Lattice Practices 2015 @ JSC

The 6th training workshop "Lattice Practices" was held at JSC October 14 to 16, 2015. The scope of the Lattice Practices workshops is to provide training in state-of-the-art numerical techniques and the use of information technologies for research in lattice QCD (LQCD). Geared towards PhD students, young researches, and other interested LQCD practitioners, the workshops feature lectures on technical topics accompanied by hands on exercises, with strong emphasis on practical training. Furthermore, a few very recent scientific developments are covered, in order to expose the young researchers and students to potential areas of future research.

This year's workshop was organized by the Joint SimLab "Nuclear and Particle Physics" of Cyprus Institute, DESY, and JSC. Speakers from the SimLab partners and other European institutions gave technical lectures and hands-on tutorials on topics commonly dealt with in their field of research. The topics covered ranged from data analysis and numerical techniques over optimization strategies and computer architecture to "hot" LQCD, with accompanying hands on sessions. Here, the participants were given examples on basic techniques such as binning and error and autocorrelation analysis, but also given typical physics tasks they will likely encounter during their own research. A particular emphasis was put on optimal programming, when the course of lectures and exercises went on to introduce the attendees to code optimization techniques

and HPC architectures in general. This was completed by an introduction to numerical linear solver techniques and deepened in the accompanying exercises for both topics. Completing this year's course of lectures were two talks discussing new simulation techniques and LQCD at finite temperature.

This year's participants came from institutions all over Europe, from Italy to Ireland, but also from as far away as India. This interest demonstrates the need for this series of educational workshops, which was initiated in 2006. A next workshop is planned for spring 2017. The slides of the talks and material of the hands on sessions can be found on the web at: http://www.fz-juelich.de/ias/jsc/lap15

contact:
Stefan Krieg,
s.krieg@fz-juelich.de

• Stefan Krieg[1]
• Dirk Pleiter[1]
• Rainer Sommer[2]
• Karl Jansen[2]
• Hubert Simma[2]
• Stefan Schäfer[2]
• Constantia Alexandrou[3]
• Giannis Koutsou[3]

[1] Jülich Supercomputing Centre (JSC), Germany

[2] John von Neumann Institute for Computing (NIC), DESY Zeuthen

[3] Computation-based Science and Technology Research Center (CaSToRC), Cyprus

Smart Data Innovation Lab

The significantly growing data economy is driven by slogans like "data is the oil of the 21st century" or "the data speaks for itself". But in order to achieve "big insights from data", important research effort still needs to be made, e.g. in terms of parallel, scalable, and even real-time processing of large data quantities ("big data"). Structuring "big data" results in information (called "smart data") which in turn leads to knowledge advantages which can be used to answer important research questions or that contributed to better decision-making processes.

In order to be able to make fast use of this competitive edge for Europe, partners from industry and research have established the Smart Data Innovation Lab (SDIL). The close cooperation between industry and science is intended to improve the conditions for cutting-edge research in the area of data engineering, parallel and scalable machine learning, data mining, and smart data processing. Figure 1 illustrates the conceptual organization of the SDIL initiative.

Besides several important supporting activities with respect to data curation, law, and security, the core benefit of the SDIL initiative is to offer interested communities an SDIL data analytics platform with three cutting-edge industry hardware and software stacks. At the time of writing, the SAP HANA In-Memory database is available on 4 nodes with each 80 CPU-cores, 1 TB RAM, and 20 TB storage. This installation includes software packages like SAP Hana Studio, Client, Smart Data Streaming, Live Tools, and the Predictive Analysis Library. The Software AG Terracotta Big Memory MAX software is available on 8 cores with 64 GB RAM running in a virtual machine. The IBM Watson Foundations is also available with IBM InfoSphere BigInsighs on 6 nodes with each 20 cores, 0.5 TB RAM, and over 300 TB space. The Model-based Predictive Analytics system with IBM SPSS Modeler is provided on 1 node with 20 cores and 1 TB of RAM. The SDIL platform thus offers powerful analytics systems without license issues for SDIL users interested in performing research on modern technologies.
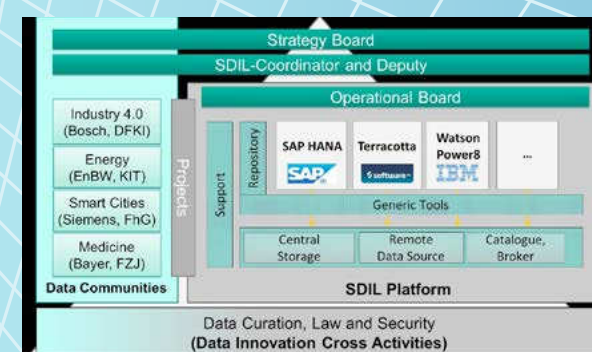

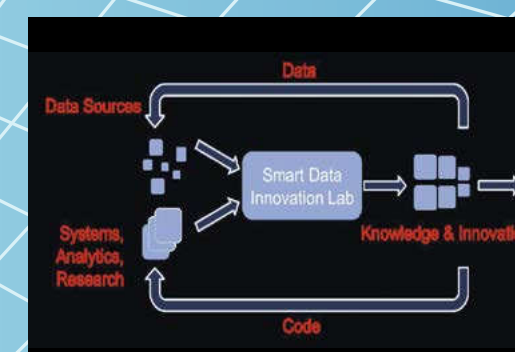Figure 1: Conceptual organization of the Smart Data Innovation Lab (SDIL).

Figure 2: SDIL combines data sources with cutting-edge systems, analytics, and research.