Open Science infrastructure	<a href="http://www.hirmeos.eu/">http://www.hirmeos.eu/</a>	C. NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS	Pierre Mounier	pierre.mounier@openedition.org	From 2017-01-01 to 2019-06-30	1.997.878	Closed	

## D9.3 Appendix

Project acronym	Project title	Web	Coordinator	Coordinator name	Coordinator e-mail	From... to...	EU contribution	Status (Dec-2019)	ETP4HPC classification
INTERTWINE	Programming Model INTERoperability ToWards Exascale	<a href="http://www.intertwine-project.eu/">http://www.intertwine-project.eu/</a>	THE UNIVERSITY OF EDINBURGH	Dr George Beckett	<a href="mailto:info@intertwine-project.eu">info@intertwine-project.eu</a>	From 2015-10-01 to 2018-09-30	3.861.401	Closed	Basic Technology Projects started 2015
MAESTRO	Middleware for memory and data-awareness in workflows	<a href="https://www.maestro-data.eu/">https://www.maestro-data.eu/</a>	FORSCHUNGSZENTRUM JULICH GMBH	Dirk Pleiter	<a href="mailto:d.pleiter@fz-juelich.de">d.pleiter@fz-juelich.de</a>	From 2018-09-01 to 2021-08-31	3.989.491	Open	Basic Technology Projects starting 2018/2019
MANGO	Exploring Manycore Architectures MANGO for Next- Generation HPC systems	<a href="http://www.mango-project.eu/">http://www.mango-project.eu/</a>	UNIVERSITAT POLITECNICA DE VALENCIA	José Flich	<a href="mailto:jflich@disc.a.upv.es">jflich@disc.a.upv.es</a>	From 2018-10-31 to 2019-03-31	5.801.820	Closed	Basic Technology Projects started 2015
MAX	Materials design at the eXascale	<a href="http://www.max-centre.eu/">http://www.max-centre.eu/</a>	CONSIGLIO NAZIONALE DELLE RICERCHE	Elisa Molinari	<a href="mailto:elisa.molinari@max-centre.eu">elisa.molinari@max-centre.eu</a>	From 2015-09-01 to 2018-02-28	4.068.864	Closed	Centres of Excellence in computing applications started 2015
MAX2	Materials design at the eXascale-2	<a href="http://www.max-centre.eu/">http://www.max-centre.eu/</a>	CONSIGLIO NAZIONALE DELLE RICERCHE	Elisa Molinari	<a href="mailto:elisa.molinari@max-centre.eu">elisa.molinari@max-centre.eu</a>			Open	Centres of Excellence in computing applications starting 2018
Mont-Blanc 2020	Mont-Blanc 2020, European scalable, modular and power efficient HPC processor	<a href="http://montblanc-project.eu/">http://montblanc-project.eu/</a>	BULL SAS (ATOS GROUP)	Etienne Walter	<a href="mailto:Etienne.walter@atos.net">Etienne.walter@atos.net</a>	From 2017-12-01 to 2020-11-30	10.131.849	Open	Other HPC Projects
Mont-Blanc 3	Mont-Blanc 3, European scalable and power efficient HPC platform based on low-power embedded technology	<a href="http://montblanc-project.eu/">http://montblanc-project.eu/</a>	BULL SAS (ATOS GROUP)	Etienne Walter	<a href="mailto:Etienne.walter@atos.net">Etienne.walter@atos.net</a>	From 2015-10-01 to 2018-09-30	7.968.375	Closed	Basic Technology Projects started 2015
MSO4SC	Mathematical Modelling, Simulation and Optimization for Societal Challenges with Scientific Computing	<a href="http://mso4sc.elm-erex.hu/">http://mso4sc.elm-erex.hu/</a>	ATOS SPAIN SA	Javier Francisco Nieto	<a href="mailto:francisco.nieto@atos.net">francisco.nieto@atos.net</a>	From 2016-10-01 to 2018-09-30	2.435.065	Closed	

## D9.3 Appendix

Project acronym	Project title	Web	Coordinator	Coordinator name	Coordinator e-mail	From... to...	EU contribution	Status (Dec-2019)	ETP4HPC classification
MuG	Multi-Scale Complex Genomics	<a href="http://www.multiscalegenomics.eu">http://www.multiscalegenomics.eu</a>	FUNDACIO INSTITUT DE RECERCA BIOMEDICA (IRB BARCELONA)	Modesto Orozco	modesto.oro@irbbarcelona.org	From 2015-11-01 to 2018-10-31	2.961.164	Closed	
NEXTGenIO	Next Generation I/O for Exascale	<a href="http://www.nextgenio.eu/">http://www.nextgenio.eu/</a>	THE UNIVERSITY OF EDINBURGH	Mark Parsons	m.parsons@epcc.ed.ac.uk	From 2015-10-01 to 2018-09-30	8.114.504	Closed	Basic Technology Projects started 2015
NLAFET	Parallel Numerical Linear Algebra for Future Extreme-Scale Systems	<a href="http://nlafet.eu/">http://nlafet.eu/</a>	UMEA UNIVERSITET	Prof. Bo Kågström	bokg@cs.umu.se	From 2015-11-01 to 2018-10-31	3.907.375	Closed	Basic Technology Projects started 2015
NoMaD	The Novel Materials Discovery Laboratory	<a href="https://nomad-coe.eu/">https://nomad-coe.eu/</a>	MAX-PLANCK-GESELLSCHAFT ZUR FORDERUNG DER WISSENSCHAFT EN EV	Matthias Scheffler	scheffler@fhi-berlin.mpg.de	From 2015-11-01 to 2018-10-31	4.910.624	Closed	Centres of Excellence in computing applications started 2015
OpenAIRE 2020	Open Access Infrastructure for Research in Europe 2020	<a href="https://www.openaire.eu/">https://www.openaire.eu/</a>	ETHNIKO KAI KAPODISTRIAKO PANEPISTIMIO ATHINON	Mike Hatzopoulos	mike@di.uoa.gr	From 2015-01-01 to 2018-06-30	13.000.000	Closed	
OpenAIRE -Advance	OpenAIRE Advancing Open Scholarship	<a href="https://www.openaire.eu/advance">https://www.openaire.eu/advance</a>	ETHNIKO KAI KAPODISTRIAKO PANEPISTIMIO ATHINON	Mike Hatzopoulos	mike@di.uoa.gr	From 2018-01-01 to 2020-12-31	9.999.998	Open	
OpenAIRE -Connect	OpenAIRE - CONNECTing scientific results in support of Open Science	<a href="https://www.openaire.eu/connect">https://www.openaire.eu/connect</a>	CONSIGLIO NAZIONALE DELLE RICERCHE	Donatella Castelli	donatella.castelli@isti.cnr.it	From 2017-01-01 to 2019-06-30	1.997.838	Closed	
OpenDreamKit	Open Digital Research Environment Toolkit for the Advancement of Mathematics	<a href="https://opendreamkit.org/">https://opendreamkit.org/</a>	UNIVERSITE PARIS-SUD	Nicolas M. Thiéry	Nicolas.Thiery@u-psud.fr	From 2015-09-01 to 2019-08-31	7.633.846	Closed	

## D9.3 Appendix

Project acronym	Project title	Web	Coordinator	Coordinator name	Coordinator e-mail	From... to...	EU contribution	Status (Dec-2019)	ETP4HPC classification
OpenRiskNet	OpenRiskNet: Open e-Infrastructure to Support Data Sharing, Knowledge Integration and in silico Analysis and Modelling in Risk Assessment	<a href="https://openrisknet.org/">https://openrisknet.org/</a>	DOUGLAS CONNECT GMBH	Dr. Thomas Exner	thomas.exner@douglasconnect.com	From 2016-12-01 to 2019-11-30	2.999.113	Closed	
OPERAS-D	Design for Open access Publications in European Research Areas for Social Sciences and Humanities	<a href="https://operas.hypotheses.org/projects/operas-d">https://operas.hypotheses.org/projects/operas-d</a>	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS	Pierre Mounier	pierre.mounier@openedition.org	From 2017-01-01 to 2018-06-30	408.586	Closed	
PhenoMenal	PhenoMeNaL: A comprehensive and standardised e-infrastructure for analysing medical metabolic phenotype data	<a href="http://phenomenal-h2020.eu/home/">http://phenomenal-h2020.eu/home/</a>	EUROPEAN MOLECULAR BIOLOGY LABORATORY	Christoph Steinbeck	steinbeck@ebi.ac.uk	From 2015-09-01 to 2018-08-31	7.697.734	Closed	
POP	Performance Optimization and Productivity	<a href="https://pop-coe.eu/">https://pop-coe.eu/</a>	BARCELONA SUPERCOMPUTING CENTER	Jesus Labarta	jesus.labarta@bsc.es	From 2015-10-01 to 2018-03-31	4.048.845	Closed	Centres of Excellence in computing applications started 2015
POP2	Performance Optimization and Productivity 2	<a href="https://pop-coe.eu/">https://pop-coe.eu/</a>	BARCELONA SUPERCOMPUTING CENTER	Jesus Labarta	jesus.labarta@bsc.es	From 2018-12-01 to 2021-11-30	7.605.999	Open	Centres of Excellence in computing applications starting 2018
PPI4HPC	Public Procurement of Innovative Solutions for High-Performance Computing	<a href="https://www.ppi4hpc.eu/">https://www.ppi4hpc.eu/</a>	FORSCHUNGSZENTRUM JULICH GMBH	Prof. Dr. Dirk Pleiter	d.pleiter@fz-juelich.de	From 2017-04-01 to 2021-09-30	25.967.653	Closed	
PRACE-5IP	PRACE 5th Implementation Phase Project	<a href="http://www.prace-ri.eu/prace-5ip/">http://www.prace-ri.eu/prace-5ip/</a>	FORSCHUNGSZENTRUM JULICH GMBH	Serge Bogaerts	S.Bogaerts@staff.prace-ri.eu	From 2017-01-01 to 2019-04-30	15.000.000	Closed	

## D9.3 Appendix

Project acronym	Project title	Web	Coordinator	Coordinator name	Coordinator e-mail	From... to...	EU contribution	Status (Dec-2019)	ETP4HPC classification
RDA Europe 4.0	The European plug-in to the global Research Data Alliance	<a href="https://rd-alliance.org/rda-europe">https://rd-alliance.org/rda-europe</a>	TRUST-IT SERVICES LIMITED			From 2018-03-01 to 2020-05-31	3.500.001	Open	
READ	Recognition and Enrichment of Archival Documents	<a href="https://read.transkribus.eu/">https://read.transkribus.eu/</a>	UNIVERSITAET INNSBRUCK	Dr. Günter Mühlberger	guenter.muehlberger@uibk.ac.at	From 2016-01-01 to 2019-06-30	8.220.715	Closed	
READEX	Runtime Exploitation of Application Dynamism for Energy-efficient eXascale computing	<a href="https://www.readex.eu/">https://www.readex.eu/</a>	TECHNISCHE UNIVERSITAET DRESDEN	Prof. Dr. Wolfgang E. Nagel	wolfgang.nagel@tu-dresden.de	From 2015-09-01 to 2018-08-31	3.534.198	Closed	Basic Technology Projects started 2015
RECIPE	RELIable power and time-Constraints-aware Predictive management of heterogeneous Exascale systems	<a href="http://www.recipe-project.eu/">http://www.recipe-project.eu/</a>	POLITECNICO DI MILANO	William Fornaciari	william.fornaciari@polimi.it	From 2018-05-01 to 2021-04-30	3.285.300	Open	Basic Technology Projects starting 2018/2019
RI Impact Pathways	Charting Impact Pathways of Investment in Research Infrastructures	<a href="http://ri-paths.eu/">http://ri-paths.eu/</a>	EUROPEAN FUTURE INNOVATION SYSTEM CENTRE	Alasdair Reid	contact@ri-paths.eu	From 2018-01-01 to 2020-06-30	1.498.718	Open	
SAGE	Percipient Storage for Exascale Data Centric Computing	<a href="http://www.sagestorage.eu/">http://www.sagestorage.eu/</a>	SEAGATE SYSTEMS UK LIMITED	Sai Narasimhamurthy	sai.narasimhamurthy@seagate.com	From 2015-09-01 to 2018-08-31	7.882.531	Closed	Basic Technology Projects started 2015
Sage2	Percipient Storage for Exascale Data Centric Computing2	<a href="http://www.sagestorage.eu/content/sage2-overview">http://www.sagestorage.eu/content/sage2-overview</a>	SEAGATE SYSTEMS UK LIMITED	Sai Narasimhamurthy	sai.narasimhamurthy@seagate.com	From 2018-09-01 to 2021-08-31	3.997.117	Open	Basic Technology Projects starting 2018/2019
UBORA	Euro-African Open Biomedical Engineering e-Platform for Innovation through Education	<a href="http://ubora-biomedical.org/">http://ubora-biomedical.org/</a>	UNIVERSITA DI PISA	Prof. Arti Ahluwalia	arti.ahluwalia@ing.unipi.it	From 2017-01-01 to 2019-06-30	992.250	Closed	
VECMA	Verified Exascale Computing for Multiscale Applications	<a href="http://www.vecma.eu/">http://www.vecma.eu/</a>	UNIVERSITY COLLEGE LONDON	Dr. Hugh Martin	h.martin@cbkscicon.com	From 2018-06-15 to 2021-06-14	3.999.478	Open	Basic Technology Projects starting 2018/2019

## D9.3 Appendix

Project acronym	Project title	Web	Coordinator	Coordinator name	Coordinator e-mail	From... to...	EU contribution	Status (Dec-2019)	ETP4HPC classification
VESTEC	Visual Exploration and Sampling Toolkit for Extreme Computing	<a href="https://vestec-project.eu/">https://vestec-project.eu/</a>	DEUTSCHES ZENTRUM FUER LUFT - UND RAUMFAHRT EV	Andreas Gerndt	<a href="mailto:andreas.gerndt@dlr.de">andreas.gerndt@dlr.de</a>	From 2018-09-01 to 2021-08-31	3.196.228	Open	Basic Technology Projects starting 2018/2019
VI-SEEM	VRE for regional Interdisciplinary communities in Southeast Europe and the Eastern Mediterranean	<a href="https://vi-seem.eu/">https://vi-seem.eu/</a>	ETHNIKO DIKTYO EREVNAS TECHNOLOGIAS AE	Dr. Ognjen Prnjat	<a href="mailto:oprnjat@admin.grnet.gr">oprnjat@admin.grnet.gr</a>	From 2015-10-01 to 2018-09-30	3.300.000	Closed	
VRE4EIC	A Europe-wide Interoperable Virtual Research Environment to Empower Multidisciplinary Research Communities and Accelerate Innovation and Collaboration	<a href="https://www.vre4eic.eu/">https://www.vre4eic.eu/</a>	GEIE ERCIM	Peter Kunz	<a href="mailto:peter.kunz@ercim.eu">peter.kunz@ercim.eu</a>	From 2015-10-01 to 2018-09-30	4.370.000	Closed	
West-Life	World-wide E-infrastructure for structural biology	<a href="https://about.west-life.eu/network/west-life/west-life">https://about.west-life.eu/network/west-life/west-life</a>	SCIENCE AND TECHNOLOGY FACILITIES COUNCIL	Martyn Winn	<a href="mailto:martyn.winn@stfc.ac.uk">martyn.winn@stfc.ac.uk</a>	From 2015-11-01 to 2018-10-31	3.981.125	Closed	
XDC	eXtreme DataCloud	<a href="http://www.extreme-datacloud.eu/">http://www.extreme-datacloud.eu/</a>	ISTITUTO NAZIONALE DI FISICA NUCLEARE	Daniele Cesini	<a href="mailto:daniele.cesini@cnaf.infn.it">daniele.cesini@cnaf.infn.it</a>	From 2017-11-01 to 2020-01-31	3.077.000	Open	
CYBELE	Fostering precision agriculture and livestock farming through secure access to large-scale HPC-enabled virtual industrial experimentation environment empowering scalable big data analytics	<a href="http://www.cybele-project.eu">www.cybele-project.eu</a>	WATERFORD INSTITUTE OF TECHNOLOGY	Dr. Alan Davy	<a href="mailto:sdavy@tssg.org">sdavy@tssg.org</a>	From 01/01/2019 to 31/12/2021	12.407.674	Open	HPC and Big Data testbeds

## D9.3 Appendix

Project acronym	Project title	Web	Coordinator	Coordinator name	Coordinator e-mail	From... to...	EU contribution	Status (Dec-2019)	ETP4HPC classification
DeepHealth	Deep-Learning and HPC to Boost Biomedical Applications for Health	<a href="https://deephealth-project.eu">https://deephealth-project.eu</a>	EVERIS SPAIN	Mónica Caballero	monica.caballero.gallete@everis.com	From 01/01/2019 to 31/12/2021	12.774.825	Open	HPC and Big Data testbeds
EVOLVE	HPC and Cloud-enhanced Testbed for Extracting Value from Diverse Data at Large Scale	<a href="https://www.evolve-h2020.eu/">https://www.evolve-h2020.eu/</a>	DATADIRECT NETWORKS FRANCE	Jean-Thomas Acquaviva	jtacquaviva@ddn.com	From 01/12/2018 to 30/11/2021	11.045.920	Open	HPC and Big Data testbeds
LEXIS	Large-scale Execution for Industry & Society	<a href="http://lexis-project.eu">http://lexis-project.eu</a>	VYSOKA SKOLABANSKA - TECHNICKA UNIVERZITA OSTRAVA	Jan Martinovic	jan.martinovic@vsb.cz	From 01/01/2019 to 30/06/2021	12.218.546	Open	HPC and Big Data testbeds
ENERXICO	Supercomputing and Energy for Mexico	<a href="http://www.enerxico-project.eu">www.enerxico-project.eu</a>	BARCELONA SUPERCOMPUTING CENTER	Rose Gregorio	rose.gregorio@bsc.es	From 01/06/2019 to 31/05/2021	1.999.030	Open	International Cooperation
HPCWE	High performance computing for wind energy	<a href="http://www.hpcwe-project.eu">www.hpcwe-project.eu</a>	THE UNIVERSITY OF NOTTINGHAM	Xuerui Mao	Xuerui.Mao@nottingham.ac.uk	From 01/06/2019 to 31/05/2021	1.995.651	Open	International Cooperation
ARGO	WCET-Aware Parallelization of Model-Based Applications for Heterogeneous Parallel Systems	<a href="http://argo-project.eu">http://argo-project.eu</a>	KARLSRUHER INSTITUT FUER TECHNOLOGIE	Jürgen Becker	becker@kit.edu	From 01/01/2016 to 31/03/2019	3.892.181	Closed	Other projects
EXAMODE	EXtreme-scale Analytics via Multimodal Ontology Discovery & Enhancement	<a href="http://www.examode.eu">www.examode.eu</a>	HAUTE ECOLE SPECIALISEE DE SUISSE OCCIDENTALE	Dr. Manfredo Atzori	manfredo.atzori@hevs.ch	01/01/2019 - 31/12/2022	4.333.281	Open	Other projects
M2DC	Modular Microserver DataCentre	<a href="http://m2dc.eu">http://m2dc.eu</a>	INSTYTUT CHEMII BIOORGANICZNEJ POLSKIEJ AKADEMII NAUK	Ariel Oleksiak	ariel@man.poznan.pl	From 01/01/2016 to 30/06/2019	7.998.935	Open	Other projects
OPRECOMP	Open transPRECision COMPuting	<a href="http://oprecomp.eu">http://oprecomp.eu</a>	IBM RESEARCH GMBH	Cristiano Malossi	acm@zurich.ibm.com	From 01/01/2017 to 31/12/2020	5.990.510	Closed	Other projects

## D9.3 Appendix

Project acronym	Project title	Web	Coordinator	Coordinator name	Coordinator e-mail	From... to...	EU contribution	Status (Dec-2019)	ETP4HPC classification
EUROLAB-4-HPC-2	Consolidation of European Research Excellence in Exascale HPC Systems	<a href="https://eurolab4hpc.eu">https://eurolab4hpc.eu</a>	CHALMERS TEKNISKA HOEGSKOLA AB	Per Stenström	<a href="mailto:per.stenström@chalmers.se">per.stenström@chalmers.se</a>	From 01/05/2018 to 30/04/2020	1.600.000	Open	Ecosystem development
EXDCI-2	European eXtreme Data and Computing Initiative - 2	<a href="http://exdci.eu">http://exdci.eu</a>	PARTNERSHIP F. ADVANCED COMPUTING IN EUROPE AISBL	Marjolein Oorsprong	<a href="mailto:m.Oorsprong@staff.prace-ri.eu">m.Oorsprong@staff.prace-ri.eu</a>	From 01/03/2018 to 31/08/2020	2.440.000	Open	Ecosystem development
HPC-EUROPA3	Pan-European Research Infrastructure on High Performance Computing	<a href="http://www.hpc-europa.eu">www.hpc-europa.eu</a>	CINECA CONSORZIO INTERUNIVERSITARIO	Paola Alberigo	<a href="mailto:staff@hpc-europa.org">staff@hpc-europa.org</a>	From 01/05/2017 to 30/04/2021	9.206.162	Open	Ecosystem development

## ANNEX 2: PROCESS Dissemination activities: Nov 2017 – Nov. 2019 period

### [1]Type of activity

- RE: PROCESS supported Event (organised/co-organised by PROCESS partner/s)
- 3PE: Third party event e.g. Workshop, Exhibition, Conference, etc
- N: News third-party: for news published in other website
- PR: Press release: published press releases
- M: Media: interview about the project
- W: Website links - third party: links from external website to the project's website

### [2]Type of audience:

- SCI: Scientific
- IND: Industry;
- OTH: Other audiences (academic, government...)

### [3]Status:

- D: Done
- P: Programmed

F:Foreseen, but not yet confirmed

### D9.3 Appendix

NO.	Activity type [1]	Partner	Title	Date	Location	Audience [2]	Size of Audience	Target countries	Status [3]
1	3PE	LMU	SuperComputing conference SC19. <a href="https://sc19.supercomputing.org">https://sc19.supercomputing.org</a>	18-21/11/2019	Denver, CO, USA	SCI, IND, OTH		International	D
2	3PE	LMU	Workshop on Solution Supporting Scientific Analysis in the EOSC Ecosystem	22/10/2019	Helsinki, Finland	SCI	15	Europe	D
3	RE	LMU	eScience 2019, Workshop on Platform-driven e-Infrastructure Innovations	24/09/2019	San Diego, CA, USA	SCI	50	International	D
4	RE	LMU	Invited Talk at the University of Southern California: 'Towards Exascale-ready Data Service Solutions'	20/09/2019	Los Angeles, CA, USA	SCI	25	International	D
5	3PE	LMU	EOSC Concertation Meeting - Workshop Building EOSC through the H2020 projects - current status & future directions	09/09/2019	Brussels, Belgium	OTH (EC), SCI	120	Europe	D
6	RE	LMU	Invited Talk at the Leibniz Supercomputing Center: 'PROCESS: Exascale-ready Solutions'	22/07/2019	Garching, Germany	SCI, IND	50	International	D
7	3PE	LMU	Workshop Creating Platform-Driven E-Infrastructure Innovation On EOSC	10/07/2019	Athens, Greece	SCI	50	Europe	D
8	3PE	LMU	Poster "PROCESS -- PROviding Computing solutions for ExaScale challengeS" @ ICCS 2019 <a href="https://www.iccs-meeting.org/iccs2019/">https://www.iccs-meeting.org/iccs2019/</a>	12-14 /06/2019	Faro, Portugal	SCI	400	Europe	D
9	3PE	LMU	EuroHPC Summit Week 2019, Workshop 'HPC Ecosystem Summit', <a href="https://events.prace-ri.eu/event/850/sessions/2674/attachments/880/1288/HPC_Ecosystem_Summit_-_Agenda_Concept_-_v05_CLEAN.pdf">https://events.prace-ri.eu/event/850/sessions/2674/attachments/880/1288/HPC_Ecosystem_Summit_-_Agenda_Concept_-_v05_CLEAN.pdf</a>	14/05/2019	Poznan, Poland	SCI, OTH (EC)	50	Europe	D

## D9.3 Appendix

NO.	Activity type [1]	Partner	Title	Date	Location	Audience [2]	Size of Audience	Target countries	Status [3]
10	3PE	LMU	SC18 supercomputer conference 2018 <a href="https://sc18.supercomputing.org/">https://sc18.supercomputing.org/</a>	11-16/11/2018	Dallas, TX, USA	SCI, IND, OTH		International	D
11	RE	LMU	eScience2018, Workshop on Platform-driven e-Infrastructure Innovations <a href="http://bit.ly/2MM3GoT">http://bit.ly/2MM3GoT</a>	29/10/2018	Amsterdam, The Netherlands	SCI	37	International	D
12	3PE	LMU	Poster at EnviroInfo 2018 <a href="http://www.enviroinfo2018.eu/">http://www.enviroinfo2018.eu/</a>	5-7/09/2018	Munich, Germany	SCI	130	International	D
13	3PE	UvA	Paper: Privacy-Preserving Record Linkage with Spark. At 19th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGRID)	14-17/05/2019	Larnaca, Cyprus	SCI		Europe	D
14	3PE	UvA	LOBCDER system for SKA use case (radio astronomy). At EGI Workshop Design your e-Infrastructure <a href="http://bit.ly/2N7RyNV">http://bit.ly/2N7RyNV</a>	09/05/2019	Amsterdam, The Netherlands	SCI		Europe	D
15	3PE	UvA	Application-defined infrastructures. At Container Technologies in Cloud and HPC Research and Commercial Applications <a href="http://bit.ly/2MKIWxM">http://bit.ly/2MKIWxM</a>	29/03/2019	Amsterdam, The Netherlands	SCI		Europe	D
16	3PE	UvA	Paper: Validating data integrity using blockchain technology. At International Workshop on Resource brokering with blockchain (RBchain)	10/12/2018	Nicosia, Cyprus	SCI		Europe	D
17	3PE	UvA	Poster: A Framework for creating data processing pipeline using online services. At IEEE eScience	29/10/2018	Amsterdam, The Netherlands	SCI		International	D
18	3PE	UvA	Towards a New Paradigm for programming Scientific workflows. At Bridging from Concepts to Data and Computation for eScience (BC2DC) workshop IEEE eScience.	24/09/2018	San Diego, CA, USA	SCI		International	D

### D9.3 Appendix

NO.	Activity type [1]	Partner	Title	Date	Location	Audience [2]	Size of Audience	Target countries	Status [3]
19	3PE	HES-SO	Concept Attribution with Regression Concept Vectors. IEEE Transactions on Multimedia Special Issue on Multimedia Computing with Interpretable Machine Learning			SCI		Europe	
20	3PE	HES-SO	Heterogeneous exascale computing. At IEEE International Conference on Intelligent Engineering Systems <a href="http://bit.ly/2JikOLO">http://bit.ly/2JikOLO</a>	21-23/06/2018	Las Palmas de Gran Canaria, Spain	SCI		Europe	D
21	PR	HES-SO	Appearance on ICCV daily magazine	29/11/2019	Seoul, South Korea	SCI		International	F
22	3PE	HES-SO	Interpreting intentionally flawed models with linear probes. At ICCV workshop on statistical deep learning in computer vision <a href="http://bit.ly/31JR2Lg">http://bit.ly/31JR2Lg</a>	27/10-02/11/2019	Seoul, South Korea	SCI		International	D
23	3PE	HES-SO	Poster presentation. At ICCV19	27/10-02/11/2019	Seoul, South Korea	SCI		International	D
24	3PE	HES-SO	Machine Learning in Medical Imaging. At International Conference on new research and development in technical and natural science <a href="http://bit.ly/2PmddV0">http://bit.ly/2PmddV0</a>	18-20/09/2019	Radenci, Slovenia	SCI		Europe	D
25	3PE	HES-SO	Visualizing and interpreting feature reuse of pretrained CNNs for histopathology. At Irish Machine Vision and Image Processing Conference IMVIP 2019 <a href="http://bit.ly/2N8fxMP">http://bit.ly/2N8fxMP</a>	28/08/2019	Dublin, Ireland	SCI		Europe	D
26	3PE	HES-SO	Talk Interpretability of Machine Learning Systems for Medical Imaging. At the University of Geneva <a href="http://bit.ly/2BB5daT">http://bit.ly/2BB5daT</a>	02/04/2019	Geneva, Switzerland	SCI	30	Europe	D
27	3PE	HES-SO	Conference: Improved interpretability for computer-aided severity assessment of retinopathy of prematurity. At SPIE Medical Imaging <a href="http://bit.ly/2BQGKi1">http://bit.ly/2BQGKi1</a>	16-21/02/2019	San Diego, CA, USA	SCI		International	D

## D9.3 Appendix

NO.	Activity type [1]	Partner	Title	Date	Location	Audience [2]	Size of Audience	Target countries	Status [3]
28	3PE	HES-SO	Discussion and presentation of the project at the Google Brain headquarters	February 2019	Palo Alto, CA, USA	SCI	4	Local	D
29	3PE	HES-SO	Talk Regression Concept Vectors to explain Deep Learning. At Swiss Machine Learning Day at EPFL <a href="http://bit.ly/2PdZtvG">http://bit.ly/2PdZtvG</a>	November 2018	Switzerland	SCI			D
30	3PE	HES-SO	Regression Concept Vectors for Bidirectional Explanations in Histopathology. At Workshop on Interpretability of Machine Intelligence in Medical Image Computing <a href="http://bit.ly/31NkaRX">http://bit.ly/31NkaRX</a>	16/09/2018	Granada, Spain	SCI	25	International	D
31	3PE	HES-SO	Seminar: Use Case 1. At the Argonne National Laboratory <a href="http://bit.ly/33ZeqG8">http://bit.ly/33ZeqG8</a>	23/08/2018	Argonne, Chicago, USA	SCI	15	International	D
32	3PE	HES-SO	Talk at the Quantitative Tumor IMaging Lab at Massachussets General Hospital <a href="http://bit.ly/2WbJxeS">http://bit.ly/2WbJxeS</a>	July 2018	Boston, MA, USA	SCI	10		D
33	3PE	HES-SO	Invited talk as alumni student at the Cambridge Engineering Departement <a href="http://bit.ly/31KbThi">http://bit.ly/31KbThi</a>	June 2018	Cambridge, UK	SCI	35		D
34	3PE	HES-SO	ISPDC 2018 <a href="http://lsds.hesge.ch/ISPDC2018/">http://lsds.hesge.ch/ISPDC2018/</a>	25-28/06/2018	Geneva, Swizerland	SCI			D
35	3PE	HES-SO	Talk at the Valais AI Workshop	April 2018	Lausanne, Switzerland	SCI	65		D
36	3PE	HES-SO	Presentation of Use Case 1. At eScience workshop <a href="http://bit.ly/31LpiWq">http://bit.ly/31LpiWq</a>	8-9/02/2018	Amsterdam, The Netherlands	SCI			D
37	3PE	HES-SO	Presentation of the project to the Swedish company ContextVision <a href="http://bit.ly/2JiiWYo">http://bit.ly/2JiiWYo</a>	December 2017		SCI	8	Local	D

### D9.3 Appendix

NO.	Activity type [1]	Partner	Title	Date	Location	Audience [2]	Size of Audience	Target countries	Status [3]
38	W	HES-SO	MedGIFT Website: <a href="http://medgift.hevs.ch/wordpress/projects/process/">http://medgift.hevs.ch/wordpress/projects/process/</a>	cont.	online	SCI		International	D
39	W	HES-SO	Research Gate: <a href="https://www.researchgate.net/project/PROCESS">https://www.researchgate.net/project/PROCESS</a>	cont.	online	SCI		International	D
40	W	HES-SO	Github: <a href="https://github.com/medgift/PROCESS_UC1">https://github.com/medgift/PROCESS_UC1</a>	cont.	online	SCI		International	D
41	W	HES-SO	Medium <a href="http://bit.ly/2oiEtZl">http://bit.ly/2oiEtZl</a>	cont.	online	SCI		International	D
42	3PE	UISAV/IISAS	Heterogeneous Exascale Computing. At Recent Advances in Intelligent Engineering. Topics in Intelligent and Informatics	2020	Springer chapter	SCI		International	F
43	3PE	UISAV/IISAS	Reduction of radio astronomical observations to sky maps as	28-30/10/2019	Dubrovnik, Croatia	IND		Europe	D
44	3PE	UISAV/IISAS	Slovak Investment and Trade Development Agency event	24/10/2019	Bratislava, Slovakia	SCI	200	International	D
45	3PE	UISAV/IISAS	Reference exascale architecture	24/09/2019	San Diego, CA, USA	SCI		International	D
46	3PE	UISAV/IISAS	eScience 2019, Workshop on Platform-driven e-Infrastructure Innovations <a href="https://escience2019.sdsc.edu">https://escience2019.sdsc.edu</a>	24/09/2019	San Diego, CA, USA	SCI		International	D
47	3PE	UISAV/IISAS	Machine Learning in Medical Imaging. At International Conference on new research and development in technical and natural science	18-20/09/2019	Radenci, Slovenia	SCI		Europe	D
48	3PE	UISAV/IISAS	Anomaly Detection Method for Online Discussion	19-21/08/2019	Halifax, Canada	SCI		International	D

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NO.	Activity type [1]	Partner	Title	Date	Location	Audience [2]	Size of Audience	Target countries	Status [3]
49	3PE	UISAV/IISAS	Artificial Intelligent (AI) Innovation in Cloud Computing and IoT (International Joint-Research and Training)	26/11/2018	Taipei, Taiwan	SCI	150	International	D
50	3PE	UISAV/IISAS	A resource usage prediction system using Functional-Link and Genetic Algorithm Neural Network for multivariate cloud metrics. The 11th IEEE International Conference on Service-Oriented Computing and Applications (SOCA'2018)	November 2018	Paris, France	SCI		International	D
51	3PE	UISAV/IISAS	eScience2018, Workshop on Platform-driven e-Infrastructure Innovations <a href="http://bit.ly/2MM3GoT">http://bit.ly/2MM3GoT</a>	29/10/2018	Amsterdam, The Netherlands	SCI	37	International	D
52	3PE	UISAV/IISAS	Keynote lecture: From Scalable, Semantically-based Distributed Computing to Exascale Computing (CGW'2018 workshop) <a href="http://www.cyfronet.krakow.pl/cgw18/programme.html">http://www.cyfronet.krakow.pl/cgw18/programme.html</a>	October 2018	Crakow, Poland	SCI		International	D
53	3PE	UISAV/IISAS	Clustering analysis of online discussion participants. In The 13th International Conference on Future Networks and Communications (FNC 2018)	13-15/08/2018	Gran Canaria, Spain	SCI		International	D
54	3PE	UISAV/IISAS	Exascale computing and data architectures for brownfield applications. In 14th IEEE International Conference on Natural Computation, Fuzzy Systems and Knowledge Discovery (ICNC-FSKD 2018) <a href="https://ieeexplore.ieee.org/abstract/document/8686900">https://ieeexplore.ieee.org/abstract/document/8686900</a>	20-30/07/2018	Huangshan, China	SCI		International	D
55	3PE	UISAV/IISAS	Crawling and Analysis of Online Discussions in Major Slovak National Newspapers. In 22nd IEEE International Conference on Intelligent Engineering Systems (INES 2018)	21-23/06/2018	Las Palmas de Gran Canaria, Spain	SCI		International	D

## D9.3 References

NO.	Activity type [1]	Partner	Title	Date	Location	Audience [2]	Size of Audience	Target countries	Status [3]
56	3PE	UISAV/IISAS	Predicting the probability of exceeding critical system thresholds. At CEUR Workshop Proceedings <a href="http://ceur-ws.org/Vol-2139/189-196.pdf">http://ceur-ws.org/Vol-2139/189-196.pdf</a>	May. 2018	Kyiv, Ukraine	SCI		International	D
57	W	UISAV/IISAS	Research Gate: <a href="https://www.researchgate.net/project/PROCESS">https://www.researchgate.net/project/PROCESS</a>	cont.	online	SCI		International	D
58	3PE	AGH/AGH-UST	eScience 2018. Workshop: Platform-driven e-infrastructure innovations - Presentation: <a href="http://dice.cyfronet.pl/projects/details/Process">http://dice.cyfronet.pl/projects/details/Process</a>	29/10/2018	Amsterdam, The Netherlands	SCI		International	D
59	3PE	AGH/AGH-UST	Poster. At KU KDM'18 <a href="http://dice.cyfronet.pl/projects/details/Process">http://dice.cyfronet.pl/projects/details/Process</a>	7-9/03/2018	Zakopane, Poland	SCI		Local	D
60	3PE	UNKNOWN	Digital Infrastructures for Research 2018	9-11/10/2018	Lisbon, Portugal	SCI		Europe	
61	3PE	UNKNOWN	Poster International Symposium on Grids and Clouds 2018 <a href="http://indico4.twgrid.org/indico/event/4/">http://indico4.twgrid.org/indico/event/4/</a>	6-23/03/2018	Taipei, Taiwan	SCI		Worldwide	

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COM (2016) European Cloud Initiative- Building a competitive data and knowledge economy in Europe.