



Knowledge Network Architecture in Support of International Science

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ICSU (The International Council for Science) created the World Data System (WDS) as an interdisciplinary body at its General Assembly in Maputo in 2008, and since then the membership of the WDS has grown to include 86 members, of whom 56 are institutions or data centres focused on providing quality-assured data and services to the scientific community.

In addition to its objective of providing universal and equitable access to such data and services, WDS is also active in promoting stewardship, standards and conventions, and improved access to products derived from data and services.

Whereas WDS is in process of aggregating and harmonizing the meta-data collections of its membership, it is clear that additional benefits can be obtained by supplementing such traditional meta-data sources with information about members, authors, and the coverages of the data, as well as metrics such as citation indices, quality indicators, and usability. Moreover, the relationships between the actors and systems that populate this meta-data landscape can be seen as a knowledge network that describes a sub-set of global scientific endeavor.

Such a knowledge network is useful in many ways, supporting both machine-based and human requests for contextual information related to a specific data set, institution, author, topic, or other entities in the network. Specific use cases that can be realised include decision and policy support for funding agencies, identification of collaborators, ranking of data sources, availability of data for specific coverages, and many more.

The paper defines the scope of and conceptual background to such a knowledge network, discusses some initial work done by WDS to establish the network, and proposes an implementation model for rapid operationalisation. In this model, established interests such as DataCITE, ORCID, and CrossRef have well-defined roles, and the standards, services, and registries required to build a community-maintained, scalable knowledge network is presented.

We conclude with a short discussion on feasibility and sustainability of global data infrastructure, the role of the WDS Knowledge Network in this infrastructure, and the necessary conditions for success.