

Modelling generic e-Scholarship infrastructure with the e-Framework

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SERVICE ORIENTED ARCHITECTURE IN E-SCHOLARSHIP

Two problems hamper sharing of content in digital repositories in research, and the humanities in particular. First, most content is in silos, trapped by institutional, technological or disciplinary barriers. Secondly, recurrent functional requirements across domains are not taken advantage of, making business analysis and software implementation expensive and inefficient. We address both problems, by proposing a method for developing blocks of generic functionality expressed in terms of standards-compliant services, to solve recurrent requirements regardless of discipline. While the method has broad applicability, we focus on repositories as a particularly frequent and important example.

GENERIC SERVICE-BASED SOLUTIONS TO RECURRENT REQUIREMENTS

Functional requirements – such as “let users annotate items” and “show search results from linked repositories, obtained through harvest” – recur frequently across domains and institutional contexts. Yet due to a false perception that each discipline and institution’s requirements are unique, these requirements are collected, analysed and implemented repeatedly, with both effort and gained knowledge wasted – a problem recognised by Project Bamboo, as discussed later. Capturing these requirements in small packages that link requirements with generic service-oriented solutions is thus doubly beneficial. First, the functional requirements collection process is immediately elevated to a higher level of abstraction, with potential for reuse of existing service components. Secondly, the solutions proposed are service-oriented, since the well-defined exchange of information is crucial for avoiding the construction of new silos.

AUSTRALIAN WOMEN’S ARCHIVE PROJECT

The Australian Women’s Archive Project is an example of a project moving into the post-silo era. AWAP’s principle content repository, the Australian Women’s Register (AWR), publishes data to the web which is discoverable, citeable and “scrapable”. Analysis of their requirements using the techniques described below revealed how their needs can be described in blocks of generic functionality, which can then in turn be mapped onto existing deployed services, new services that can be implemented with off-the-shelf software, and very little custom development.

PROJECT BAMBOO

Project Bamboo, funded by the Andrew F Mellon Foundation, is an ambitious cross-disciplinary initiative to improve the use of digital technologies in the humanities. Given such a broad scope, it is focused on identifying recurrent services across the humanities, refactoring existing services or building new ones, then deploying them on a generic “Bamboo Platform”. Still in the planning process, Bamboo has not yet chosen a methodology for the service analysis or mapping to its user requirements, expressed as “scholarly narratives” and “recipes”. With AWAP, we contributed a scholarly narrative² and two recipes^{3,4}, and this analysis thus demonstrates a possible solution to Bamboo’s task of analysing user requirements to find redeployable services.

USING THE E-FRAMEWORK TO MODEL FUNCTIONALITY BLOCKS

The e-Framework for Education and Research⁵ provides a shared framework and set of tools for describing core infrastructure in terms of well-defined and understood descriptions of services. To describe AWR’s requirements in generic terms, a number of blocks of reusable functionality were developed. The notion of a “collection” of items is taken as a starting point.

- Collection: Add, Read, Replace, Remove items.
- Searchable Collection: Collection with browsing and search features.
- Syndication: Harvest metadata from other collections, syndicate metadata from this one.
- Annotation: Users attach information to any published object.
- Contribution: Create entries online.
- Reviewing: Force new items to go through a two stage review process.

Each SUM orchestrates services and datastores to provide functionality including exposed services. A new form of diagram based on UML component diagrams, the SUM Composition Diagram shows explicitly how the SUM can be integrated with others.

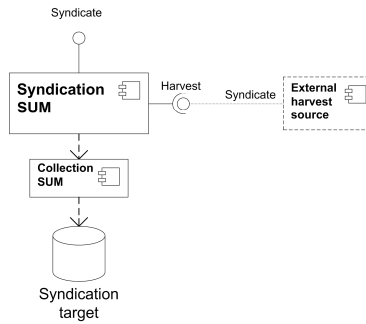


Figure 1 Syndication: A simple example of a SUM Composition Diagram.

In the case of the collaborative encyclopaedia, all of the above blocks – including several instances of some – were integrated to produce a complete description of a generic collaborative encyclopaedia with syndication, annotation and reviewing features. However, the SUMs are generic enough to be used in a wide range of contexts and domains.

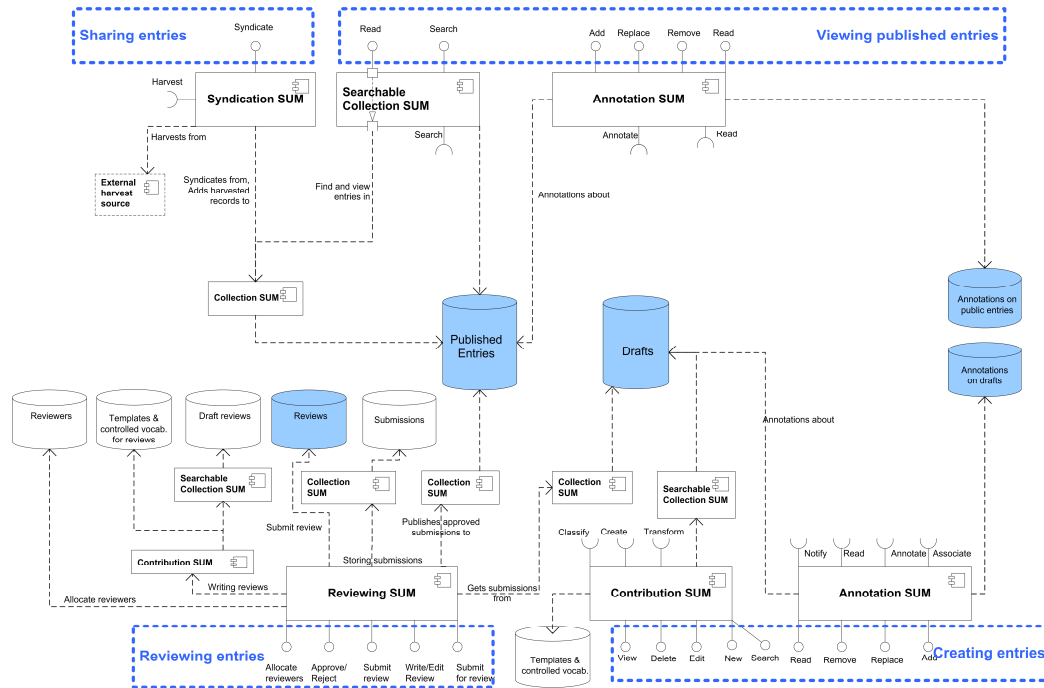


Figure 2: SUM Integration Diagram for Collaborative Encyclopaedia

WHAT NEXT?

We anticipate further developing and publishing the range of SUMs described above. It will then be up to bodies like Project Bamboo to take this approach and build demonstrator services to quantify their effectiveness in solving problems in e-Research. This will happen by improving the analyses with user input to identify gaps, then implementing systems based on them, to quantify the efficiency benefits of an infrastructure driven approach based on generic requirements.

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