ASTRI Raw Web Converter

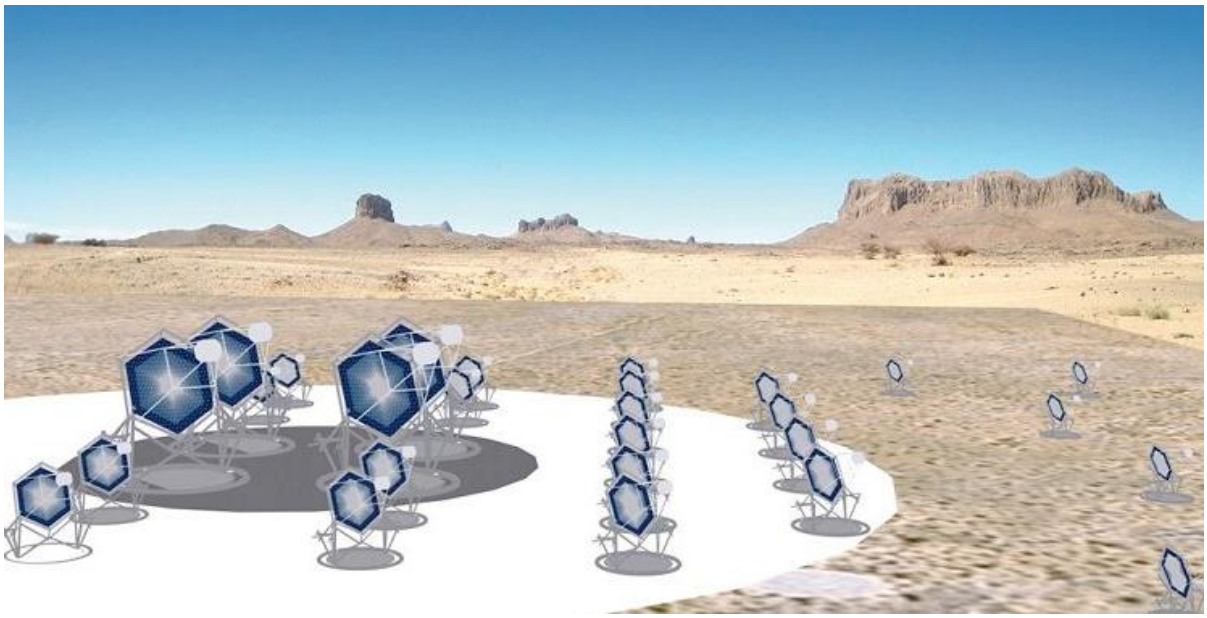

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TABLE OF CONTENTS

DISTRIBUTION LIST

ASTRI mailing list	astri@brera.inaf.it

DOCUMENT HISTORY

Version	Date	Modification
1.0	05/02/2012	first version
		update

LIST OF ACRONYMS

ICD	Interface Control Document
LAMP	Linux Apache MySql Php
MVC	Model View Control

APPLICABLE DOCUMENTS

[AD1] AD1

REFERENCE DOCUMENTS

[RD1] "ASTRI Camera/Detector DAQ Software (DDS) ICD" Issue 1.2 Date 15/01/2013 - M. Trifoglio, A. Bulgarelli, V. Conforti, F. Gianotti.

[RD2] "FITS data format for the ASTRI L0 DATA", Issue 1, 27/11/2012, Saverio Lombardi, Denis Bastieri.

[RD3] Web Site: http://www.cakephp.org

[RD4] "Web-Application Development Usign the Model/View/Controller Design Pattern" ,Avraham Leff, James T. Rayfield , 2001

[RD5] "Telemetry generator Prototype for the ASTRI Montecarlo Data" , V. Conforti, A. Bulgarelli, M. Trifoglio, F. Gianotti - 05/10/2012

[RD6] "FITS generator prototype for the ASTRI Montecarlo Data" , V. Conforti, A. Bulgarelli, M. Trifoglio, F. Gianotti - 05/10/2012

1. INTRODUCTION

A binary format is being defined for Telemetry (TM) data packet to be generated by the ASTRI Back End Electronics (BEE) with the event-data read out and with the housekeeping data of the ASTRI Camera.

In the current early phase of the project, when the ASTRI Camera is being designed, variuos tools are being developed in order to simulate the data flow to variuous purposes.

The ASTRI Raw Web Converter presented in this document is the tool developed at IASF Bologna in order to handle the ASTRI TM Raw data files simulated by the Camera development team at IASF Palermo and generate the corresponding files in the ASTRI FITS Raw format.

2. SCOPE

The main goal of the converter is to read ASTRI TM Raw binary data in the format defined in RD.1 according to a well defined structure and write the data in FITS format according to the format defined in RD.2.

The software is designed to accept all the different types of TM Raw packets that are being defined for the ASTRI Camera.

The scope of this document is to introduce the version 1.0 of the program.

Next chapter presents the architecture of the software. Chapter 4 describes the software requirements as use cases. Chapter 5 explains the design of the application and the chapter 6 presents the data model. The last chapter contains the user guide.

3. SOFTWARE ARCHITECTURE

The converter software is composed by a web application and one or more standalone applications hosted in the same server. The *Figure 1* shows the components involved in the architecture. The user interacts with the software using a web browser. The user's requests are accepted by the web application which uses a database to ensure the data persistence. Moreover one or more programs named *processors* are started by the web application in order to execute the conversion of input file and save the result file in the file system archive.

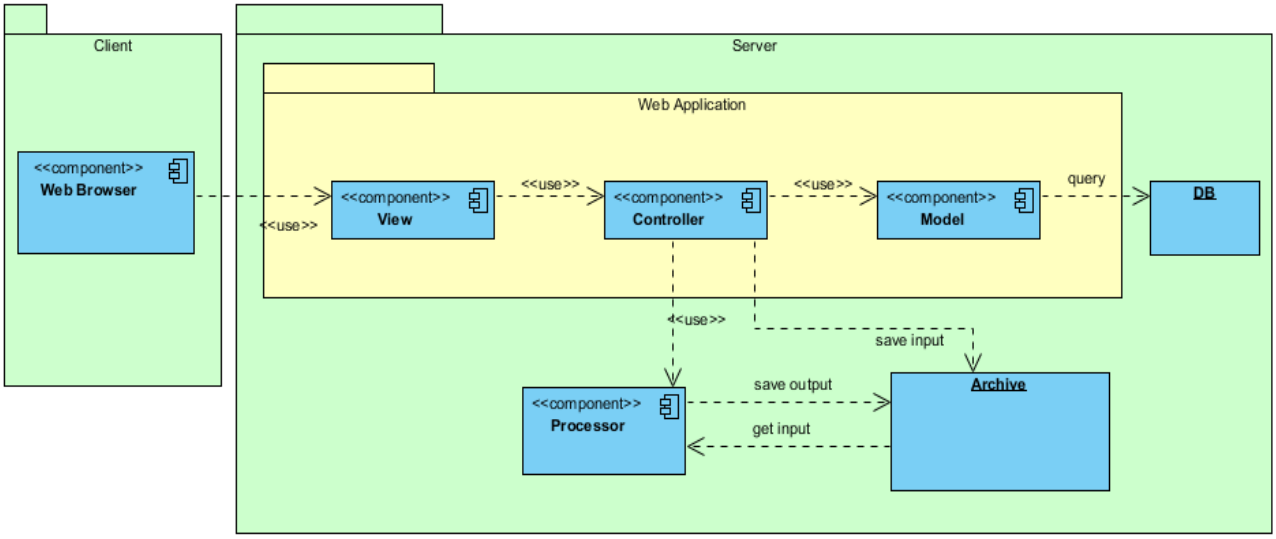


Figure 1 - Componenent diagram

3.1 The Client

The client may be each computer device (also mobile) which has the internet connection and a web browser. Of course the client must have the input binary file to convert.

3.2 The Server

The Server has actually the following LAMP configuration:

- Operating System: Red Hat Linux Cento OS 64 bit;
- Web Server: Apache 2.2.15;
- DBMS: MySql ver. 14.14 distrib. 5.1.66 for redhat-linux-gnu (x86_64);
- Programming language: PHP ver. 5.3.3

The web application of the server is implemented using the CakePHP framework [RD3] (version 2.3.0) which supports the MVC paradigm [RD4].

4. SOFTWARE REQUIREMENTS

The software requirements are exaplained using the following use cases diagram:

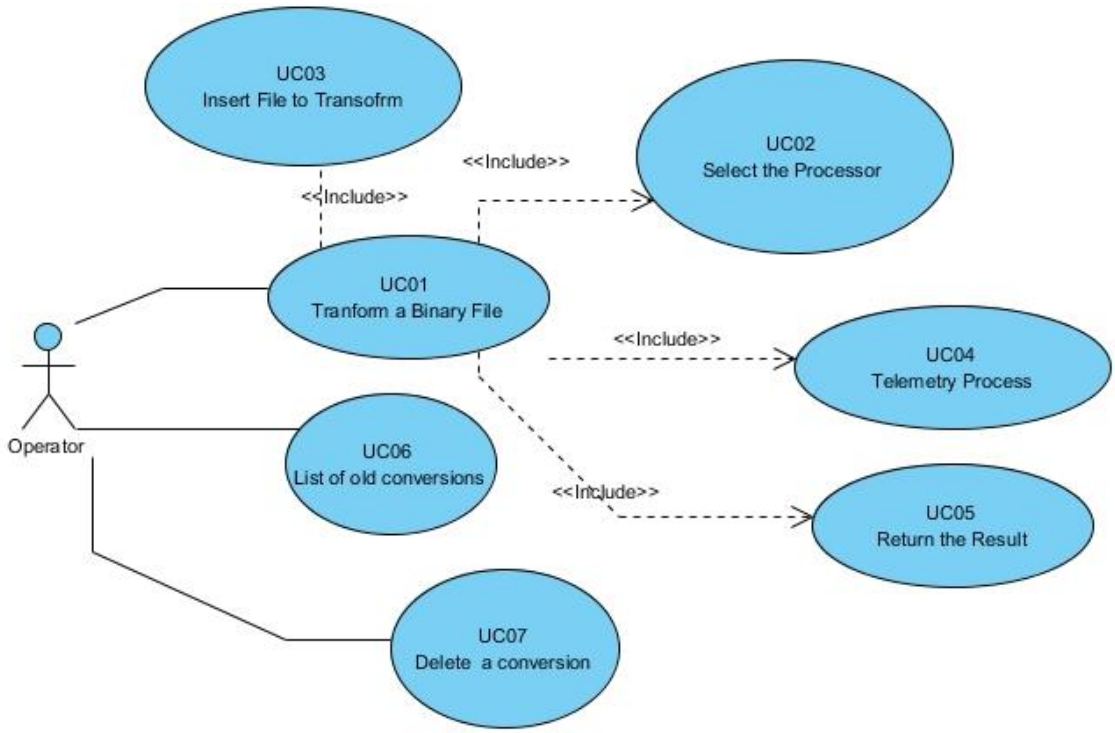


Figure 2 - Use cases diagram

In the following table there are the use cases description:

Use Case ID	Name	Documentation
	Operator	Is the authenticated user.
	Tranform a Binary File	This use case is the core of the project that is a conversion of a binary file in a new format file human understandable.
	Select the Processor	The user can select the kind of conversion. The success of conversion depends by the compliance of the binary data to the telemetry structure

		defined in the processor.
	Insert File to Transofrm	The user select the file to transform, then the system upload the file on the server.
	Telemetry Process	The process of conversion is done using a system call to the program processor.
	Return the Result	After the conversion the system displays a new row with the name of the binary file passed as input and the name of file processed. Each of these file can be downloaded in a local machine. Moreover These files are permanently stored in the server, thus are always available until delete.
	List of old conversions	The user displays everytime the conversions just executed.
	Delete a conversion	The operator delete an old conversion.

5. THE DESIGN

There are many classes involved in this project, but most of them are part of the *cakephp* framework. The following two figures shown the classes added for this project and the inheritance relations with the *cakephp* classes.

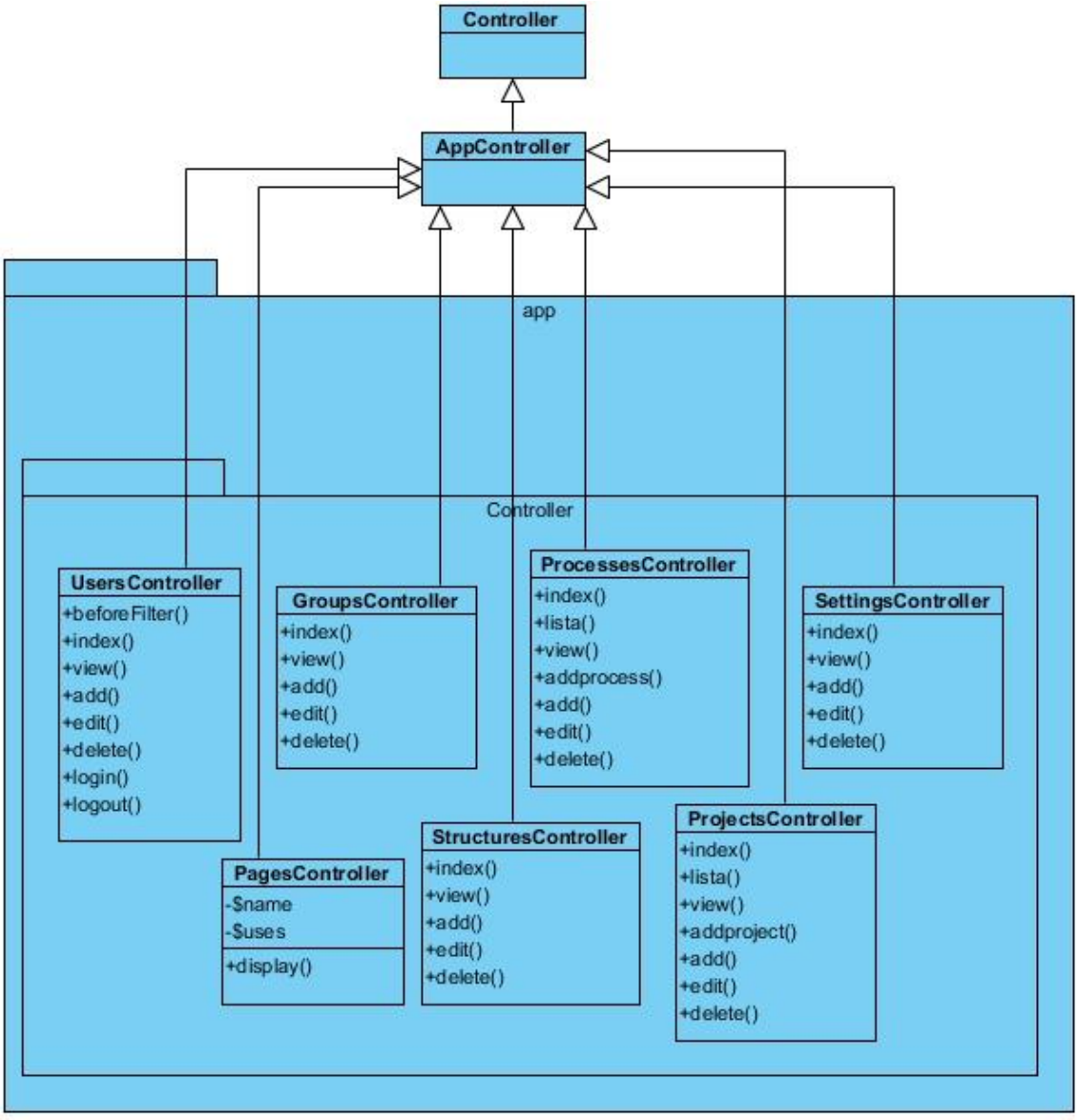


Figure 3 - Controller class diagram

The figure 3 shows the controller classes. *UserController* class and *GroupsControllers* class are useful for the account management and keep a link from a conversions to the user owner. *SettingsController* and *StructuresController* classes allow the user to choose the kind of conversion. *ProjectController* class is introduced in order to allow the user to organize his conversions in folders. *ProcessesController* class is involved in

the conversion and the *PageController* class allows the management of static html pages.

Similar class of the controller just presented are also in the model classes which are aimed at the interaction between the controllers and tha database. The following figure shows the class diagram of the models:

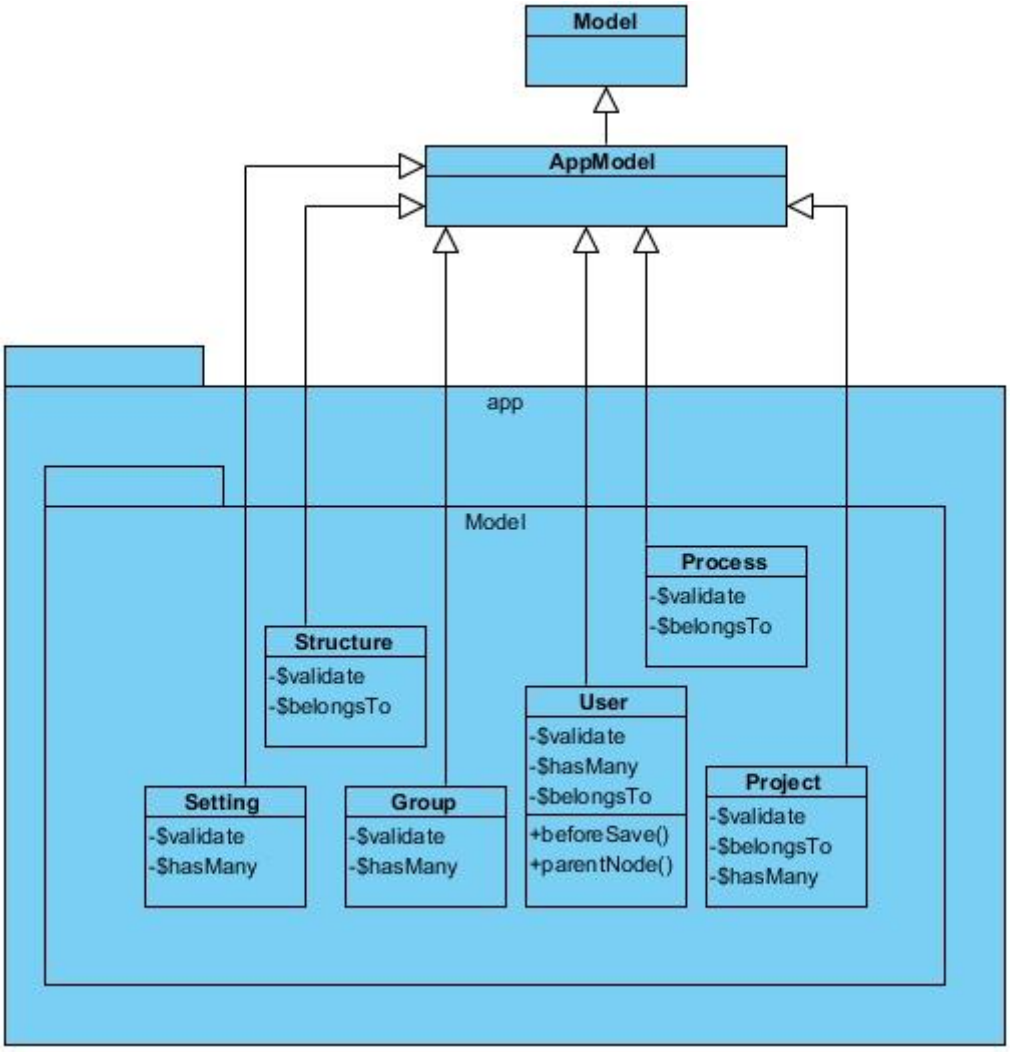


Figure 4 - Model class diagram

In order to better understand the process of conversion it follows the communication diagram:

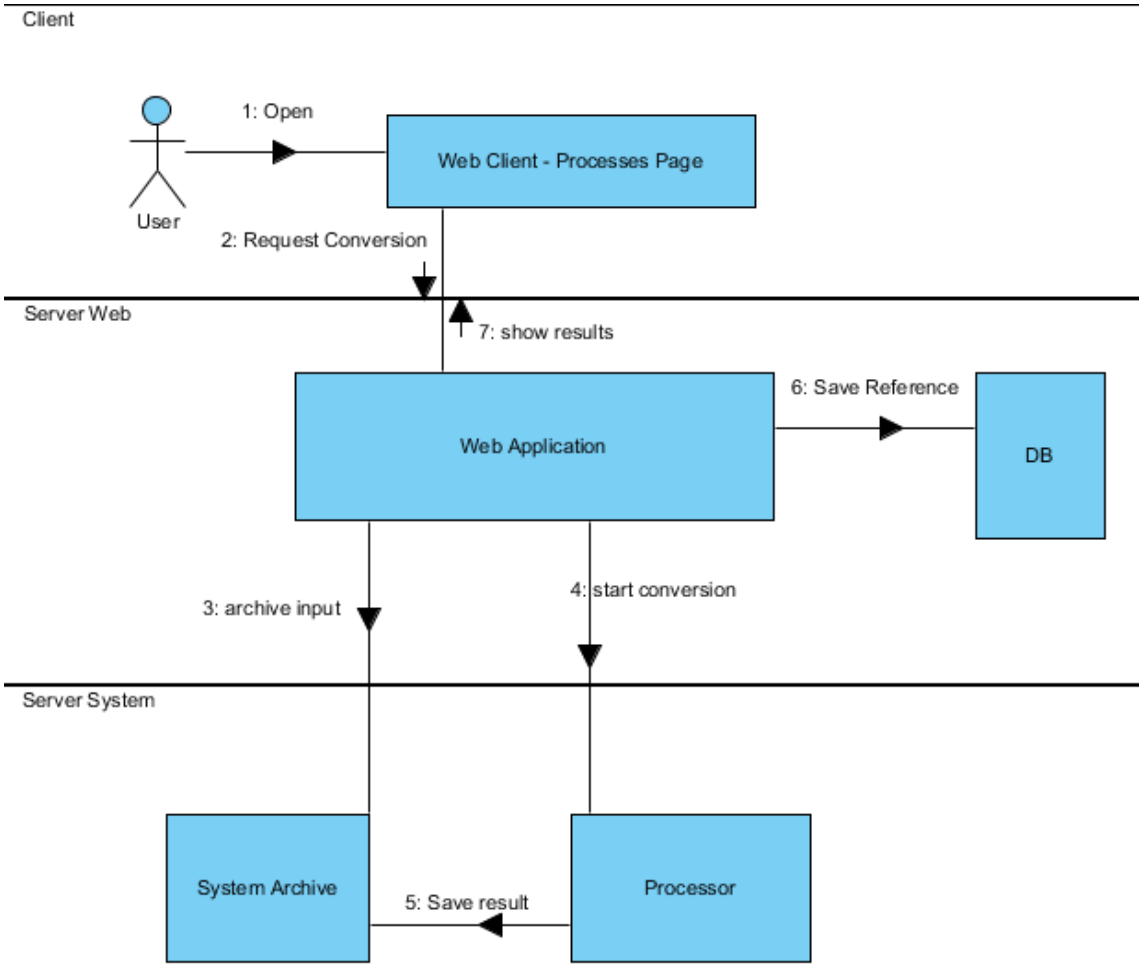


Figure 5 - Communication diagram

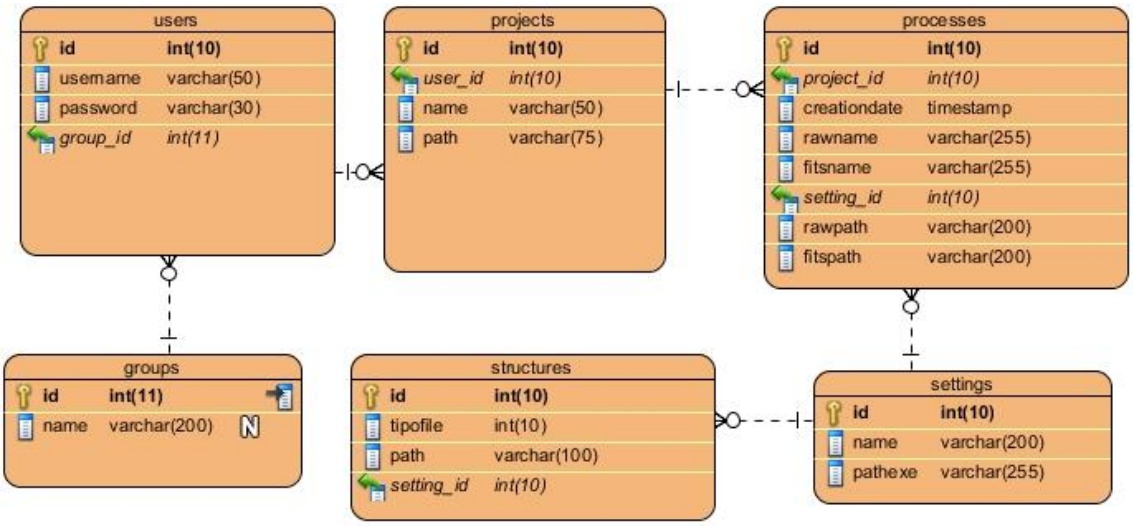
The above diagram displays 3 levels: client, server web and server system. The conversion flow is started by the user which opens the web page of the application and makes a conversion request.

On the server level the web application loads the user request and saves the input file on the file system. Then the web application executes a system call to the processor program that executes the conversion and stores the result in the file system. The web application also adds in the database the reference to the input and to the output files.

Finally the web application returns a page to the web browser of the user which shows a list of all files included the last conversion just performed.

6. THE DATA MODEL

The data model is shown in the following entity relation ship diagram:



The data model is able to manage different kind of conversion using the *settings* and *structures* tables. The *settings* table hosts the name of the processor program and path of the program; the *structures* table hosts the telemetry structure files as described in [RD5] and [RD6]. When the administrator will add other processor programs, then the user will be automatically able to perform the new defined conversions.

7. USER GUIDE

This chapter explains a brief user guide of the application. User and password credentials are required in order to access the application. They must be required to conforti@iasfbo.inaf.it. The following figure shows the page ot the system authentication:

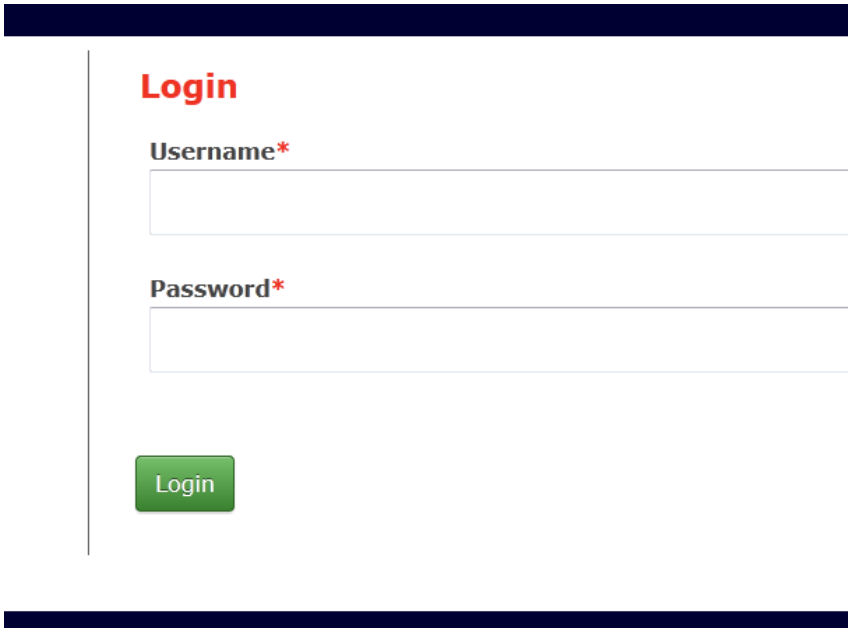


Figure 6 - Login page

After the success of the authentication the user is redirect to he home page which is like the following figure:

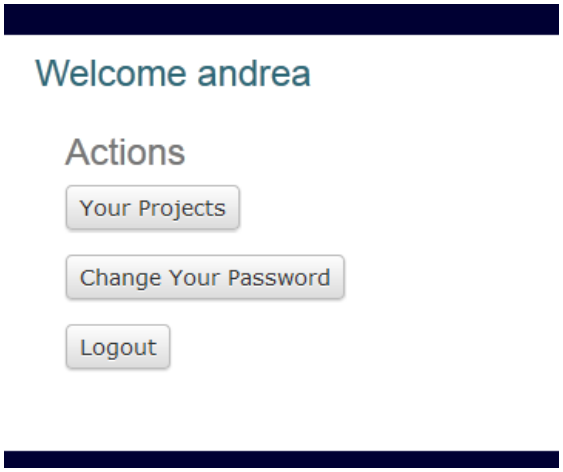


Figure 7 - The home page

The allowed actions are: logout, change password and go to the projects page. Indeed the application allows the creation of one or more project for the users aimed at supporting the user in the file organization.

The page of projects is shown in the figure 8.

Figure 8 - The Projects page

The projects page displays all the projects created by the logged user. It can access in a project selecting the name, or it can delete the project. The left panel contains the button to create a new project.

When a project is select, the program displays the list of all processes (or conversions) of the project:

Figure 9 - Page of processes

Each row of the processes table shown in the above figure is a conversion. For each conversion is displayed:

- the creation date;
- the input binary file (downloadable);
- the output file (downloadable);
- the setting (kind of conversion).

The same page has in the left panel the button to execute a new conversion. When selected, a new page will appears where the user can choose the input file and the setting (kind of conversion).

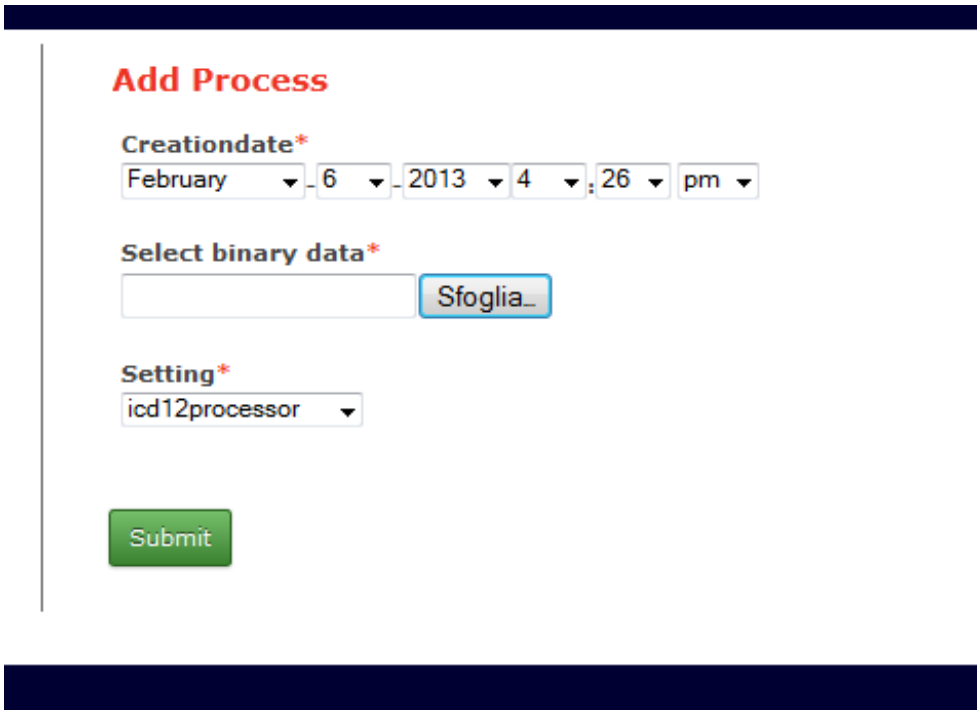


Figure 10 - Execute a new conversion

At the end of the process the program shows the page of the conversions list (shown in the figure 9) where it will display a new row with the conversion just done.

At anytime is possible to return to the home page or logging out by the system, using an horizontal menu, site on the top of every page.