Research is now characterized by digital recording, storage/curation with provenance, analysis, modeling, mining, visualization and reporting. Moreover, increasingly it is characterized by cooperation and sharing, by re-use (for validation and for multidisciplinary research) and by new methods of digital intercommunication among researchers from videoconferencing to blogs and wikis to liquid publications. The end-to-end process of research – from idea to proposal to funded project to outputs – is supported by ICT (Information and Communication Technologies).

However, for this ICT support to operate effectively and efficiently, the various entities of the research domain require digital description to facilitate discovery, contextualization (for relevance and quality but including rights, costs, security, and privacy restrictions) and action. Initially describing datasets, metadata now is used also to describe software components, services (including workflows), persons, organizational units, projects, funding, facilities, equipment, computing resources including instrumentation, research outputs (publications, patents, products) and more. This permits portals to catalog assets and provide access for download and use but increasingly it allows VREs (Virtual Research Environments) to assist a researcher in constructing workflows over distributed and heterogeneous data and software to achieve the research objective. Metadata also allows research managers to assess research and produce research strategies.

To achieve all this, metadata must have formal syntax and declared (multilingual) semantics. Most existing metadata ‘standards’ do not meet these criteria, but many can be interconverted to a subset of a canonical form that does. This interconversion is critical for utilization of research assets from heterogeneous sources and across research domains and illustrative examples underline the point. Many research organizations and projects have utilized CERIF (Common European Research Information Format: a European Union Recommendation to Member States) as the canonical data model to meet these objectives. RDA (Research Data Alliance) is evolving a list of metadata elements to be recommended to support the operations described above; the set accords well with CERIF and – like CERIF - is a superset of other metadata ‘standards’.

The philosopher’s stone was reputed to turn base substances to valuable ones. The Rosetta stone permitted multilinguality. Metadata with formal syntax and declared semantics makes research assets valuable and available multilingually.