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# myExperiment 2.0 - preserving digital research objects using the Wf4Ever Architecture

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Increasingly, published research is based on digital artefacts such as scientific workflows, web services and public data sets. myExperiment is a social website for sharing workflows and data, used by scientists of different domains such as bioinformatics, chemistry and astrophysics.

myExperiment lets scientists build a structured aggregation or pack of the artefacts supporting a scientific work, which we call a Research Object. Packs may include a workflow, input data, reference data and the workflow results, thereby giving other researchers the ability to independently reproduce the virtual experiment and verify the results or reuse the work to analyse new data.

Research Objects can be collectively annotated, shared, published, modified, combined and derived, but are also subject to external changes, evolution and decay. For instance, rerunning a Research Object becomes difficult or impossible if its workflow depends on tools and services which are no longer executable. Similarly, researchers analysing the work might struggle to reuse a Research Object if it is not clear how its artefacts can be combined.

To address these preservation concerns we are developing “myExperiment 2.0” as both a software architecture and a reference implementation, called Wf4Ever. The Wf4Ever Architecture uses a Research Object Model to specify aggregations of digital artefacts with rich annotations, recording their provenance and evolution, and allowing sharing and collaboration through a set of decoupled RESTful Linked Data services.

The Wf4Ever Toolkit combines techniques such as analysing and comparing workflow structures, provenance traces from automated workflow reruns and utilising workflow integrity and authenticity checking in order to detect Research Object decay, replay past workflow executions, attempt automated repair and recommend replacement workflow fragments.

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