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WP2

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Creation of database with information collected in D2.1

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Abstract:
This document describes functionality and technology used for the working database (DB) prototype concerning D2.2 task of the WP2 of RINGrid. The database contains all the information collected till now in WP2 and should be used as interface between instrument OWNER and USER groups.

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1. Introduction

As was described in D2.1 report and in TA of the RINGrid project, the process of collection of instrument and user information is considerably time consuming, but a very important task serving as basis for other workpackages. Till now, IIFs and UIFs containing detailed information about instruments and users were collected trought PDF- or web-based forms. The collection of information in this way was chosen as an appropriate method for the initial stage of the project. It was good decission from the point of view for reducing the time for information gathering.

During this process, some problems were encountered, connected with the encoding and the usage of different version of the PDF programs. This leads to difficulties related to information processing and analysing in the WP2 tasks as well to the activities of other workpackages (e.g. WP3) of the RINGrid.

Beside, the information collected by IIFs concerning instrument specifications and services should be easy accessed from users interested in experiments and measurements on this equipment. It also should kept in mind that the instruments which will be at the disposal for remote access, should be conventionally used by instrument owners also. In this connection mutual benefits for both parties concerned (i.e. users and owners) should be detected. A good decision for fast implementation of these requirements is using of database technology.

The database presented in this report is planed and realized as a prototype of information interface between both groups: instrument **OWNERS** an instrument **USERS**.

The product was created by using **MySQL** as **Database Server** and **Apache Tomcat** as **Application Server** technologies.

As an initial task in the process of database creation, the information preliminary collected till now by IIFs and UIFs was converted to database format.

In the next stages of the project, only improved IIFs and UIFs tools for direct information recording in the database format will be used.

This product could be considered as prototype of the future databases that should contain structured information concerning remotely accessible instruments and services integrated in the next generation grids.

2. Technology for the Creation of the RINGrid Database

Due to the requirements for easier and more flexible data access, we considered to realize the database prototype mentioned above using web technology. Besides, we accepted to use free, commonly used, multiplatform compatible programming tools to create the database.

Tacking into consideration the above mentioned reasons, we use **MySQL** as **Database Server**, **Apache Tomcat** as **Application Server** as well as **JavaServer Pages** and **Java Servlet** technologies. In this context, the following steps have been done:

1) Creation of MySQL Database

- creation of Instrument_Information Table
- creation of User_Identification Table

2) Importing data from XML-files of the collected IIFs into the MySQL database

3) Creation of the Java Web Application

- creations of suitable HTML-form for sending of instrument and user information;
- creation of suitable HTML-form for searching of instrument and user information;

4) Creation of JavaServer Pages and Servlets for database search, which dynamically generate HTML for representation of the detected information (text and images).

2.1. Overview of the MySQL

The MySQL® database has become the world's most popular open source database because of its consistent fast performance, high reliability and simple usage. It is used in more than 10 million installations ranging from large corporations to specialized embedded applications. MySQL is not only the world's most popular open source database, but it becomes the database of choice for a new generation of applications built on the LAMP stack (Linux, Apache, MySQL, PHP / Perl / Python) also. MySQL runs on more than 20 platforms including Linux, Windows, OS/X, HP-UX, AIX and Netware, providing a kind of flexibility. Whether the MySQL user is new to database technology or an experienced developer or DBA, MySQL offers a comprehensive range of certified software, support, training and consulting.

2.2. The JavaServer Pages Overview

JavaServer Pages (JSP) technology enables web developers and designers rapid development and easy maintainance of information-rich, dynamic web pages that gives a leverage for the existing business systems. As a part of the Java technology family, JSP technology enables rapid development of web-based applications that are platform independent. JSP technology separates the user interface from content generation, enabling designers to change the overall page layout without altering the underlying dynamic content.

2.3. The JavaServlets Technology Overview

Servlets are Java platform technology of choice for extending and enhancing web servers. Servlets provide a component-based, platform-independent method for building of web-based applications, without performance limitations of CGI programs. Unlike the proprietary server extension mechanisms (such as the Netscape Server API or Apache modules), the servlets are server- and platform-independent. This leaves you free to select a "best of breed" strategy for your servers, platforms, and tools.

Servlets have access to the entire family of Java APIs, including the JDBC API to access enterprise databases. Servlets can also access a library of HTTP-specific calls and receive all the benefits of the mature Java language, including portability, performance, rentability and crash protection. Today servlets are a popular choice for building interactive web applications. Third-party servlet containers are available for Apache Web Server, Microsoft IIS, and others. Servlet containers are usually a component of web and application servers, such as BEA WebLogic Application Server, IBM WebSphere, Sun Java System Web Server, Sun Java System Application Server, and others.

The JavaServer Pages (JSP) is an extension of the servlet technology created to support authoring of HTML and XML pages. It makes it easier to combine fixed or static template data with dynamic content.

2.4. The Overview of the Apache Tomcat Application Server

Apache Tomcat is the servlet container that is used in the official Reference Implementation for the Java Servlet and JavaServer Pages technologies. The Java Servlet and JavaServer Pages specifications are developed by Sun under the Java Community Process.

Apache Tomcat is developed in an open and participatory environment and released under the Apache Software License. Apache Tomcat is intended to be a collaboration of the best-of-breed developers from around the world. Apache Tomcat powers numerous large-scale, mission-critical web applications across a diverse range of industries and organizations.

3. RINGRid Database Functionality Description

The structure of the proposed database is shown on Fig. 1.

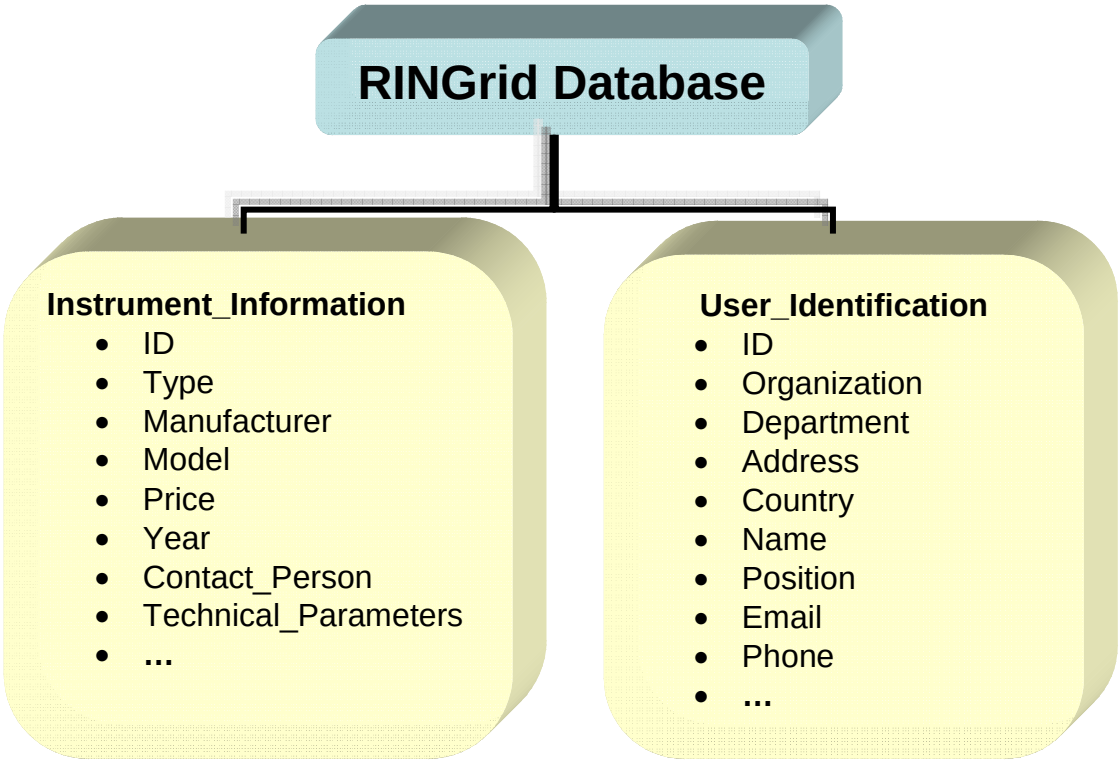

Fig. 1. RINGrid Database Structure

The database contains two main sections – Instrument Information and User Identification (Fig.1). Following the described above instruments and users information, a suitable way for

gattering, keeping and proceading of all mentioned information is needed. In respect to these requirements and using the tools described in Chapter 2 of this document, a working prototype of the database was created. It consists of all IIF and UIF information collected till now and should be used as interface between instrument OWNER and USER communities, as well as in analytical tasks in the next RINGrid activities.

This product could be considered as prototype of the future large databases that should work on the Remote Access Information Gates / Gateways (RAIG) in the Internet, containing large amount of structured information regarding remotely accessed scientific instruments and their user communities (Fig. 2).

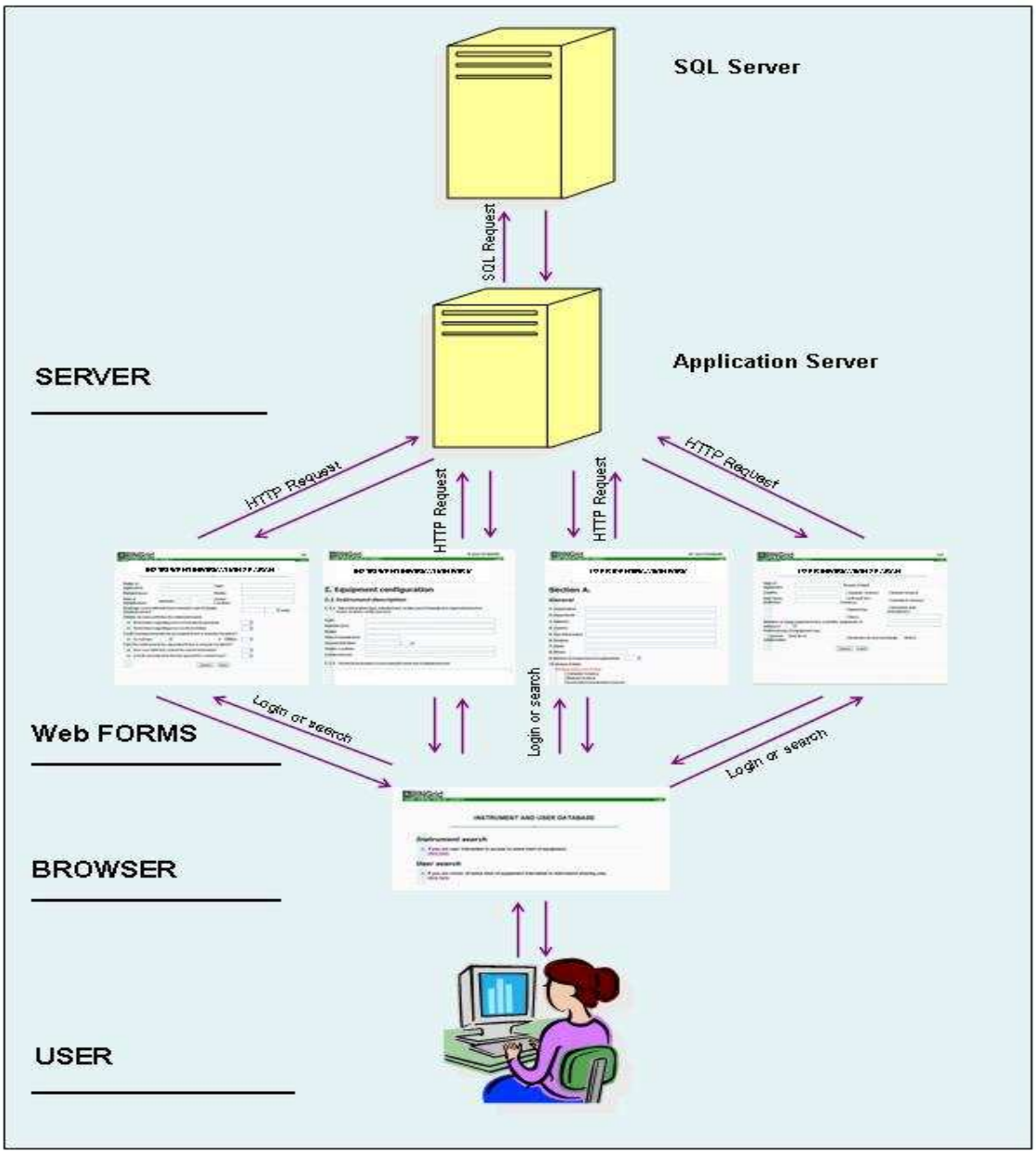

Fig.2. Schematic presentation of Database usage

The presented database prototype provides the following advantages, concerning instruments and users information:

- unification of the collected information;
- exhaustiveness of the data;
- flexibility of information treatment;
- possibility for easier statistical processing of the collected data.

The database is an information interface between both groups: instrument **OWNERS** an instrument **USERS**. The firs group **(OWNERS)** should use it in order to search for proper users and user communities with potential interest to access their equipment according to conditions, which were preliminary defined and described (Fig.3).

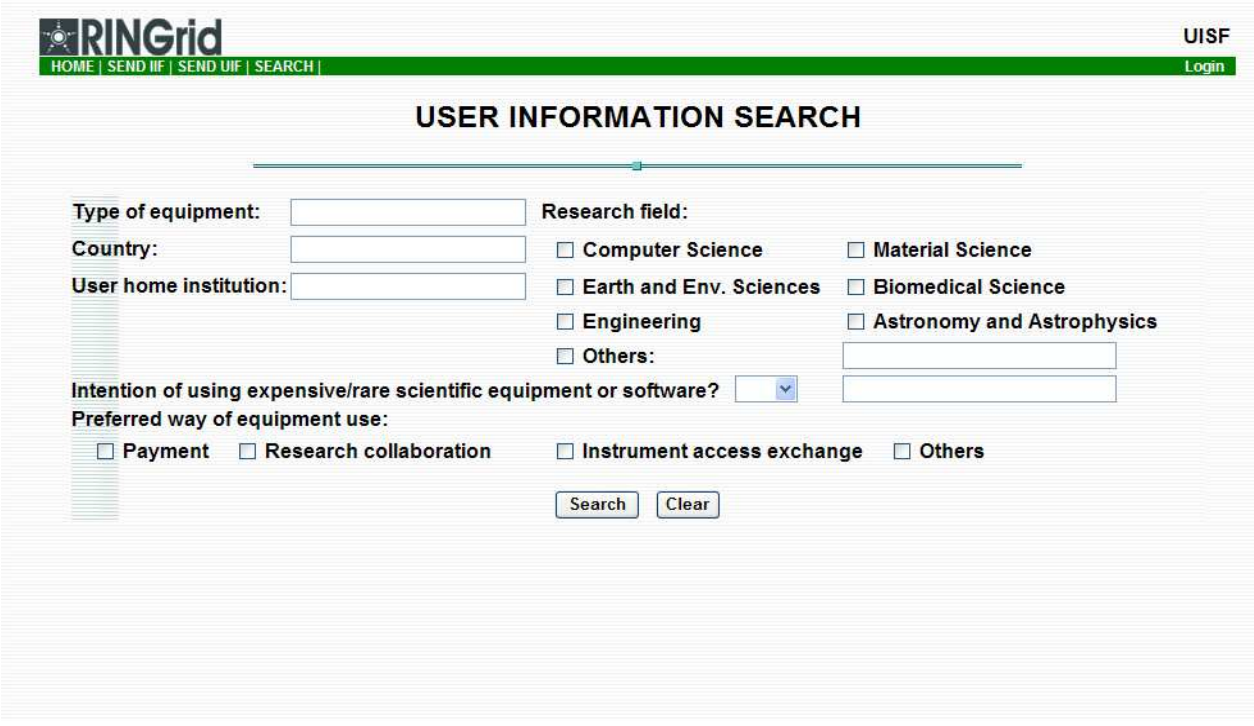

Fig. 3. The main user search page

The second group **(USERS)** can access this database in their search for suitable remotely accessible instruments that best fit the defined criteria (Fig.4).

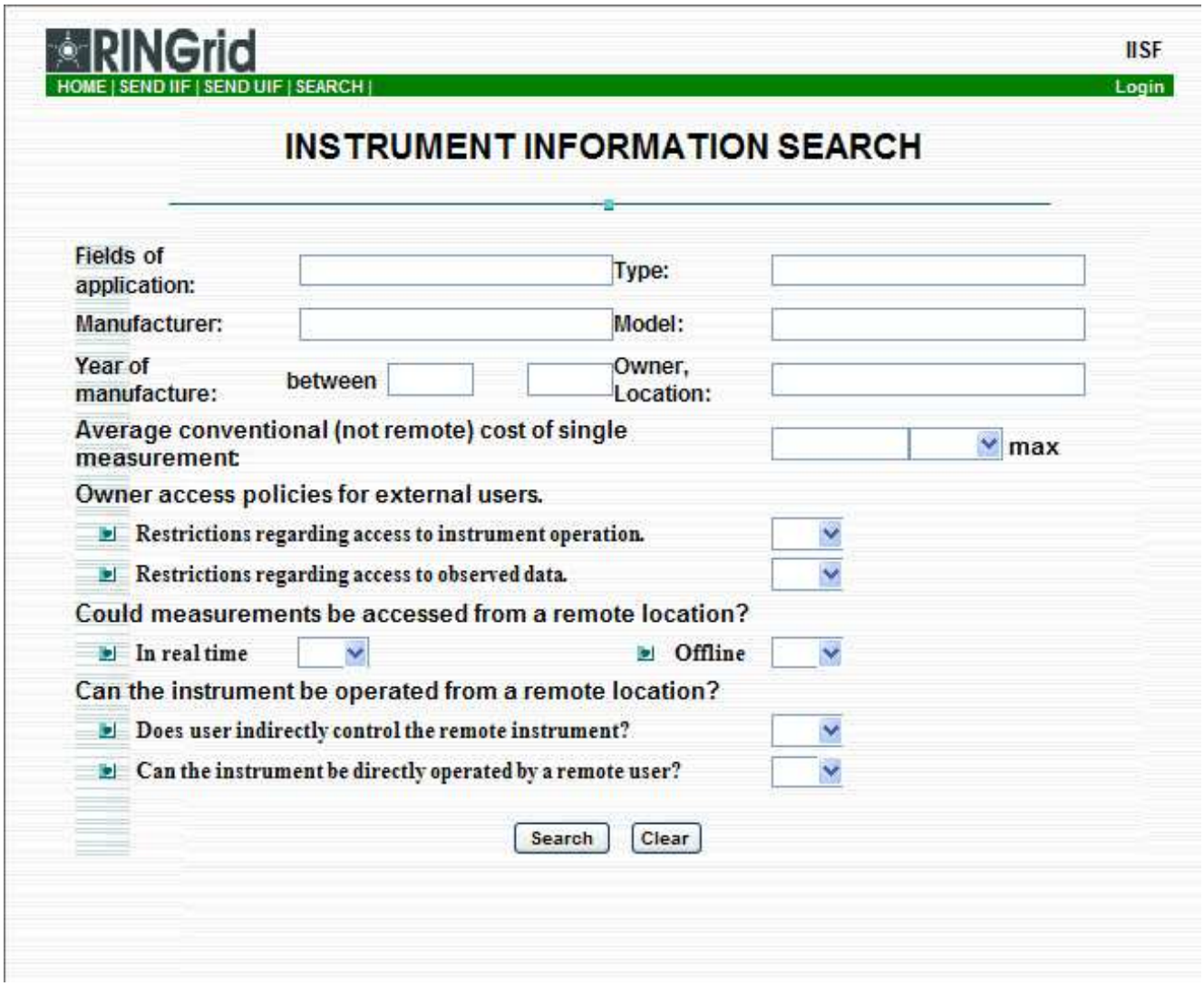

Fig. 4. The main instrument search page

In addition, the possibilities for simplification and time reduction of the process of IIFs and UIFs collection (Fig. 5) are integrated (i.e. IIF and UIF information is directly recorded in the database and no additional data conversion is needed).

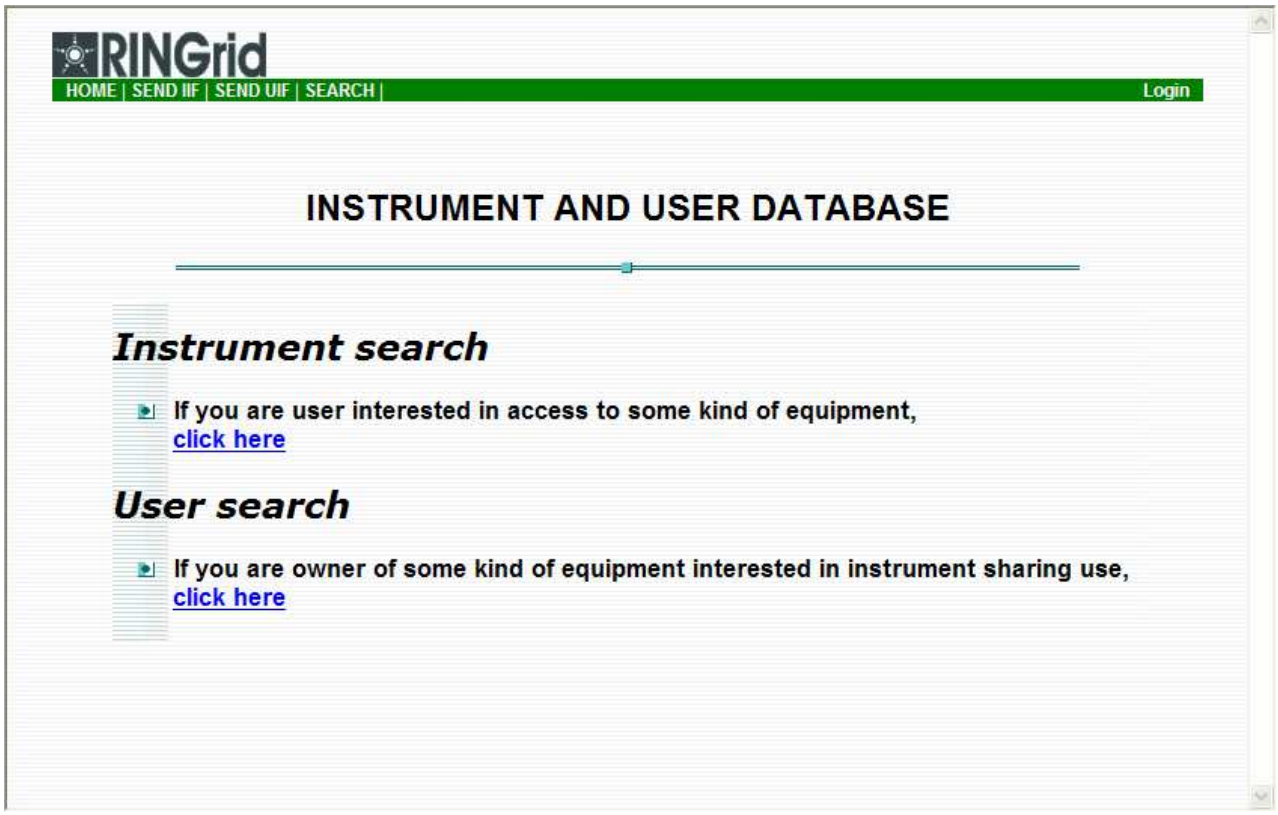

Fig. 5. The integrated IIFs and UIFs tools optimised information collection process

3.1. Database search for instruments and user communities.

For search actions no login procedure is needed, it is possible to go directly to the **SEARCH** option (Fig.5). After that, there are two options:

1) The first one is a link for searching of instruments (Fig. 4). On this page, there are two main fields: **Fields of application** and **Type.** The user of the database has to fill at least one of them. All others are optional. One example for instrument search is as follow:

If the user of the database search instruments applied in astronomical research, he can write Astronomy in the **Fields of application** or choose particular instrument that is probably used in this kind of research (Telescope) and to write it in the **Type** field of the search page.

2) The second option on the main search page is for searching of users of instruments (Fig.3). On this page, there are two main fields: **Type of equipment** and **Research field**. It is necessary at least one of them to be filled. All others are optional. One example for users search is:

If we search users working in the field of astronomy, we have to choose the **Astronomy and Astrophysics** check box or to choose particular instrument that users in this kind of research

commonly accessed (Telescope for example) and to write it in the **Type of equipment** field of this search page.

The proposed database is simple and friendly for using. It can be easy correct and expand at any time with additional information about users and instruments.

4. Summary

The completed D2.2 task concerning creation of RINGrid Instruments and Users Database gives new increased opportunities for collecting, systematisation and analysing of information regarding WP2 activities. It simplifies and reduces the time for processing the IIF and UIF collection. The database works as interface between OWNERS and USERS groups regarding their activities in planning and searching of instruments available for remote access. Moreover, it can be implemented as analytical tool in the next RINGrid project activities.

This IT product could be considered as prototype of the future large scale databases that should be used on the Remote Access Information Gates / Gateways (RAIG) in the Internet, containing a large amount of structured information regarding remotely accessible scientific instruments.

Definitions, abbreviations, acronyms

IIF	–	Instrument Information Form
UIF	–	User Information Form
DB	–	Database
DBA	–	Database administrator
JSP	–	Java Server Pages
CGI	–	Common Gateway Interface
RAIG	–	Remote Access Information Gates
LAMP	–	Linux Apache MySQL PHP
PHP	–	Perl Hypertext Preprocessor

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