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Keynote: Co-designing Self-Service Digital Twin Workflows with DIY Cluster Toolbox and DRI Leasing Federation

Thursday 23 March 2023 09:00 (1 hour)

Per industry definition, objectives of Digital Twins (DTs) include facilitating real-time or on-demand investigation, impact studies, and recalibrating for monitoring, diagnostics and prognostics of virtual ecosystems representing real world scenarios. Efficient and secure implementation of complex workflows encompassing a wide range of experimental, observational and simulation computational and data science methods have been identified among the underpinning requirements for DTs. This talk covers two foundational building blocks for enabling complex and distributed workflows as the underlying technologies span from edge to supercomputing ecosystems. The first one is technical and the second one relates to business models. A do-it-yourself (DIY) cluster toolbox by the University of Bristol called Cluster-in-the-Cloud (CitC) has been co-designed for diverse workflows across different software defined, public cloud, IT infrastructure. In addition, these workflows rely on distributed data and compute resources, spanning from supercomputing facilities to cloud to the edge instruments. CitC enables flexible mapping and orchestration of software stacks pipelines and data-driven workflows. On the business model side, specifically for institutional, national, and internationally funded tier-n digital research infrastructure (DRI), there needs to be a resource allocation scheme managed in a federated manner across resource and service providers. This could be compared to a leasing model that can be deployed on a multi-tenant DRI. Domain-specific examples exist within global-scale science experiments and service providers consortia but not across them. A discussion on DT workflows as co-design driver use cases will be presented for realising a self-service and secure edge-cloud-supercomputing continuum.

Session chairperson: Michela Taufer

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