



POLISH-JAPANESE ACADEMY
OF INFORMATION TECHNOLOGY

Content Management (CMS)

Lecture 03: Content Management Systems - functionality

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Agenda

- Introduction
- Ideal CMS system
- Popular functionalities
- Summary

*Source: Wikipedia.com,
Fragments of materials written by professor Kazimierz Subieta.*

Introduction

- Hypothetical, ideal Content Management System.
- Source
 - The 20 point CMS test from <http://www.openadvantage.org>

CMS functionality

- No precise definition. You can expect, among others:
 - publication of various categories of articles divided into categories,
 - managing users with access rights and various roles in the system,
 - discussion forums,
 - storing and sharing files,
 - multimedia playback (video / music),

CMS functionality (2)

- Functionality example- continued
 - searching for information,
 - workflow management,
 - many content editing capabilities,
 - personalization of appearance, functionality,
 - friendly URLs,
 - time organization (calendar, meetings),
 - photo galleries, movies, etc.
 - modularity / extensibility,

CMS functionality (3)

- Functionality example - continued
 - possibility to change appearance using skins/themes
 - separation of content from the way it is published/presented,
 - versioning of content,
 - support for multiple languages,
 - distribution of information (e.g. RSS),
 - publication of content according to defined conditions (e.g. time),
 - ...

User registration

- Can users register by themselves?
- Users management
 - Searching
 - Adding
 - Removing
- Fighting against automatic registrations
 - Activation link,
 - CAPCHA (*Completely Automated Public Turing test to tell Computers and Humans Apart*).

Fixed elements of the webpage

- Change headers / footers for the entire portal
- Easy to edit
 - WYSIWYG tools,
 - classic approach,
 - block/modules solution,
 - Manual (HTML tags) file changes,
- Inserting a custom logo
 - Permanent place on the site
 - Freedom of placement

Start page

- Easy to edit
 - WYSIWYG tools,
 - Manual file changes
- Possibility to place following elements:
 - Text,
 - Graphic,
 - Animation
 - Others
- Reuse of parts

Use of Cascading Style Sheets (CSS)

- Using CSS in the management of:
 - Colour,
 - Fonts,
 - Attributes,
- Changing the appearance of content on the portal (sometime also *styles* within *templates*).
- Editing methods:
 - WYSIWYG tools,
 - Manual file changes

Text columns

- Different ways to split (layout) text :
 - Without columns (one column),
 - Two columns,
 - One column containing the insertion and piece of text and an additional, full column
 - Others

Links within the portal

- How to create links between materials inside the portal
- Granulation of elements :
 - Article,
 - Page,
 - Paragraph,
 - Word,
 - ...

Navigating

- Creating custom bookmarks/menus by:
 - users,
 - administrators
- Automatic document splitting for pages.

Search and filter

- Ability to filter content with different criteria:
 - time,
 - category,
 - creator
- Searching:
 - fast,
 - precise
 - easy and advanced

Controlling users

- Assign to custom/defaults groups with different rights.
- Granularity of permissions.
- Possibility of individual (per user) rights assignment :
 - viewing,
 - searching,
 - changing.
- Managing user IP addresses.

Custom content types

- Very useful functionality in more advanced cases;
- Possibility to define many custom attributes with different data types, e.g .:
 - text,
 - number,
 - date,
 - true/false,
 - file, etc.
- Similar to custom classes in programming languages.



Workflow processes

- Approval path:
 - does it exist,
 - the ability to define your own,
 - assigning different paths depending on :
 - User/group,
 - content.
- Ability to define publication date / time

Version management

- Retaining the changes of any element in the portal.
- Possibility of restoring one of the previous versions of the element.
- Searching for changes and people, who made them.
- Archiving elements that are no longer used, for example - an article.

Reserved zones

- Creating zones for members only
- Block access for others like:
 - other groups ,
 - anonymous
- Emulating

File area (Repository)

- Users can upload and download files,
- Information about version, file size, etc.
- Rights management as is the case with other content
- Extras:
 - File preview, e.g. PDF,
 - Automatic creation of thumbnails (e.g. images, PDFs).

Distribution of information

- Possibility to use other media than browser screen:
 - content print,
 - sound,
 - conversion to other formats e.g. PDF.
- Different types of views:
 - to read,
 - to print.
- Generate RSS stream/feed.

Distribution of information (2)

- Notifying the user of new events such as new:
 - articles,
 - files,
 - posts on the forum.
- Automatic contact with users:
 - E-mail,
 - SMS,
 - messaging apps, e.g. WhatsApp, Facebook, Discord, Snapchat, Telegram, Signal.
- Newsletters.

User interface

- Personalisation, which means the ability to customize the portal for a specific user:
 - with registration,
 - without registration (cookies).
- Uses the entire available screen area. In some cases depends on the skin/theme you choose.

User interface (2)

- Skins and themes
- Content editors using WYSIWYG
- Various language versions of:
 - The system (GUI),
 - The content.
- AJAX

Extendibility

- The vast majority of systems can be extended using additional modules/plugins.
- Proper integration of the plugin with built-in/core functionality, e.g. searching.
- Sometimes, within a single CMS (e.g. Joomla), there are different types of extensions, for example:
 - GUI,
 - Search system.

Extendibility (2)

- Installation methods :
 - Self-searching module (usually as an archive), local unpacking and uploading to the server using FTP,
 - As the mentioned above, but upload archive possible from the CMS.
 - A central repository with the ability to search and install automatically from the CMS level.
- Security of plugins.

Workflows

- Content management requires routine workflows such as tracking, role assignment and accountability, integrated security, automated notification, process population monitoring.
- Workflow management systems allow you to define multi-step processes that include diverse content, personnel and actions such as posting, reviewing, approving, etc.

Workflows (2)

- Work process management systems automate tasks such as :
 - Establishing human teams and the role of people in the teams
 - designing of work processes
 - Creating and maintaining work process instances.

CMS features: personalisation

- The main points of personalisation are:
 - Registration and authentication of web application users.
 - Adaptation of the website to individual user preferences; e.g. his/her theme preferences.
 - Storing the site's visit history and the transactions or purchases they (users) have made.

CMS features: personalisation(2)

- Storing and sharing personalized user input or parameterized user input; for example, his/her notes, bookmarks, calendar, event scheduler, reminders,
- Synthetic analysis and user reports to improve the quality and effectiveness of the content and services offered by the Web application.

Approach to personalisation

● Technical resources:

- Information about registered users is stored in the server side database,
- Information about the specific account and specific computer on which the user is working is based on the so-called cookies.
 - Cookies are files that are remembered by the client computer in which the server can save any (not too long) information.
 - The specific user is unknown, his/her "identity" is known only to account and computer.

Approach to personalisation(2)

- Cookies are not shared between different portals, each portal has its own.
- Content is customised to the user's profile:
 - Specifying a profile of interest explicitly by the user. The disadvantage is that the user usually does not do it, and even if he/she does, it's not very accurate.
 - Collaborative filtering: Creating user categories and assigning a user to a specific category based on the history of his or her behavior on the portal ("click-through").

CMS features: searching

- An efficient way to find information by end users is a main factor in the success of your web application.
- Searching means having to categorize content and intelligently indexing it.
- The search often takes place through formal features (date of publication, author, category, keywords) that are sometimes referred to (in RDF) as "metadata".

CMS features: searching (2)

- Searching is mostly done:
 - In the full text of the stored content components
 - by associating content elements with other content elements
- Classical search forms (known) from libraries are of little use.
- New paradigms are needed, usually based on graphical metaphors.

CMS features: ontology

- In philosophy: the study of beings, the theory of being, the description of the nature and structure of reality, the specification of conceptualization.
- In artificial intelligence: formal specification (using mathematical logic) of objects, concepts and other entities that exist in a certain domain and the formal specification of the relationships between these entities.

CMS features: ontology (2)

- The artificial intelligence approach is not very useful in reality, for example - the Stock Exchange: many thousands of pages of legislation, articles, regulations, etc. Who can write it down using the formulas of predicate calculations?
- In business (business ontology): everything IT systems designers need to know about business to properly write applications that support this business.
- This knowledge should be formally written. "Formally" usually means a standard and agreed language, such as XML / RDF.

CMS features: metadata

- General definition: These are data about data
 - what data they contain, how they are structured, what their significance is, how they are restricted, how they are organized, stored, protected, shared,

CMS features: metadata (2)

- Metadata is a certain extension of the concept of a database schema, or a certain implementation of this schema in the form of directories.
- Metadata also covers information independent of the content of the data itself, such as when a given data was created, in what format, who is its author, for how long it is valid.

CMS features: metadata (2)

- Data descriptions contained in metadata have two main advantages :
 - Contains common abstractions about data representation, such as format; In general, „take outside the brackets" all information they have in common, which greatly reduces the volume of data itself;
 - Represent field knowledge (ontology); They allow data to be inferred and can therefore be used to reduce access to the data itself.

Ontology and metadata

- The main purpose of working on business ontology is to standardize the following elements :
 - Grammar of descriptions of individual entities,
 - Names and their meanings within a given business (e.g. what do the words "author", "client", "instrument", "action", etc. mean)

Ontology and metadata (2)

- The limitations associated with the described entities,
 - Metadata associated with entities (author of description, date of creation, date of the last update, etc.)
 - Permissive operations on entities.
- In this regard, the ontology record is a meta-database that establishes both the structure of the database itself and some additional metadata that is the basis for processing the database.

Summary

- Modern CMS systems provide a very wide range of functionality.
- Sometimes you need to install additional modules.
- However, in practice, 90% of the needs can be realised without the need for implementation.
- Some systems offer great expandability and configuration capabilities (such as Drupal).