Exposing astronomical data with VOSSIA 2.0: a modular and customizable VO-compliant multi-protocol interface

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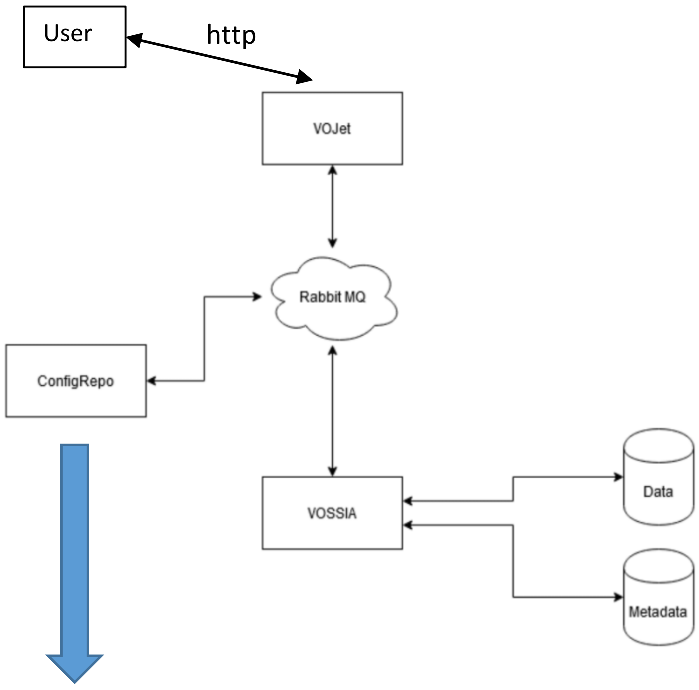
Exposing astronomical datasets with a standardized interface can be a real challenge. From one side the International Virtual Observatory Alliance (IVOA) defines standards in form of recommendations for protocols and output formats, on the other side the heterogeneous nature of datasets makes the use of a single tool for exposure problematic. VOSSIA 2.0 aims at introducing a flexible customization system to build services with custom IVOA-like protocols, of which the official ones are meant to be a predefined subset, at configuration level. Here we present the main features of VOSSIA 2.0, its modular architecture and the basics of its configuration system, finally our perspectives and plans for its release.

RabbitMQ-based modular architecture



Basic VO compliance

Input data are validated and parsed according to IVOA DALI[1] standards. For example intervals are supposed to be in a format like:

min_value max_value

Multiple occurrences of the same input parameter are combined with OR operators.

SQL WHERE conditions are calculated from requests by combining all the conditions generated by the input binding classes triggered by query strings with AND operators.

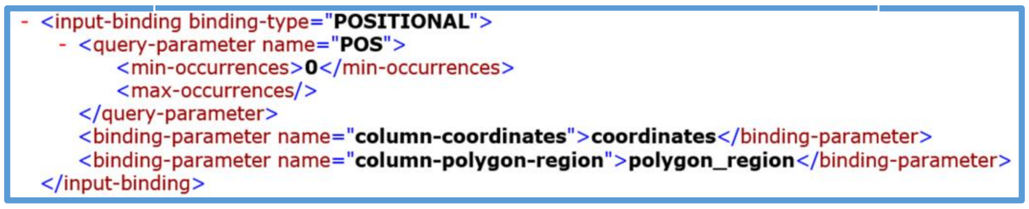
Metadata are expected to be available in a TAP_SCHEMA[1].

Outputs are formatted as VOTables[1].

Configuration of exposed services (services.xml)

services.xml defines for each exposed service how to access its data and metadata, service configurations like the maximum number of rows allowed in output and which protocol the service follows.

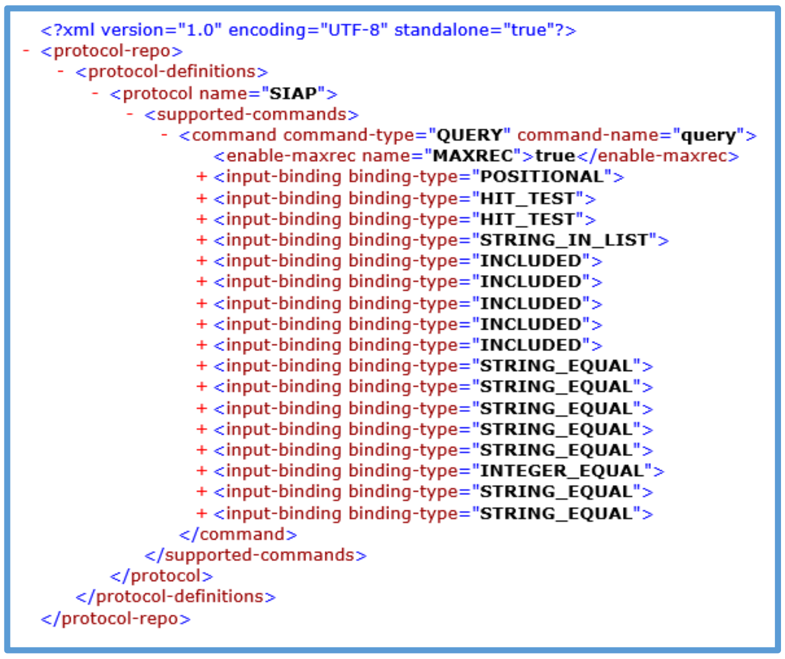
Example of input binding for IVOA SIAP[1] 2.0 POSITIONAL search



```
- <input-binding binding-type="POSITIONAL">
   - <query-parameter name="POS">
        <min-occurrences>0</min-occurrences>
        <max-occurrences/>
     </query-parameter>
     <binding-parameter name="column-coordinates">coordinates</binding-parameter>
     <binding-parameter name="column-polygon-region">polygon_region</binding-parameter>
  </input-binding>
```

Input bindings map user request query parameters, or combinations of them, to specific business-logic classes which parse, validate and translate them to SQL WHERE conditions.

Configuration of protocols (descriptors.xml)



```
  <?xml version="1.0" encoding="UTF-8" standalone="true"?>
- <protocol-repo>
   - <protocol-definitions>
      - <protocol name="SIAP">
         - <supported-commands>
            - <command command-type="QUERY" command-name="query">
                 <enable-maxrec name="MAXREC">true</enable-maxrec>
               + <input-binding binding-type="POSITIONAL">
               + <input-binding binding-type="HIT_TEST">
               + <input-binding binding-type="HIT_TEST">
               + <input-binding binding-type="STRING_IN_LIST">
               + <input-binding binding-type="INCLUDED">
               + <input-binding binding-type="INCLUDED">
               + <input-binding binding-type="INCLUDED">
               + <input-binding binding-type="INCLUDED">
               + <input-binding binding-type="INCLUDED">
               + <input-binding binding-type="STRING_EQUAL">
               + <input-binding binding-type="STRING_EQUAL">
               + <input-binding binding-type="STRING_EQUAL">
               + <input-binding binding-type="STRING_EQUAL">
               + <input-binding binding-type="STRING_EQUAL">
               + <input-binding binding-type="INTEGER_EQUAL">
               + <input-binding binding-type="STRING_EQUAL">
               + <input-binding binding-type="STRING_EQUAL">
              </command>
           </supported-commands>
        </protocol>
     </protocol-definitions>
  </protocol-repo>
```

descriptors.xml defines available protocols by input bindings.

We aim at making VOSSIA 2.0 available for testing in 2022

[1] All IVOA documents are available at http://www.ivoa.net/documents