

4th BDEC (Big Data and Extreme Computing) Closed Workshop, 15-17 June 2016, Frankfurt

Title: European HPC systems fulfilling the requirements of Big Data

Our objective at this workshop is to determine what system characteristics the future European HPC system should demonstrate in order to meet the needs of the Big Data user. As the European HPC technology projects and other related efforts converge into market-ready prototypes (i.e. the Extreme-Scale Demonstrators), it is critical to know what the Big Data community experts from their HPC providers.

ETP4HPC (www.etp4hpc.eu) is an industry-led advisory think tank of companies and research centres involved in High-Performance Computing technology research in Europe. Its aim is to build a world-class HPC Technology Supply Chain, increase the global share of European HPC and HPC technology vendors and maximise the benefit of HPC technology for the European HPC user community. ETP4HPC's contribution to the European HPC Ecosystem is the following:

- We define the **European HPC technology roadmap (SRA)**
- We **represent the European HPC technology value chain** in relationships with the European Commission (ETP4HPC representing the private side of a Public Private Partnership – PPP - with the Commission, while liaising with the Big Data Value Public Private Partnership, another EU PPP dealing with Big Data oriented business and services)
- We develop the **international collaborations** and relationships of the Ecosystem
- We **facilitate the development of SME's and start-ups**

Strategic Research Agenda

ETP4HPC issues and maintains its Strategic Research Agenda (SRA - <http://www.etp4hpc.eu/sra>) as a mechanism to provide contextual guidance to European Researchers and Businesses but also to guide EU priorities for research in the Horizon 2020 HPC programme. This SRA delineates a roadmap for the achievement of European exascale capabilities. The following are the area of HPC technology that we focus on, together with their main challenges:

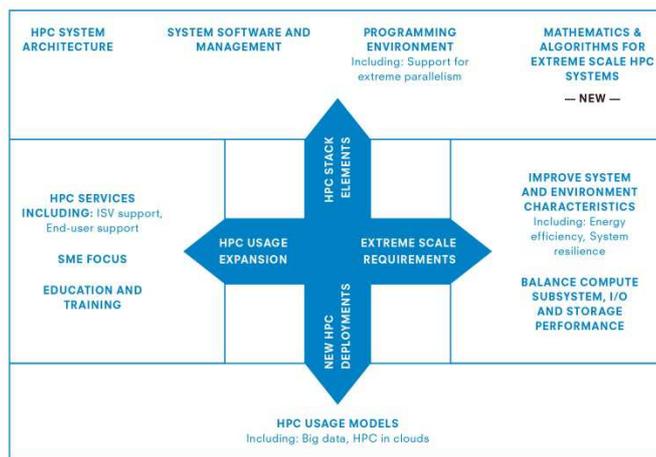
- HPC System Architecture and Components
- Energy and Resiliency, Programming Environment
- System Software and Management
- Big Data and HPC Usage Models
- Balance Compute, I/O and Storage Performance

- Mathematics and algorithms for extreme scale HPC systems
- Extreme-Scale Demonstrators – Full-scale prototypes built in order to validate the technologies produced by the European Exascale effort.

This work is carried out with the EXDCI project aimed at coordinating the European HPC strategy. Our model of European HPC technology is based on four dimensions as show below.

Data centric visions have already been put at the heart of our reflections and R&D recommendations since 2013. A number of projects funded under Work Programme 2014-2015 of Horizon 2020, aligned with our SRA (a 90M€ first programme), are already dealing with big data requirements and the convergence or evolutions of HPC architectures in this perspective.

We are particularly keen to support a more synergistic approach, so as to better coordinate EU-funded project but also to further leverage possible international cooperation (definition and possible standardisation of APIs and benchmarks, virtualisation, can be examples of potential topics discussions and efforts).



Extreme-Scale Demonstrators

The Extreme-Scale Demonstrators (EsDs - <http://www.etp4hpc.eu/en/esds.html>) are prototypes built out of the technologies produced by the European HPC technology projects (and other technologies available in the market, if needed). Their objective is to verify the preparedness of the technologies available for the delivery of complete and competitive HPC systems. The current Strategic Research Agenda (SRA) of ETP4HPC (available at: <http://www.etp4hpc.eu/sra>) contains a chapter defining the basic principle of the EsDs. ETP4HPC is currently working on defining the system requirements of the EsDs, including those dictated by the needs of Big Data. The EsDs need to represent market-viable and competitive products. We would like to work with the international Big Data community on defining such needs and how they should be reflected in the features of the future European systems.