



# IVOA Support Interfaces Version 0.2

## IVOA Working Draft 2004 July 10

**This version:**

**0.2** <http://www.ivoa.net/internal/IVOA/VOSupportInterfaces-0.2.pdf>

**Previous versions:**

**0.1** <http://www.ivoa.net/internal/IVOA/StandardInterfaces-0.1.pdf>

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## Abstract

This document describes the minimum required interface to participate in the IVOA as a web service.

## Status of this document

This is a Working Draft. There are no prior released versions of this document.

*This is an IVOA Working Draft for review by IVOA members and other interested parties. It is a draft document and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use IVOA Working Drafts as reference materials or to cite them as other than "work in progress." A list of [current IVOA Recommendations and other technical documents](http://www.ivoa.net/docs/) can be found at <http://www.ivoa.net/docs/>.*

## Acknowledgments

This work is based on discussions and actions from the 2003 IVOA meeting in Strasbourg and further discussions on registry functionality at JHU late in 2003. The latest inputs came from the Interop meeting in Cambridge MA May 2004.

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## 1 Introduction

Web Services form an increasing part of the Virtual Observatory. It is felt there are some basic Interfaces which these services should provide. The word interface is used here in the SOAP sense, this has been referred to as a port in older SOAP documentation and perhaps still in the Grid community.

Hence this document attempts to define the standard interfaces which a service should provide.

The VO also has many non SOAP service which would benefit from standard interfaces. A method is also described for invoking these services in a CGI manner.

A new document is also expected which will give a VO-Profile for our services. This will tie in with WS-I specifications.

### 1.1 About the document

In the normal requirements manner the words “should” and “shall” are used to convey the level of necessity of the interface. Each interface is clearly given a short description and a requirement number of the form SI-N where N is a running number in the document..

## 2 Standard VO Interfaces

### 2.1 Registration MetaData

The service should be the single authoritative source for metadata. WEB services provide WSDL in a standard manner. WSDL alone is insufficient for the purposes of the VO. We need something more like the VOResource implementation of the RM (Resource Metadata) document[RM]. In a web service we would return the object type produced

from the XSD for the RSM. The definition of VOResource must be included in the WSDL for the service. This does not preclude returning an extension of the VOResource.

The registry remains the place to go to find metadata but a standard service like this would allow us to build a registry where we just input our service URL and the registry then asks for and validates the metadata. It could even periodically check it is up to date.

- SI-1** All VO services should implement the “getRegistration” interface. This shall return a valid VOResource document describing the metadata of this service. The owner will have to already get an authorityID and resourceKey from a provider for this.
- SI-2** All VO services should implement the “RegistrationChangedOn” interface. This shall return the date the metadata last changed.

## 2.2 Availability

The heartbeat interface is to tell us if the service is in operation. It should do a good check on the underlying service to see if it is still operational and not just be a simple return from a web server e.g. if it relies on a database it should check the database is still up.

Ultimately some portals may track these heartbeats and compile uptime statistics. With the location we could have 3D global maps of services and availability.

- SI-3** All VO services shall implement the “getAvailability” interface. This shall return an xml document containing :
- Uptime - the up time of the service
  - ValidTo - how long it believes this will be valid i.e. next scheduled downtime.
  - ContactDetails – Name, Email and PhoneNumber of a person to contact if there is a problem.

## 2.3 Harvest Log

Many services perform some sort of logging – if only web logs. For a global Virtual Observatory it will be interesting to be able to correlate global logs. For example if we have multiple registries it would be nice to be able to have an idea of number of requests on each one and where they are coming from. This is of course a gory topic but we feel an initial effort should be made to have some rudimentary interface for grabbing logged information in some standard (preferably tabular) format.

- SI-4** All VO services should implement the “HarvestLog” interface. This interface should take two parameters “fromDate” and “toDate” and should return a set of LogEntry. A LogEntry would contain the following information:
- IP - Address request came from
  - Request - The actual request or some representation of it.
  - Event - What that means internally i.e. QUERY,HARVEST,UPDATE etc.
  - TimeIn - Time request was received.
  - TimeOut - Time request was serviced.
  - Volume - ~Size in bytes of the response

- Status - 0 for pending, 1 for done, 2 for failed
- Response- Error message if this failed, perhaps the actual response if it is a small response, otherwise some summary statement or blank. Mainly to have errors.

### 3 Changes from previous versions

- Names changed according to resolutions  
[http://www.ivoa.net/twiki/bin/view/IVOA/InterOpMay2004GridAndWebServices#V\\_Obs\\_Support\\_Interfaces\\_original](http://www.ivoa.net/twiki/bin/view/IVOA/InterOpMay2004GridAndWebServices#V_Obs_Support_Interfaces_original)
- Drop position from Heartbeat (now getAvailability)

### 4 References

[RM] [Resource Metadata for the Virtual Observatory](http://www.ivoa.net/Documents/WD/ResMetadata/WD-ResMetadata.html); Bob Hanisch et al.;

### 5 Appendix 1

This is the basic WSDL to implement these services.

```
<?xml version="1.0" encoding="utf-8"?>
<definitions xmlns:s1="http://www.ivoa.net/xml/VOResource/v0.10"
xmlns:http="http://schemas.xmlsoap.org/wsdl/http/"
xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/"
xmlns:s="http://www.w3.org/2001/XMLSchema" xmlns:s0="voss.ivoa.net"
xmlns:s3="http://www.ivoa.net/xml/VODDataService/v0.5"
xmlns:s2="http://www.ivoa.net/xml/VORegistry/v0.3"
xmlns:s5="http://www.ivoa.net/xml/SIA/v0.7"
xmlns:s4="http://www.ivoa.net/xml/ConeSearch/v0.3"
xmlns:soapenc="http://schemas.xmlsoap.org/soap/encoding/"
xmlns:tm="http://microsoft.com/wsdl/mime/textMatching/"
xmlns:mime="http://schemas.xmlsoap.org/wsdl/mime/"
targetNamespace="voss.ivoa.net" xmlns="http://schemas.xmlsoap.org/wsdl/">
  <types>
    <s:schema elementFormDefault="qualified" targetNamespace="voss.ivoa.net">
      <s:import namespace="http://www.ivoa.net/xml/VOResource/v0.10" />
      <s:element name="getRegistration">
        <s:complexType />
      </s:element>
      <s:element name="getRegistrationResponse">
        <s:complexType>
          <s:sequence>
            <s:element minOccurs="0" maxOccurs="1" name="getRegistrationResult"
type="s1:Resource" />
          </s:sequence>
        </s:complexType>
      </s:element>
      <s:element name="RegistrationChangedOn">
        <s:complexType />
      </s:element>
    </s:schema>
  </types>

```

```

<s:element name="RegistrationChangedOnResponse">
  <s:complexType>
    <s:sequence>
      <s:element minOccurs="1" maxOccurs="1"
name="RegistrationChangedOnResult" type="s:dateTime" />
    </s:sequence>
  </s:complexType>
</s:element>
<s:element name="getAvailabaility">
  <s:complexType />
</s:element>
<s:element name="getAvailabailityResponse">
  <s:complexType>
    <s:sequence>
      <s:element minOccurs="0" maxOccurs="1" name="getAvailabailityResult"
type="s0:Availability" />
    </s:sequence>
  </s:complexType>
</s:element>
<s:complexType name="Availability">
  <s:sequence>
    <s:element minOccurs="1" maxOccurs="1" name="upTime" type="s:dateTime" />
    <s:element minOccurs="1" maxOccurs="1" name="validTo" type="s:dateTime" />
    <s:element minOccurs="0" maxOccurs="1" name="contactDetails" type="s:string"
/>
    <s:element minOccurs="0" maxOccurs="1" name="message" type="s:string" />
  </s:sequence>
</s:complexType>
<s:element name="harvestLog">
  <s:complexType>
    <s:sequence>
      <s:element minOccurs="1" maxOccurs="1" name="fromDate"
type="s:dateTime" />
      <s:element minOccurs="1" maxOccurs="1" name="toDate" type="s:dateTime" />
    </s:sequence>
  </s:complexType>
</s:element>
<s:element name="harvestLogResponse">
  <s:complexType>
    <s:sequence>
      <s:element minOccurs="0" maxOccurs="1" name="harvestLogResult"
type="s0:ArrayOfLogEntry" />
    </s:sequence>
  </s:complexType>
</s:element>
<s:complexType name="ArrayOfLogEntry">

```



```

    <s:element minOccurs="0" maxOccurs="unbounded" name="date" type="s1:Date"
/>
    <s:element minOccurs="0" maxOccurs="1" name="version" type="s:string" />
    <s:element minOccurs="0" maxOccurs="1" name="contact" type="s1:Contact" />
  </s:sequence>
</s:complexType>
<s:complexType name="ResourceName">
  <s:simpleContent>
    <s:extension base="s:string">
      <s:attribute form="unqualified" name="ivo-id" type="s:anyURI" />
    </s:extension>
  </s:simpleContent>
</s:complexType>
<s:complexType name="Creator">
  <s:sequence>
    <s:element minOccurs="0" maxOccurs="1" name="name"
type="s1:ResourceName" />
    <s:element minOccurs="0" maxOccurs="1" name="logo" type="s:anyURI" />
  </s:sequence>
</s:complexType>
<s:complexType name="Date">
  <s:simpleContent>
    <s:extension base="s:date">
      <s:attribute default="representative" form="unqualified" name="role"
type="s:string" />
    </s:extension>
  </s:simpleContent>
</s:complexType>
<s:complexType name="Contact">
  <s:sequence>
    <s:element minOccurs="0" maxOccurs="1" name="name"
type="s1:ResourceName" />
    <s:element minOccurs="0" maxOccurs="1" name="address" type="s:string" />
    <s:element minOccurs="0" maxOccurs="1" name="email" type="s:string" />
    <s:element minOccurs="0" maxOccurs="1" name="telephone" type="s:string" />
  </s:sequence>
</s:complexType>
<s:complexType name="Content">
  <s:sequence>
    <s:element minOccurs="0" maxOccurs="unbounded" name="subject"
type="s:string" />
    <s:element minOccurs="0" maxOccurs="1" name="description" type="s:string" />
    <s:element minOccurs="0" maxOccurs="1" name="source" type="s1:Source" />
    <s:element minOccurs="0" maxOccurs="1" name="referenceURL"
type="s:anyURI" />
    <s:element minOccurs="0" maxOccurs="1" name="type" type="s1:Type" />
  </s:sequence>

```

```

    <s:element minOccurs="0" maxOccurs="unbounded" name="contentLevel"
type="s1:ContentLevel" />
    <s:element minOccurs="0" maxOccurs="unbounded" name="relationship"
type="s1:Relationship" />
  </s:sequence>
</s:complexType>
<s:complexType name="Source">
  <s:simpleContent>
    <s:extension base="s:string">
      <s:attribute form="unqualified" name="format" type="s:string" />
    </s:extension>
  </s:simpleContent>
</s:complexType>
<s:simpleType name="Type">
  <s:restriction base="s:string">
    <s:enumeration value="Other" />
    <s:enumeration value="Archive" />
    <s:enumeration value="Bibliography" />
    <s:enumeration value="Catalog" />
    <s:enumeration value="Journal" />
    <s:enumeration value="Library" />
    <s:enumeration value="Simulation" />
    <s:enumeration value="Survey" />
    <s:enumeration value="Transformation" />
    <s:enumeration value="Education" />
    <s:enumeration value="Outreach" />
    <s:enumeration value="EPOResource" />
    <s:enumeration value="Animation" />
    <s:enumeration value="Artwork" />
    <s:enumeration value="Background" />
    <s:enumeration value="BasicData" />
    <s:enumeration value="Historical" />
    <s:enumeration value="Photographic" />
    <s:enumeration value="Press" />
    <s:enumeration value="Organisation" />
    <s:enumeration value="Project" />
    <s:enumeration value="Registry" />
  </s:restriction>
</s:simpleType>
<s:simpleType name="ContentLevel">
  <s:restriction base="s:string">
    <s:enumeration value="General" />
    <s:enumeration value="Elementary Education" />
    <s:enumeration value="Middle School Education" />
    <s:enumeration value="Secondary Education" />
    <s:enumeration value="Community College" />
  </s:restriction>

```

```

    <s:enumeration value="University" />
    <s:enumeration value="Research" />
    <s:enumeration value="Amateur" />
    <s:enumeration value="Informal Education" />
  </s:restriction>
</s:simpleType>
<s:complexType name="Relationship">
  <s:sequence>
    <s:element minOccurs="1" maxOccurs="1" name="relationshipType"
type="s1:RelationshipType" />
    <s:element minOccurs="0" maxOccurs="unbounded" name="relatedResource"
type="s1:ResourceName" />
  </s:sequence>
</s:complexType>
<s:simpleType name="RelationshipType">
  <s:restriction base="s:string">
    <s:enumeration value="mirror-of" />
    <s:enumeration value="service-for" />
    <s:enumeration value="derived-from" />
    <s:enumeration value="related-to" />
  </s:restriction>
</s:simpleType>
<s:simpleType name="ResourceStatus">
  <s:restriction base="s:string">
    <s:enumeration value="active" />
    <s:enumeration value="inactive" />
    <s:enumeration value="deleted" />
  </s:restriction>
</s:simpleType>
<s:complexType name="Organisation">
  <s:complexContent mixed="false">
    <s:extension base="s1:Resource">
      <s:sequence>
        <s:element minOccurs="0" maxOccurs="unbounded" name="facility"
type="s1:ResourceName" />
        <s:element minOccurs="0" maxOccurs="unbounded" name="instrument"
type="s1:ResourceName" />
      </s:sequence>
    </s:extension>
  </s:complexContent>
</s:complexType>
<s:complexType name="AccessURL">
  <s:simpleContent>
    <s:extension base="s:anyURI">
      <s:attribute form="unqualified" name="use" type="s1:AccessURLUse" />
    </s:extension>
  </s:simpleContent>
</s:complexType>

```

```

    </s:simpleContent>
  </s:complexType>
  <s:simpleType name="AccessURLUse">
    <s:restriction base="s:string">
      <s:enumeration value="full" />
      <s:enumeration value="base" />
      <s:enumeration value="dir" />
    </s:restriction>
  </s:simpleType>
  <s:complexType name="Service">
    <s:complexContent mixed="false">
      <s:extension base="s1:Resource">
        <s:sequence>
          <s:element minOccurs="0" maxOccurs="unbounded" name="interface"
type="s1:Interface" />
        </s:sequence>
      </s:extension>
    </s:complexContent>
  </s:complexType>
  <s:complexType name="Interface" abstract="true">
    <s:sequence>
      <s:element minOccurs="0" maxOccurs="1" name="accessURL"
type="s1:AccessURL" />
    </s:sequence>
  </s:complexType>
  <s:complexType name="WebBrowser">
    <s:complexContent mixed="false">
      <s:extension base="s1:Interface" />
    </s:complexContent>
  </s:complexType>
  <s:complexType name="Capability">
    <s:attribute form="unqualified" name="standardID" type="s:anyURI" />
    <s:attribute form="unqualified" name="standardURL" type="s:anyURI" />
  </s:complexType>
</s:schema>
<s:schema elementFormDefault="qualified"
targetNamespace="http://www.ivoa.net/xml/VORRegistry/v0.3">
  <s:import namespace="http://www.ivoa.net/xml/VOResource/v0.10" />
  <s:complexType name="Authority">
    <s:complexContent mixed="false">
      <s:extension base="s1:Resource">
        <s:sequence>
          <s:element minOccurs="0" maxOccurs="1" name="managingOrg"
type="s1:ResourceName" />
        </s:sequence>
      </s:extension>
    </s:complexContent>
  </s:complexType>

```

```

    </s:complexContent>
  </s:complexType>
  <s:complexType name="Registry">
    <s:complexContent mixed="false">
      <s:extension base="s1:Service">
        <s:sequence>
          <s:element minOccurs="0" maxOccurs="unbounded"
name="managedAuthority" type="s:string" />
        </s:sequence>
      </s:extension>
    </s:complexContent>
  </s:complexType>
</s:schema>
<s:schema elementFormDefault="qualified"
targetNamespace="http://www.ivoa.net/xml/VODDataService/v0.5">
  <s:import namespace="http://www.ivoa.net/xml/VOResource/v0.10" />
  <s:import namespace="http://www.ivoa.net/xml/ConeSearch/v0.3" />
  <s:import namespace="http://www.ivoa.net/xml/SIA/v0.7" />
  <s:complexType name="DataCollection">
    <s:complexContent mixed="false">
      <s:extension base="s1:Resource">
        <s:sequence>
          <s:element minOccurs="0" maxOccurs="unbounded" name="facility"
type="s1:ResourceName" />
          <s:element minOccurs="0" maxOccurs="unbounded" name="instrument"
type="s1:ResourceName" />
          <s:element minOccurs="0" maxOccurs="1" name="coverage"
type="s3:Coverage" />
          <s:element minOccurs="0" maxOccurs="unbounded" name="format"
type="s3:Format" />
          <s:element minOccurs="0" maxOccurs="unbounded" name="rights"
type="s3:Rights" />
          <s:element minOccurs="0" maxOccurs="1" name="accessURL"
type="s1:AccessURL" />
        </s:sequence>
      </s:extension>
    </s:complexContent>
  </s:complexType>
  <s:complexType name="Coverage">
    <s:sequence>
      <s:element minOccurs="0" maxOccurs="1" name="spatial" type="s3:Spatial" />
      <s:element minOccurs="0" maxOccurs="1" name="spectral" type="s3:Spectral" />
      <s:element minOccurs="0" maxOccurs="1" name="temporal" type="s3:Temporal"
/>
    </s:sequence>
  </s:complexType>

```

```

<s:complexType name="Spatial">
  <s:sequence>
    <s:element minOccurs="0" maxOccurs="unbounded" name="region"
type="s3:Region" />
    <s:element minOccurs="0" maxOccurs="1" name="resolution" type="s:float" />
    <s:element minOccurs="0" maxOccurs="1" name="regionOfRegard"
type="s:float" />
  </s:sequence>
</s:complexType>
<s:complexType name="Region" abstract="true" />
<s:complexType name="Spectral">
  <s:sequence>
    <s:element minOccurs="0" maxOccurs="unbounded" name="waveband"
type="s3:Waveband" />
    <s:element minOccurs="0" maxOccurs="1" name="range"
type="s3:WavelengthRange" />
    <s:element minOccurs="0" maxOccurs="1" name="resolution" type="s:float" />
  </s:sequence>
</s:complexType>
<s:simpleType name="Waveband">
  <s:restriction base="s:string">
    <s:enumeration value="Radio" />
    <s:enumeration value="Millimeter" />
    <s:enumeration value="Infrared" />
    <s:enumeration value="Optical" />
    <s:enumeration value="UV" />
    <s:enumeration value="EUV" />
    <s:enumeration value="X-ray" />
    <s:enumeration value="Gamma-ray" />
  </s:restriction>
</s:simpleType>
<s:complexType name="WavelengthRange">
  <s:sequence>
    <s:element minOccurs="1" maxOccurs="1" name="min" type="s:float" />
    <s:element minOccurs="1" maxOccurs="1" name="max" type="s:float" />
  </s:sequence>
</s:complexType>
<s:complexType name="Temporal">
  <s:sequence>
    <s:element minOccurs="0" maxOccurs="1" name="startTime" type="s:date" />
    <s:element minOccurs="0" maxOccurs="1" name="endTime" type="s:date" />
    <s:element minOccurs="0" maxOccurs="1" name="resolution" type="s:float" />
  </s:sequence>
</s:complexType>
<s:complexType name="Format">
  <s:simpleContent>

```

```

    <s:extension base="s:string">
      <s:attribute default="false" form="unqualified" name="isMIMEType"
type="s:boolean" />
    </s:extension>
  </s:simpleContent>
</s:complexType>
<s:simpleType name="Rights">
  <s:restriction base="s:string">
    <s:enumeration value="public" />
    <s:enumeration value="secure" />
    <s:enumeration value="proprietary" />
  </s:restriction>
</s:simpleType>
<s:complexType name="WebService">
  <s:complexContent mixed="false">
    <s:extension base="s1:Interface" />
  </s:complexContent>
</s:complexType>
<s:complexType name="GLUService">
  <s:complexContent mixed="false">
    <s:extension base="s1:Interface" />
  </s:complexContent>
</s:complexType>
<s:complexType name="ParamHTTP">
  <s:complexContent mixed="false">
    <s:extension base="s1:Interface">
      <s:sequence>
        <s:element minOccurs="0" maxOccurs="1" name="resultType" type="s:string"
/>
      </s:sequence>
    </s:extension>
  </s:complexContent>
</s:complexType>
<s:complexType name="Param">
  <s:sequence>
    <s:element minOccurs="0" maxOccurs="unbounded" name="param"
type="s3:Param" />
  </s:sequence>
  <s:attribute form="unqualified" name="qtype" type="s3:HTTPQueryType" />
</s:extension>
</s:complexContent>
</s:complexType>
<s:complexType name="Param">
  <s:sequence>
    <s:element minOccurs="0" maxOccurs="1" name="name" type="s:string" />
    <s:element minOccurs="0" maxOccurs="1" name="description" type="s:string" />
    <s:element minOccurs="0" maxOccurs="1" name="dataType"
type="s3:DataType" />
    <s:element minOccurs="0" maxOccurs="1" name="unit" type="s:string" />
    <s:element minOccurs="0" maxOccurs="1" name="ucd" type="s:string" />
  </s:sequence>
</s:complexType>

```

```

<s:complexType name="DataType">
  <s:simpleContent>
    <s:extension base="s3:ScalarDataType">
      <s:attribute default="1" form="unqualified" name="arraysize" type="s:token" />
    </s:extension>
  </s:simpleContent>
</s:complexType>
<s:simpleType name="ScalarDataType">
  <s:restriction base="s:string">
    <s:enumeration value="boolean" />
    <s:enumeration value="bit" />
    <s:enumeration value="unsignedByte" />
    <s:enumeration value="short" />
    <s:enumeration value="int" />
    <s:enumeration value="long" />
    <s:enumeration value="char" />
    <s:enumeration value="unicodeChar" />
    <s:enumeration value="float" />
    <s:enumeration value="double" />
    <s:enumeration value="floatComplex" />
    <s:enumeration value="doubleComplex" />
  </s:restriction>
</s:simpleType>
<s:simpleType name="HTTPQueryType">
  <s:restriction base="s:string">
    <s:enumeration value="GET" />
    <s:enumeration value="POST" />
  </s:restriction>
</s:simpleType>
<s:complexType name="SkyService">
  <s:complexContent mixed="false">
    <s:extension base="s1:Service">
      <s:sequence>
        <s:element minOccurs="0" maxOccurs="unbounded" name="facility"
type="s1:ResourceName" />
        <s:element minOccurs="0" maxOccurs="unbounded" name="instrument"
type="s1:ResourceName" />
        <s:element minOccurs="0" maxOccurs="1" name="coverage"
type="s3:Coverage" />
      </s:sequence>
    </s:extension>
  </s:complexContent>
</s:complexType>
<s:complexType name="TabularSkyService">
  <s:complexContent mixed="false">
    <s:extension base="s3:SkyService">

```

```

    <s:sequence>
      <s:element minOccurs="0" maxOccurs="unbounded" name="table"
type="s3:Table" />
    </s:sequence>
  </s:extension>
</s:complexContent>
</s:complexType>
<s:complexType name="Table">
  <s:sequence>
    <s:element minOccurs="0" maxOccurs="1" name="name" type="s:string" />
    <s:element minOccurs="0" maxOccurs="1" name="description" type="s:string" />
    <s:element minOccurs="0" maxOccurs="unbounded" name="column"
type="s3:Param" />
  </s:sequence>
  <s:attribute form="unqualified" name="role" type="s:string" />
</s:complexType>
</s:schema>
<s:schema elementFormDefault="qualified"
targetNamespace="http://www.ivoa.net/xml/ConeSearch/v0.3">
  <s:import namespace="http://www.ivoa.net/xml/VODDataService/v0.5" />
  <s:import namespace="http://www.ivoa.net/xml/VOResource/v0.10" />
  <s:complexType name="ConeSearch">
    <s:complexContent mixed="false">
      <s:extension base="s3:TabularSkyService">
        <s:sequence>
          <s:element minOccurs="0" maxOccurs="1" name="capability"
type="s4:ConeSearchCapability" />
        </s:sequence>
      </s:extension>
    </s:complexContent>
  </s:complexType>
  <s:complexType name="ConeSearchCapability">
    <s:complexContent mixed="false">
      <s:extension base="s4:CSCapRestriction">
        <s:sequence>
          <s:element minOccurs="1" maxOccurs="1" name="maxSR" type="s:float" />
          <s:element minOccurs="1" maxOccurs="1" name="maxRecords" type="s:int"
/>
          <s:element minOccurs="1" maxOccurs="1" name="verbosity" type="s:boolean"
/>
        </s:sequence>
      </s:extension>
    </s:complexContent>
  </s:complexType>
  <s:complexType name="CSCapRestriction" abstract="true">
    <s:complexContent mixed="false">

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    <s:extension base="s1:Capability" />
  </s:complexContent>
</s:complexType>
</s:schema>
<s:schema elementFormDefault="qualified"
targetNamespace="http://www.ivoa.net/xml/SIA/v0.7">
  <s:import namespace="http://www.ivoa.net/xml/VOResource/v0.10" />
  <s:import namespace="http://www.ivoa.net/xml/VODataService/v0.5" />
  <s:complexType name="SIACapRestriction" abstract="true">
    <s:complexContent mixed="false">
      <s:extension base="s1:Capability" />
    </s:complexContent>
  </s:complexType>
  <s:complexType name="SIACapability">
    <s:complexContent mixed="false">
      <s:extension base="s5:SIACapRestriction">
        <s:sequence>
          <s:element minOccurs="1" maxOccurs="1" name="imageServiceType"
type="s5:ImageServiceType" />
          <s:element minOccurs="0" maxOccurs="1" name="maxQueryRegionSize"
type="s5:SkySize" />
          <s:element minOccurs="0" maxOccurs="1" name="maxImageExtent"
type="s5:SkySize" />
          <s:element minOccurs="0" maxOccurs="1" name="maxImageSize"
type="s5:ImageSize" />
          <s:element minOccurs="1" maxOccurs="1" name="maxFileSize" type="s:int"
/>
          <s:element minOccurs="1" maxOccurs="1" name="maxRecords" type="s:int"
/>
        </s:sequence>
      </s:extension>
    </s:complexContent>
  </s:complexType>
  <s:simpleType name="ImageServiceType">
    <s:restriction base="s:string">
      <s:enumeration value="Cutout" />
      <s:enumeration value="Mosaic" />
      <s:enumeration value="Atlas" />
      <s:enumeration value="Pointed" />
    </s:restriction>
  </s:simpleType>
  <s:complexType name="SkySize">
    <s:sequence>
      <s:element minOccurs="1" maxOccurs="1" name="long" type="s:float" />
      <s:element minOccurs="1" maxOccurs="1" name="lat" type="s:float" />
    </s:sequence>
  </s:complexType>
</s:schema>

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</s:complexType>
<s:complexType name="ImageSize">
  <s:sequence>
    <s:element minOccurs="1" maxOccurs="1" name="long" type="s:int" />
    <s:element minOccurs="1" maxOccurs="1" name="lat" type="s:int" />
  </s:sequence>
</s:complexType>
<s:complexType name="SimpleImageAccess">
  <s:complexContent mixed="false">
    <s:extension base="s3:TabularSkyService">
      <s:sequence>
        <s:element minOccurs="0" maxOccurs="1" name="capability"
type="s5:SIACapability" />
      </s:sequence>
    </s:extension>
  </s:complexContent>
</s:complexType>
</s:schema>
</types>
<message name="getRegistrationSoapIn">
  <part name="parameters" element="s0:getRegistration" />
</message>
<message name="getRegistrationSoapOut">
  <part name="parameters" element="s0:getRegistrationResponse" />
</message>
<message name="RegistrationChangedOnSoapIn">
  <part name="parameters" element="s0:RegistrationChangedOn" />
</message>
<message name="RegistrationChangedOnSoapOut">
  <part name="parameters" element="s0:RegistrationChangedOnResponse" />
</message>
<message name="getAvailabailitySoapIn">
  <part name="parameters" element="s0:getAvailabaility" />
</message>
<message name="getAvailabailitySoapOut">
  <part name="parameters" element="s0:getAvailabailityResponse" />
</message>
<message name="harvestLogSoapIn">
  <part name="parameters" element="s0:harvestLog" />
</message>
<message name="harvestLogSoapOut">
  <part name="parameters" element="s0:harvestLogResponse" />
</message>
<portType name="VOSupportInterfacesSoap">
  <operation name="getRegistration">

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    <documentation>A VorResource document describinbg this resource
</documentation>
    <input message="s0:getRegistrationSoapIn" />
    <output message="s0:getRegistrationSoapOut" />
</operation>
<operation name="RegistrationChangedOn">
    <documentation> Date the Registration data last changed </documentation>
    <input message="s0:RegistrationChangedOnSoapIn" />
    <output message="s0:RegistrationChangedOnSoapOut" />
</operation>
<operation name="getAvailabaility">
    <documentation>Uptime Information</documentation>
    <input message="s0:getAvailabailitySoapIn" />
    <output message="s0:getAvailabailitySoapOut" />
</operation>
<operation name="harvestLog">
    <documentation>Log infomrmation</documentation>
    <input message="s0:harvestLogSoapIn" />
    <output message="s0:harvestLogSoapOut" />
</operation>
</portType>
<binding name="VOSupportInterfacesSoap" type="s0:VOSupportInterfacesSoap">
<soap:binding transport="http://schemas.xmlsoap.org/soap/http" style="document" />
<operation name="getRegistration">
    <soap:operation soapAction="voss.ivoa.net/getRegistration" style="document" />
    <input>
        <soap:body use="literal" />
    </input>
    <output>
        <soap:body use="literal" />
    </output>
</operation>
<operation name="RegistrationChangedOn">
    <soap:operation soapAction="voss.ivoa.net/RegistrationChangedOn"
style="document" />
    <input>
        <soap:body use="literal" />
    </input>
    <output>
        <soap:body use="literal" />
    </output>
</operation>
<operation name="getAvailabaility">
    <soap:operation soapAction="voss.ivoa.net/getAvailabaility" style="document" />
    <input>
        <soap:body use="literal" />

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</input>
<output>
  <soap:body use="literal" />
</output>
</operation>
<operation name="harvestLog">
  <soap:operation soapAction="voss.ivoa.net/harvestLog" style="document" />
  <input>
    <soap:body use="literal" />
  </input>
  <output>
    <soap:body use="literal" />
  </output>
</operation>
</binding>
<service name="VOSupportInterfaces">
  <documentation> Standard Support Interfaces for IVOA services</documentation>
  <port name="VOSupportInterfacesSoap" binding="s0:VOSupportInterfacesSoap">
    <soap:address location="http://localhost/VOSS/VOSupportServices.asmx" />
  </port>
</service>
</definitions>
```