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The Semantic eScience Framework

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The goal of this effort is to design and implement a configurable and extensible semantic eScience framework (SESF). Configuration requires research into accommodating different levels of semantic expressivity and user requirements from use cases. Extensibility is being achieved in a modular approach to the semantic encodings (i.e. ontologies) performed in community settings, i.e. an ontology framework into which specific applications all the way up to communities can extend the semantics for their needs.We report on how we are accommodating the rapid advances in semantic technologies and tools and the sustainable software path for the future (certain) technical advances. In addition to a generalization of the current data science interface, we will present plans for an upper-level interface suitable for use by clearinghouses, and/or educational portals, digital libraries, and other disciplines.SESF builds upon previous work in the Virtual Solar-Terrestrial Observatory. The VSTO utilizes leading edge knowledge representation, query and reasoning techniques to support knowledge-enhanced search, data access, integration, and manipulation. It encodes term meanings and their inter-relationships in ontologies anduses these ontologies and associated inference engines to semantically enable the data services. The Semantically-Enabled Science Data Integration (SESDI) project implemented data integration capabilities among three sub-disciplines; solar radiation, volcanic outgassing and atmospheric structure using extensions to existingmodular ontolgies and used the VSTO data framework, while adding smart faceted search and semantic data registrationtools. The Semantic Provenance Capture in Data Ingest Systems (SPCDIS) has added explanation provenance capabilities to an observational data ingest pipeline for images of the Sun providing a set of tools to answer diverseend user questions such as “Why does this image look bad?.

http://tw.rpi.edu/portal/SESF