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1. INTRODUCTION

We have used PHP and MySQL to develop a dynamic central news service to support the needs of the National Oceanic and Atmospheric Administration (NOAA) Research laboratories, program offices and university Joint Institutes located throughout the US. The NOAA Research Hot Items allows users from each of the NOAA Research operating units to enter newsworthy items. The user has the authority to either make this submission available for public viewing, or can publish this at a later stage. This software, all bundled under the name "Hot Items," was first written in 2000. After using the software for a year, the requirements were refined and version 2 of Hot Items was implemented in June of 2001.

2. REQUIREMENTS

2.1 Site Functionality

The fundamental requirement for the Hot Items software is to allow a user to enter some text (a story). This story is associated with an Operating Unit (O.U.) of NOAA Research. A summary, or headline, associated with this story is then displayed on a page containing the summaries of all NOAA Research Operating Units. This headline will only be visible on the summary page for a pre-defined period. Added to this basic functionality additional functionality for user management, and lab/division content management has been added. Another layer was later added to allow each NOAA Research O.U. to have its own Hot Items summary page. These O.U. level pages have a feature which allows a user to migrate a story from O.U. level to OAR level. The NOAA Research level pages are referred to as "org" level pages. The summary page for the OAR level has a "tile" for each division in which the particular Operating Unit's stories are listed. To prevent any O.U. from getting more exposure due to the location of their tile on the page, the tiles' positions change from day to day (Soreide and Burger, 2002) (Fig. 1).

2.2 Story Entry Templates

Four templates are available with which a user can enter a story. These templates allow for free form, media event, paper or publication and a meeting or conference announcement stories. Each template has different form fields allowing for different content requirements.

2.3 Security

Access to the summary and story detail pages are open to all users, while only authenticated users are allowed to enter or edit stories, and manage O.U. accounts.

To ensure O.U. level pages are accessible only to the

owner unit, all O.U. level pages are domain protected at the server level.

2.4 Operating Unit Level Differentiation

The colors on the O.U. and NOAA Research level pages differ to avoid user confusion when viewing these sites. At the O.U. level each Unit's page has its own logo and distinct identifying text on its page to further aid differentiation.

3. TECHNOLOGIES

The web server is an Apache web server on a Sun Sparc Machine running Sun Solaris 8. For this project we used the MySQL database and PHP server Scripting language to provide business intelligence to the application.

4. ARCHITECTURE

This is a 2-tier application with the business intelligence residing in PHP files on the server. The web server, database and PHP files all reside on the same server. All library files are located outside the server web area on the host machine. The files accessed by the user are only PHP framework files, which in turn access the appropriate PHP program files.

5. SOFTWARE DESIGN

5.1 Database

The database tables can be divided into three broad groups: user management, O.U. management and story management.



Fig. 1. The org and lab level Hot Items summary pages.

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5.2 Hot Items User Management

The database user table contains the user profile and user usage history. The profile information comprises authentication information and the user's access level. There is only one user table for the whole Hot Items site. Each user is associated with a particular lab. The user access level is an integer value between 513 and 1023.

5.3 Operating Unit Management

This group comprises three tables. One table contains all lab information like O.U. name, lacronym and fields to determine the location of the O.U. on the OAR level summary page. The two remaining tables contain the story configuration (lifetime and display information) for the lab level and NOAA Research level pages.

5.4 Story Management

Each O.U. level and org level site has five story tables—one table for each story type (paper announcement, free form, media event and meeting/conference information). This differentiation was needed because of the different fields required by each story type. Fields in common (like the headline) reside in the fifth table, which also has information about the story entry date, and the user who entered the story. There is a slight difference between the O.U. and org level tables, as the org level tables need to keep track of the O.U. association of each story. One of the requirements was that story content could be changed when a story was moved from O.U. to org level. This necessitated separating the org and O.U. level story tables.

5.5 Site Layout

Each O.U. level and org level site has a secure and a public portion. The server, using standard IP address filtering, controls access to the O.U. and org level public pages. Access to the secure portion of the site requires a user to have an authentication pair. This portion of the site is served through a SSL connection.

5.6 Software Design

Since the functionality is shared by all the different O.U. implementations of Hot Items, software libraries are used extensively. Only one copy of this library resides on the host and is used by all the O.U. and org level sites. Because of slightly different functionality between O.U. and org level pages, there is some library file differentiation between these levels. The PHP web pages for all levels are framework files, which load different page components from the software libraries. These page components comprise header files, a footer file and the business logic for the page body.

5.7 Database User Management

Different database users are used for authentication, the secure portion, and the public portion and database management.

5.8 User Access Levels and Page Access Control

Nine different user levels are allowed within the site, of which six levels are implemented. For each of the org and O.U. level pages there are three levels: User, Administrator and Director. These access levels are represented by a ten bit binary number, of which the most significant bit (left-most) is always set. Each bit in the

binary word represents a particular access level. A user is assigned an access level by the O.U. or org level administrator when the user is created.

Access is controlled to all pages within the secure portion of the site to a) prevent unauthorized users from accessing the pages (users not logged in) and b) allow only users with the correct permission level to access the pages. Certain pages, like the user management page, is only accessible to administrator level users. User levels are also used to ensure users only have access to their own stories.

Each page within the secure portion of the site has a decimal access value. Converted to a binary word, the set bits represent the user levels that are able to access this page. The user access level and the page access level are compared when the page is first accessed.

5.9 Persistent Data

Extensive use is made of session variables to maintain persistence between different pages. Session variables are used to save user session time, user permission level and O.U. association without having to access this information from the database each time it is needed. Besides reducing code, this has the added advantage of eliminating another database roundtrip. All session variables are saved on the server. The session ID is the only information saved in a cookie on the client machine. If the use of cookies is not desired the session variable can be saved using URL mangling.

6. CONCLUSION

The use of PHP and MySQL is well documented, and with this project again proved to be quite a successful application of these technologies. Software management does become a problem with a large project when using PHP, because of the lack of a proper design environment. For this project I used Allaire (now Macromedia) Homesite 4.5, while CVS was used for code version management. Database design was done with Microsoft Visio. Software performance is satisfactory, and Hot Items has turned out to be quite a successful application.

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8. REFERENCES

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