

# Serving Mathematics

in a distributed e-learning environment

[http://maths.york.ac.uk/serving\\_maths/](http://maths.york.ac.uk/serving_maths/)

**RQP** : Remote Question Protocol (Alex Smith – [aws105@york.ac.uk](mailto:aws105@york.ac.uk))

A web services (SOAP 1.1) protocol to provide remote processing of assessment items on behalf of assessment systems.

- Supports remote rendering and processing of items.
- Neutral to the item format.

VLEs can provide support for many foreign item formats through RQP.

- Item engines are under development for QTI, MathQTI and several custom formats.
- Support for RQP has been implemented in the open source VLE Moodle (<http://moodle.org/>).
- The Moodle quiz module has been substantially rewritten to support adaptive items.  
Moodle is now more suitable for the complex mathematical items provided by AiM and STACK.
- A demonstration is available on our website.

RQP is especially useful for mathematics:

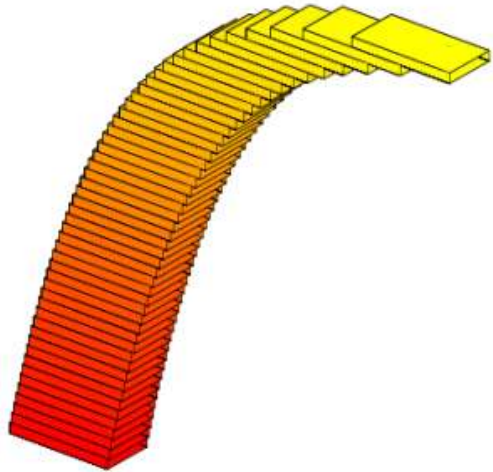
- The item engine software generally has a complex installation procedure.
- Significant server administrative skills are needed.
- There are complex security concerns with the server.
- Mathematical questions often require intensive processing.  
Support for load balancing was one of the requirements for RQP.

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**STACK** : System for Teaching and Assessment using a Computer algebra Kernel  
(Chris Sangwin - [chris@sangwin.com](mailto:chris@sangwin.com))



- Builds upon the success of AiM and based on the sound pedagogical principles developed through the experience of using AiM for the teaching of mathematics.
- Abstracts the operations of the computer algebra system (CAS) so that different systems can be supported.
- Currently Maxima and Axiom are supported. These are free and open source unlike Maple which AiM uses.
- Uses the CAS for mathematical operations only; the building of the HTML page is handled in PHP rather than in the CAS as with AiM.
- Simple installation; requires a web server with PHP, one of the supported computer algebra systems and TtH. AiM uses Java and Tomcat rather than PHP. The CAS can be provided as a remote service via web services.
- Mainly focuses on assessment item processing but also provides stand alone assessment support.
- Provides an RQP interface to enable the integration of complex mathematical items into other assessment systems such as virtual learning environments (VLEs).