

## FACTSHEETS WEB APPLICATION

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October 26, 2000

### Introduction

The Factsheets web application was conceived out of the requirement to create, update, publish, and maintain a web site with dynamic research and development (R&D) content. Before creating the site, a requirements discovery process was done in order to accurately capture the purpose and functionality of the site.

One of the high priority requirements for the site would be that no specialized training in web page authoring would be necessary. All functions of uploading, creation, and editing of factsheets needed to be accomplished by entering data directly into web form screens generated by the application.

Another important requirement of the site was to allow for access to the factsheet web pages and data via the internal Sandia Restricted Network and Sandia Open Network based on the status of the input data. Important to the owners of the web site would be to allow the published factsheets to be accessible to all personnel within the department whether or not the sheets had completed the formal Review and Approval (R&A) process. Once the factsheets had gone through the formal review and approval process, they could then be published both internally and externally based on their individual publication status.

An extended requirement and feature of the site would be to provide a keyword search capability to search through the factsheets. Also, since the site currently resides on both the internal and external networks, it would need to be registered with the Sandia search engines in order to allow access to the content of the site by the search engines.

To date, all of the above requirements and features have been created and implemented in the Factsheet web application. These have been accomplished by the use of flat text databases, which are discussed in greater detail later in this paper.

### Application Language and Platform

The Factsheet application written in Perl 5 is designed to run in a UNIX environment. Since the application is designed to run as a web application it can be accessed via any standard web browser. The application was primarily designed to run under Netscape Communicator as part of Sandia National Laboratories' common operating environment but has been tested on other popular browsers as well.

### Web Site Security

The Factsheets web site is designed to sit behind a secure firewall. Accesses to all editing and site management functions are also protected by kerberos password authentication. This gives the site manager authority to grant access to contributors to factsheets on the site. It also gives the site manager control over who has access to update categories and to perform site management functions such as web page generation and publication to both the internal and external sites.

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## Web Site Overview and Structure

The structure of a factsheet web site is 3 levels deep. The user pre-establishes four high level groups for the site which are immediately accessed from the site's home page. Categories are entered via a web interface in the site and tied to the high level groups in a flat text database file. As factsheets are entered into the database, they are linked to the categories in the factsheet data entry form. The structure therefore consists of 4 main groups, a second level consisting of an unlimited number of categories, and the third level containing unlimited factsheets.

## Structure of the Internal and External Factsheet Web sites

The factsheet web page uses framesets to create the portal page to the site (see Figure 1). The left frame is designed to allow the user to navigate into the Sandia National Laboratories external web and the factsheet web site. Clicking on "Center Home" takes the user to the main frame (home page) of the factsheet web site. The right frame consists of two main areas that are also split into smaller sub-frames. The upper right-hand frames consist of a keyword search field and a submit button along with static graphics and navigation links via graphic images. The linked navigation graphics are used to pull up categories in the left part of the lower right frame based on the group selected. The resultant categories displayed for the group become links that drive database calls to dynamically bring up related factsheets listed in the factsheets database. The seemingly complex frame structure of the site allows the user to navigate to desired factsheets by drilling down through the groups and categories. Since factsheets may be tied to more than one category, clicking on different groups allows the user access to the factsheets via multiple routes. The site also allows the user to search for factsheets by listing them alphabetically by author's last names or list all available factsheets by title.

## Site Search Logging

As a browser of the site searches for factsheets by keyword searches, the application logs the search to a search log flat database text file. The purpose of the log is to allow the site owner to view keyword searches of the site to identify the type of content being searched for as well as utilization of the site.

## Factsheet Database Structures

The Factsheet web application contains several database files. Below is the list of files and a description of their purpose and content.

*Factsheet Database:* The actual factsheet data is contained in a flat text database file usually called database.txt. This file contains all of the data necessary to generate the factsheet web page along with any auxiliary image gallery data files. Data contained in this database include factsheet number (automatically assigned by the application), main paragraph, main image, body paragraphs and titles, image gallery information, contact information, and categories.

*Categories Database:* A second database contains the categories for the second level of the structure in a flat database file called categories.dat. This database is edited by calling upon the "Edit Categories File" button from the site main menu. The categories are entered or deleted by a dynamically generated form listing all of the categories in the database (see Figure 2). By deleting the name of the category from a field and clicking on the "Save Category Changes" button on the form, the category is deleted from the database. A new category can easily be added to the site by simply entering a new category in the blank field at the bottom of the form and

clicking on the "Save Category Changes" button. Data contained in this file are the names of the categories and markers concerning which groups they are related.

*Global Variables Database:* A third database `globals.dat` contains security and maintenance data for the site. This database contains the list of users allowed to access and manage the site. The database also contains the email address for the person who should receive all email from the site, what auxiliary image file extensions are allowable for the image gallery, the number of days to warn if factsheets are aging, and the maximum pixel width and height of the main graphic file. Clicking the "Save Changes" button updates the data to the file.

## **Data Entry and Management**

The factsheet web site uses an input form created from a template for entering and editing data (see Figure 3). Depending which button on the main screen or template form is clicked, the application will retrieve data from the database and merge it with the factsheet template, or it will present a blank input form. The factsheet template contains many input fields. These fields allow the user to input a main body graphic and caption, a main body paragraph, up to 9 body paragraphs and titles, up to 5 auxiliary graphics and graphic captions for an image gallery. The form also contains a drop down field to select multiple categories to which the factsheets can be referenced.

If the user chooses to add a new factsheet by clicking on the "Add New Factsheet" button, a blank input form is generated and displayed. In the blank form are default paragraph titles, which the user is allowed to overwrite in the form. In order to create static searchable HTML pages on the site, the "FileStem" field is required in order to define the name of the static HTML file to be generated at a later time.

Integral to the factsheet data entry form is an employee data retrieval utility. This utility is executed via client-side JavaScript to launch a pop-up window for retrieving the employee data. By entering the name and/or organization for an employee, the user can automatically retrieve and populate employee data into the form.

Below the body paragraphs of the factsheet edit/add data entry input form are fields to enter up to 5 graphic filenames and captions for an optional image gallery (see Figure 4). This data is used by the application to create a static web page containing thumbnail images and captions with links to auxiliary web pages. The auxiliary web pages contain larger images and captions for better viewing of the images. The generation of these pages will be discussed more later.

A part of the factsheets application main menu is a utility for uploading images of select graphic formats. The site only allows the user to upload images that are viewable in standard browsers such as Internet Explorer, Netscape, and AOL. The user may upload up to 4 images to the site at one time. A word of caution is that although the images have been identified in the factsheet data entry form, they will not be viewable in the static web pages until they have been uploaded by this utility. Upon uploading the images, the user has the option to change the actual name of the file stored on the remote UNIX server. The location of the images is defined in the application and therefore is of no concern to the user.

## **Static Web Page Generation and Publication**

One of the main features of the Factsheet application is the ability to generate and publish the web site (see Figure 5). Once individual factsheets have been reviewed and approved, the application

allows the site administrator to generate or regenerate and publish the factsheets to both the internal and external networks.

From the main menu of the Factsheet creation/maintenance utility, the user can proceed to generate and publish web pages using all of the data entered into the databases. Upon performing this process, static web pages are dynamically generated and then published to their appropriate locations on both the internal and external web.

Static factsheet web pages are generated and published in a two-step process. The first step in this process is to generate the factsheets. Upon clicking on the "Regenerate the Factsheets" button, static web pages are generated and stored in a temporary folder. The application combines data from the factsheet databases with the factsheet template to generate these pages. The second step in the process is to publish the new factsheet pages. This is accomplished by clicking on the "Publish the Factsheets" button on the main menu. This button pulls up another page that prompts the user for their email userid and FTP password. This assures that the person performing this function is authorized to publish content on the external web. Upon publishing factsheets from the database, graphics identified in the database along with all necessary files are copied to their appropriate locations and backed up.

### **Credits**

The Factsheets web application was originally written in by Sam Cancilla, Department 9517 (WebCo), of Sandia National Laboratories. Since its creation and implementation, it has served as a programming concept and basis to create other like sites Sandia National Laboratories. Frank J. Vigil and Roxana G. Reeder, also of Sandia National Laboratories, WebCo, have made a copy of the described Factsheet web site for a second department at Sandia. They are currently creating and enhanced improved version of the site for the original customers.

### **Summary**

The Factsheets web site has proven to be a very useful tool in managing dynamic web site content. Since this site resides behind a secure firewall, it provides the site manager with full control over how data is created and published. In today's environment where strategic data is vulnerable to individuals without proper access credentials or a need-to-know, the data can be monitored and published with greater assurance.

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The Materials and Process Sciences Center at Sandia National Laboratories provides scientific and engineering expertise in the areas of materials and material processes that support the missions of the laboratory and the needs of our customers. Our program is focused on three theme areas:

**Materials Science and Engineering**

Synthesis & Processing      Performance

Properties      Composites & Structures




Figure 1. Portal page utilizing framesets to create navigation to the internal and external networks.

### Edit the list of categories

To delete a category delete its name below.

Category Name	Material Type	Processes	Characterization	Applications
Aging and Reliability	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Bio-Materials	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Capabilities	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Catalysis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Ceramic Processing	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ceramics	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cleaning	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coatings	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 2. Edit the categories which gives directions on how to delete and checkboxes to choose the major topic.

- Worlds Smallest Polysilicon Tensile Sample (External - Active)
- X-Ray Diffraction (XRD) (Internal - Active)
- Zirconium-Titanium Phosphate Acid Catalysts Synthesized by Sol Gel Techniques (External - Active)

Figure 3. Factsheet starting screen for the creation of a factsheet.

## Image Gallery

Filename	<input type="text"/>	Thumb.	<input type="text"/>
Thumbnail 1:	<input type="text"/>	Caption:	<input type="text"/>
Filename	<input type="text"/>	Aux.	<input type="text"/>
Auxiliary 1:	<input type="text"/>	Caption:	<input type="text"/>
Filename	<input type="text"/>	Thumb.	<input type="text"/>
Thumbnail 2:	<input type="text"/>	Caption:	<input type="text"/>
Filename	<input type="text"/>	Aux.	<input type="text"/>
Auxiliary 2:	<input type="text"/>	Caption:	<input type="text"/>
Filename	<input type="text"/>	Thumb.	<input type="text"/>
Thumbnail 3:	<input type="text"/>	Caption:	<input type="text"/>
Filename	<input type="text"/>	Aux.	<input type="text"/>
Auxiliary 3:	<input type="text"/>	Caption:	<input type="text"/>
Filename	<input type="text"/>	Thumb.	<input type="text"/>
Thumbnail 4:	<input type="text"/>	Caption:	<input type="text"/>
Filename	<input type="text"/>	Aux.	<input type="text"/>
Auxiliary 4:	<input type="text"/>	Caption:	<input type="text"/>
Filename	<input type="text"/>	Thumb.	<input type="text"/>
Thumbnail 5:	<input type="text"/>	Caption:	<input type="text"/>
Filename	<input type="text"/>	Aux.	<input type="text"/>
Auxiliary 5:	<input type="text"/>	Caption:	<input type="text"/>

Figure 4. This screen is where you may create up to 5 graphic filenames and captions for an optional image gallery.

## 1800 Factsheet creation/maintenance utility

### The Factsheets need to be published.

<input type="button" value="Edit the Factsheet Database"/>	<input type="button" value="Regenerate the Factsheets"/>	<input type="button" value="Publish the Factsheets"/>
<input type="button" value="Upload Files"/>	<input type="button" value="Edit Categories File"/>	<input type="button" value="Other Maintenance Tasks"/>
<a href="http://www.sandla.gov">The External Site (www.sandla.gov)</a>	<a href="http://www.sandla.gov">Log of Searches (www.sandla.gov)</a>	<a href="#">What would be published now.</a>
<a href="http://www-irm.sandla.gov">The Internal Copy (www-irm.sandla.gov)</a>		

Figure 5. The screen which allows you to generate and publish the factsheets.