

# Validation and quality assurance for IVOA services

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**Abstract:** VO Paris Data Centre is a collaboration between Observatoire de Paris, IAP, and IPSL to promote the Virtual Observatory and develop data centre activities. Our mission is to share the data centre infrastructure as well as the knowledge in standards and software, and competence in technologies. Our implication in standards development and participation to the IVOA (International Virtual Observatory Alliance) led us to develop a service validator. After this first step we decided to gather statistics on service compliance in the IVOA. We also tried to define metrics to characterize their evolution. Finally, we plan to contact providers to encourage them to modify their services so that they become VO compliant.

## DAL Validator

Available at <http://voparis-validator.obspm.fr> this validator has been developed to validate Data Access Layer services' VOTables against the current specifications for ConeSearch, Simple Image Access Protocol, Simple Spectrum Access Protocol and Simple Line Access Protocol.



### VOTable Validation Service

[http://voparis-srv.obspm.fr/sia/sia\\_mama.php?POS=180.0%2C60.0&SIZE=1.0%2C1.0&FORMAT=ALL](http://voparis-srv.obspm.fr/sia/sia_mama.php?POS=180.0%2C60.0&SIZE=1.0%2C1.0&FORMAT=ALL)

```
<?xml version="1.0" encoding="UTF-8" ?>
<VOTABLE version="1.1" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://www.ivoa.net/xml/VOTable-1.1" >
  <RESOURCE type="results"><DESCRIPTION VOPAR</DESCRIPTION>
  <INFO name="QUERY_STATUS" value="OK"/>
  <PARAM name="POS" datatype="char" unit="deg" value="180.0,60.0"/>
  <PARAM name="SIZE" datatype="double" unit="deg" value="1.0,1.0"/>
  <PARAM name="FORMAT" datatype="char" value="ALL"/>
  <PARAM name="INTERSECT" datatype="char" value="OVERLAPS"/>
  <PARAM name="SURVEY" datatype="char" value="all"/>
  <FIELD name="ID"><PARAM name="Instrument" value="a.l.instr" datatype="char" value="Photographic Focus / MAMA"/>
</VOTABLE>
```

SUCCESS: valid VOTable 1.1!

SUCCESS: valid Simple Image Access 1.0!

Warning: Exactly one FIELD OF PARAM should have code="PROP\_ID", with datatype="char", and arraysize="\*", identifying the instrument or instruments used to make the observation. Either the element is missing, or some of its required attributes are missing or erroneous. No match found.

Warning: Exactly one FIELD OF PARAM should have code="VOX:BandPass\_RefValue", with datatype="double", specifying the characteristic (reference) frequency, wavelength, or energy for the bandpass model. Either the element is missing, or some of its required attributes are missing or erroneous. No match found.

Warning: Exactly one FIELD OF PARAM should have code="VOX:Image\_PixImage", with datatype="char", and arraysize="\*", specifying the type of processing done by the image service to produce an output image pixel. Either the element is missing, or some of its required attributes are missing or erroneous. No match found.

## Services Validation

A set of tools available at <http://voparis-validation.obspm.fr> queries the IVOA registries and run the DAL validator over them.

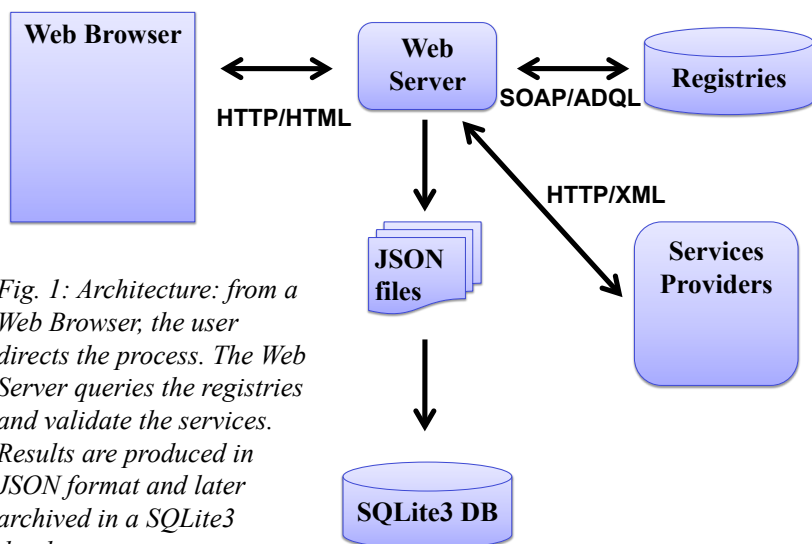


Fig. 1: Architecture: from a Web Browser, the user directs the process. The Web Server queries the registries and validate the services. Results are produced in JSON format and later archived in a SQLite3 database.

## Results of the validation

The results are presented using colored widgets to identify issues with the validation. Moreover, for each service, we display the number of days for which the results have remained the same.



Select Registry WSDL:   
 Select Registry endpoint:   
 Select resource type:   
 Additional keyword:   
 Result Selection: From:  Max:   
 Run validator:  Run validator for results  
 Run validator in batch mode (several tests)  
 Save results to JSON file  Display results  
 Compare to existing JSON file  
 Storage:   
 Debug level:

IVOA Registry Query for type=SIA and keyword=HST from=1 max=100

### IVOA Registry Results

#	IVOA Identifier	Short Name	Title (description)	Interface xsi:type, Role, Type => spec	Service URL and Validator URL	Validator results		
1	<a href="#">ivo://stec/HST/PRVIEW</a>	HST/SIAP /PREVIEW	SIAP Service Hubble Space Telescope preview images	Interface xsi:type=vs:ParamHTTP Role=Std Type=ivo://vo.net/std/SIA => Spec=Simple Image Access 1.0	<a href="http://archive.eso.org/archive/hst/siap1.0/preview/siap.cgi?">http://archive.eso.org/archive/hst/siap1.0/preview/siap.cgi?</a> <a href="#">Validate Validate(Batch)</a>	FORMAT=ALL VOTable	FORMAT=METADATA Simple Image Access	error Simple Image Access
2	<a href="#">ivo://ra.lbgc/COSMOS</a>	COSMOS	Cosmic Evolution Survey with HST	Interface xsi:type=vs:ParamHTTP Role=Std Type=ivo://vo.net/std/SIA => Spec=Simple Image Access 1.0	<a href="http://ra.lbgc.caltech.edu/cgi-bin/Atlas/hst-atlas?mission=COSMOS&amp;hdr_location=%5CCOSMOSDataPath%5C&amp;collection_desc=Cosmic+Evolution+Survey+with+HST+%28COSMOS%29&amp;SIAP_ACTIVE=1&amp;Validate+Validate(Batch)">http://ra.lbgc.caltech.edu/cgi-bin/Atlas/hst-atlas?mission=COSMOS&amp;hdr_location=%5CCOSMOSDataPath%5C&amp;collection_desc=Cosmic+Evolution+Survey+with+HST+%28COSMOS%29&amp;SIAP_ACTIVE=1&amp;Validate+Validate(Batch)</a>	FORMAT=ALL VOTable	FORMAT=METADATA Simple Image Access	error Simple Image Access
3	<a href="#">ivo://cad.cnr.ca/sia/hst</a>	CADC/HST	CADC/HST Image Search	Interface xsi:type=vs:ParamHTTP Role=Std Type=ivo://vo.net/std/SIA => Spec=Simple Image Access 1.0	<a href="http://www.cadc-ccda.hia-ih.nrc-cnrc.gc.ca/sia/HSTquery?">http://www.cadc-ccda.hia-ih.nrc-cnrc.gc.ca/sia/HSTquery?</a> <a href="#">Validate Validate(Batch)</a>	FORMAT=ALL VOTable	FORMAT=METADATA Simple Image Access	error Simple Image Access

## Quantitative Results

The IVOA Services Validator is run every night to follow the progression of the validity of all the DAL services available in the IVOA registries.

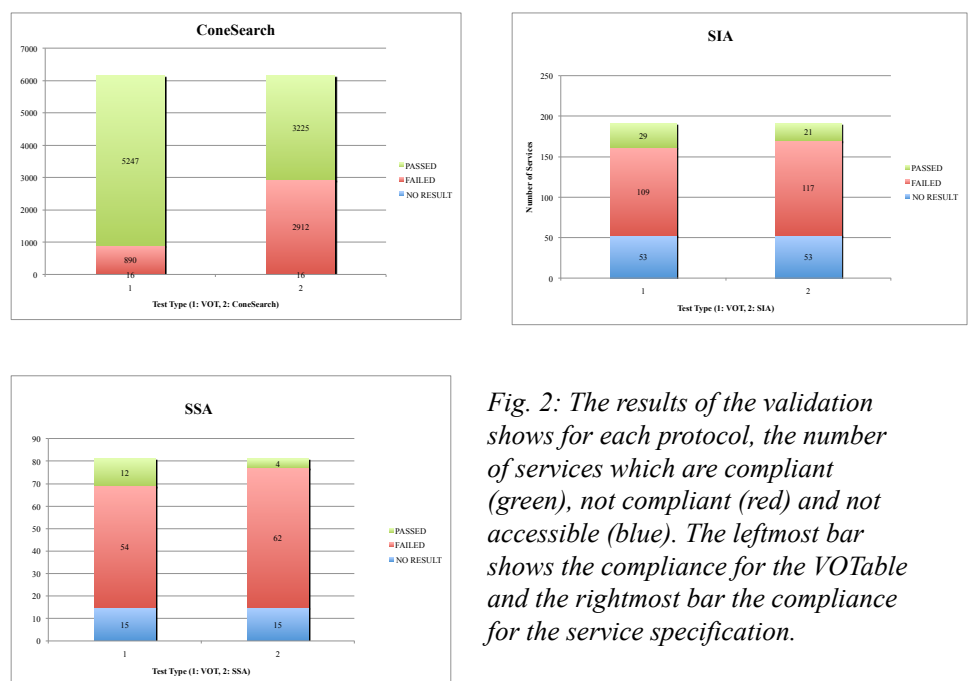


Fig. 2: The results of the validation shows for each protocol, the number of services which are compliant (green), not compliant (red) and not accessible (blue). The leftmost bar shows the compliance for the VOTable and the rightmost bar the compliance for the service specification.

## Future Developments

- An extension in the registry will allow to validate each service against its exact version
- We plan to contact providers of non-compliant services to encourage them to modify their services