ETP 4 HPC

EUROPEAN TECHNOLOGY PLATFORM FOR HIGH PERFORMANCE COMPUTING

ANNUAL REPORT 2020

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ETP4HPC Chairman
Jean-Pierre Panziera

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External contributions
- New members: Dell Technologies, Cendio AB, Do IT Systems SrL, Leonardo SpA, HypeAccelerator Solutions Ltd, CERFACS, Graphcore Ltd, EXAPSYS PC, Max Planck Computing and Data Facility, Thales, ZeroPoint Technologies, Pasqal, EMG2 SAS, SiPearl
- Article on projects Castiel, EuroCC, FF4EuroHPC: Miriam Koch

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cea
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DLR Deutsches Zentrum für Luft- und Raumfahrt
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doit SYSTEMS
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ECMWF
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Editorial

Jean-Pierre Panziera
ETP4HPC Chair

Dear ETP4HPC Members, Collaborators and Partners,

As the Chairman of our Association, I am satisfied with what we had achieved in the course of 2020, in spite of the rising operational difficulties, personal pain and the adverse economic prospects. ETP4HPC's membership base has grown by ten percent and the diversity of the members we acquired reflects the trend set by the TransContinuum Initiative, a very promising platform with the aim of broadening the scope of HPC and aligning it with other technologies. The processes within the EuroHPC RIAG which we preside over have matured. We have done some good work in the area of industrial use and our webinar series has proven to be a success. Furthermore, EuroHPC is bound to become an even more powerful mechanism as we're looking to become a critical player in its second phase.

As a technologist with decades of experience, I feel this is the time to reflect on the role of HPC and technology in general in our society. Would it not be appropriate to consider technology not only as the engine of economic growth, the source of new products and services but also as a means to balance out the scars we leave on the only home we all have: our planet? I think HPC, which has a potential to provide extremely efficient and environment friendly solutions, should be at the forefront of this new thinking.

I am certain this approach will be reflected in the future policy guidelines which affect our SRA work, our project ideas and research work.

As a European, I should stress the importance of technological sovereignty. While no continent should operate as an isolated island, the developments of last year show that Europe needs its own source of HPC and other advanced technologies. There are clear directions in this respect arriving from our policy-making counterparts, but I also think that this priority should pervade our activities. It does not mean precluding anyone within our ecosystem from participating in our work, but we must remain clear on our goals and the expectations of our stakeholders and our society.

On behalf of myself, the Office and the Steering Board, I would also like to thank all our Members for the trust they have put in our abilities to run the Association. Thanks are in order to the current Steering Board and the Office for getting our ship through the rough waters of 2020.

Following the elections on the 4th March, the task of managing ETP4HPC will be transferred to a new Steering Board and a new Chairman. I trust that they will continue to steer our vessel in the direction desired by all our Members.

Keep safe!

Our association

Maria Tóth joined the ETP4HPC Office on 1st September 2020. Maria has a long experience of European projects and is based in Hungary - a very welcome East extension of the ETP4HPC Office. Maria supports the office with project related activities (EXDCI-2, HPC-GIG) and also contributes to communication activities.

ETP4HPC – the European Technology Platform (ETP) for High-Performance Computing (HPC) - is a private, industry-led and non-profit association. Our main mission is to promote European HPC research and innovation in order to maximise the economic and societal benefit of HPC for European science, industry and citizens. Our main task is to propose research priorities and programme contents in the area of HPC technology and usage by issuing a Strategic Research Agenda (SRA). This SRA is used by the EuroHPC Joint Undertaking (JU) to define the contents of the HPC Technology Work Programmes.

We are a private member of the EuroHPC JU that provides mechanisms and resources to develop globally competitive European HPC systems, technology and application expertise. We have several representatives in EuroHPC's Research and Innovation Advisory Group (RIAG).

The ETP4HPC **Steering board**

The current Steering Board was elected at the Annual General Assembly on 13 March 2018, initially for 2 years, but as the 2020 General Assembly could not be held due to the Covid restrictions, is was extended until 2021. Its members represent:

- **European Research centres (5 seats):**
  BSC, CEA, Cineca, Fraunhofer, Forschungszentrum Jülich (FZJ)
- **European SMEs (4 seats):**
  E4 Computer Engineering, ParTec, Megware
- **European-controlled corporations (4 seats):**
  Atos, ESI Group, Infineon, Seagate
- **International companies with R&D in Europe (2 seats):**
  Fujitsu, Intel

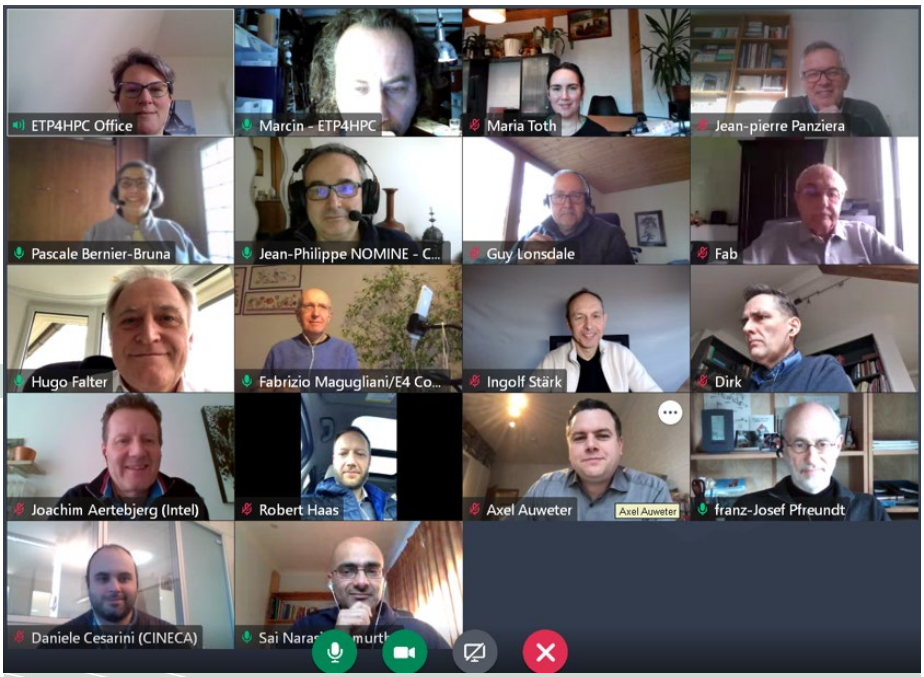
The Steering Board appointed the following Steering Committee:

- **Chairman:**
  Atos - Jean-Pierre Panziera
- **Vice-chair for Research:**
  CEA - Jean-Philippe Nominé
- **Vice-chair for Industry:**
  Seagate - Sai Narasimhamurthy
- **Secretary:**
  ParTec - Hugo Falter
- **Treasurer:**
  Fraunhofer - Guy Lonsdale

The ETP4HPC **Steering board**

The Office is in charge of day-to-day operations, under the supervision of the Steering Board. We have a distributed Office team, composed of professionals contributed by several of our members:

- **Pascale Bernier-Bruna (Atos):** communication, website, social media
- **Carolien Deklerk:** accounting
- **Maike Gilliot (Teratec):** office coordination, support to chairman, workshops...
- **Michael Malms (IBM):** SRA and TCI
- **Marcin Ostasz:** roadmap, industrial relations, member relations, back office
- **Maria Toth:** project related activities (EXDCI-2, HPC-GIG)



Our **members**

ETP4HPC has 105 members as of end 2020, representing 23 countries. The association welcomed 14 new members in 2020, passing for the first time the 100 mark. Four new industrial organisations joined – the number may seem low, but this is a 23.5% growth! Our members have diverse profiles, from HPC technology players active in Europe to HPC users: vendors - both large industrial companies and small SMEs, academic HPC research organisations and industrial HPC users.

BREAKDOWN OF OUR MEMBERS BY STATUTE AND PROFILE

STATUTE

- 63 Full members
  - 10 SMEs
  - 18 Industrial organisations
  - 35 Research organisations
- 42 Associated members
  - 30 SMEs
  - 3 Industrial organisations
  - 5 Research organisations
  - 4 Associations or individuals

PROFILE

- 61 Private sector
  - 40 SMEs
  - 21 Industrial organisations
- 44 Public sector
  - 40 Research organisations
  - 4 Associations or individuals

New members by order of arrival

Dell

Full member/
Global Organisation

Dell Technologies is a unique family of businesses that provides the essential infrastructure for organizations to build their digital future, transform IT and protect their most important asset: information. Dell EMC offers a wide spectrum of purpose-built systems including compute, network, storage and software for many types of HPC workloads. Dell Technologies carries out R&D activities related to HPC and supercomputing across Europe and has invested in numerous collaborations that advance hardware and software relevant to strengthening supercomputing capabilities in the region.
The Dell logo is a trademark of Dell Inc.

www.delltechnologies.com

Cendio AB

Associated member/
SME

Cendio develops and commercializes ThinLinc, a Linux remote desktop server built on open source technology. ThinLinc provides the possibility to get Graphical User Interface access to High Performance Computing for Technical and Scientific computing remotely. ThinLinc allows users to exploit HPC resources over a company LAN/WAN or over the Internet by sharing central server and GPU resources. It has native clients for Windows, Mac OS and Linux as well as HTML5. Our current mission is to provide the best Linux Remote Desktop Server.

www.cendio.com

Do IT Systems s.r.l.

Associated member/ SME

The company represents the natural evolution of its founders who come from more than twenty years of experience in the industrial high performance computing market. It inherits their technical and relationship skills, developed over the time while working with companies ranging from the small study up to the big multinationals operating in the industrial and manufacturing domain. The story of Do IT is characterized by a steady growth, this allows Do IT to be structured to meet the increasing reference market demands.

www.doit-systems.it

Leonardo S.p.A.

Full member/ Corporate European Organisation

Leonardo, a global high-technology company, is among the top ten world players in Aerospace, Defence and Security and Italy's main industrial company. Organized into five business divisions, Leonardo has a significant industrial presence in Italy, the United Kingdom, Poland and the USA, where it also operates through subsidiaries such as Leonardo DRS (defence electronics), and joint ventures and partnerships: ATR, MBDA, Telespazio, Thales Alenia Space and Avio. Product leadership: Helicopters, Aircraft, Aerostructures, Electronics, Cyber Security and Space.

www.leonardocompany.com

HypeAccelerator Solutions Ltd

Associated member/ SME

HypeAccelerator Solutions is a UK Technology Consultancy advising Corporations, Government and technology partners on data-intensive supercomputing for industry, science, artificial intelligence, machine learning and highperformance data analytics.
We use Accelerated, Disruptive Thinking across five core technology disciplines, to create innovative ideas and solutions – HPC, AI, Data Science, Future Architectures and Transformational Change.

http://hypeaccelerator.co.uk

CERFACS

Full member/ Research Organisation

Cerfacs is a mutualized centre of research, development, transfer and training regarding simulation and High Performance Computing. Involved in national and international projects, Cerfacs works closely with its seven shareholders from industry and public service (Airbus, Cnes, EDF, Météo France, Onera, Safran, Total), in partnership with CNRS (UMR CECI).

https://cerfacs.fr

New members by order of arrival

Graphcore Limited

Full member/ Corporate European Organisation

We're optimistic for a future where people live healthier, more informed, more creative lives. We see a world where technology enhances human potential, and takes us into a new era of intelligence and progress that everyone can benefit from. We let innovators create the next breakthroughs in machine intelligence. We believe our Intelligence Processing Unit (IPU) technology will become the worldwide standard for machine intelligence compute. The Graphcore IPU is going to be transformative across all industries whether you are a medical researcher, roboticist or building autonomous cars.
We have created a completely new processor, the IPU, specifically designed for AI compute. The IPU's unique architecture lets AI researchers undertake entirely new types of work, not possible using current technologies, to drive the next advances in machine intelligence.

http://graphcore.ai

EXAPSYS P.C.

Associated member/ SME

EXAPSYS (Exascale Performance Systems) is a start-up company focusing on commercially exploiting the research results of two Research Centres in the HPC area. The aim of EXAPSYS is to develop highly parallel innovative heterogeneous HPC systems and applications, utilizing FPGAs as well as other accelerators (e.g. AI accelerators).
The EXAPSYS core research and development team has extensive experience in developing a) Homogeneous and heterogeneous highly Parallel Systems, b) FPGA-based accelerators, c) Parallel heterogeneous IoT/CPS systems, d) Advanced simulators for highly parallel systems.

https://exapsys.eu

Max Planck Computing and Data Facility (MCPDF)

Full member/ Research Organisation

The Max Planck Computing and Data Facility (MPCDF) is a cross-institutional competence centre of the Max Planck Society to support computational and data sciences.
In close collaboration with domain scientists from different Max Planck Institutes the MPCDF is engaged in the development and optimization of algorithms and applications for high performance computing as well as in the design and implementation of solutions for data-intensive projects. The MPCDF operates state-of-the-art supercomputers, several mid-range compute systems and data repositories for various Max Planck institutes, and provides an up-to-date infrastructure for data management including long-term archival.

www.mpcdf.mpg.de

Thales

Full member/ Corporate European Organisation

Whenever a critical decision needs to be made, Thales has a role to play. Thales solutions help customers to make the right decisions at the right time and act accordingly in challenging environments. To help create a safer world, Thales serves five keys sectors: Aerospace, Space, Ground Transportation, Digital Identity and Security and Defence and Security. World-class technology, the combined expertise of 80,000 employees and operations in 68 countries have made Thales a key player in keeping the public safe and secure, guarding vital infrastructure and protecting the national security interests of countries around the globe. Thales is proud of the role he plays in a world that is increasingly mobile, interconnected, interdependent and dangerous. Innovation is nothing new at Thales; it has always been part of the Group's history and remains crucial to our success both today and in the future. Thales invests 1 billion euros a year in self-funded R&D, and more than 28,000 Thales employees are directly involved in research and technology.

www.thalesgroup.com

ZeroPoint Technologies

Associated member/ SME

ZeroPoint Technologies AB was incorporated in 2015 as a spinout from Chalmers University of Technology. The Intellectual Property Portfolio related to computer memory management was then acquired from the founders and transferred into the new startup. The Technology, ideas and many of the people behind and with ZeroPoint come from Pr Per Stenström's research group, which is internationally recognized for excellence within HPC.
Since its creation, ZeroPoint has attracted skilled people from industry, finance and the startup community and raised its first round of Venture Capital in 2016.
Our technology has received significant interest from server, embedded system and smart mobile SoC developers. Systems with memory compression are environmentally friendly and financially effective. They reduce hardware waste while they increase system performance and power efficiency. In short: More Performance per Watt.

www.zptcorp.com

Pasqal

Associated member/ SME

Founded in 2019, PASQAL develops and markets Quantum Processing Units (QPUs) that have the potential to address complex computing issues, from fundamental science to real-world grand challenges.
The company is a spin-out from Institut d'Optique in Palaiseau, one of the leading quantum research centres in the world.
Our QPUs are build based on a neutral atom technology. Atoms are added one-by-one. Therefore, the system provides a high flexibility level allowing to investigate different geometries, paving the way towards a Universal Quantum Processor. In addition, our technology is seen as the most scalable one as of today, setting the blueprint for a 1000-qubit processor by 2023 (technical details and an overview of some possible use cases can be found in the whitepaper available on PASQAL's website).

https://pasqal.io

EMG2 SAS

Associated member/ SME

EMG2 proposes hardware acceleration platforms and integrated servers for High Performance Computing, High speed Networking (>100GigE) and Deep Packet Inspection as well as for Smart Storage (Computational Storage), ML/IA and DataBase acceleration.

http://emg2.com/

SiPearl

Associated member/ SME

The Franco-German company SiPearl is designing the high-performance, low-power microprocessor to drive the move to exascale for European supercomputers. Developed within the European Processor Initiative (EPI), the consortium selected by the EU to support the development of the European microprocessor, SiPearl was created in June 2019 by Philippe Notton. Supported by Europe (specific grant agreement no.826647 under the Horizon 2020 programme), this privately-owned company is moving forward with the joint project of the EPI's 27 members.
Based on a roadmap that is closely aligned with the EU's goals, SiPearl's range of microprocessors will help drive the development of HPC and its applications in Europe. It will help ensure Europe's technological sovereignty and independence so that its businesses, its research centres and its institutions are able to meet strategic challenges in various fields, from artificial intelligence to health, weather forecasting, energy, defence, chemicals, engineering, cybersecurity, connected mobility and smart cities.

www.sipearl.com

The TransContinuum Initiative

Pascale Bernier-Bruna, *ETP4HPC Office*

To pursue and extend the collaborative work started around HPC in the Digital Continuum when we were preparing the latest edition of our Strategic Research Agenda, ETP4HPC now coordinates the TransContinuum Initiative (TCI). To materialise our commitment to this initiative, we have co-authored a TCI Vision document with 7 peer organisations. We published a joint Press Release on 11 December 2020[1] to announce this cooperation and promote the TCI Vision document. A common logo for the Initiative was also created.

This TCI Vision document outlines a vision for a horizontal collaboration between European associations and projects involved in IT technology, application and services provisioning for the Digital Continuum. This is a first step towards the necessary synchronisation of European efforts across domains.

The document is available on the ETP4HPC website[2].

The 8 partners in the TCI meet regularly under the leadership of our Michael Malms to prog ress toward the five objectives they set themselves:

1. Elaborate joint recommendations for R&D to be carried out in EU- or JU-funded work programmes addressing challenges in the digital continuum.
2. Engage with EU Research & Innovation funding entities to promote our recommendations.
3. Generate and foster an interdisciplinary network of experts in science and industry.
4. Contribute to Strategic Research [and Innovation] Agendas or any other road mapping documents issued by participating partners, specifically on interdisciplinary technical aspects, with a view to extend the concept of co-design to cover the entire continuum.
5. Contribute to the 5 Horizon Europe missions (adaptation to climate change including societal transformation, cancer, healthy oceans, seas coastal and inland waters, climate-neutral and smart cities, soil health and food.)

One of the first pragmatic actions will be to design the contribution of the Digital Twin enabler to the Horizon Europe missions.

1. www.etp4hpc.eu/news/247-transcontinuum-initiative-joint-vision-docume.html
2. www.etp4hpc.eu/transcontinuum-initiative.html

Our **7 partners in the TCI**:

- **5G IA**
  the 5G Infrastructure Association,
  https://5g-ia.eu/
- **AIOTI**
  the Alliance of Internet Of Things Innovation,
  https://aioti.eu/
- **BDVA**
  the Big Data Value Association,
  https://www.bdva.eu/
- **CLAIRE**
  the Confederation of Laboratories for Artificial Intelligence Research in Europe,
  https://claire-ai.org/
- **ECSO**
  the European Cybersecurity Organisation,
  https://ecs-org.eu/
- **EU-Maths-In**
  the European Service Network of Mathematics for Industry and Innovation,
  https://eu-maths-in.eu/
- **HiPEAC**
  project (High Performance Embedded Architecture and Compilation).
  https://www.hipeac.net/

Gearing up for the next SRA

Marcin Ostasz, *ETP4HPC Office*

Our plans for 2021 include work on the next Strategic Research Agenda, which should start in the third quarter, with the announcement of the SRA 5 Working Groups. In the meantime, the TransContinuum Initiative will provide further material to be used in the SRA.

But before getting to that, we opened the SRA 5 preparation process to all members of ETP4HPC, asking them for suggestions for the topics that should be covered in the ETP4HPC White Papers. These White Papers will constitute another element of the SRA 5 preparation process.

A White Paper is a four-to six-page document that will be issued prior to SRA 5. It should tackle a technical paradigm that should be addressed in SRA 5. The topics suggested should:

- be clearly identified and focused (i.e. one should avoid broad definitions)
- clearly define the issues to be analysed and be specific to the European HPC ecosystem, i.e. they should target areas that differentiate Europe from other regions and contribute to our competitiveness.

We are looking to issue two or three White Papers in total. The closing date for suggesting topics was 15 February 2021, so at the time of going to press the topics selected by our SRA Team are not known yet. They will be announced at the ETP4HPC General Assembly on 4 March.

If you missed the February deadline, you will have another opportunity later, as there will be another round of proposals later on in the year.

White paper
‘The Extreme Predictions Use Case’

By Peter BAUER, Marc DURANTON and Michael MALMS

Our first white paper was written in conjunction with HiPEAC and was published as part of the HiPEAC 2021 Vision (page 44).

www.hipeac.net/vision/2021/

Dealing responsibly with extreme events requires not only a drastic change in the ways society addresses its energy and population crises. It also requires a new capability for using present and future information on the Earth system to reliably predict the occurrence and impact of such events. A breakthrough in Europe’s predictive capability can be made manifest through science and technology solutions delivering as yet unseen levels of predictive reliability with real value for society.

The “TransContinuum Initiative”, initiated by ETP4HPC, ECSO, BDVA, 5GIA, EU MATHS IN, CLAIRE, AIOTI and HiPEAC, offers unprecedented opportunities to overcome the technological limitations currently hampering progress in this area. Beyond providing this use case with better technology solutions, the initiative offers a foundation for an Earth system – computational science collaboration that will eventually lead to science and technology being truly co-developed, and thus to sustainable benefit for one of today’s most relevant applications and for European technology providers.

Looking back on EuroHPC's achievements in 2020

Pascale Bernier-Bruna, *ETP4HPC Office*

As the EuroHPC JU is entering a new phase, let's look back on its tremendous achievements in the past year, despite the though context. EuroHPC now pulls together the resources of the EU and of 32 countries, including some non-EU member states, and includes also two private members, ETP4HPC and BDVA. Getting agreement between so many countries makes the European approach very challenging, but this is what the EU is all about: ensuring that all participating countries get more out of it than they would have if they were acting alone.

In 2020, the focus was on infrastructure, on procuring eight supercomputers, with the objective to have all eight operational by the end of 2021. The year also saw the launch of the first 3 EuroHPC-funded projects; the first 19 Research and Innovation projects were selected, and calls were launched for three advanced pilot systems and for the continuation of the European Processor Initiative.

PROCURING EIGHT EUROHPC SUPERCOMPUTERS

In 2020, the priority was to procure, jointly with the eight hosts and consortia selected in 2019, five petascale systems and three pre-exascale machines. The first EuroHPC JU procurement contract was signed in September 2020 for Luxembourg's MeluXina, and many others have followed. The selected systems will introduce a diverse technology base across the EU, with a variety of architectures excelling on different types of workloads.

EuroHPC pre-exascale supercomputers

1. **LUMI**, a 375 petaflops (sustained) system from HPE is under construction at CSC's datacentre in Kajani (Finland). The LUMI Consortium gathers Finland, Belgium, the Czech Republic, Denmark, Estonia, Iceland, Norway, Poland, Sweden, and Switzerland.
2. **Leonardo**, a 250 petaflops (sustained) machine from Atos, will be located in the new datacentre of CINECA in Bologna (Italy). The hosting consortium also includes Slovenia, Slovakia, Austria, Hungary, and Greece.
3. **MareNostrum5** will be hosted by the Barcelona Supercomputing Centre (Spain).

EuroHPC petascale supercomputers:

1. **MeluXina**, a 10 petaflops (sustained) system from Atos, is under construction at LuxProvide in Luxembourg. It will be the first national supercomputer in Luxembourg.
2. **VEGA**, a 6.8 petaflops (sustained) machine from Atos, is under construction at the Institute of Information Science in Maribor (IZUM) in Slovenia.
3. **Karolina**, a 9.13 petaflops (sustained) system from HPE, is being installed at the IT4Innovations National Supercomputing Centre in Ostrava (Czech Republic).
4. **PetaSC**, a 4.44 petaflops (sustained) machine from Atos, will be installed at the Sofia Tech Park (Bulgaria).
5. **Deucalion**, a 7.7 PFlops (sustained) system from Fujitsu and Atos, will be hosted by the Minho Advanced Computing Centre (MACC) in Portugal.

LAUNCHING THE FIRST 3 EUROHPC PROJECTS

The first three EuroHPC-funded projects, resulting from call EuroHPC-04-2019, started in September 2020. They are detailed in our next article Strengthening HPC in Europe: EuroCC, CASTIEL and FF4EuroHPC, p. 16.

All coordinated by HLRS in Stuttgart, those projects seek to boost European HPC knowledge and opportunities. EuroCC aims to bring the participating European countries to a common high level in HPC and AI. It will establish national competence centres in the participating countries. Its Coordination and Support Action CASTIEL links together the national centres throughout Europe to ensure successful collaboration. FF4EuroHPC aims to expand the use of high-performance computing among SMEs in Europe, building on the successes of the previous Fortissimo projects.

PREPARING THE LAUNCH OF 19 R&I PROJECTS

The EuroHPC JU selected 19 projects during the evaluation of its first research and innovation call (EuroHPC-2019-1), out of 38 received proposals. All of them are preparing to start in the first months of 2021.

Nine selected projects address the topic "Extreme scale computing and data driven technologies". They will focus on performance and efficiency of future exascale systems and leverage ongoing European efforts.

Five selected proposals address the topic "HPC and data centric environments and application platforms". They will focus on the development of energy-efficient HPC software and demonstrate significant use cases and pilot systems.

Five selected proposals address the topic "Industrial software codes for extreme scale computing environments and applications". They will further develop, adapt and optimize HPC software for applications in the European industry, while exploiting synergies with existing solutions. Two of those projects, LIGATE and SCALABLE, actually started in January 2021[1].

CALLS FOR 3 PILOTS AND FOR THE CONTINUATION OF EPI

Finally, EuroHPC launched two Research and Innovation calls. ETP4HPC, in its role with-in EuroHPC's Research and Innovation Advisory Group (RIAG), was instrumental in identifying the research priorities implemented in these calls.

Call EuroHPC-2020-1 included two topics. "Advanced pilots towards the European supercomputers", which closed on 15 September 2020, aims to demonstrate the integration of European technology building blocks developed for example in previously funded EU Research & Innovation (R&I) actions (European Processor Initiative and others) into fully integrated pilot supercomputing systems aiming at exascale performance. Two complementary pilot supercomputing systems will be supported under this topic: one leveraging the efforts on European low power general purpose processing technologies and a one leveraging the efforts on European open hardware solutions.

The second topic "Pilot on quantum simulator ", which closed on 28 July 2020, aims at deploying a quantum simulation infrastructure based on European technology, accessible to the European scientific and industrial user community.

Call EuroHPC-2020-02 "Framework Partnership Agreement in European low-power microprocessor technologies (Phase 2)" opened on 18 August 2020. It is a follow-up of the Specific Grant Agreement that established the European Processor Initiative (EPI) in 2018. It addresses the second phase of the research roadmap defined in the Framework Partnership Agreement and will provide the means to turn the most ambitious part of the European HPC research and innovation agenda into a reality.

LOOKING AHEAD TO EUROHPC "PHASE 2"

Two years after its establishment, the EuroHPC JU became autonomous on 24 September 2020. As of this day, the EuroHPC JU ceased to be under the supervision of the Directorate-General for Communications Networks, Content and Technology of the European Commission (DG CNECT), though the European Commission remains member of the EuroHPC Governing Board (50% of all votes). The EuroHPC JU now is solely responsible for its operations and has the capacity to implement its own budget, under the direction of Mr. Anders Dam Jensen, its Executive Director. Our association looks forward to contributing with content and knowledge to the "new" EuroHPC JU.

1. https://eurohpc-ju.europa.eu/news/new-projects-supporting-drug-design-response-pandemics-hpc-software-european-key-industries

Strengthening HPC in Europe: EuroCC, CASTIEL and FF4

The first three EuroHPC-funded projects – EuroCC, CASTIEL and FF4EuroHPC – started in September 2020, with one common target: strengthening HPC and its ecosystem in Europe. We interviewed two representatives of the projects, Dr. Bastian Koller from High-Performance Computing Center Stuttgart (HLRS) (coordinator of the three activities) and Dr. Guy Lonsdale from scapos (coordinating the Open Calls and part of the coordination team of FF4EuroHPC) to learn about the progress so far.

Bastian Koller

Question @Bastian Koller:
CASTIEL and EuroCC are two new projects that aim to build a framework for the European HPC landscape. What will this framework look like and what is its purpose?

Answer BK:
We're in the process of establishing, within EuroCC, national competence centres for high performance computing, or NCCs for HPC in short, one in each of the 33 participating countries. The long-term goal is to have these centres as the single point of access in each country to the national and European HPC ecosystem. The NCCs will act as orientation points for providers, users and scientists in the vast field of HPC, HPDA and AI. They will collect knowledge, resources and information about HPC in their country while being connected to each other, thus ensuring a strong European network (supported by the CASTIEL Coordination and Support Action).

Question @Bastian Koller:
How will you achieve the goal to strengthen European High-Performance Computing with these competence centres?

Answer BK:
The establishment of the EuroHPC Joint Undertaking and thus the implementation of a common European strategy for High-Performance Computing was the first crucial step for Europe. However, looking at the maturity level of the deployment of HPC and related technologies (HPDA and AI) by stakeholders from academia, industry and public administration, there is quite a difference when comparing the individual nations. What we generally need to do for a continuous progress is, on the one hand, help to highlight existing skills and excellence in HPC applications and technologies, on the other hand, develop new competencies and deepening of local knowledge and expertise. Thus, the next step – and this is our current focus – is mapping each nation's competences within each NCC, as well as networking and fostering the exchange of knowledge and capabilities within the network of NCCs. In this way, we will be able to achieve an understanding of differences and common ground, which helps us to close existing gaps and finally to bring HPC forward in Europe. To facilitate this, we started by establishing cross-NCC working groups focused on the identification and mapping of competences and comparing and aligning training efforts as well as interactions with industry.

4EuroHPC

Guy Lonsdale

Question @Guy Lonsdale:
Speaking of interaction with industry – for new technologies to be accepted in a broader industrial context it is important that especially small and medium sized enterprises take up the possibility. FF4EuroHPC strives for SMEs to experiment with HPC. How do you encourage them to do so?

Answer GL:
Well, in the first instance we can provide some of them funding to perform business-oriented experiments on the use of HPC. Small and medium sized enterprises, particularly from manufacturing and engineering sectors but potentially also from other key European industrial sectors, supported by HPC technology providers, can apply to our open calls. When selected, FF4EuroHPC finances pilot projects (or "experiments") that will each demonstrate how advanced HPC services can solve that SME's business challenges. These experiments will generate success stories that will be disseminated broadly to promote the potential impact of using HPC by the large, very heterogeneous field of SMEs in Europe. Another benefit is that we learn about the requirements from various fields of potential deployment, which helps us to better understand possible industrial uptake of HPC by all stakeholders.

Question @Guy Lonsdale:
So if we understand it correctly, experiments are at the heart of FF4EuroHPC and their results will be the project's main outputs. These application experiments will be undertaken with the help of two open calls, the first open call having closed in January 2021. When will the second call be open and what are its benefits for SMEs?

Answer GL:
Yes, exactly. The second call will be announced before the end of June 2021 with a submission deadline around the end of September. The benefits depend strongly on the business challenge being addressed for the participating company. In general, we can optimise design and operational workflows and processes (e.g. by introducing or optimising prototyping in the design process). What we observed in the previous Fortissimo projects was that the SMEs were able to see that they would be able to achieve savings in production costs and resources and become more competitive. In general, we can provide an assisted and funded trial of a technology growing in uptake and importance, across an enormous range of use cases. So I would strongly recommend that SMEs get in contact with us to learn how they can use HPC – and then apply to our next open call!

Thank you so much for your answers. We look very much forward to seeing the results of these three great initiatives!

CoEs started in 2020

The yearly Handbook prepared with the support of EXDCI-2 features the complete list and details of 50 on-going EC-funded projects related to HPC - including Centres of Excellence, HPC and Big Data testbeds, international cooperations, support actions, European Processor... Whether you are looking for project partners or just curious about the contents of the latest projects, you will find it all in our Handbook.

Download the PDF or browse online on :

www.etp4hpc.eu/european-hpc-handbook.html

Four new Centers of Excellence in computing applications started in October 2020, as a result of call INFRAEDI-05-2020. They join the 10 existing CoEs, under the umbrella of the FocusCoE support action.

Center of Excellence in Combustion

CoEC

The Centre of Excellence in Combustion (CoEC) is a collaborative effort to exploit Exascale computing technologies to address fundamental challenges encountered in combustion systems. The CoEC vision is aligned with the goals of decarbonization of the European power and transportation sectors and Europe´s vision to achieve net-zero greenhouse gas emissions (GHG) by 2050. The CoEC initiative is a contribution of the European HPC combustion community to a long-term GHG emissions reduction in accordance with the Paris Agreement. The consortium is composed by leading European institutions in the fields of computational combustion and High-Performance Computing and promotes a core of scientific and technological activities aiming to extend the state-of-the-art in combustion simulation capabilities through advanced methodologies enabled by Exascale computing.

www.coec-project.eu

@CoEC_EU **@coec-eu**

NOMAD

Predicting novel materials with specific desirable properties is a major aim of ab initio computational materials science (aiCMS) and an urgent requirement of basic and applied materials science, engineering and industry. Such materials can have immense impact on the environment and on society, e.g. on energy, transport, IT, medical-device sectors and much more. Currently, however, precisely predicting complex materials is computationally infeasible.
NOMAD CoE will develop a new level of materials modelling, enabled by upcoming HPC exascale computing and extreme-scale data hardware.

www.nomad-coe.eu

@NoMaDCoE

PerMedCoE

Personalised Medicine (PerMed) opens unexplored frontiers to treat diseases at the individual level combining clinical and omics information. However, the performances of the current simulation software are still insufficient to tackle medical problems such as tumour evolution or patient-specific treatments. The challenge is to develop a sustainable roadmap to scale-up the essential software for the cell-level simulation to the new European HPC/Exascale systems. Simulation of cellular mechanistic models are essential for the translation of omic data to medical relevant actions and these should be accessible to the end-users in the appropriate environment of the PerMed-specific big confidential data.
The goal of the HPC/Exascale Centre of Excellence in Personalised Medicine (PerMedCoE) is to provide an efficient and sustainable entry point to the HPC/Exascale-upgraded methodology to translate omics analyses into actionable models of cellular functions of medical relevance.

www.permedcoe.eu

@PerMedCoE @permedcoe

TREX

TREX federates European scientists, HPC stakeholders, and SMEs to develop and apply quantum mechanical simulations in the framework of stochastic quantum Monte Carlo methods. This methodology encompasses various techniques at the high-end in the accuracy ladder of electronic structure approaches and is uniquely positioned to fully exploit the massive parallelism of the upcoming exascale architectures. The marriage of these advanced methods with exascale will enable simulations at the nanoscale of unprecedented accuracy, targeting a fully consistent description of the quantum mechanical electron problem.

http://trex-coe.eu

@trex_eu @trex-eu

A selection of our activities

SRA presentation in the EuroLab workshop at HiPEAC 2020 Conference (Bologna, Italy)

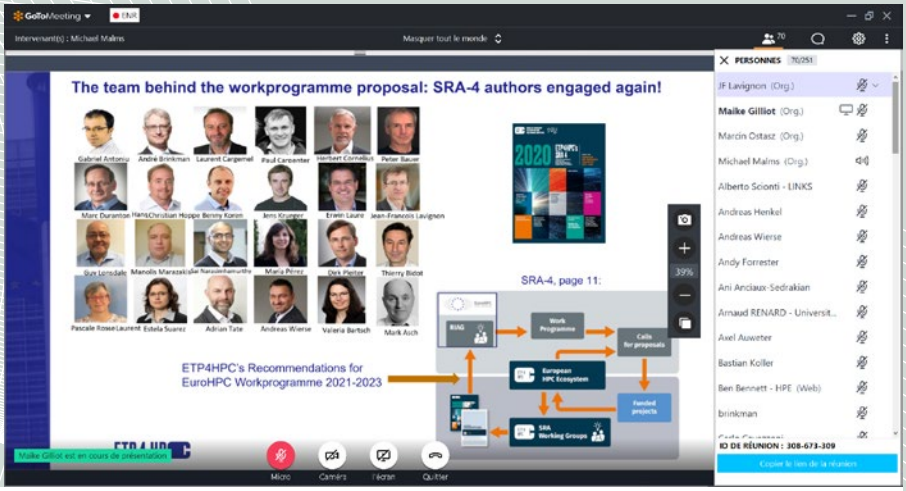
ETP4HPC was an invited speaker at the workshop "Making Europe Excel in HPC" organised by project EuroLab as a workshop within the HiPEAC 2020 conference. Jean-François Lavignon (former chairman of ETP4HPC) presented the fourth edition of our Strategic Research Agenda and our vision of HPC technology research for Europe. If we had only known at the time (21 January 2020) that this was going to be our only live event, we would have enjoyed Bologna even more...

Online workshop: HPC, Big Data, IoT and AI future industry-driven collaborative strategic topics

On 5 May 2020, BDVA and ETP4HPC coorganised an online workshop to analyse in depth the challenges, limitations and perspectives of the Large Scale Pilot actions currently being developed in the context of the ICT-11-2018-2019 calls. These pilots and test-beds deal with data coming from different industrial and business domains, such as manufacturing, health, agrifood, finance. Although the particular sectors covered by the pilots provide a diversity of challenges, there are many common difficulties that have to be overcome. Outcomes of this workshop will be relevant for the future research and innovation activities in both the EuroHPC JU, and the AI, Data and Robotics Partnership, and are meant to support alignment between both partnerships.
Over 80 participants representing HPC, Data, AI and IoT areas of expertise joined this online session with a good balance of Research, Industry, policy makers and other relevant players.

Organising and attending events in 2020 was extremely challenging in the context of the COVID pandemic. As of March, all planned events were either cancelled- such as the European HPC Summit Week, initially planned for March 2020 – or organised virtually. The ETP4HPC team adapted to the circumstances and developed its digital skills to continue to reach our public.

Online General Assembly



Initially planned on 5 March 2020 in Frankfurt, our 10th GA was finally held online on 26 May, when it became obvious that we would not be able to organise a live event anytime soon.

After the usual overview of the past year by our chairman Jean-Pierre Panziera, Thomas Skordas, Director of DG Connect's *Digital Excellence and Science Infrastructure Directorate* at the European Commission, was invited to present the evolutions of the EuroHPC JU and programme. Then Michael Malms, our expert in charge of the SRA, reported on the newly issued SRA 4 and on the ensuing TransContinuum Initiative led by ETP4HPC.

Voting was open by email, to approve the 2019 Activity Report and Financial Report. The General Assembly also approved an extension of the mandate of the current Steering Board "until the General Assembly can vote in a face-to-face meeting in 2021".

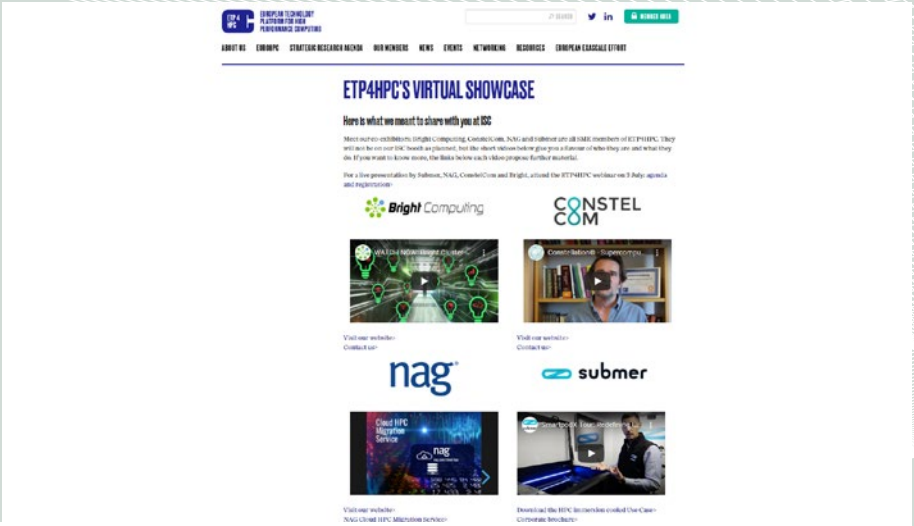
Launch of ETP4HPC webinars – TransContinuum Initiative (TCI)

In June 2020, ETP4HPC launched a series of regular webinars. We started with two webinars in June/July to share what we would normally have presented at ISC, and then as of September we found our regular pace with monthly webinars.

The inaugural webinar took place on 19 June. It focused on our Transcontinuum effort, which is a cooperative follow-up of our work on the Strategic Research Agenda. Two members of the Transcontinuum team, François Bodin and Zoltán Horváth, were invited to present, along with TCI coordinator Michael Malms.

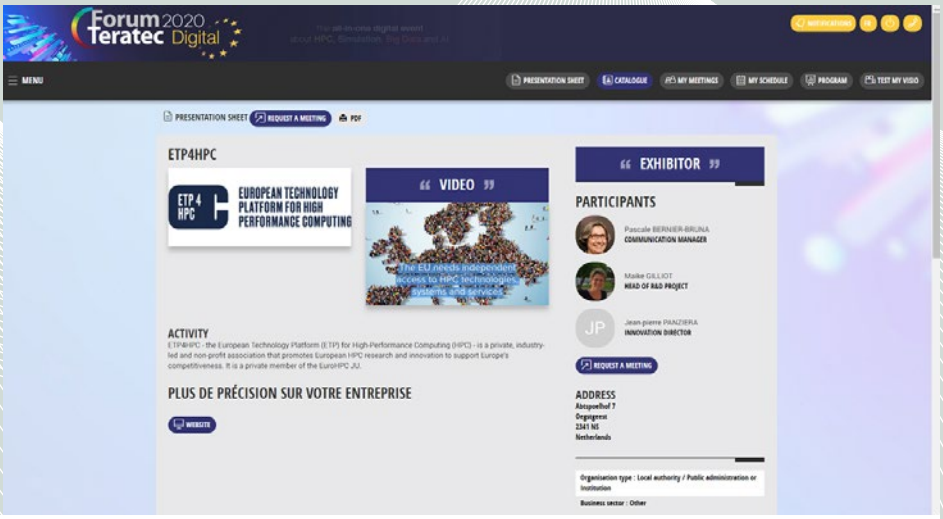
A selection of our activities

Around ISC: virtual booth and webinar



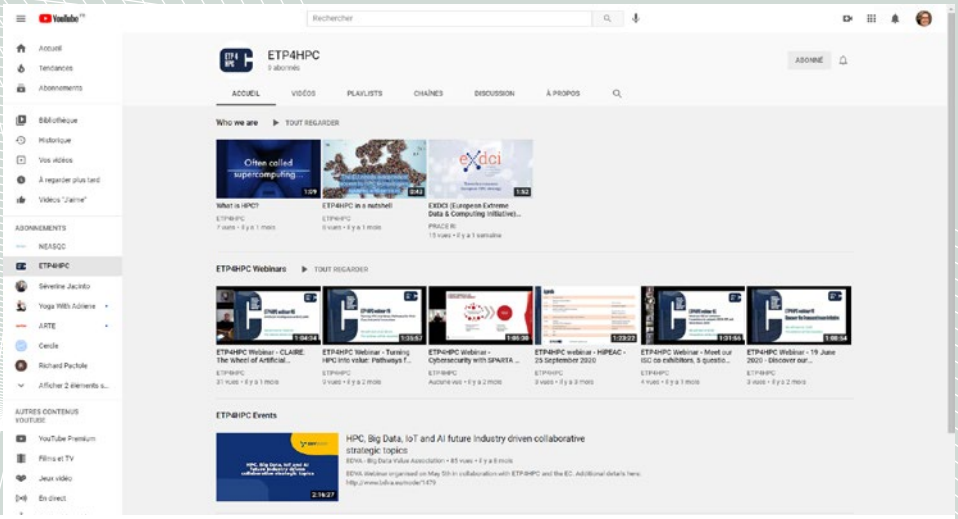
The cancellation of the ISC exhibition also cancelled the opportunity for four of our SME members to exhibit their solutions on the ETP4HPC booth. Bright Computing, ConstelCom, NAG and Submer had applied for a mini-booth. Instead we created a virtual showcase page on the ETP4HPC website with short videos, to give a flavour of who those four SMEs are and what they do – with links to further resources. All four were also invited for a brief talk during our 3rd July live webinar, which was dedicated to what we would normally have presented at ISC. During this webinar, we also asked 5 questions to 2 long-running projects: DEEP-EST and Mont-Blanc, to find out more about their results. This was of course not as effective as the real ISC, especially in terms of networking, but it nevertheless allowed the ETP4HPC team to maintain the link with our members and our community.

Teratec Forum



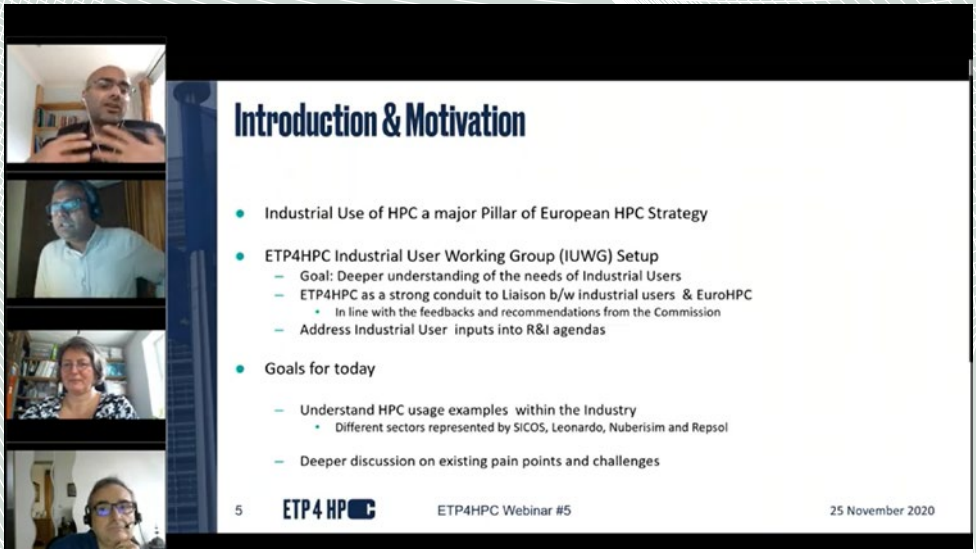
The Teratec Forum, initially due to take place in June near Paris, was finally held online on 13-14 October. The Teratec association managed to put together (in only six weeks from decision!), and successfully deliver a fully virtual event, complete with virtual exhibition, a video meeting platform for networking between attendees and exhibitors, and a full conference and workshop programme. Kudos to them! ETP4HPC had a virtual booth as part of the Europa Village that gathered many European projects and stakeholders. A short video introduced our association, and our dream team was available for online meetings. Both the exhibition and the conference programme were well-attended – with many pleasant informal exchanges going on live in the chat during conferences!

YouTube channel



With all events going online, with our webinar series, ETP4HPC now regularly has videos to share. We there-fore decided it was time to open our own YouTube channel. The recordings of our webinars are all stored there, but you can also find short videos about our association, as well as a playlist of ETP4HPC interviews that were published in various media.
Follow us on:
https://s.42l.fr/ETP4HPC-youtube

Webinar organised by our Industrial Users Working Group (IUWG)



On 25 November 2020, our IUWG had invited four industrial users with very different profiles, to share their experiences of using HPC as an industrial user.

- Repsol (the global energy company headquartered in Spain)
- Leonardo (a global high-technology company and Italy's main industrial company)
- SICOS (a German SME, spin-off of the Karlsruhe Institute of Technology (KIT) and the University of Stuttgart)
- Nuberisim (a German SME that offers CFD and Aero-Acoustic Simulation as a Service)

They all played the game, answered many questions from the audience, and we all learnt a lot from their testimonies!

The webinar was moderated by Sai Narasimhamurthy (chair of the ETP4HPC Industrial User Working Group and our Vice-chair for Industy), and Jean-Philippe Nominé (our Vice-chair for Research).
The replay is available on the ETP4HPC YouTube channel:
https://s.42l.fr/ETP4HPC-youtube.

Participation in events

Date	Event	Location	Participation of ETP4HPC
16/01/2020	**Steering Board meeting**	Online	
20-22/01/2020	**HiPEAC 2020 Conference**	Bologna, Italy	Poster, SRA talk by Jean-François Lavignon
03-05/02/2020	**11th European Innovation Summit: Implementing Horizon Europe: From Policy to Impact**	Brussels, Belgium	ETP4HPC represented by Jean-Philippe Nominé (talk in the Digital Transformation session)
04/03/2020	**Steering Board Meeting**	Online	
05/03/2020	**All members call**	Online	In lieu of the initially planned General Assembly
17/03/2020	**Steering Board Meeting**	Online	Extra call for RIAG election
23-27/03/2020	**EuroHPC Summit Week 2020 CANCELED DUE TO COVID-19**	Porto, Portugal	ETP4HPC co-organiser
26/03/2020	**Transcontinuum work session at EHPCSW CANCELLED - REPLACED BY SERIES OF CALLS**	Porto, Portugal	Michael Malms organiser
22/04/2020	**Steering Board Meeting**	Online	
05/05/2020	**Online workshop: HPC, Big Data, IoT and AI future industry-driven collaborative strategic topics**	Online	Michael Malms co-organiser with BDVA
25/05/2020	**Steering Board Meeting**	Online	
25/05/2020	**e-IRG Workshop**	Online	ETP4HPC represented by SB members Fabrizio Magugliani (E4) and Jean-Philippe Nominé (CEA)
26/05/2020	**ETP4HPC 10th General Assembly**	Online	
28/05/2020	**Steering Board Meeting I**	Online	
16/06/2020	**Follow-up workshop with ICT11 projects**	Online	Michael Malms co-organiser with BDVA
19/06/2020	**1st ETP4HPC webinar: Discover the Transcontinuum Initiative**	Online	
21-25/06/2020	**ISC 2020 CANCELLED**	Frankfurt, Germany	Booth
03/07/2020	**ETP4HPC webinar: Meet our ISC co-exhibitors**	Online	
03/07/2020	**BDVA workshop with ICT11 projects**	Online	Michael Malms co-organiser with BDVA
16/09/2020	**Steering Board Meeting**	Online	
25/09/2020	**ETP4HPC webinar: HiPEAC and friends**	Online	
13-14/10/2020	**Teratec Forum 2020**	Online	Virtual booth in Europa Village
23/10/2020	**ETP4HPC webinar: Cybersecurity with SPARTA**	Online	
28/10/2020	**Steering Board Meeting**	Online	
15-20/11/2020	**SC20**	Online	BoF submitted but not accepted
25/11/2020	**ETP4HPC webinar: Industrial users panel**	Online	Reused material from submitted SC BoF
26/11/2020	**Steering Board Meeting**	Online	
01-03/12/2020	**ICT 2020 CANCELLED**	Cologne, Germany	Submission for booth
02/12/2020	**Steering Board Exceptional Meeting**	Online	
15/12/2020	**ETP4HPC webinar: Artificial Intelligence with CLAIRE**	Online	
17/12/2020	**Steering Board Meeting**	Online	

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