Opportunities and challenges in consolidating the Moroccan Digital Research Infrastructure for Multi-Disciplinary Science and Big Data Particle Physics Analysis

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Abstract:
Rapid advances in Digital Research Infrastructure constantly translate into new technologies in multiple aspects of knowledge and technology transfer. Big Data promises to revolutionise the Knowledge Outcomes within and beyond Multi-Disciplinary science, by enabling novel, highly efficient ways to plan, conduct, disseminate and assess research. The last few decades have witnessed the creation of novel approaches to produce, store, and analyse data, culminating in the emergence of the field of data science. This brings together Digital Research Infrastructure that includes computational, algorithmic, statistical and mathematical techniques towards extrapolating knowledge from Big Data. Particle physics field looks at the most fundamental structure of the universe – the particles that are its most basic building blocks, and the ways they interact with each other. The field has always been an early adopter of new technologies, applying them in the state-of-the-art discovery machines and experiments that produce floods of Big Data that can be analysed anytime and anywhere using shared and interlinked of heterogeneous research data via large digital infrastructures. The availability of vast amounts of data in machine-readable formats provides an incentive to create efficient procedures to collect, organise, visualise and model these data. Big Data challenges like these are not limited to high-energy physics. Researchers across Multi-Disciplinary Science see the newfound ability to link and cross-reference data from diverse sources as improving the accuracy and predictive power of scientific findings. Big Data are widely viewed as ushering in a new way of performing research and challenging existing understandings of what counts as scientific knowledge. Hence, the Digital Research Infrastructure must be discussed in what direction scientific computing should be going in order to address increasing computational demands and expected shortfalls. The challenges and opportunities of the Moroccan High Performance computing facility will be discussed. The building of a sustainable African networking framework to enhancing the collaboration between African countries in the digital Research Infrastructure will be addressed.