DIGITAL OFF-AIR RADIO EVENTS ARCHIVE OF THE BULGARIAN NATIONAL RADIO

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ABSTRACT. The paper describes the design and the system created for digital off-air radio events archive of the Bulgarian National Radio. The system provides more efficient application of modern information technologies into radio production and its presentation on different new media platforms.

1. Introduction. In recent years, public service radio broadcasting media in Europe has embarked on expanding the distribution of their products on new media platforms to meet the new needs of the audience and especially to ensure the safeguarding of the public service so that it can be fully implemented in the digital environment. It is abundantly clear that only through transformation into new media formats can public broadcasters continue to perform their function, defending the cultural diversity and identity, the pluralism, the social cohesion, so their mission for high standards implementation and the social democratic values protection (something missing). This transformation inevitably

leads to new challenges and new problems, to the creation of a different type of archives (other than the so far prevailing sound radio archives). This new type of archives, however, must be fully compatible with the old radio archives, it has to be integrated into them and meet the specific processes of radio production.

In April 2011 the European Broadcasting Union (EBU) Radio department conducted a survey on the use of new services and media [1]. 31 public radio operators from 28 countries participated in this study. The results from this survey are shown in figure 1. Analysis of different EBU radio archives are given in [2, 3].
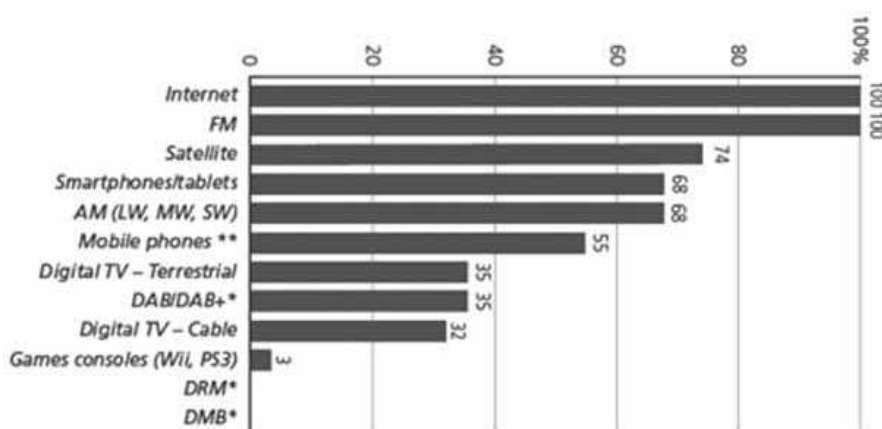

Fig. 1. Representation of public radio broadcasters on various platforms

Common international platforms for exchange of information and broadcasting require common metadata. All EBU radio stations archives are in process of transition from analog to digital archives. This process almost finished for some, while others are still at the beginning. The dimensions of this process are determined by various financial and organizational factors as well as the requirements for specialized and highly skilled labor. The transition is inevitable and due to our/radio's extreme responsibility to future generations, it must be secured in technology. The basic rule for the digitization of radio archives is to preserve the original carrier of information, which is also archived and stored. And then the sound should be kept as close as possible to the original. Preservation and protection of the Audiovisual Heritage is a long and expensive process and in good technological conditions the transfer of an hour of airtime (broadcast ma-

terial) takes two hours on average, but in many cases this time can be multiplied by five.

The archive is a means not only of production but also of storage. It is part of the historical and cultural heritage of each country [4]. In recent years, along with the audio materials, which are essential for the radio, an increasing volume with text, images, and video materials are presented. All of them must be in compatible formats and subject to a single search. Due to the multi-platforms already present in radio production, integrated and shared archive plays a crucial role for broadcasting.

In this paper the design, implementation and use of the digital off-air radio events archive system of the Bulgarian National Radio is presented. The paper is organized in the following way: chapter 2 discusses the BNR archives; chapter 3 describes the need of the BNR Off-air radio events archive; followed by a description of the system EventsBNR in chapter 4. Chapter 5 presents the conclusion and gives directions for future research.

2. BNR Archives. Bulgarian National Radio (BNR), founded in 1935, is a major radio operator in Bulgaria, the largest multiprogramming media in Bulgaria, which produces and distributes 11 programs, the largest information network in the country with the richest sound archive – the Gold Fund. The Internet portal of the BNR has versions in 11 languages. BNRadio produces and broadcasts radio drama and children's programs, it is the largest Bulgarian cultural institution with six music ensembles, Museum and Archives, the largest producer of Bulgarian music, one of the largest media partners supporting the most prestigious cultural festivals and competitions. The BNR broadcast FM, AM, LM wave, satellite and digital shortwave, internet radio.

The rich archives of BNR can be a source of radio production, but also of cross media and multimedia products, as well as various newsletters to help journalists. The digitization of radio archives is a long and expensive process and is expected to take between 7 and 10 years. Off-air events archive, which is the subject of this work, is also supplied with information flows whose sources are BNR off-air events and different materials designed primarily for work on the BNR Web Portal and the Internet radio Binar. Figure 2 presents the architecture of BRN archives and their use in the BNR production systems on different platforms.

3. The need of the BNR Off-air radio events archive. In recent years, as a result of the work on the BNR web portal and on BNR off-air events
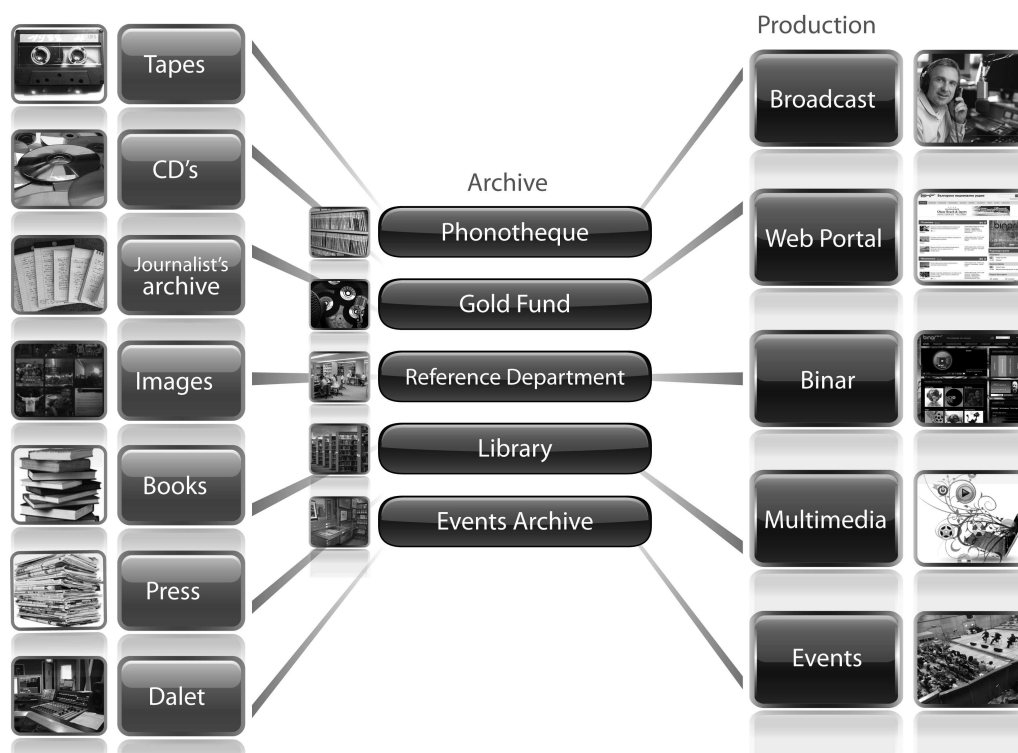
Fig. 2. Schematic structure of the archives, information flows and sources of materials for the different platforms of the BNR

a large amount of information that could be defined as archive was collected in various media - digital and paper (digital in different formats, containing images, video and texts). Technologically they are organized in an archive, but because of the huge quantity and variety of data, more in-depth work on these materials is required , as well as creation of a digital BNR off-air archive. This digital off-air archive would facilitate work on an image search for the web portal, providing the various teams of the Radio programs with quick access to the acquired information.

All this information, organized in an appropriate form, can be incorporated into database, and be accessible to all radio journalists. The presence of a digital off-air events archive can be a source of information about the history of the Bulgarian National Radio. Another way to make use of this archive would be providing part of it for free (open) access.

The Bulgarian National Radio (BNR) off-air archive must comply with

the European standards and technologies for creating and searching multimedia objects in digital archives and methods to align metadata as determined by the European Broadcasting Union (EBU) standards [5].

Creation and maintenance of multimedia records, and direct access to their content will allow secure storage and optimum use of the accumulated information. It will give an adequate response to the new requirements for the media, and in particular to radio operators due to technological developments considering the needs of the audience. Mullane Mike [6], Head of the "News, sport and new media" in European Broadcasting Union, explains the place of media in radio: "The hybrid technology RadioDNS, which combines the strengths of broadcast and the internet, will enable broadcasters to fill blank screens with descriptive text, social media feeds, maps, medal tables and slideshows." Based on the nature of the data collected in this archive we will be responsible as keepers of parts of the Bulgarian cultural and historical heritage, formulated by Bob Collins [7] from the Irish radio during the workshop "Copyright" held in 1999 in Amsterdam. He mentions: "As public broadcasters, we are called upon to generate, to preserve and to make available the material that will offer to our own programme-makers and to the generation that succeed them the opportunity of greater understanding of the experience of our time ... Among other things, this means that a new kind of responsibility falls on our generation, to maintain, conserve and to use this archive."

In response to the new challenges facing the radio and new platforms for its production there is a need to create and maintain a digital archive of BNR off air events, ensure compatibility with the main archive of the radio, facilitating so both the editors and the journalists.

4. Digital off-air radio events archive of the Bulgarian National Radio System EventsBNR

4.1. System requirements. The system for digital off-air radio events archive of the Bulgarian National Radio System has to fulfill the following requirements:

- to meet the requirements as directed by the European Broadcasting Union

- to use EBU core standard

- to be a web based system

- to allow direct use in radio production

- to allow users (web editors, journalists) to add and describe events, with any number of related items and keywords

- to be developed as a system for storing and searching images, video and audio material associated with off-air radio events

- to manage all existing formats for images, text and video

- to show thumbnail image for all entered images

- to be compatible with the existing BNR sound archive

- to be easily modified and upgraded

- to prove the ability to collaborate with multiple users

- to be established as a storage system for cultural heritage [8], consistent with the standards of the Golden Fund of the BNR

- to allow different levels for access

- to have user friendly interface

- to be managed by an administrator, who maintains control of the system, and allows for the removal of any inappropriate, invalid, or unneeded content from the system.

We analyzed the top 10 systems for handling documents (10TopTenReviews (`http://document-management-software-review.toptenreviews.com`), and the top 10 systems for working with documents (Capterra: (`http://www.capterra.com/document-management-software`)) such as Dokmee (`http://www.dokmee.net/`), Cloud Document Management (`http://docassist.us/`), S4i Express (`http://www.s4isystems.com/`), LogicalDOC (`http://www.logicaldoc.com/`), CogniDox for high-tech companies (`http://www.cognidox.com/`), Firmex Virtual Data Rooms (`http://www.firmex.com/`), TeamLab (`https://www.teamlab.com/`), Widen Collective (`http://www.widen.com/`).

We also analyzed the top database management systems, used for maintaining archives (`http://www.xmarks.com/topic/document_management_software`) such as: Alfresco (www.alfresco.com), Open Source Document Management System (`www.knowledgetree.com`), LogicalDOC (`www.logicaldoc.com/product.html`), Open source document management for the masses (`www.opendocman.com`), Dokmee (`www.dokmee.net`), Kordil EDMS (`www.kordil.net`),

DocPoint (`www.docpoint.biz`), ademero (`www.ademero.com`), infoRouter DMS (`www.inforouter.com`).

We also reviewed? functions in Microsoft SQL Server 2014 (`http://www.microsoft.com/en-us/download/details.aspx?id=29062`), the system in the Centre for Learning Technology (CLT) to London School of Economics radio archive, based on the system Fedora [9] and VisR [10] system for organizing photos of events are examine.

After the analysis and having in mind that all of the EBU radio providers are using their own homemade system and to fulfill all of the specified requirements we decided to design and implement our own system EventsBNR.

4.2. EventsBNR system database architecture. The EventsBNR system database has three main tables that are used for implementing the functionality of the 'Listings', 'Items', and 'Keywords', as well as a table for 'Users'. The relationships 'Items_Keywords', and 'Keywords_Listings' are modeled using a side table for each. The complete list of all tables used by the system and the complete schema of each table is given in Figure 3.
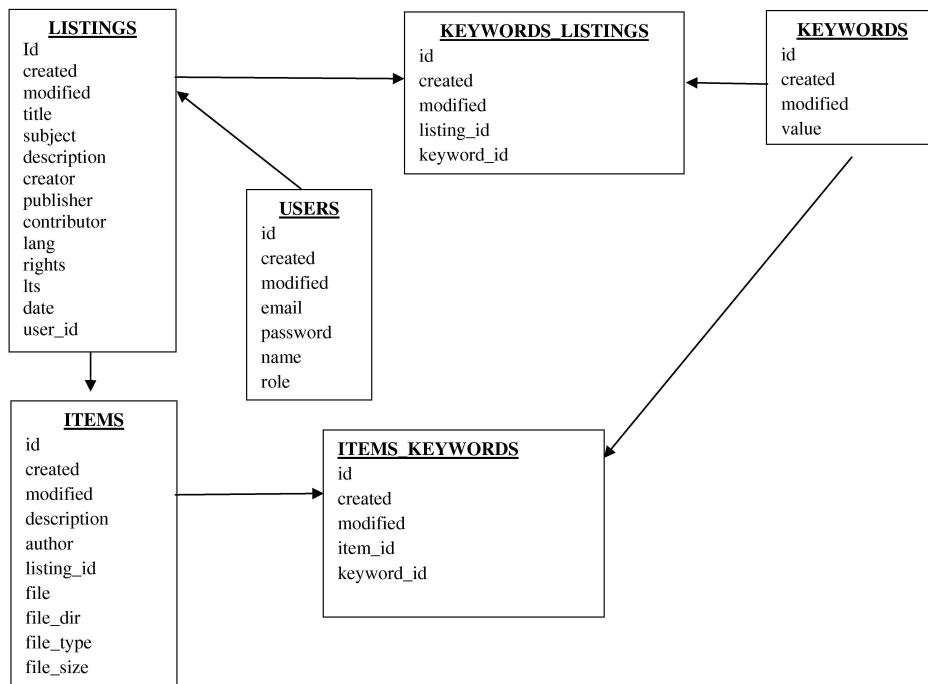

Fig. 3. EventsBNR Table Relationships

4.3. EventsBNR System interface. The design of the dialog pages in EventsBNR is the same as all pages of the system. Each page has a horizontal bar for navigation - Navigation area, and searching bottoms located at the top of the page. The Navigation area has links to the Home page, the Events listing page, the Items listing page, and to the Log page. Clicking Events or Items next to Search toggles the search form. To the left of the content of each page, is a vertical area for Actions. The content of this area depends on the access level of the user. Actions always visible for all users include List Events and List Items. Actions visible to users/editors or the abovementioned include New Event. Actions only visible to admins include Manage Events, Manage Items, Manage Users, Manage Keywords, New User, and New Keyword. The main area of the content of each page is used to display the listing view or details of individual Events or Items. The acceptable by different kind of users pages is given in Figure 4.
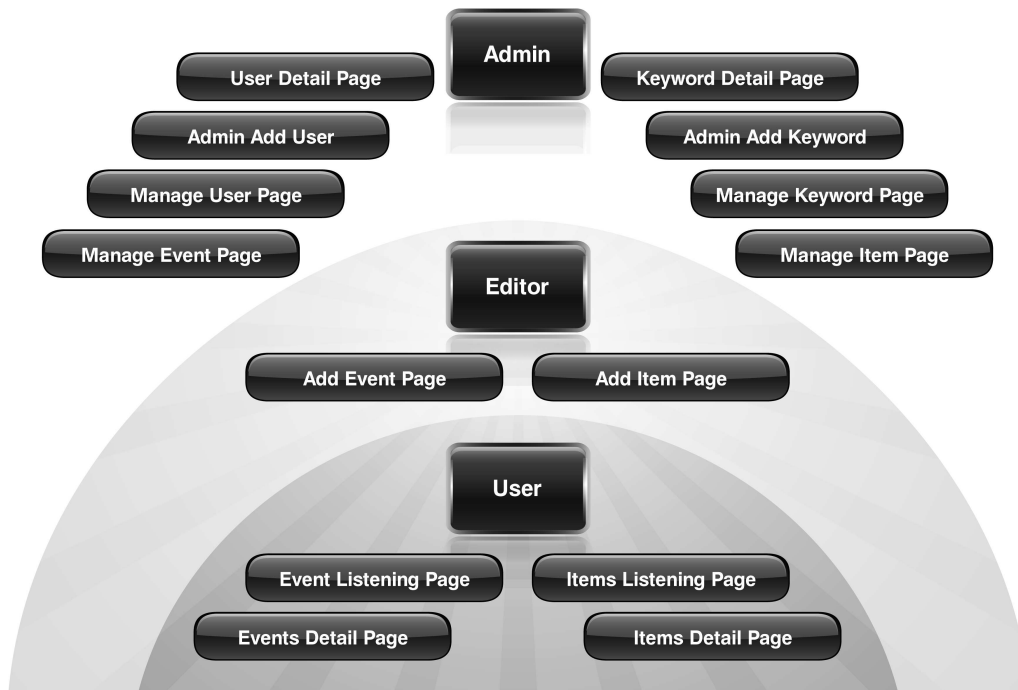

Fig. 4. Pages acceptable by different kind of users

The EventsBNR system supports the following pages:

Event Listing Page is a paginated list view of Events (Listing records). This is the landing page for the site and can be viewed by any users (logged

in/out). The information displayed by each row of the Events listing is: Id, Title, Subject, Description, Creator, Publisher, Contributor, Language, Rights, Long Term Storage, Date, and an Actions column containing View, Edit, or Delete buttons (the Edit and Delete buttons are only visible to the user/editor who created the Event).

Items Listing Page is a paginated list view of Items. This page is accessible by all users through either the navigation bar, or the List Items action. The information displayed by each row of the Items listing include: Author, Description, File (showing a preview thumbnail), Id, Created, Modified, Listing (containing a link to the listing), and an Actions column containing View, Edit, or Delete buttons (the Edit and Delete buttons are only visible to the user/editor who created the Item).

Event Detail Page is accessible by all users by clicking View in the Actions column of an Event on the Event Listing Page. Displayed in the content area of this page are the details of the Event record. This is followed by a list of Related Items (displayed in the same format as the Items Listing Page). This is followed by a list of Related Keywords.

Item Detail Page is accessible by all users by clicking View in the Actions column of the Items Listing Page or the Related Items of an Event Detail. Displayed in the content area of this page are the details of the Item record. This is followed by a list of Related Keywords.

Keyword Detail Page is accessible by logged in admins only. The content area of this page displays the details of the Keyword records.

User Detail Page is accessible by logged-in admins only. The content area of this page displays the details of the User record. This is followed by a listing of Related Listings (displayed in the same format as the Events Listing Page).

Add Event Page is accessible by logged-in users or admins via the New Event action. The content area of this page contains simple form that allows a user to fill in the details of an Event record and create the new record. The only required fields are Title, Subject, Creator and Date. Submitting the form takes the user to the Events Listing Page.

Admin Add User Page is accessible to logged-in admins only, through the New User action. The content area of this page contains a simple form that allows a user to fill in the details of a User record and create a new record. All fields are required. Submitting the form takes the user to the Manage Users Page.

Admin Add Keyword Page is accessible to logged-in admins only,

through the New Keyword action. The content area of this page contains a simple form that allows a user to fill in the details of a Keyword record and create a new record. All fields are required. Submitting the form takes the user to the Manage Keywords Page.

Manage Events Page is accessible to logged-in admins only, through the Manage Events action. The content area of this page displays the same information as the Events Listing Page, with the addition of a User column (containing a link to the User Detail Page for that User). Also, the Actions column contains buttons to View, Edit, and Delete Event records.

Manage Items Page is accessible to logged-in admins only, through the Manage Items action. The content area of this page displays the same information as the Items Listing Page, except that all of the actions are available under the Actions column.

Manage Users Page is accessible to logged-in admins only, through the Manage Users action. The content area of this page displays a paginated list of User records, with columns displaying the Name, Email, Role, Id, Created date, Modified date for each, and an Actions column containing buttons to View, Edit, and Delete User records.

Manage Keywords Page is accessible to logged-in admins only, through the Manage Keywords action. The content area of this page displays a paginated list of Keyword records, with columns displaying the Keyword, Id, Created date, Modified date for each, and an Actions column containing buttons to View, Edit, and Delete Keyword records.

4.4. EventsBNR System implementation. The EventsBNR is a web based system, allowing users to keep track of the events, and to keep track of the related photos or other content from these events. The system EventsBNR is designed and implemented using the Cake PHP MVC Framework [11]. By utilizing a framework, much of the boilerplate code that is commonly used in PHP applications is handled by the framework. This means that common issues such as security, validation, database connections, administration, and debugging information are easily implemented with little or no additional development needed. MVC stands for Model-View-Controller - a system in which the different layers of the application can be divided and independently developed.

The ***Model*** acts as the interface between the application and the database, and models are implemented to define the schema of the database tables. Each model is implemented in a separate PHP class, each in its own file. These files reside in the app/Model path, under the project root. Within the model file,

much of the information that would be needed for managing the data is included. Such information includes the fields and types used by the models, the validation rules for adding and updating records, relationships to other models, searchable field configuration, and pre- and post-save functions. The entire configuration for the model is implemented within a single PHP class, which extends AppModel.

The ***View component*** of the MVC framework can be thought of as the template for each screen. This is the template that is used by the Controller, for generating the screen based on data from the Model. The View files are .ctp files, which reside in the app/View/Model's path, under the project root. For example in the app/View/Items path, there are all of the templates for the different screens related to the model.

The last component of the framework is the ***Controller***. This is where the bulk of logic for the application resides. The Controller lies between the data and presentation layer, and defines the different screens available to each model. The Controller files reside in the app/Controller path. Each Controller is its own file, with the controller extending AppController. Each screen, and related view, is implemented as a public function within this class. For example, in the app/Controller/ItemsController.php file, there are functions implemented for the index, add, edit, and delete views (and versions of these for admins).

The entire configuration for the application resides in PHP files under the app/Config path, under the project root.

4.5. Example for applying the EventsBNR system. This example is about preparation and implementation of the latest edition of the National Radio Competition for Children's Creative Writing "Sparks" and promoting the event on the program website. The XXX edition of this Radio Competition was eld on 14 June 2013. For the gala evening it is desirable to have a diploma, awarded to the winning authors. Within the database, the system has already loaded EventsBNR material from several editions of the competition. Among them is the logo of the contest, painted 30 years ago by Boris Dimovsky. Since a diploma for winning authors is needed with the logo of the contest, the editor completes the form shown in Figure 5, for search in the event. The word "logo" is entered in the "description" and as a result the demand gets a specific element - the image of the logo of the festival "Sparks" which will be used in developing the distinctive diploma.

5. Conclusions and future work. The future of radio archives is directly related to the future of radio itself. To develop and maintain radio archives one should be well acquainted with the specifics of radio production and

Fig. 5. Screen of the EventsBNR system: a search result items to the event
"Iskri" (Sparks)

particularly with the highly altered environment of broadcasting – new platforms
for radio services. With the launch in July 2012 of Internet radio Binar (`binar.
bg`) the Bulgarian National Radio became the first media in Bulgaria to meet the
challenge to perform public functions in the field of new technologies.

Along with the sound, images in various formats have now also found
a place in radio production. The future, as well as the present of the radio
archives, is no longer only sound but images, documents etc., like the proposed
system EventsBNR.

In the EventsBNR system a separate sub-part about the history of the
Bulgarian National Radio can be created. For journalism students, colleagues and
other researchers, the system EventsBNR can provide access to a rich archive with
a wide variety of historical materials.

The EventsBNR system allows combining hundreds of thousands of hours
of recordings with significant collections of photographs; manuscripts and ad-
ministrative documents to form the Radio archives as a unique monument of
Bulgarian social and cultural life.

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