What's Next for BigHPC? Parallel, Distributed, and Quantum Horizons

Abstract

The panel *"What's Next for BigHPC? Parallel, Distributed, and Quantum Horizons"* explored the future of high-performance computing (HPC), from emerging research directions to long-term challenges and opportunities. Panelists discussed the role of HPC and quantum computing in the era of Artificial Intelligence, strategies for sustainable and energy-efficient systems, and the application domains, such as climate modeling, drug discovery, and finance, that would benefit most from advances in parallel, distributed, and hybrid approaches.

Panelist short bios

Claudio Cicconetti

Claudio Cicconetti (Ph.D., 2003) is a Senior Researcher in the Ubiquitous Internet group at IIT-CNR, where he leads the |Quantum⟩ Lab. Prior to joining CNR, he served as R&D Manager at Intecs (2009–2013) and as Senior Software Engineer at MBI (2014–2018). He has managed several national and European projects, including FP7 CROWD and ESA SAT4NET, and has contributed to numerous other R&D initiatives at both national and international levels. He currently serves as the Technical Manager of the Horizon Europe project EDGELESS. In 2021, he was awarded a research grant by the Networking Team at Facebook. In 2023, he won the Quantum Internet Application Challenge. He is an Area Editor for IEEE Networking Letters, Computer Networks, and IET Quantum Communication, and regularly serves on the program committees of major international conferences. He has co-authored over 80 peer-reviewed publications and holds two international patents, with an h-index of 30 (Google Scholar). He is also a member of the Scientific and Technical Committee of GARR.

Biagio Cosenza

Biagio Cosenza is an associate professor at the University of Salerno, Italy. From 2015 to 2019, he was a senior researcher at the TU Berlin, Germany, where he was the principal investigator of the DFG project Celerity. From 2011 to 2015, he was a postdoctoral researcher at the University of Innsbruck, Austria, where he contributed to the Insieme compiler and the DK-Plus multidisciplinary platform. Cosenza's research focuses on high-performance computing and programming models; he is a member of the Khronos SYCL Working Group and the UXL Foundation. His research is currently funded by the EuroHPC Joint Undertaking (LIGATE project), the Italian Ministry of Research (LibreRT project), and several industrial projects.

Sandro Fiore

Sandro Fiore, Ph.D., Associate Professor at the Department of Information Engineering and Computer Science (DISI) of the University of Trento, where he leads the High Performance Climate Informatics Laboratory. His research activity focuses on scientific data management, computational sustainability,

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workflows, and provenance for climate change in extreme-scale HPC, distributed and cloud environments. He is actively involved in many European research infrastructure projects and initiatives, especially in the European Open Science Cloud context, developing middleware services and tools as well as applications for the scientific communities. He is co-chair of the Data Task Force of the European Network for Earth System Modelling and an active member of the Earth System Grid Federation, the distributed data infrastructure managing CMIP datasets for the IPCC.

Declaration on Generative AI

The authors have not employed any Generative AI tools.