Introduction

What is a Virtual Observatory?

A virtual observatory ("VO") is a standardised digital archive and smart methods to use it. In most cases the database has a nice web interface. Also there is a growing amount of helpful tools to search and visualise data, or you can connect to it with your own programs.

Why do we need a Virtual Observatory?

In Astrophysics the amount of observed and simulated data increases strongly every year. Much of that data is described poorly. This makes it difficult to use that information for anyone else but the primary researchers (and sometimes even for them). The virtual observatory initiative aims to properly describe all data and make it available to the community. Thus it helps you to find and extract the information you are really looking for.

Who defines the standards? How do they improve archive use?

As a consequence of the diverse state of archives worldwide, a joint initiative was formed in 2002 which is called the *International Virtual Observatory Alliance* (IVOA). It is a collaborative body of astrophysicists and computer scientists who work together to find descriptions for all possible forms of astrophysical data ("metadata"). Also they develop the corresponding protocols and methods to search, exchange and process that data.

The role of GAVO

What is GAVO?

The "German Astrophysical Virtual Observatory" is the German participant in the IVOA initiative and serves the same cause described above. Specifically we aim to help the German astrophysical community to publish data, to adopt the international standards and to use the available archives and tools. Also GAVO collects the feedback from the community for improvements of the standards, interfaces, protocols and software.

How can GAVO help me?

We can assist you if you have data that you want to publish, or if you want to improve your already existing archive. GAVO can also teach you to advanced methods to find and analyse data from the archives available. The details depend on the area of research. The easiest way to find out is to contact a GAVO member (see backside of this leaflet for addresses).

The GAVO member *Zentrum für Astronomie Heidelberg* (ZAH) is currently setting up the first German data center to support the German community.

What kind of work do I have to expect?

To set up a VO compatible archive you need to supply detailed description of your data. GAVO can help you on how to get started on the standards or you can check the IVOA web pages (see below). For running the actual web interface, knowledge of databases and web publishing methods will be helpful.

Links and Contact

GAVO Website:

http://www.g-vo.org

Email:

gavo@ari.uni-heidelberg.de

You can meet the GAVO members at the meeting of the *Astronomische Gesellschaft* (AG), September 25-28, 2007 in Würzburg.
We present regular demos of service / tool usage

GAVO is a joint project of the following institutes:

Zentrum für Astronomie Heidelberg (ZAH), Max-Planck-Institut für extraterrestrische Physik (MPE), Garching, Astrophysikalisches Institut Potsdam (AIP), Institut für Astronomie und Astrophysik Tübingen (IAAT), Technische Universität München

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Services & Archives

This is a list of a few example sites to give you an overview of interesting services and additional documentation.

Euro-VO (www.euro-vo.org)

This site is a starting point to discover the Virtual Observatory concept. Offers many articles about technical and scientific aspects, and is still growing as an ongoing project. Also offers a registry for VO archives.

CDS (cdsweb.u-strasbg.fr)

The *Centre de Données astronomiques de Strasbourg* hosts several of the most important archives and services (e.g. Simbad, VizieR).

IVOA (www.ivoa.net)

The IVOA publishes all VO technical papers. The most important source of information to get definite description of the protocols and schemata to implement.

SDSS (cas.sdss.org/astro)

The Sloan survey is one of the most extensive sky surveys so far, offering images and spectra. On top of from a very advanced web interface it also provides some VO services.

NVO (www.us-vo.org)

The US VO project with many services, such as the "DataScope", a search box to query VO archives around the world.

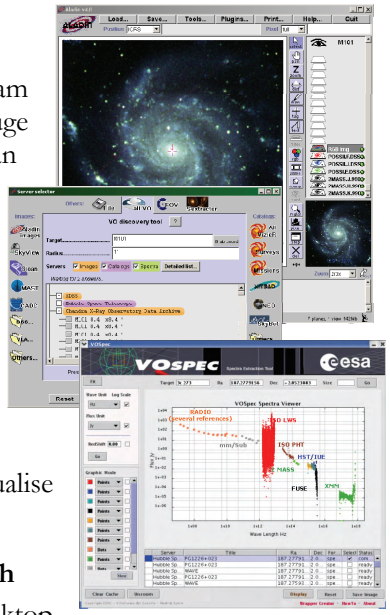
Helpful Tools

The VO initiative published several programs to connect to VO archives and to retrieve, visualise and process data. We only mention some of the most popular here. For links to these tools, see http://www.g-vo.org/www/External/Tools.

If you want your own software to connect to the VO, this is currently possible via the VO protocols ("plastic") or Java libraries and calls.

Topcat

One of the most advanced tools to work with (VO-) Tables. Allows for visualisation, cross matching, and much more.



Aladin

a image display program that connects to a huge list of data bases. Can be used as an interactive sky atlas that to search, retrieve and visualise all available data for a specified target.

VOspec, SpecView

Tools to retrieve, visualise and analyse spectra.

Astrogrid Workbench

An advanced desktop application for doing science in the Virtual Observatory, with many different applications included.

GERMAN ASTROPHYSICAL VIRTUAL OBSERVATORY

GAVO

What is GAVO?

An Introduction to the German Astrophysical Virtual Observatory Project

Visit the GAVO Website:

http://www.g-vo.org

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Bundesministerium für Bildung und Forschung