

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

Workshop at the EuroHPC Summit Week 2021

March 23rd 2021, 15:00 to 16:00

Abstract

The integration of Big Data, AI, IoT, Cloud/Edge/Fog Computing and HPC technologies allows exploiting large volumes of data coming from diverse and heterogeneous data sources by deploying data processing and data analytics tasks along the Computing Continuum. Building upon previous workshops held during 2020 with the H2020 ICT11 projects, this session aims at identifying research and innovation needs in terms of convergence and alignment of the basic technologies and their utilization by industry, especially SMEs. Focus areas in the HPC-HPDA spectrum include Data, workflows, HPC/Cloud infrastructure to edge and AI/ML training. The session also aims at engaging the new EuroHPC JU projects addressing these focus areas. Outcomes 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 in between both partnerships.

Organiser: BDVA/DAIRO (*)

Objectives

The integration of Big Data, AI, IoT, Cloud/Edge/Fog Computing and HPC technologies allows exploiting large volumes of data coming from diverse and heterogeneous data sources by deploying data processing and data analytics tasks along the Computing Continuum.

BDVA organised in collaboration with ETP4HPC and the European Commission an online workshop, set up in two sessions (May 5th and July 3rd 2020), to analyse in depth the challenges, limitations and longer term perspectives of the Large Scale Pilot actions that are currently being developed in the context of the ICT-11-2018-2019 calls. These pilots demonstrate the potential of these technologies in the implementation of industrial pilot test-beds. These pilots and test-beds deal with data coming from different industrial and business domains, such as manufacturing, health and healthcare, Agrifood, Finance, and other business or public sector domains.

Based on the analysis of the outcomes, BDVA extracted a subset of future research and innovation needs in terms of convergence and alignment of the basic technologies and their utilization in industry and specially SMEs. This 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 in between both partnerships**.

In particular, BDVA has analysed the assessment and project-view on the following focus areas in the HPC-HPDA-spectrum:

- **Data:** avoidance of moving data, data curation and anonymizing, cross-IT infrastructure management.
- **Workflows:** approaches for mastering the complexity and orchestration. Would a reference architecture of workflows be helpful?
- **HPC/Cloud infrastructure to edge:** data movement, data sharing and orchestration, use of blockchain technology, cybersecurity, importance for industry (digital Twin context).
- **AI/ML, training:** need for automated ML, distributed training, explainability of the decision-making process.

This session aims at 1) informing about the outcomes of the work developed during 2020; 2) analysing more in depth some of the challenges based on the progress of H2020 ICT-11 projects (**); and, 3) extending the analysis involving a larger group of projects and in particular inviting the new EuroHPC JU projects (***).

Based on this analysis, the aim is to outline future research and innovation needs in terms of convergence and alignment of the basic technologies and their utilization in industry and specially SMEs.

Agenda

Time	Topic	Speakers/Participants
15:00 – 15:10	Introduction and objectives Presentation paper results from the workshops in 2020 Opening of the Mural interactive session for participants	María Pérez (UPM) María Pérez (UPM) Mattia Trino (BDVA/DAIRO)
15:10 – 15:50	Presentation from ICT-11 projects: <ul style="list-style-type: none"> • DeepHealth • CYBELE • LEXIS • Evolve • IoTwins • Infinitech 5-7 minutes per project based on guiding questions. Maximum 5 slides per project. Interaction with Mural and Q&A through the chat.	DeepHealth: Mónica Caballero (Everis) and Jon Ander Gómez (UPV). CYBELE: Sophia Karagiorgou (Ubitech). LEXIS: Jan Martinovič (IT4Innovations). Evolve: Jean-Thomas Acquaviva (DDN). IoTwins: Paolo Bellavista (UNIBO). INFINITECH: Ernesto Troiano (GFT).
15:50 – 16:00	Outcomes and closing remarks (based on input from projects and input from the audience and new EuroHPC JU project on Mural)	María Pérez (UPM)

(*) BDVA has recently updated its name to DAIRO, Data, AI and Robotics (DAIRO) aisbl. For communications purposes we continue using BDVA or BDVA/DAIRO in our communications

(**) ICT-11 targeted projects:

- **DeepHealth:** [Deep-Learning and HPC to Boost Biomedical Applications for Health](#)
- **IoTwins:** [Distributed Digital Twins for industrial SMEs: a big-data platform](#)
- **CYBELE:** [FOSTERING PRECISION AGRICULTURE AND LIVESTOCK FARMING THROUGH SECURE ACCESS TO LARGE-SCALE HPC-ENABLED VIRTUAL INDUSTRIAL EXPERIMENTATION ENVIRONMENT EMPOWERING SCALABLE BIG DATA ANALYTICS](#)
- **EVOLVE:** [HPC and Cloud-enhanced Testbed for Extracting Value from Diverse Data at Large Scale](#)
- **LEXIS:** [Large-scale EXecution for Industry & Society](#)
- **INFINITECH:** [Tailored IoT & BigData Sandboxes and Testbeds for Smart, Autonomous and Personalized Services in the European Finance and Insurance Services Ecosystem](#)

(***) EuroHPC projects targeted:

H20202-JTI-EuroHPC-2019-1 (“Extreme scale computing and data driven technologies”)

- SPARCITY
- RED-SEA
- TIME-X
- ADMIRE
- DEEP-SEA
- eProcessor
- DcomEX
- IO-SEA
- MAELSTROM

EuroHPC-2019-2 ("HPC and data centric environments and applications platforms")

- MICROCARD
- REGALE
- eFlows4HPC
- ACROSS
- HEROES

EuroHPC-2019-3 ("Industrial software codes for extreme scale computing environments and applications")

- LIGATE
- OPTIMA
- SCALABLE
- NextSim
- exaFOAM

-