POLISH-JAPANESE ACADEMY
OF INFORMATION TECHNOLOGY

Content Management (CMS)

Lecture 02: Content Management Systems - introduction

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Agenda

- Introduction
- CMS functionality
- Design of a CMS
- Classification and review of CMSs
- Summary

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

Introduction

- Content Management System (CMS)
- Internet portal (Wikipedia): the kind of information service for which the Internet is a medium. Typically, a web portal includes news, articles, videos and search functionality.

Introduction (2)

- Polish portals
  - Wirtualna Polska – first portal in Poland
  - Onet.pl
  - Gazeta.pl
  - o2.pl
- Foreign portals
  - Yahoo
  - AOL

Introduction (3)

- Vortal – special kind of a portal, publishing information thematically similar to each other
- Wikipedia

- Examples
  - Theatrical vortal : http://www.e-teatr.pl/
  - Sports vortal: http://new.sports.pl/
  - Astronomical vortal : http://www.astronomia.pl/
  - Treasure Hunter's vortal: http://www.poszukiwania.pl
  - Software vortal: www.dobreprogramy.pl/
  - Portals/ Vortals on Wikipedia: http://pl.wikipedia.org/wiki/Wikipedia:Wikiportale

Creative chaos in the field of CMS

- Technological and market innovation and the possibility of earning big money cause the beginning of chaos.
- If A, B, C, formats are used for a given type of content, then a mapping A-B, B-A, A-C will be needed
- The lack of standards and incompatible solutions implies middleware, mostly based on the new format (see JSON, XML).
- The "two programmers in the garage" syndrome: the success of a micro-scale solution causes the bottom-up solution for the macro-scale to expand (see HTML, XML, ...). Result: 1000-page of „simple”XML textbooks.
- Creative chaos was already present in other areas (e.g. in programming languages). Usually, it subsides after a while.

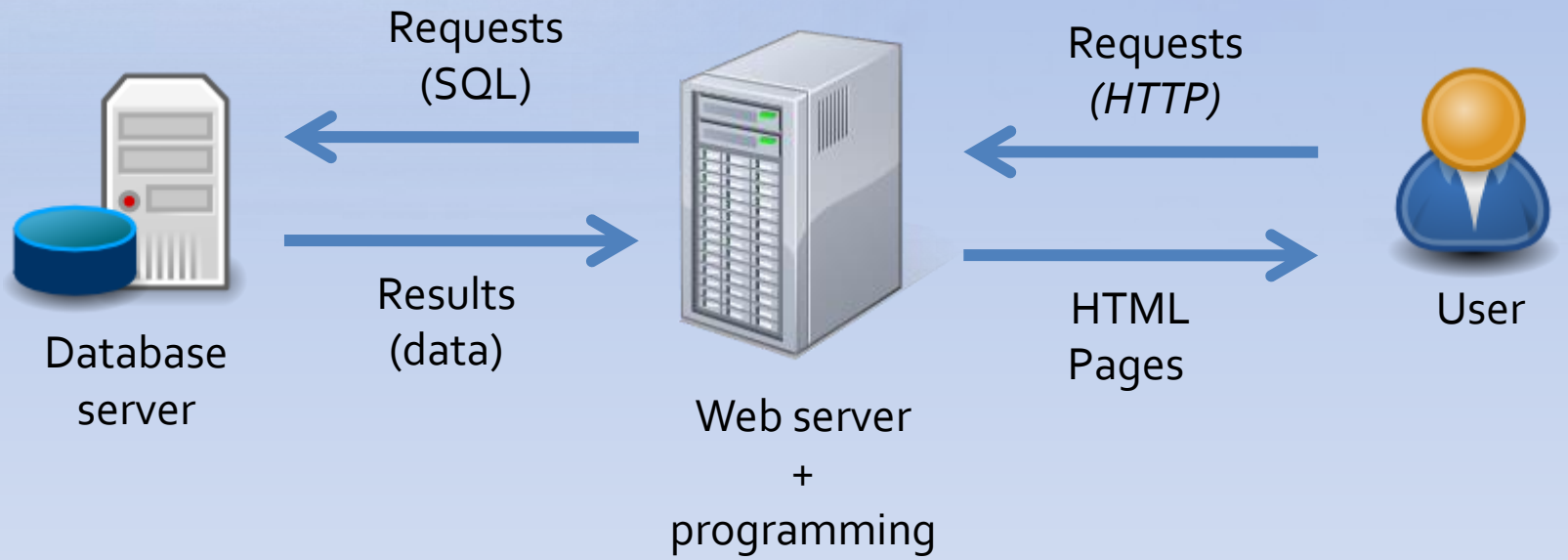
CMS functionality

- No precise definition. You can expect, for example
  - Publication of various kinds 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),
  - searching for information,
  - workflow management,
  - rich editing capabilities of the content,
  - personalization of appearance, functionality,

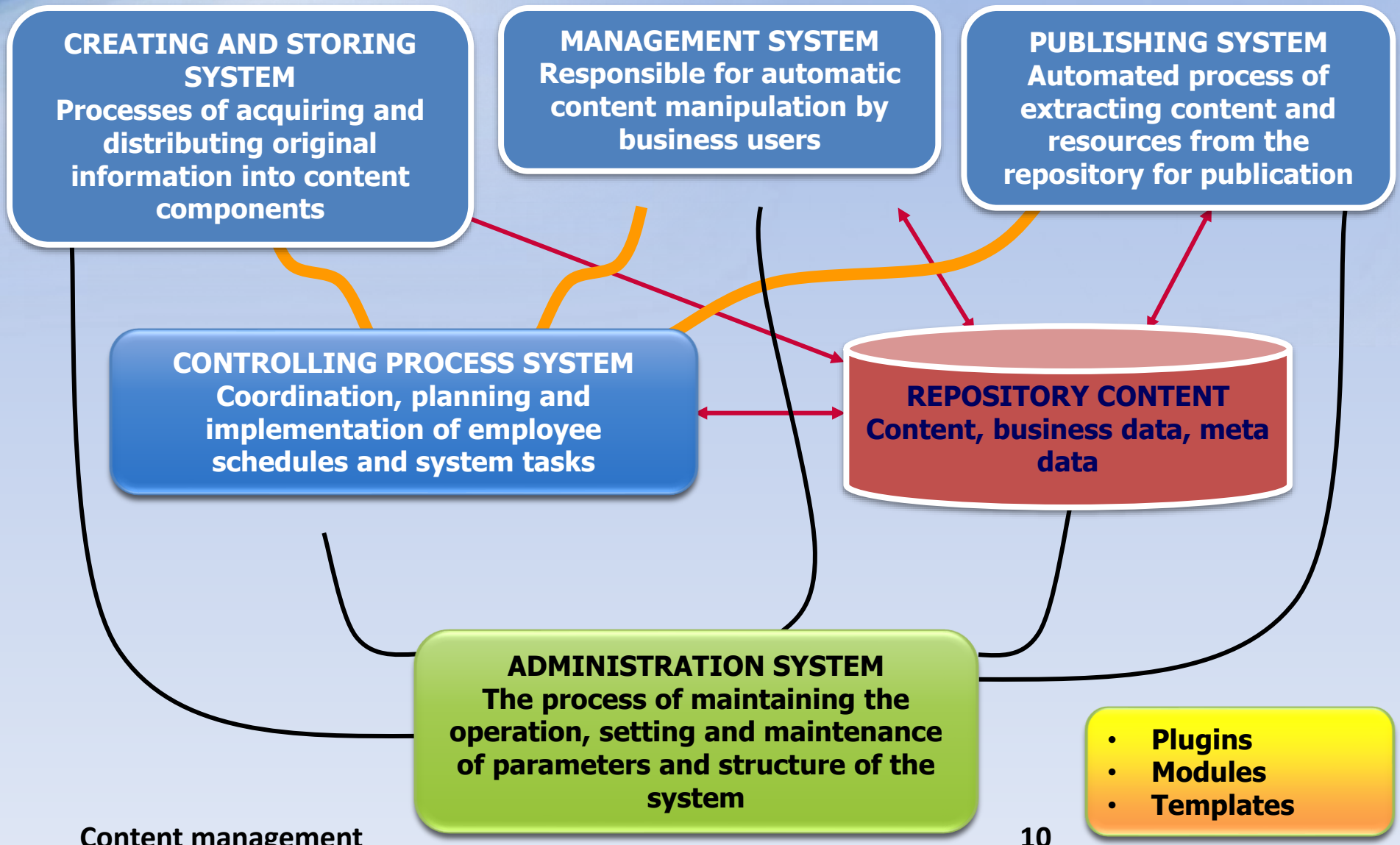
CMS functionality (2)

- Example functionality/properties - *continued*
  - possibility to change appearance using skins/themes/templates,
  - Separation of content from the way it is published / presented,
  - versioning of content,
  - support for multiple languages,
  - distribution of information (e.g. RSS),
  - friendly URLs,
  - time organization (calendar, meetings),
  - photo galleries, movies, etc.
  - …

Simplified CMS architecture



Main components of CMS



CMS components – add-ons

- The functionalities/behavior/appearance of the CMS system can be extended/modified using:
  - plugins,
  - modules,
  - components,
  - templates.
- Two approaches can be distinguished:
  - Built-in very advanced functionality and relatively few plugins,
  - Slim core and lots of plugins.

CMS components – creating and storing system

- It consists of the tools, procedures and staff that is employed to create and gather content and perform editorial work.
- Tasks:
  - Creating content "from scratch": authors design, create, and improve content using their own tools.
  - Acquisition: customizing and editing content from external sources.

CMS components – creating and storing system (2)

- Tasks – *continued*:
  - Aggregation: formatting of the information design: useful components, meta-data.
  - Conversion: change format and structure of information to meet the required content storing standards; separation of unnecessary information e.g., headers and footers; mapping this format to the required standard, such as XML, that can be introduced into the system.

CMS components – creating and storing system (3)

- Tasks – *continued*.
  - Services: they are part of the application logic and business services provided by CMS that support information gathering and transformation. Services support the creation, updating and removal of content components.

CMS components – management system

- It is responsible for the collection, storage, sharing, maintenance and administration of content and other information.
- It is based on content database, meta-information and business data.

CMS components – management system(2)

- Includes processes and tools for accessing, updating and administering the collected information.
- It is responsible for the security and authorization of access to the content.
- It is responsible for connections to other systems.

CMS components - workflow control system

- It implements the coordination, planning and implementation of staff schedules and tasks.
- Includes tools, procedures and people employed to ensure effective processes for collecting, storing and publishing of the content.

CMS components – workflow control system (2)

- The work process control system affects the content collection system, the management system and the publishing system.
- Every step of the process, from manufacturing to final publication, should be able to be modeled and traced within the same system.

CMS components –work process control system (3)

- Aspects of work processes include:
  - employees,
  - tasks,
  - actions,
  - standard processes,
  - tools,
  - data and documents flow.

CMS components – publishing system

- It is responsible for extracting the content and other assets from the repository, formatting them and automatically creating publications from them.
- It consists of tools, procedures and people retrieving content from the repository and making publications.
- It should include:
  - Publication templates

CMS components – publishing system (2)

- It should include – continued:
  - Dependencies between the content,
  - Well organized file system and directories,
  - Mechanism of final publication,
  - Alternatively - programming language.

Scenarios and forms of content management application

- Publishing news, such as online newspapers,
- Website search engines (Google, Bing, DuckDuckGo, Yahoo, Altavista, ...)
- Technical support for the company's product
- B2C (Business-To-Customer): e-commerce - internet stores.
- Information exchange portals in the chosen field, educational portals.
- eLearning.
- Social networking.

Scenarios and forms of content management application (2)

- B2B (Business-To-Business): e-business (business portals): transactions, sales or exchange of goods and services, on a wholesale scale.
- B2E (Business-To-Employee): internal Internet or Intranet systems to handle business processes inside the company.
- C2C (Customer-To-Customer): Classified Ads, Auctions, ...
- Corporate portals - organize the distributed and heterogeneous resources and information services of your organization.
- Group work of distributed teams, virtual design offices.
- .... And many other possibilities ....

Classification and review of CMS

- In most cases modern CMS systems are implemented as web applications. As such, we will focus on such solutions.
- There are no strong functional criteria for precise division.
- However, they can be divided by licensing, cost, technology or dedicated specialty.

Classification and review of CMS (2)

- Free solutions (including open-source on various licenses).
- Commercial systems starting from 10$, up to millions of dollars.
- The most popular www technologies and languages are:
  - PHP,
  - MS ASP.NET, ASP.NET MVC,
  - Java J2EE,
  - Python,
  - Ruby,
  - JavaScript, TypeScript.

Classification and review of CMS (3)

- Popularity of web technologies according to http://trends.builtwith.com (data from 2020-10).

Technology	Websites	%
PHP	492,233	49.22
ASP.NET	118,112	11.81
Ruby on Rails	52,179	5.22
Java EE	39,488	3.95
ASP.NET Ajax	38,351	3.84
OpenResty	37,680	3.77
Product Schema	37,596	3.76
Ruby on Rails Token	34,748	3.47
Offer Schema	34,212	3.42
Organization Schema	32,375	3.24
Facebook Domain Verification	27,364	2.74
Foundation	25,484	2.55
ASP.NET MVC	25,265	2.53
Person Schema	24,255	2.43
GlobalSign Domain Verification	19,865	1.99
Adobe Dreamweaver	19,249	1.92
Express	18,263	1.83
AggregateRating Schema	17,431	1.74

Source: http://trends.builtwith.com/framework

Classification and review of CMS (4)

- The most popular database systems:
  - MySQL, Maria DB
  - MS SQL Server,
  - PostgreSQL,
  - Oracle.
- Other technologies:
  - JavaScript (np. Angular.js, ReactJS, Vue.js, Ember.js, jQuery),
  - XML,
  - JSON,
  - REST,
  - SOAP.

Sample solutions

- Free systems:
  - WordPress,
  - Drupal,
  - Joomla,
  - Plone,
  - Exponent CMS,
  - Lenya,
  - Silva,
  - OpenCMS,
  - Typo3,
  - Xoops,
  - …

Exemplary solutions (2)

- Large commercial packages covering functionality of all phases and aspects of web systems development, e.g.
  - Vignette Content Management Suite (www.vignette.com),
  - Broadvision One-To-One Publishing (www.broadvision.com).

Exemplary solutions(3)

- Products with similar features to the mentioned above, but with less integration possibilities with existing production systems,
  - Microsoft SharePoint, Content Management Server,
  - Serena PVCS Content Manager V9 (www.serena.com),
  - RedDot Solutions (www.reddot.com),
  - Mediasurface 5 (www.mediasurface.com).

Exemplary solutions (4)

- Tools that focus primarily on managing large document repositories and support the group work, e.g.
  - Stellent® Document Management (www.stellent.com),
  - EMC Document and Image Processing (software.emc.com/),
  - WorkSite (www.interwoven.com).

Exemplary solutions(5)

- Systems that are used to manage the production cycle of the elements of the site (issues related to user roles, work processes) e.g.:
  - PaperThin CommonSpot Content Server V4.6 (www1.paperthin.com)
- Tools supporting the final phase of the creation of the website, like its publication, personalization, etc.,
  - BEA WebLogic E-Business Platform (www.bea.com),
  - ATG Platform (www.atg.com).

CMS as development catalyst

- To support content management, software vendors have created a huge number of different tools, integrated systems and extensions to existing systems.
  - The traditional field of document management has been largely dominated by CMS functions.
  - There are object-oriented repositories for storing content of any type, especially XML repositories.

CMS as development catalyst (2)

- Database management vendors, such as Oracle, CA, Sybase, Informix, IBM, shifted the focus of the SZBD offerings from traditional content management to content creating and maintenance.
- Various forms of workflows became significant, as the means of controlling CMS functions.
- There are also comprehensive all-in-one tools.

Summary

- CMS systems provide the necessary features for effective content management.
- The vast majority of modern solutions are based on web technologies.
- Due to the varied offer, most organizations can find something for themselves.