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## **Content Management System Used in Monitoring of a Photovoltaic Plant**

*The paper presents the facilities of a new content management system (CMS), TYPO3, based on the example of a common scientific research portal, between Fachhochschule Gelsenkirchen Germany and the «Eftimie Murgu» University Resita Romania, the so called «Solar Competence Exchange».*

### **1. Introduction**

The ever increasing number of content management systems (CMS) on the market easily leads to confusion, as determining a suitable CMS-solution for specific requirements.

Content management can be described as resolving three general issues: content creation, content delivery for the consumer or user, and information retrieval, whether the information is in print or electronic form.

The future CMS market is seen as being crystallized around specific problem areas. For example, some vendors may cluster around delivering solutions to health care organizations or universities. Others may primarily target e-commerce websites, or large intranets. The system presented is an application focused on scientific exchange between universities, part of the so called “net4science”, a web based management and cooperation platform for science and development.

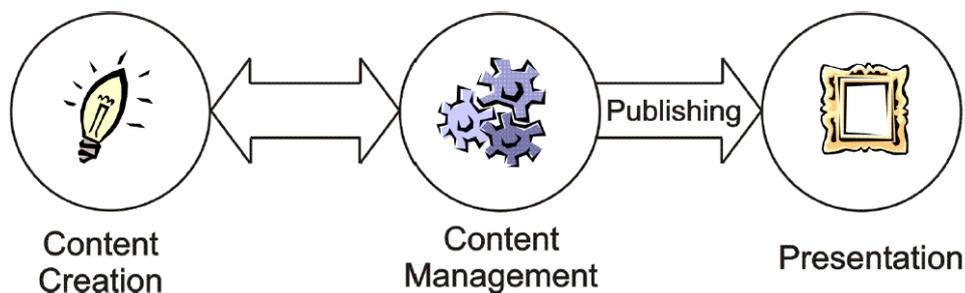
### **2. Basic functionality of a CMS**

The key functions for every CMS, as shown in figure 1, are content creation, management, publishing and presentation.

Content creation includes the authoring of new content, the acquisition of content and the aggregation of syndicated content. A central repository (e.g. XMLfiles or a database) is used to store the site and its associated metadata. The usage of a centralized information repository offers a wide range of advantages.

CMSs provide publishing engines which allow the appearance and page layout of the site to be applied automatically. These publishing engines further ensure the consistency of the appearance across the entire site. In this way, the publishing of the site is fully automated by the CMS.

A CMS provide a number of features which enhance the quality and effectiveness of the site itself. (e.g. build site navigation, obtain the site structure directly out of the repository). The CMS can be used to make a site more dynamic and improve its accessibility and thereby enhances the site's overall impact.



**Figure 1:** Basic functionality of a CMS

One of the basic ideas behind CMS is to separate the management of content from the design process. This approach (separation of concerns) is being used in many fields in the IT sector. In the case of CMS, this separation leads to greater independence between the appearance of the web site and the information contained.

### **3. CMS TYPO3 advantages for the monitoring platform**

The TYPO3 based on the 'net4science' used in the Solar Competence Exchange project brings a couple of advantages to the end user that wants to have a sure platform for his research results to change the data and other information with scientist over the world: Encoded intranet (using cryptographic procedures: MD5 but also SSL), Web-based editor for easy content production, No programming language needed, Instant messaging system (data base-based, internal mail for a high security level).

On this site the student's of the both universities will have an account created by the administrator for each of them, with limited access permission, to different information placed on the page, like documents to the theme, papers as result of the researcher, a.o.

That fore, the system the features that allows: Document and multimedia administration (Data Asset Management), Coded data retention in a database (Document safe), Calendar function with event registration (synchronization with Mi-

Microsoft Outlook 2003 and other email clients and groupware solutions), Administration of unlimited many user and groups of user, Sophisticated right assignment for each range, page contents and for each document, Import and export of data via standard interfaces, Possible integration into directory services (LDAP), Index search over pages and documents, Lexical table of content, Expenditure and visualization of scientific real time data, Safe file integration on different levels possible (Coding of the file path; password inquiry; download allowed just with TAN-Transaction Number), Bologna conformity (contents are organizable in topics, modules and meetings and consist of individual components), Spam protection.

All the advantages of the system are used in the platform that monitors the photovoltaic potential of the different locations according to FH Gelsenkirchen and "Eftimie Murgu" University Resita. Different monitored parameters, like solar radiation, module and ambient temperature, the produced dc/ac current and dc/ac voltage of different installations are saved in a MySQL data base, incorporated in TYPO3, with the possibility to call the measurements in each moment, for a real time monitoring. The data can also be graphically represented and measurements of different days compared to become a better vision of the plants evolution and their dependence to the climatic conditions.



**Figure 2.** Solar Competence Exchange

Figure 2 presents the main structure of the page, with the possibility to choose between the real time data of different monitored locations and the measurements values that has to be shown / compared. Solar Competence Exchange platform allow a common research, a safe information transfer between the two research centers, and a real time comparison of the efficiency of similar solar pho-

photovoltaic modules in these two locations. To obtain a real image of the photovoltaic potential in Romania, especially the locations Resita, data has to be collected for minimum 12 months.

Another point that presents interest is the behavior of the national electricity grid when the produced energy is directed injected in it. This all will represent a very important data base that researcher will have to analyze in the field of renewable energies, especially solar energy. This information will have to be used in the next years, when Romania has to produce until 2015, like the other countries of the European Union, at least 15% of his necessary energy from renewable sources, other than hydro energy. This is a very important target, concerning that the energy politics of the EU and the world wide problem with the fossil energy will focus nearly in Romania a continuously growing importance of the energy from renewable sources and that for the monitoring of such system, photovoltaic or wind plants, is crucial.

#### 4. Conclusion

The idea of the Solar Competence Exchange project can be used in different research activities in research teams inside an institute or between different institutions in different counties. The system is very flexible, useable in every research field, where research information has to be transferred, saved and coded in databases, scientific real time data expedite and visualized.

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