Web Application for the Engineering Data Files Processing

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Abstract

One of the problems of introducing new data formats and procedures is a high cost in terms of manpower and time to develop, modify and deploy necessary software across the SLR network. Web applications are a relatively new type of applications located on the server and accessible via the web browsers hence simplifying the software distribution and making any changes and improvements immediately accessible to all users. In this report the web application for the Engineering Data Files (EDF) processing and analysis is considered in more details. Review of the existing functionality and future development is presented.

Introduction

As was shown in [1] the preferable way to handle Engineering Data Files (EDF) processing and analysis is a web application to reduce overall implementation costs accross the ILRS network and to make software and its eventual future changes immediately accessible to the all users. For more detailed information on the EDF's, see [2]. Another advantage of the web applications is their accessibility to everyone with an internet connection and web browser (security restrictions may apply).

EDF Processing Application

Overview of the current implementation of the EDF processing workflow is presented in [2]. Incoming EDF from stations are uploaded via FTP and after preprocessing are moved to the directories for anonymous ftp access and also are inserted in the relational database. Data then can be accessed and processed over the Internet using the dedicated web application. Web application basic functionality, based on the goals stated in [1], can be summarized as following:

- Overview of the used equipment

- Calibration time series and analysis

- Calibration charts

- External interfaces: data export to Excel, web feeds (e.g. RSS)

The use of the application is straightforward. The equipment overview function (Figure 2) allows users to retrieve data about the equipment used in a given period of time for all stations, and to use it as a selection criteria for the calibration time series and to calculate statistics for one or more stations. The selected data can then be compared, plotted or exported to an Excel spreadsheet and downloaded to the user computer. Tabular data view for the Excel export is presented in the Figure 3. Live calibration data can be also published from the database as an RSS feed directly usable in other applications or web sites.
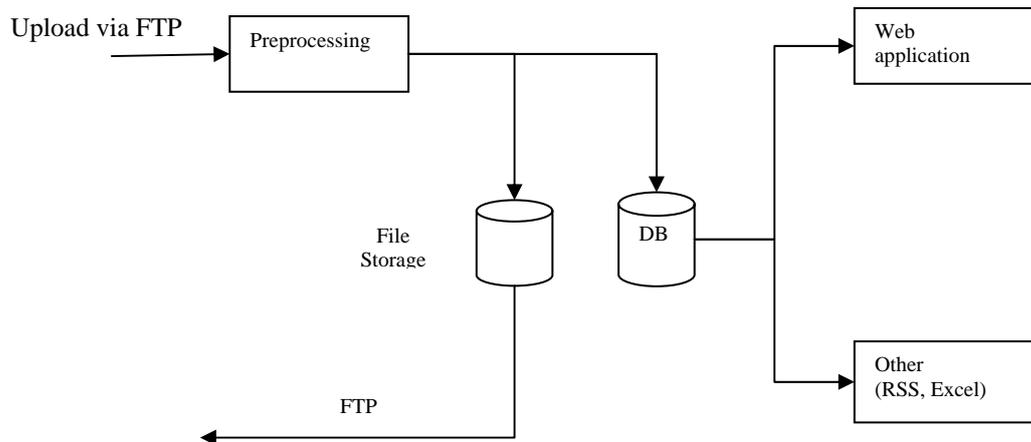
Figure 1*: EDF processing flow*

Implementation details and future extensions

The EDF processing web application is now deployed on the server at the Institute of Astronomy, Institute of Latvia, and access information will be published on the EDF website [2]. The application is running on a Windows 2003 server and using a Firebird 1.5 relational database for the data storage. The most challenging part of the application is calibration data selection based on the used hardware and data model in the database. This is because it involves optional and station specific data within EDF XML documents and it leads directly to tree data structures which don't map well into the relational database structure. The current solution is to make directly accessible within the database only required parameters from the EDF specification, and to limit the number of parameters available for the data selection. The list of key parameters currently made available for data search and selection are:

- Station
- Calibration epoch
- Detector type
- Timer type
- Laser

Another limitation of the current design and data model is that the station custom data recorded within EDF can be used only as a reference and should be retrieved from the original EDF and stored in the database table as an entity, separately. Hence one of possible future extensions may include migration to the XML database to remove these limitations. Other eventual improvements are related to the user interface and application functionality including improvements in the data model.

Conclusions

One of the main problems in designing the EDF processing application is the absence of a common naming standard for the SLR station basic hardware elements and their parameters   which can have an adverse impact on obtaining ranging results. Very likely similar problems will be encountered by others trying to record, process and analyze SLR data.

Figure 2: Hardware overview and selection

Figure 3: Calibration time series – table view

References

[1]   Salminsh K. "Engineering Data File Processing and Distribution", p.377, 14th International Laser Ranging Proceedings, San Fernando 2004.

[2]   Website: http://www.astr.lu.lv/EDF