

IVOA Registry Work Group

RWP04

Registry Replication and Querying

Contents

- Registry Usage
- Requirements
- Registry network structure
- Registry queries
- Registry management.

Registry Usage

What will they be used for?

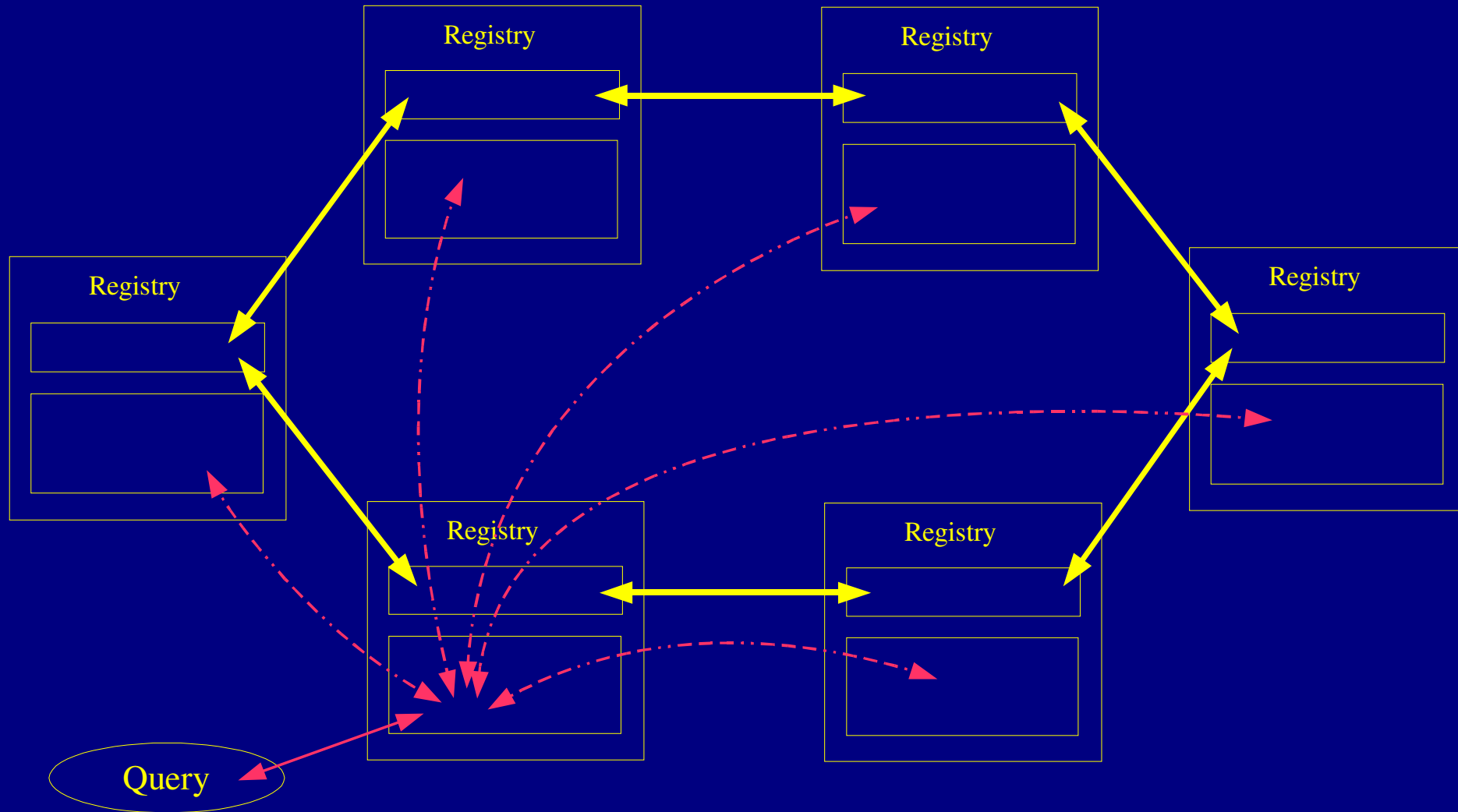
- Publishing
- Browsing
- Query processing.

Requirements

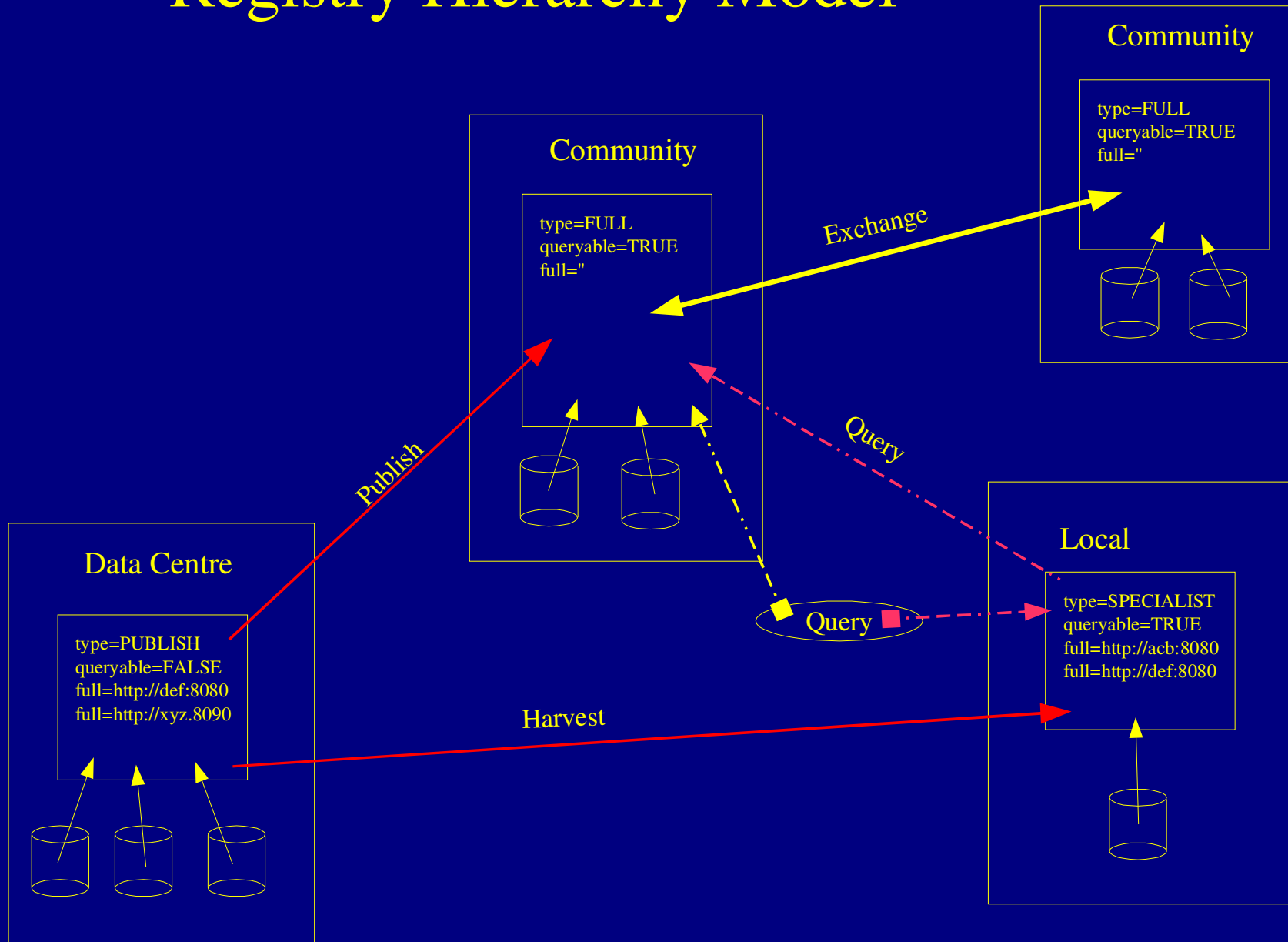
- Distributed
- Low maintenance
- Extensible
- Robust
- Reliable
- Flexible.

Registry Network Structure

Registry Peer Network



Registry Hierarchy Model



Registry Queries

- SQL vs XML
- Convergence with VOQL.

SQL Standards

An OUTER JOIN is not available in DB2/CS Version 2 (although it is available in Oracle 7).

In DB2, a combination of an inner join, union, and subselect achieves the same result that can be produced by an Oracle outer join. Any outer join statements in an Oracle application should be rewritten using union and subselect, based on the required query logic.

```
SELECT B.thr_grp_id, B.thr_pt, B.thr_pt_min, count(A.thr_grp_id)
FROM vthr_grp_det B, vthr_subscriber A
WHERE B.resell_acct_num = rs1AcctNumber AND
      (grpID IS NULL OR B.thr_grp_id=grpID) AND
      B.resell_acct_num = A.resell_acct_num(+) AND
      B.thr_grp_id = A.thr_grp_id(+) AND
      B.thr_pt = A.thr_pt_met(+)
GROUP BY B.thr_grp_id,B.thr_pt,B.thr_pt_min
```

The following DB2 SQL statement that creates the same result as the Oracle outer join:

```
EXEC SQL SELECT B.thr_grp_id, B.thr_pt, B.thr_pt_min, count(A.thr_grp_id)
           FROM vthr_grp_det B, vthr_subscriber A
           WHERE B.resell_acct_num = :rs1AcctNumber AND
                 (grpID IS NULL OR B.thr_grp_id = :grpID) AND
                 B.resell_acct_num = A.resell_acct_num AND
                 B.thr_grp_id = A.thr_grp_id AND
                 B.thr_pt = A.thr_pt_met

UNION

SELECT B.thr_grp_id, B.thr_pt, B.thrPt_min, 0
FROM vthr_grp_det B
WHERE B.resell_acct_num = :rs1AcctNumber AND
      B.thr_grp_id = :grpID AND
      not EXISTS (SELECT *
                  FROM vthr_subscriber A
                  WHERE B.resell_acct_num = A.resell_acct_num AND
                        B.thr_grp_id = A.thr_grp_id AND
                        B.thr_pt = A.thr_pt_min)

GROUP BY B.thr_grp_id, B.thr_pt, B.thr_pt_min
```

XML / XSD

```
<?xml version="1.0" encoding="UTF-8"?>
<xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  <xsd:element name="regQuery">
    <xsd:complexType>
      <xsd:sequence>
        <xsd:group maxOccurs="1" minOccurs="1" ref="contents"/>
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>
  <xsd:element name="userID">
    <xsd:simpleType>
      <xsd:restriction base="xsd:string"/>
    </xsd:simpleType>
  </xsd:element>
  <xsd:element name="query">
    <xsd:complexType>
      <xsd:sequence>
        <xsd:group maxOccurs="1" minOccurs="1" ref="criteria"/>
        <xsd:group maxOccurs="1" minOccurs="1" ref="return"/>
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>
  <xsd:element name="operator">
    <xsd:simpleType>
      <xsd:restriction base="xsd:string">
        <xsd:enumeration value="AND"/>
        <xsd:enumeration value="OR"/>
        <xsd:enumeration value="NOT"/>
        <xsd:enumeration value="LESSTHAN"/>
        <xsd:enumeration value="GREATERTHAN"/>
        <xsd:enumeration value="DIFFERENCE"/>
        <xsd:enumeration value="AVERAGE"/>
        <xsd:enumeration value="CONE"/>
        <xsd:enumeration value="EQUALS"/>
      </xsd:restriction>
    </xsd:simpleType>
  </xsd:element>
  <xsd:element name="field">
    <xsd:simpleType>
      <xsd:restriction base="xsd:string"/>
    </xsd:simpleType>
  </xsd:element>
  <xsd:element name="value">
    <xsd:simpleType>
      <xsd:restriction base="xsd:string"/>
    </xsd:simpleType>
  </xsd:element>
  <xsd:group name="contents">
    <xsd:sequence>
      <xsd:element maxOccurs="1" minOccurs="1" ref="userID"/>
      <xsd:element maxOccurs="1" minOccurs="1" ref="query"/>
    </xsd:sequence>
  </xsd:group>
  <xsd:group name="nameValuePairs">
    <xsd:sequence>
      <xsd:element maxOccurs="1" minOccurs="1" ref="field"/>
      <xsd:element maxOccurs="1" minOccurs="1" ref="value"/>
    </xsd:sequence>
  </xsd:group>
  <xsd:group name="criteria">
    <xsd:sequence>
      <xsd:element maxOccurs="1" minOccurs="1" ref="operator"/>
      <xsd:group maxOccurs="1" minOccurs="1" ref="nameValuePairs"/>
    </xsd:sequence>
  </xsd:group>
  <xsd:group name="return">
    <xsd:sequence>
      <xsd:element maxOccurs="unbounded" minOccurs="0" ref="field"/>
    </xsd:sequence>
  </xsd:group>
</xsd:schema>
```

Example Query

```
<?xml version="1.0" encoding="UTF-8"?>
<regQuery>
  <userID>user@institute</userID>
  <query>
    <return>
      <field>OBJID</field>
      <field>CATNAME</field>
      <field>TARGETNAME</field>
      <field>TARGETID</field>
      <field>RA</field>
      <field>DEC</field>
      <field>PRIORITY</field>
      <field>MAG_1</field>
      <field>PROGID</field>
      <field>MAG_2</field>
    </return>
    <criteria>
      <operator type="AND"/>
      <operator type="CONE">
        <field>RA</field>
        <value>161.82385037365</value>
        <field>DEC</field>
        <value>37.2641191920894</value>
        <field>RADIUS</field>
        <value>100</value>
      </operator>
      <operator type="OR">
        <operator type="LESS THAN">
          <field>MAG_1</field>
          <value>14</value>
        </operator>
        <operator type="LESS THAN">
          <operator type="DIFFERENCE">
            <field>MAG_1</field>
            <field>MAG_2</field>
          </operator>
          <value>5</value>
        </operator>
      </operator>
    </criteria>
  </query>
</regQuery>
```

What we want:

```
<return>  
  <field>OBJID</field>  
  <field>CATNAME</field>  
  <field>TARGETNAME</field>  
  <field>TARGETID</field>  
  <field>RA</field>  
  <field>DEC</field>  
  <field>PRIORITY</field>  
  <field>MAG_1</field>  
  <field>PROGID</field>  
  <field>MAG_2</field>  
</return>
```

How we propose to get it:

```
<criteria>
  <operator type="AND"/>
  <operator type="CONE">
    <field>RA</field>
    <value>161.82385037365</value>
    <field>DEC</field>
    <value>37.2641191920894</value>
    <field>RADIUS</field>
    <value>100</value>
  </operator>
  <operator type="OR">
    <operator type="LESS THAN">
      <field>MAG_1</field>
      <value>14</value>
    </operator>
    <operator type="LESS THAN">
      <operator type="DIFFERENCE">
        <field>MAG_1</field>
        <field>MAG_2</field>
      </operator>
      <value>5</value>
    </operator>
  </operator>
</criteria>
```

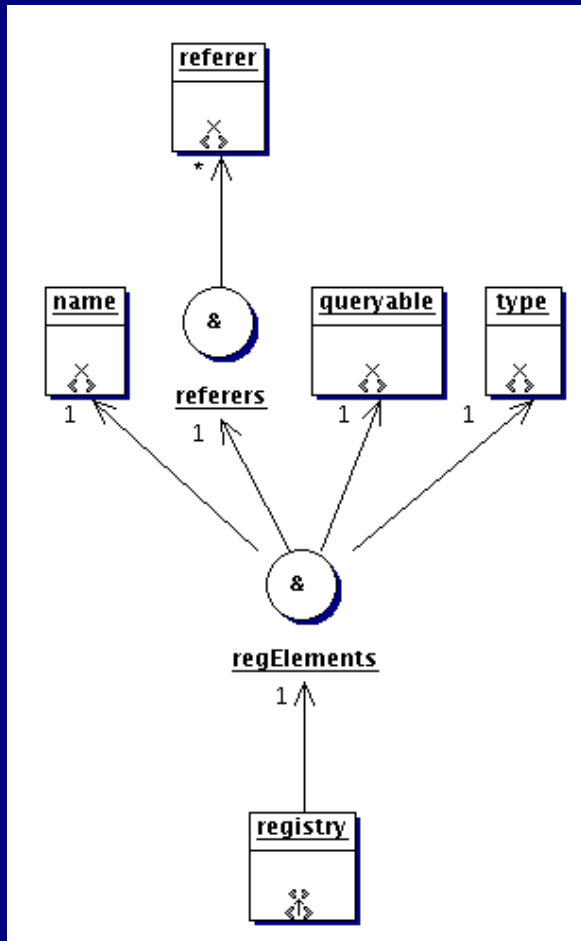
Convergence with VOQL

- Advantages
 - Reuse as much query processing code as possible
 - Consistency
 - Simpler clients,
- Disadvantages
 - Too much information
 - Interpretation of query at registry.

Registry Management

- Configuration
- Local management
- Replication / Harvesting / Publication.

Configuration

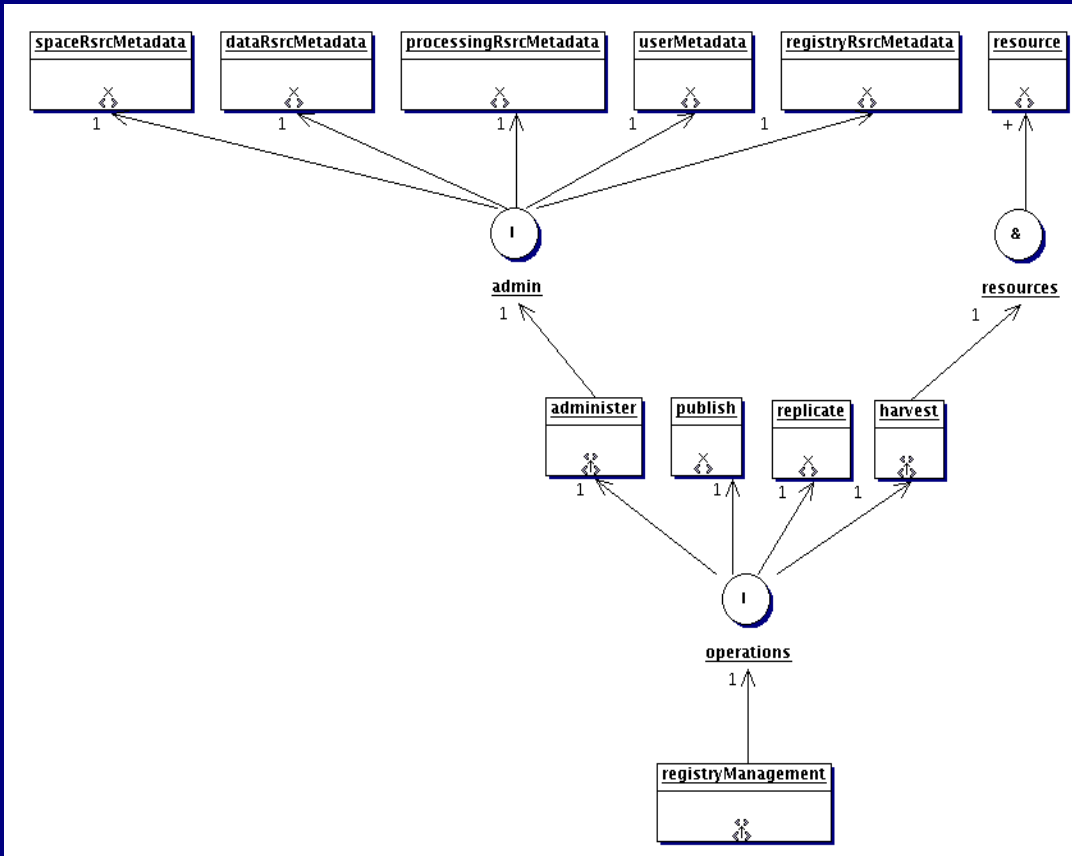


```

<?xml version="1.0" encoding="UTF-8"?>
<xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  <xsd:element name="registry">
    <xsd:complexType>
      <xsd:sequence>
        <xsd:group maxOccurs="1" minOccurs="1" ref="regElements"/>
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>
  <xsd:element name="name">
    <xsd:simpleType>
      <xsd:restriction base="xsd:string"/>
    </xsd:simpleType>
  </xsd:element>
  <xsd:element name="type">
    <xsd:simpleType>
      <xsd:restriction base="xsd:string">
        <xsd:enumeration value="FULL"/>
        <xsd:enumeration value="SPECIALIST"/>
        <xsd:enumeration value="PUBLISHER"/>
      </xsd:restriction>
    </xsd:simpleType>
  </xsd:element>
  <xsd:element name="queryable">
    <xsd:simpleType>
      <xsd:restriction base="xsd:boolean"/>
    </xsd:simpleType>
  </xsd:element>
  <xsd:element name="referer">
    <xsd:simpleType>
      <xsd:restriction base="xsd:anyURI"/>
    </xsd:simpleType>
  </xsd:element>
  <xsd:group name="referers">
    <xsd:sequence>
      <xsd:element maxOccurs="unbounded" minOccurs="0" ref="referer"/>
    </xsd:sequence>
  </xsd:group>
  <xsd:group name="regElements">
    <xsd:sequence>
      <xsd:element maxOccurs="1" minOccurs="1" ref="name"/>
      <xsd:element maxOccurs="1" minOccurs="1" ref="type"/>
      <xsd:element maxOccurs="1" minOccurs="1" ref="queryable"/>
      <xsd:group maxOccurs="1" minOccurs="1" ref="referers"/>
    </xsd:sequence>
  </xsd:group>
</xsd:schema>

```

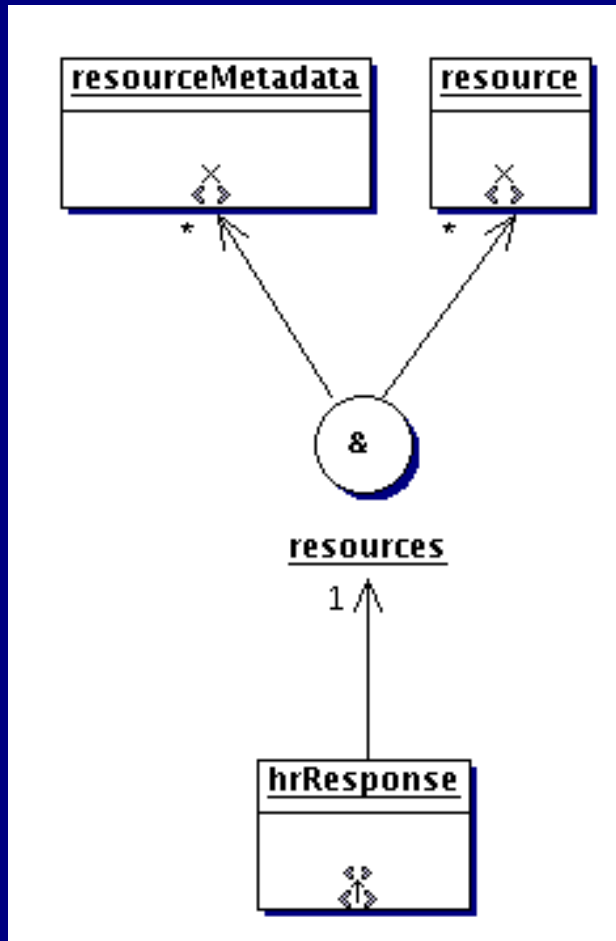

Local management



```

<?xml version="1.0" encoding="UTF-8"?>
<xsd:schema
  xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  >
  <xsd:element name="registryManagement">
    <xsd:complexType>
      <xsd:sequence>
        <xsd:group maxOccurs="1" minOccurs="1"
          ref="operations"/>
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>
  <xsd:element name="publish">
    <xsd:simpleType>
      <xsd:restriction base="xsd:string"/>
    </xsd:simpleType>
  </xsd:element>
  <xsd:element name="harvest">
    <xsd:complexType>
      <xsd:sequence>
        <xsd:group maxOccurs="1" minOccurs="1"
          ref="resources"/>
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>
  <xsd:element name="replicate">
    <xsd:simpleType>
      <xsd:restriction base="xsd:dateTime"/>
    </xsd:simpleType>
  </xsd:element>
  <xsd:element name="administer">
    <xsd:simpleType>
      <xsd:restriction base="xsd:string">
        <xsd:enumeration value="DATA"/>
        <xsd:enumeration value="SPACE"/>
        <xsd:enumeration value="REGISTRY"/>
        <xsd:enumeration value="PROCESSING"/>
        <xsd:enumeration value="USER"/>
      </xsd:restriction>
    </xsd:simpleType>
  </xsd:element>
  </xsd:schema>
  
```

Replication



```

<?xml version="1.0" encoding="UTF-8"?>
<xsd:schema
  xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  <xsd:element name="hrResponse">
    <xsd:simpleType>
      <xsd:restriction base="xsd:long"/>
    </xsd:simpleType>
  </xsd:element>
  <xsd:element name="resourceMetadata">
    <xsd:simpleType>
      <xsd:restriction base="xsd:string"/>
    </xsd:simpleType>
  </xsd:element>
  <xsd:element name="resource">
    <xsd:simpleType>
      <xsd:restriction base="xsd:string"/>
    </xsd:simpleType>
  </xsd:element>
  <xsd:group name="resources">
    <xsd:sequence>
      <xsd:element maxOccurs="unbounded" minOccurs="0"
        ref="resource"/>
      <xsd:element maxOccurs="unbounded" minOccurs="0"
        ref="resourceMetadata"/>
    </xsd:sequence>
  </xsd:group>
</xsd:schema>

```

Questions

