CONSTRUCTING ASSESSMENTS USING TOOLS AND SERVICES (CATS)

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Overview

CATS is a JISC ELF Demonstrator project and represents a collaborative undertaking between the Universities of Strathclyde and Edinburgh. Its goal is to develop a system which returns a complete content-packaged assessment – i.e. a structured set of items - by querying one or more item banks. The main tasks of the project are to:

- analyse and scope the functional requirements of such a system
- create web services to search for, retrieve and aggregate items held in item banks
- utilise and build upon the outputs of two previous JISC ELF projects – SPAID and Discovery Plus (D+)
- consult with assessment domain practitioners

The **SPAID** (Storage and Packaging of Assessment Item Data) system will be used to establish and populate a test item bank. The **D+** system will be enhanced to search for and retrieve assessment items held in one or more item banks. The consultation exercise will canvass practitioners about the types of query they would wish to specify inside a CATS "profile" (see below).

Prototype System Design

Figure 1 represents the high-level web-service architecture of the CATS prototype system. It also illustrates the processing of a request to produce an aggregation of assessment items as a content package. It assumes that at most two item banks will be searched.
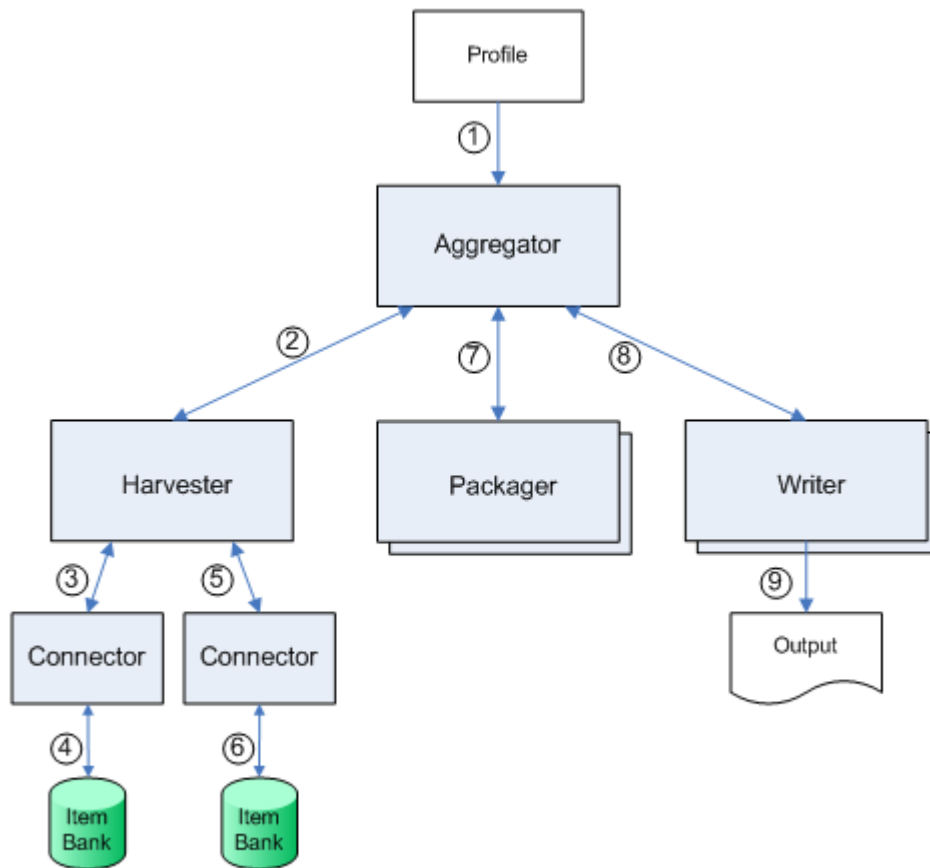
Figure 1: Design of CATS prototype system

The input to the CATS system is a static user-defined "profile" – a parameter file specifying *inter alia*

- the query to execute (e.g. "retrieve 10 geometry items")
- the identifier(s) of the target item bank(s) to search
- the identifier of a content packaging service
- the identifier of a file writing service

The first step is to issue a request to the Aggregator service, passing in a profile (*Step 1*). The Aggregator subsequently calls the Harvester service, supplying the query and the list of target item banks from the profile (*Step 2*).

The Harvester creates an instance of a Connector service for the first target item bank (*Step 3*). A Connector is a D+ based service which searches for and retrieves entire items stored within a specific item bank.

The Connector executes the query on the target item bank; matching items are returned (*Step 4*).

The Harvester may then call another Connector; for example, the number of items returned from the first bank may fall short of the total number requested in the profile. In this case, the Harvester will create an instance of a new

Connector for the next target bank (*Step 5*). This scenario represents invoking, inside the Harvester service, a "collation algorithm" i.e. a prescribed set of steps which resolves a query across the available item banks.

This second Connector instance executes the same query on the second target item bank; again matching items are returned (*Step 6*).

The Aggregator passes all the items returned by the Harvester to the Packager service specified in the profile; the Packager then returns a content package (containing manifest and packaged item(s)) (*Step 7*).

The Aggregator then passes this content package to the Writer service specified in the profile (*Step 8*).

Finally, the Writer outputs the data file(s) for the package (*Step 9*).

Future Enhancements to CATS

We have identified potential enhancements to the current system e.g.

- The prototype has no user-interaction. We believe there are several points during the flow of execution where user intervention would be valuable e.g.
    - allow user to build a search query interactively, using a GUI interface
    - allow user to preview, then retain or reject items returned to the Harvester, and re-query Harvester for more items if desired
- Support a variety of collation algorithms inside the Harvester (e.g. parallel searching of multiple targets)
- Allow specification of output destination e.g. the ability to send a complete assessment directly to an external AMS (Assessment Management System).

Workshop

The workshop will provide a useful opportunity to report work to date and capture feedback on the CATS project.

In this session we will:

- present an overview of the project
- demonstrate the functionality of the CATS prototype
- conduct a group-based discussion covering:
    - the overall practical value of such a system
    - the design approach we have taken
    - use-cases and scenarios
    - possible future enhancements to the system