International Symposium on Grids & Clouds (ISGC) 2023 in conjunction with HEPiX Spring 2023 Workshop

Sunday, 19 March 2023 - Friday, 31 March 2023

BHSS. Academia Sinica

Scientific Programme

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Tuesday, 7 May 2024

Track 1: Physics and Engineering Applications

Submissions should report on experience with physics and engineering applications, including high energy physics, that exploit grid and cloud computing services, applications that are planned or under development, or application tools and methodologies. Topics of interest include: (1)Data analysis and application including ML/DL based one; (2) Management of distributed data; (3) Performance analysis and system tuning; (4) Workload scheduling; (5) Management of an experimental collaboration as a virtual organization, in particular learning from the Covid19 pandemic; (6) Expectations for the evolution of computing models drawn from recent experience handling extremely large and geographically diverse datasets, and (7) Expectations for the evolution of computing operation etc. towards the carbon neutral.

Track 2: Health & Life Sciences (including Pandemic Preparedness Applications)

During the last decade, research in Biomedicine and Life Sciences has dramatically changed thanks to the continuous developments in High Performance Computing and highly Distributed Computing. The recent pandemic caused by Sars-CoV2 has clearly demonstrated the critical role of e-Infrastructures such high performance, high throughput and clouds infrastructure, but also of big-data and machine learning solutions to support the worldwide efforts to fight this pandemic. This track aims at discussing problems, solutions and application examples in the fields of health and life sciences, with a particular focus on non-technical end users. We invite in particular submissions concentrating on applications of pandemic response and preparedness in the areas of e.g. Drug discovery, Vaccine design, Structural biology, Bioinformatics, Medical imaging, Epidemiological studies and other Public health applications. Submissions should ideally highlight how different e-Science / e-Infrastructure solutions are being applied to fight / prepare for pandemics. Keywords: HPC, HTC, Pandemic, Drug discovery, Vaccine design, Structural biology, Bioinformatics, Medical imaging, Epidemiological studies

Track 3: Earth & Environmental Sciences & Biodiversity Applications

Environmental sciences are placing an increasing emphasis on the understanding of the Earth as a single, highly complex, coupled system with living and dead organisms. For example, feedback involving oceanic and atmospheric processes can have major consequences for the long-term development of the climate system, which in turn affects biodiversity, natural hazards and can control the development of the cryosphere and lithosphere. In this setting, natural disaster mitigation is one of the most critical regional issues in Asia. Despite the diversity of environmental sciences, many projects share the same significant challenges, where scientific computing and information technology play a central role in understanding data and studying complex systems. Technical challenges start with the collection of data from multiple distributed sensors (potentially in very remote locations) and the management of large data sets. Proper data management requires metadata fully specifying how, when and where the data were produced. Finally, results need to be presented to scientific users and stakeholders in a concise and intuitive form, requiring appropriate post-processing. This session addresses how these challenges are being handled, in particular with the aids of e-Science paradigms.

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Track 4: Social Sciences, Arts and Humanities (SSAH) Applications

Disciplines across the Social Sciences, Arts and Humanities (SSAH) have critically engaged with technological innovations such as grid- and cloud computing, and, most recently, various data analytic technologies. The increasing availability of data, ranging from social media text data to consumer big data has led to an increasing interest in analysis methods such as natural language processing, social network analysis, machine learning and text mining. These developments pose challenges as well as opening up opportunities and members of the SSAH community have been at the forefront of discussions about the impact that novel forms of data, novel computational infrastructures and novel analytical methods have for the pursuit of science endeavours and our understanding of what science is and can be. The ISGC 2023 SSAH track invites papers and presentations covering applications demonstrating the opportunities of new technologies or critically engaging with their methodological implications in the Social Sciences, Arts and Humanities. Innovative application of analytical tools for survey data, social media data, and government (open) data are welcomed. We also invite contributions that critically reflect on the following subjects: (1) the impact that ubiquitous and mobile access to information and communication technologies have for society more generally, especially around topics such as smart cities, civic engagement, and digital journalism; (2) philosophical and methodological reflections on the development of the techniques and the approaches by which data scientists use to pursue knowledge.

Track 5: Virtual Research Environment (including tools, services, workflows, portals, … etc.)

Virtual Research Environments (VRE) provide an intuitive, easy-to-use and secure access to (federated) computing resources for solving scientific problems, trying to hide the complexity of the underlying infrastructure, the heterogeneity of the resources, and the interconnecting middleware. Behind the scenes, VREs comprise tools, middleware and portal technologies, workflow automation as well a security solutions for layered and multifaceted applications. Topics of interest include but are not limited to: (1) Real-world experiences building and/or using VREs to gain new scientific knowledge; (2) Middleware technologies, tools, services beyond the state-of-the-art for VREs; (3) Science gateways as specific VRE environments, (4) Innovative technologies to enable VREs on arbitrary devices, including Internet-of-Things; and (5) One-step-ahead workflow integration and automation in VREs.

Track 6: Data Management & Big Data

The rapid growth of the data available to scientists and scholars – in terms of Velocity and Variety as well as sheer Volume – is transforming research across disciplines. Increasingly these data sets are generated not just through experiments, but as a byproduct of our day-to-day digital lives. This track explores the consequences of this growth, and encourages submissions relating to two aspects in particular - firstly, the conceptual models and analytical techniques required to process data at scale; secondly, approaches and tools for managing and creating these digital assets throughout their lifecycle.

Track 7: Network, Security, Infrastructure & Operations

Networking and the connected e-Infrastructures are becoming ubiquitous. Ensuring the smooth operation and integrity of the services for research communities in a rapidly changing environment are key challenges. This track focuses on the current state of the art and recent advances in these areas: networking, infrastructure, operations, and security. The scope of this track includes advances in high-performance networking (software defined networks, community private networks, the IPv4 to IPv6 transition, cross-domain provisioning), the connected data and compute infrastructures (storage and compute systems architectures, improving service and site reliability, interoperability between infrastructures, data centre models), monitoring tools and metrics, service management (ITIL and SLAs), and infrastructure/systems operations and management. Also included here are issues related to the integrity, reliability, and security of services and data: developments in security middleware, operational security, security policy, federated identity management, community management, and lessons learned from operations during the COVID-19 pandemic. Submissions should address solutions in at least one of these areas.

Track 8: Infrastructure Clouds and Virtualizations

This track will focus on the development of cloud infrastructures and on the use of cloud computing and virtualization technologies in large-scale (distributed) computing environments in science and technology. We solicit papers describing underlying virtualization and "cloud" technology including integration of accelerators and support for specific needs of AI/ML and DNN, scientific applications and case studies related to using such technology in large scale infrastructure as well as solutions overcoming challenges and leveraging opportunities in this setting. Of particular interest are results exploring the usability of virtualization and infrastructure clouds from the perspective of machine learning and other scientific applications, the performance, reliability and fault-tolerance of solutions used, and data management issues. Papers dealing with the cost, price, and cloud markets, with security and privacy, as well as portability and standards, are also most welcome.

Track 9: Converging High Performance Computing Infrastructures: Supercomputers, clouds, accelerators

The classical simulation-oriented computing is nowadays complemented by the machined deep learning approaches. This requires novel approaches to build and integrate high performance computing infrastructures, combining supercomputers, clouds, and specialized accelerator and artificial intelligence hardware. The integration of these different systems, often provided by different owners and different location, requires new ideas for distribution and federation. This track solicits recent research and development achievements and best practices in building and exploiting these converging high performance infrastructures or their components. The topics of interest include, but are not limited to the followings: (1) Building and use of modern high performance computing systems, including special support for AI and DNN in particular; (2) Experiences, use cases and best practices on the development and operation of large-scale heterogeneous applications; (3) Integration and interoperability to support coordinated federated use of different e-infrastructures (supercomputers, accelerated clouds, …) and their building blocks; (4) Use of virtualization techniques and containers to support access to and portability across different heterogeneous systems; (5) Performance of different applications on these integrated high performance infrastructures.

Track 10: Artificial Intelligence (AI)

During the last decade, Artificial Intelligence (AI) and statistical learning techniques have started to become pervasive in scientific applications, exploring the adoption of novel algorithms, modifying the design principles of application workflows, and impacting the way in which grid and cloud computing services are used by a diverse set of scientific communities. This track aims at discussing problems, solutions and application examples related to this area of research, ranging from R&D; activities to production-ready solutions. Topics of interests in this track include: AI-enabled scientific workflows; novel approaches in scientific applications adopting machine learning (ML) and deep learning (DL) techniques; cloud-integrated statistical learning as-a-service solutions; anomaly detection techniques; predictive and prescriptive maintenance; experience with MLOps practices; AI-enabled adaptive simulations; experience on ML/DL models training and inference on different hardware resources for scientific applications.