

Possibilities for Database Archival and Access

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Data Archive Objectives

- Platform independent node/server, compatible with standard VO **Web Service** Protocols
- Quick and **easy access through the web** to data using any web browser with standard plugins
- Perform **simple analysis** and calculations on data on the fly – filters, change axes, units
- Ability to cross-correlate with other databases, retrieve and compare data
- Ability to manually query a database with standard SQL commands
- **Multiple output formats** (ASCII, FITS, binary, GIF, JPEG) for further analysis or display

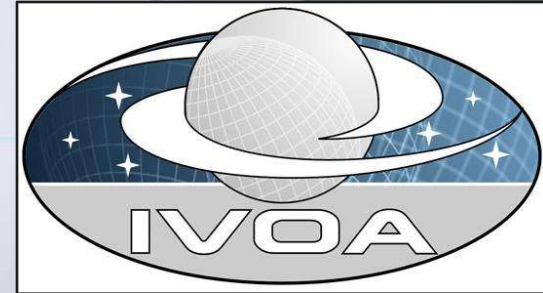


VO Web Service Protocols

- The **Virtual Observatory** is a framework which defines a set of protocols and services for astronomical data use and transfer over networks – it is **NOT** a massive central repository for data.
- Data representation takes form via **XML** (**eX**tensible **M**arkup **L**anguage)
- Data exchange makes use of Web Services using **SOAP** (**S**imple **O**bject **A**ccess **P**rotocol) and **WSDL** (**W**eb **S**ervice **D**escription **L**anguage)
- Web Services include:
 - Metadata – data about the data ...
 - Search algorithms
 - Basic analysis functions (simple plotting, filtering, units, recalibrations, etc.)
- See Szalay, et al. Microsoft Research Technical Report 2002-85

Synergy with IVOA

- **Importance of bringing the radio part of the spectrum into the VO standards**
- **In the future, cross-correlations will be performed on many large surveys, with massive amounts of data (ALFA, SDSS, HST, etc.)**
- **Understanding the tools, standards, and protocols of the VO will allow for integration of ALFA data, giving the community easy access to ALFA data products once data is available**



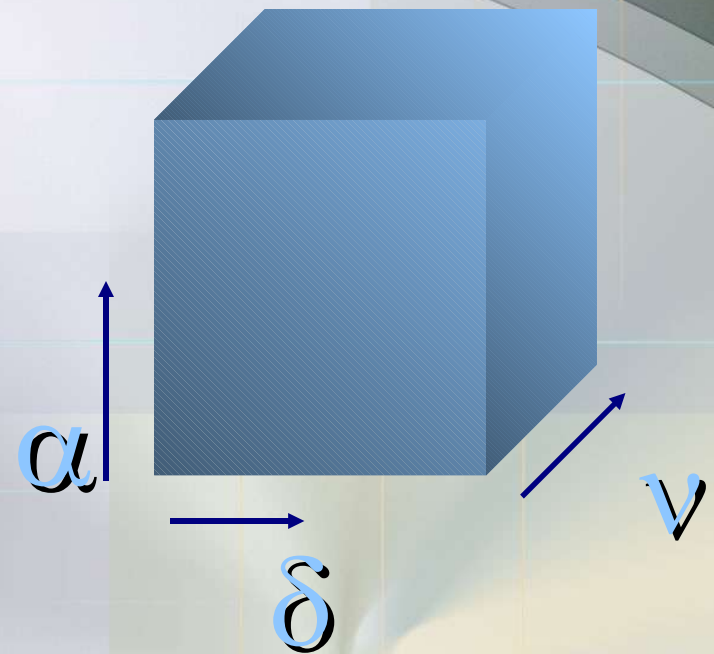
Exploring the Implementation and Design

	<u>Windows</u>	<u>Linux</u>
<u>DataBase Management System</u>	MS SQL Server 2000 MySQL	PostgreSQL MySQL
<u>Application Programming</u>	MS .NET and C#	Java
<u>Pros</u>	Well suited for large datasets and easy web implementation	Open source and Free! Sun Java SDK Kit available for free
<u>Cons</u>	Can be expensive	Support is not always easy Can experience slowdown with large datasets Java IDE's are not all free



Concept Demonstration

- Simple AO data cube of spectra.
- Each position is assigned an unique index identifier record number
- Each record contains all the information for that point – RA, Dec, Integrated Total Power Measurement, Spectrum, mask, etc.
- Data reduced in **IDL** (bandpass calibration), export of IDL structure elements and data to CSV **ASCII**
- Import to **MySQL**, Table Schema Creation
- **Javascript** map control
- **HTML Form** submission tool
- **PHP** -> **SQL** Query



Web Prototype Demonstration


E-ALFA Data Archive Demonstration - Netscape

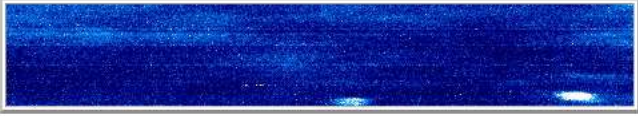
File Edit View Go Bookmarks Tools Window Help

http://dorado.astro.cornell.edu/submit2.php

E-ALFA Data Archive Demonstration

HI DATABASE



Main	<h3>Map Display</h3>  <p>Click on the above map to return ra and dec index values to the form below. Then click "Submit Query" to query the database and return information relevant to that pixel on the map. The lower left corner is (0,0). RA increases to the right, and Decl increases upward.</p> <p><input type="text"/> RA Index</p> <p><input type="text"/> Dec Index</p> <p><input type="button" value="Submit Query"/></p>	Spectra Information Display
Spectra		
Maps		
SQL Query		
Tutorial		
ALFA		
Links		

Result of Query

Recordid: 0
raindex: 0
decindex: 0
RA (B1950): 10.616805
Decl (B1950): 11.898333
Total Power [Jy]: 0.006917

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Simple application of concepts with MySQL, PHP, CSS, and Javascript


E-ALFA Data Archive Demonstration - Netscape

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RA Index

Dec Index

Result of Query

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User clicks on map, activates javascript


E-ALFA Data Archive Demonstration - Netscape

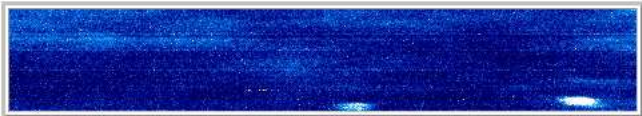
File Edit View Go Bookmarks Tools Window Help

http://dorado.astro.cornell.edu/submit2.php

E-ALFA Data Archive Demonstration

HI DATABASE



Main Spectra Maps SQL Query Tutorial ALFA Links	<h2>Map Display</h2>  <p>Click on the above map to return ra and dec index values to the form below. Then click "Submit Query" to query the database and return the results. The lower left corner pixel is (0,0). RA increases upward.</p> <p>208 <input type="text"/> RA Index</p> <p>27 <input type="text"/> Dec Index</p> <p><input type="button" value="Submit Query"/></p>	Spectra Information Display <h2>Result of Query</h2> <p>Recordid: 0 raindex: 0 decindex: 0 RA (J2000): 10.616805</p>
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Done

Pixel indices are returned to the form

Submit button queries the database


E-ALFA Data Archive Demonstration - Netscape

File Edit View Go Bookmarks Tools Window Help

http://dorado.astro.cornell.edu/submit2.php?MouseX=208&MouseY=...

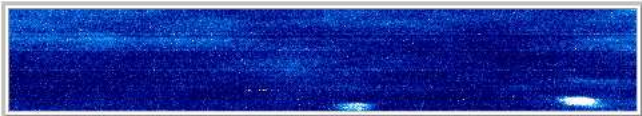
E-ALFA Data Archive Demonstration

HI DATABASE



[Main](#)
[Spectra](#)
[Maps](#)
[SQL Query](#)
[Tutorial](#)
[ALFA](#)
[Links](#)

Map Display



Click on the above map to return ra and dec index values to the form below. Then click "Submit Query" to query the database and return information relevant to that pixel on the map. The lower left corner is (0,0). RA increases to the right, and Decl increases upward.

RA Index
 Dec Index

[Spectra Information Display](#)

Result of Query

Recordid: 12898
raindex: 208
decindex: 27
RA (B1950): 10.674742
Decl (B1950): 12.640833
Total Power [Jy]: 0.006797

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Same file is called, but the URL is now different, reflecting the criteria and parameters of the query

PHP returns the results, which are displayed in a query table

Further Information (handout)

<http://www.astro.cornell.edu/~bkent/egg/alfa/>

- **Virtual Observatory**
 - VO Alliance <http://www.ivoa.net/>
 - VO Web Services <http://www.voservices.org/>
 - SkyQuery <http://www.skyquery.org/>
- **SQL (Structured Query Language)**
 - MySQL <http://www.mysql.com/>
 - MS SQL Server 2000 <http://www.microsoft.com/sql/>
 - PostgreSQL <http://www.postgresql.org/>
- **PHP (Hypertext Preprocessor)**
 - PHP Documentation <http://www.php.net/>
- **.NET Development and XML (eXtensible Markup Language)**
 - MS .NET <http://www.microsoft.com/net/>
 - Visual C# <http://msdn.microsoft.com/vcsharp/>
- **Java Development**
 - Sun Java SDK <http://www.java.com/>
- **Web Services Description, Prototype Applications, and Architecture**

Szalay, A. et al. 2002, Proceedings of the SPIE, Volume 4846, 124.