JVO Skynode Toolkit

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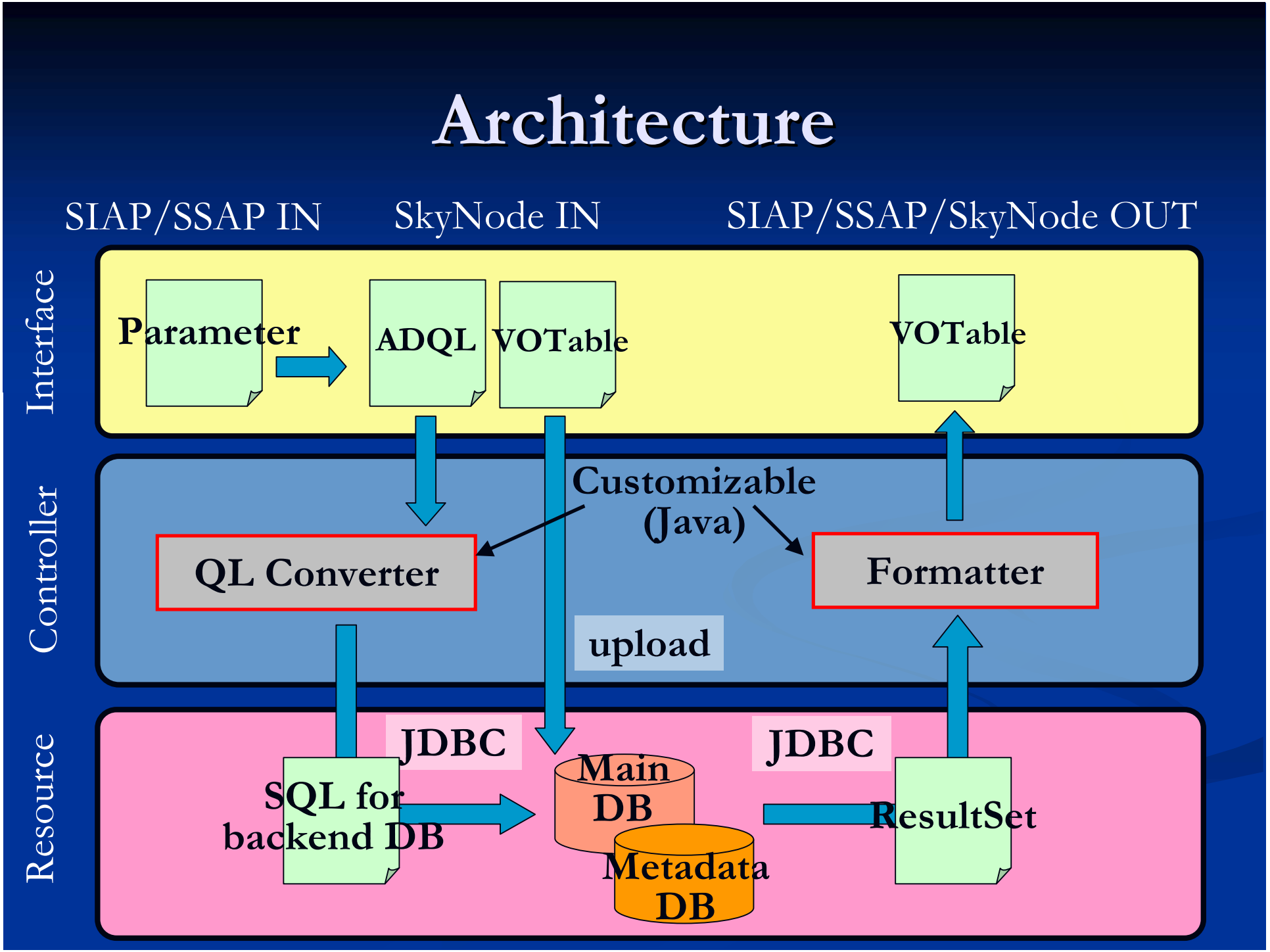
Objectives

- Provide a toolkit for exposing the relational database via VO interface.
  - It becomes possible for a data provider to make a VO compliant data service without precise knowledge about VO standard.
- For developing distributed database system based on VOQL.
  - Testing the ADQL spec.
  - Testing the SkyNode interface.
  - Feedback to the VOQL WG.

Functionalities

- Basic Skynode + Cross match
  - Region search based on HTM index
  - File upload & cross match based on proximity criteria → multiple regions search
  - ADQL Core syntax + some extensions
  - performQuery, queryCost, xmatch, table(s), column(s)
- SIAP & SSAP equivalent service.
  - ADQL query even for the image & spectrum data.
  - Data calculated dynamically on a request is treated as a function column.

Architecture



Required Software

- Java (tested on 1.4.2 and 1.5.0)
- Tomcat (servlet container, http interface)
- PostgreSQL (Relational DBMS) or others.
- SkyNode toolkit

  http://jvo.nao.ac.jp/download/skynode-toolkit
- If you want to build from source files
  - Ant (Java-based build tool)
  - JavaCC (Java Parser Generator, SQL parser)

Minimum procedure for building a skynode

- Install Java, tomcat, RDBMS and skynode toolkit.
- Prepare database for your data.
- Register metadata of your relational table(s).
- Create HTM index table as required.
- Start tomcat container and deploy the web service application.
- Instruction for building a sample skynode is described at http://jvo.nao.ac.jp/download/skynode-toolkit/instruction.txt

Example : QSO Catalog

- How to build a skynode service on the following QSO table.

```
qso=# select * from qso_veron_2003;
  id   |       name         |  raj2000   |  dej2000   |   z   | v_mag |
-------+--------------------+------------+------------+-------+-------+
     1 | FIRST J00000-0202  | 00 00 01.3 | -02 02 00  | 1.356 | 19.64 |
     2 | 2QZ J000001-3036   | 00 00 01.4 | -30 36 27  | 1.143 | 20.10 |
     3 | 2QZ J000001-3122   | 00 00 01.7 | -31 22 26  | 1.331 | 20.69 |
     4 | XMM J00000-2511    | 00 00 02.7 | -25 11 37  | 1.314 | 21.00 |
…
```

Metadata Registration

- Metadata of the database, table and columns must be registered.
  - Database – name, database URL, JDBC driver name, access user name, password, description.
  - Table – name, db name, description, etc…
  - Column – name, db name, table name, data type, UCD, unit, description…
- Methods for the registration:
  - Command line script
  - Graphical user interface (under development)

Metadata registration

1. Create metadata tables.
2. Generate a template of metadata file and edit the file. (example)
3. Register the metadata.

```
$ createdb metadb # For PostgreSQL
$ meta-op create # -- (1)
$ skynode-ops template -d qso -t ¥
  qso_veron_2003 -f template.dat # -- (2)
$ meta-op register -f template.dat # -- (3)
```

Creating HTM index

Create an HTM index table for region search.

```
$ skynode-op htm -d qso -t qso_veron_2003 ¥
  -col-ra raj2000 -col-dec dej200 -l 18
```

This will create a table named "_htm_18_qso_verson_2003".

```
$ psql qso
qso=# select * from _htm_18_qso_veron_2003;
  id    |    htm_index
-------+-----------------
     1 |  549782062857
     2 |  556618233970
     3 |  556502057816
```

Region Search

```
SELECT *
FROM   qso_veron_2003 qso
WHERE  Region('Circle 189.20625 62.216111 0.1')
```

```
SELECT *
FROM   qso_veron_2003 qso
       natural join
       (
          SELECT t1.id
          FROM   _htm_18_qso_veron_2003 t1
                 join _region t2
                 ON t1.htm between t2.low and t2.high
       )
```

Summary

- Skynode toolkit is available at:
  - http://jvo.nao.ac.jp/download/skynode-toolkit
- Instruction manual is also available at above URL
- More detailed usage will be included.