

# Uniform Method of Operative Content Management in the Electronic Content Commerce Systems

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*Abstract – In the given article content lifecycle model in electronic commerce systems is proposed. The model describes the processes of information resources processing in the electronic content commerce systems and simplifies the content automation management technology. In the given paper the main problems of e-commerce and content function management services are analyzed.*

Key words – information resources, content, content management system, content lifecycle, electronic content commerce system.

## I. Introduction

The modern market is characterized by an increase in demand for commercial content and growth proposals in public enterprises and public institutions. [1] Using commercial content helps optimize the management, trade and economic strategy and long-term development programs for production. It is associated with an increase in the complexity of management and implementation of systems using the predictive content of character. Specialized information resources are most type's users of commercial content, e.g., online newspapers, online magazines, online publishing, etc. For these users content is subject for making other commercial content [1].

## II. Problems communication with important scientific and practical tasks

The article purpose is to design a typical architecture for content management systems. The work feasibility lies in the methods and software development for information resources processing in such systems. It promotes the active development in Ukraine e-business and effective implementation of the electronic content commerce systems [1]. The scientific problem is the lack of a standardized approach to architectural design and development of such systems and the information resources processing. There is no classification of the electronic content commerce systems, which creates problems for the study of information resources processing methods in these systems. This creates problems for the appropriate software implementation. This also justifies the purpose, relevance, appropriateness and research directions. The special feature of electronic content commerce systems is as follows [1]: openness (access for all companies and users); global character (accessible from anywhere in the world); unlimited in time (access at any time); frankness (low barrier to entry);

direct interaction with the user (short channels of distribution and elimination of intermediaries such as a distributor/wholesaler); automatic analysis of queries and users data tracking; reducing the cost of e-business functioning; additional information providing in interactively. The work relevance lies in the rapid prevalence of Internet access; active development of electronic business on the Internet; set expanding of online information goods and services; increasing demand for information products and services on the Internet; there is no theoretical justification methods of information resources processing in the electronic content commerce systems; need to unify software of information resources processing in the electronic content commerce systems; active research development in the e-business field of Google, AIIM, CM Professionals organization, EMC, IBM, Microsoft Alfresco, Open Text, Oracle, SAP corporations and Lande D., Boiko B., Rockley A., McKeever S., Nakano R., McGovern G., Hackos J., Doyle B., Woods R., Halverson scientists [1-36].

## III. Recent research and publications analysis

The electronic content commerce systems implementation contributes to the e-business success [1], including: business globalization increases the demand for commercial content and fast access to it; uneven functioning business processes according to the regions (countries, regions, etc.) leads to increasing needs on speed, regularity and frequency of obtaining of the necessary commercial content; saving time in the necessary commercial content getting; personalization in services provide in the electronic content commerce systems; the electronic content commerce systems integration. Advantages and feasibility of the electronic content commerce systems introduction are as follows [1]: increased efficiency of commercial content receiving; the cycle reducing of commercial content production and sale; costs reducing associated with the content exchange; the openness of the electronic content commerce systems due to customers; automatically inform users of commercial content; alternative sales channels creation, such as online newspaper.

Problems of information resources processing in the electronic content commerce systems associated with increasing content amounts on the Internet; the rapid prevalence of Internet access; active development of e-business; the set expanding of information goods and services; the growth in demand for information products and services; technology and facilities creating and applications expansion of information resources processing techniques [1, 15-36]. In this area are actively working the world's leading manufacturers of information resources processing, particularly developed such systems [1, 6-9, 18-21]:

- content on-line sale: Online newspapers (New York Times, Washington Post, New York Post, etc.), Online Journals (Wall Street Journal, Airliner World, Chip, etc.), distance learning (Argosy, Capella, Walden, Ashford University, etc.), online edition as dictionaries/directories (Oxford English Dictionary

Online, The Mammals of Texas Online Edition, etc.), online publishing (Online Publishers Association, iUniverse, etc.), content entertainment portals (tochka.net, PokerNews, etc.), informative portals (Weather Channel, Karpaty.ua etc.) and children content portals (teremoc.ru, vshkolu.com etc.);

- off-line content sales: copywriting services (Apple Copywriting, Textbroker, Sopywriting 911, etc.); Marketing Services Shop (The Copy Box, Local Internet Marketing, etc.); RSS Subscription Extension (Apple, Google, Intel, Microsoft, etc.);
- Online shop for sale: eBooks (Google eBookstore, PayLoadz, Amazon.com Inc. Etc.); Software (Apple, AppStore, Android, etc.); video (Dailymotion, Yahoo! Directory, OnSiteVideos.com, Opera World, etc.); music (Amazon.com, MPI Home Video, MTI Home Video, Mass Music, etc.); picture (buy-images-online.com, PhotoBox, iStockPhoto, BigStockPhoto etc.); movies (Amazon.com, MovieSunlimited.com, DVDwarehouse.com.au etc.); digital art (Imagekind Inc.), manuals, articles, certificates, forms, files, etc.;
- content store of different types: cloud storage (Amazon, EMC, Google, Apple, Microsoft); cloud computing (Google, Apple, Mac, Linux, iPhone, Android, Palm).

Commercial content is the business processes object for the electronic content commerce systems (Table 1). Example is an information product or content for information resource as online newspapers, online publishing, marketing research and consulting services portal, etc.

TABLE 1

THE FEATURES OF ELECTRONIC CONTENT COMMERCE SYSTEMS

Name	Characterization
Virtuality	Personal contact lack of between the subjects in the buying/selling.
Interactivity	Adequate information support a user query in an interactive mode dumb dialogue.
Globality	Lack of time, space, assortment, administrative, social and demographic boundaries.
Dynamism	The on-line trade ability in momentary changes and adaptation to new conditions.
Efficiency	Demand, profits, economic benefits and social impact providing.

The content life cycle is a complex process that content takes place during management through the submission stages. A content lifecycle model does not take into account all stages of information resources processing (Table 2).

TABLE 2

THE CONTENT LIFE CYCLE MODEL COMPARISON

Author	Formation	Management	Implementation
McKeever	+/-	-	+/-
Bob Boiko	+/-	+/-	+/-
McGovern	+/-	-	+/-
Hackos	+/-	-	+/-
Rockley	+/-	+/-	+/-
Nakano	+/-	-	+/-
The State government of Victoria	+/-	-	+/-
AIMM	+/-	+/-	+/-
CMP org.	+/-	+/-	-
Bob Doyle	+/-	+/-	+/-
Woods	+/-	+	+
Halverson	+	+/-	+/-

## IV. Problems selection

Content streams number is greater than the ways number of goods moving to industrial enterprises. Much of the content flows consists easily formalized and automated procedures. The main problem is the common approach lack to process modeling, design and development of electronic content commerce systems. There is a general and detailed classification lack of electronic content commerce systems. This leads to the problem of the general methods definition for the architecture and algorithms development of these systems functioning. The existing electronic content commerce systems do not support the entire content life cycle, do not solve information resources processing and content management problems (Table 3). This justifies the research purpose, relevance, appropriateness and directions.

TABLE 3

CHARACTERISTICS COMPARISON OF ELECTRONIC COMMERCE SYSTEMS AND ELECTRONIC CONTENT COMMERCE SYSTEMS

The system features	Electronic commerce	Content commerce
Product immateriality	-	+
Constant products quantity	-	+
The variety products growth	+/-	+
Products storage lack	-	+
Product keeping in the database	-	+
The promotion effectiveness by keyword	+/-	+
Efficiency Product search by keyword	+/-	+
Automatic detection and elimination of products duplication	-	+
Automatic detection products aging within the meaning	-	+
Automatic determination of the relevance product	+/-	+
Automatic analysis of audience	+/-	+
Digests automatic creation	-	+
Automatic creation product	-	+
Automatic formatting product	-	+
User experience Impact to drive sales	+/-	+

## V. Goals formulation

Input information the functioning of electronic content commerce systems is evidence of a system work appointment and conditions. They define the main purpose of modeling. They also make it possible to formulate the requirements for the system formal model  $S$  and content management models.

Model of electronic content commerce systems presented as  $S = \langle X, C, V, H, Function, T, Y \rangle$ , where

$X = \{x_1, x_2, \dots, x_{n_x}\}$  – the input data to the system,

$C = \{c_1, c_2, \dots, c_{n_c}\}$  – influences the content flow on the system,  $V = \{v_1, v_2, \dots, v_{n_v}\}$  – the environment influence,

$H = \{h_1, h_2, \dots, h_{n_H}\}$  – internal system parameters,

$Y = \{y_1, y_2, \dots, y_{n_y}\}$  – the system output characteristics,

$T = \{t_1, t_2, \dots, t_{n_T}\}$  – the content management transaction time.

The process  $S$  of electronic content commerce systems functioning described by the function as  $y_j(t_i + \Delta t) = Function(x_i, c_r, v_l, h_k, t_i)$ , where  $x_i$  – is the visitor/user query to the system. Characteristics

component  $y_j$  according to Google Analytics are the visits number for the time period  $\Delta t$ , the average Time Spent Online (min:c), bounce rate (%), achieved the goal, dynamics (%), total viewing pages, page views number per visit, new visits (%), total unique visitors, traffic sources in % (search engines, direct traffic or other sites). Effects of values  $c_r$ ,  $v_l$ ,  $h_k$  on  $y_j$  as a result of the electronic content commerce systems is unknown and unexplored. Important and topical is to study the commercial content flow dynamics and models building of information resources processing in electronic content commerce systems. When considering the thematic content streams dynamics found models limited (Table 2), which opens the way for further research.

## VI. Research results analysis

The commercial content life cycle presented in the form next major processes communication.

*Source* → *content formation* → *content management* → *content implementation* → *database*.

Model of electronic content commerce systems  $S = \langle X, \text{Formation}, C, \text{Management}, \text{Realization}, Y \rangle$ ,

where  $X = \{x_1, x_2, \dots, x_{n_x}\}$  – input data set, *Formation* – content formation operator,  $C = \{c_1, c_2, \dots, c_{n_c}\}$  – content set, *Management* – content management operator, *Realization* – content implementation operator,  $Y = \{y_1, y_2, \dots, y_{n_y}\}$  – output data set.

Below is the content management models classification.

1. Pages generate per request is submitted in the form of the following main stages connection

*Content* → *content editing* → *Database* → *content presentation* → *informational resource*.

Pages generate model on demand as  $\text{Management}_Q = \langle X, C, Q, R, \text{Edit}, Y \rangle$ , where  $X$  – input data set,  $C$  – content set,  $Y$  – pages generated set,  $Q$  – query set,  $R$  – pages formulation and submission function, *Edit* – content editing and updating function.

2. Pages generate model while editing is presented as the next major stage of communication

*Content* → *content editing* → *database* → *informational resource*.

When making changes to the site content creates a static *pages* set. Not is taken into account interactivity site between visitors and content. Pages generation system model while editing as  $\text{Management}_E = \langle C, \text{Edit}, Y \rangle$ , where  $C$  – content set,  $Y$  – static pages set, *Edit* – content editing function. The pages formation described function as  $\bar{y}(t) = \text{Edit}(\bar{c}, \text{Weight}, t)$ .

3. Pages generate mixed model combines the advantages of the first two types and is presented as a communications major stages

*Content* → *content editing* → *Database* → *content analysis* → *blocks collection* → *content presentation* → *informational resource*.

Mixed type model is as  $\text{Management}_M = \langle X, C, Q, R, \text{Edit}, \text{Caching}, Y \rangle$ , where  $X$  – input data set,  $C$  – content set,  $Y$  – pages generated set,  $Q$  – query set,  $R$  – pages formulation and submission function, *Edit* – content editing and updating function, *Caching* – cache formulation function. Cache is update automatically (after a certain period or when amending certain site sections) or manually (team administrator). Another approach is to maintain information blocks on the editing site stage. Then the pages collected from these units when requesting user. The process is implementing caching. The module generates submission page once. Then it is several times faster downloading from the cache.

User queries content analysis allows to qualitatively assess the content flow in the system. This facilitates the subsequent decisions by the moderator as follows: the problem situation description and study purpose search; precise definition of the study object and subject; the object preliminary analysis; concepts substantial clarification and empirical interpretation; the procedures description for the properties and phenomena registration; the overall study plan determining; the definition of the sample type, sources collection and so on. Qualitative content analysis is intended to provide the necessary means moderator for results analysis (Table 4). With their help identify the content properties and test them on the general content stream. Then apply the content stream general properties on its specific thematic part.

TABLE 4

QUALITATIVE CONTENT ANALYSIS STAGES

Stage name	Stage characteristics
Text wrapping on blocks	Integrated content units are formation for encoding and processing.
Content stream reconstruction	The values, thoughts, views systems and arguments are reconstruction of each source text.
Conclusions forming	Generalizations are withdrawal by comparing individual system values.

Quantitative content analysis consists of the stages presented in Table. 5.

TABLE 5

QUANTITATIVE CONTENT ANALYSIS STAGES

Stage name	Stage characteristics
The analysis unit selecting	Linguistic unit convert in the form for processing.
Units frequency counting	Relationships are identifying between linguistic units.
Categorization	Categories finite and excess aggregate are determining to obtain quantitative data of their appearance. Categories irregular sequence is clustering (into groups and classes division). And on the basis of new generalized categories is received.
Data Mining	New knowledge is identifying in the content flow through multiple quantitative evaluations. Next qualify them as categories.
Results interpretation	Content and semantically-filled results are getting. For this purpose use various statistical mathematical methods and semantic formalisms.

Main task for content management process are the following items: a database create and access to it; the operational and retrospective databases forming; databases rotation; users work personalization; personal needs and sources protection; work statistics keeping; search ensuring in database; output forms generation; interaction with databases of other subsystems. In Table 6 presents the content management key stages in the electronic content commerce systems.

TABLE 6

CONTENT MANAGEMENT STAGES

Stage name	Process name	Process features
Content editing	content themes definition	creating goal, the content and structure formation;
	form definition of content presentation	graphic information; the text (article, news release, job descriptions); HTML templates; back-end code, etc.;
	management tools selection	HTML editors, processors word; visual tools for creating objects;
Content analysis	rights access assignment	full or limited access to content;
	process identifying	standard processes of new information content creation/publishing;
	content saving	in a database or repository;
	processes logging	creation, transmission and storage processes;
	information interactive	information about the next performer content;
	events audit	content versions save;
	text content analysis	quantitative or qualitative;
	versions access	support the possibility of users appealing to previous content versions;
Content presentation	static	without any logic behavior;
	dynamic	personalization (rules/filters), globalization, localization.

As information technology basis considered annotated database in search engines. It contains an index, inverse, dictionary tables, etc. In content management systems creates a database search primary content pattern (PCP). They used clustering technology (automatic forming groups with similar content on the criteria PCP). In content management systems formed database annotations for used in the search process. Clusters database each record is corresponding cluster definitions and containing its description. Database record is performing automatic abstracting methods (digest is formation of text statistical analysis methods). These methods are used to create the PCP and descriptions of available users (Fig. 1).

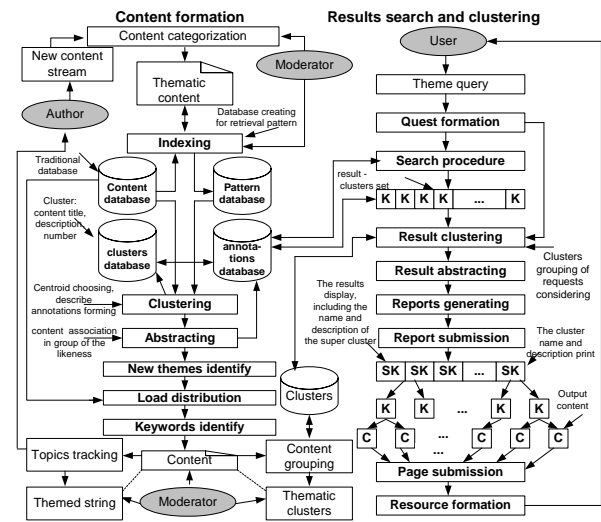


Fig. 1. Scheme of the electronic content commerce systems functioning from annotated database

Personalization based rules is the content provision to specific users or users groups of conventional business logic using. For example, using a rule where all those interested in children's books fall into the group that focused advertising children's clothing. Rules developed on the content basis that type users in a registration card. In content management systems use algorithms categorization with personalization using filters (intelligent agents). Also, algorithms use based on the content analysis of user behavior. In particular, he analyzes the content to which the user accesses, the sites visited and more. That is constantly conducted analyzed registered user and user's group history with priorities an overwhelming number for interest.

The full-text search problem in large content arrays is ineffective. The annotated content search solves the problem exactly: instead of the full content searching to search on annotations (search content pattern). Digest remotely similar content and often not perceived by person. But as the search content pattern with weighted keywords and phrases it leads to adequate results with full-text search. Digest constructed from content fragments with the largest weight values. Content analysis is used for digests automatic generation, the concepts (categories) relationship automatic detection, relationships automatic clustering to the most important identify, the relationships automatic detection (e.g., positive and negative). One of the most important tasks in content analysis is the categorization process. It sets the conceptual grid. In its terms is the content flow analyzing and new categories generate. In Fig. 2-6 presented the results of the developed electronic content commerce systems "Good morning, accountant" (dobryjranok.com). They are obtained from Google Analytics as graphs and charts. They imply that the all stages presence of the content life cycle on the site significantly increases the visits and unique user's amount. Causes of excessive standard content-search results are divided into two different categories: duplication and inconsistency. It is essential that belonging to duplicate content has completely objective and is determined automatically on the formal criteria basis.

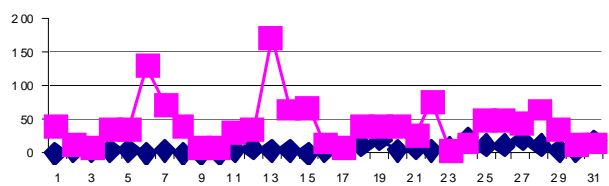
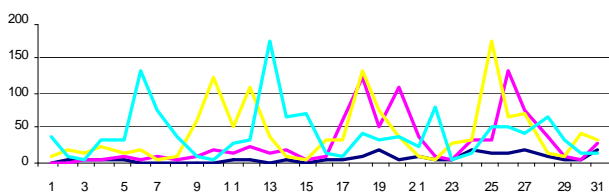


Fig. 2. Resource “Good morning, accountant” visit distribution for the September-December 2012 period

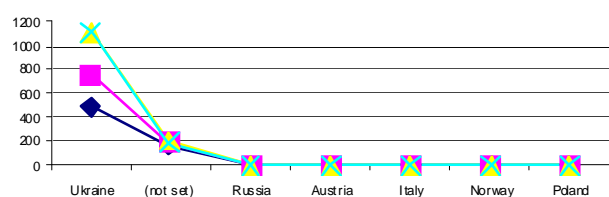


Fig. 3. Resource visit distribution from different countries for the September-December 2012 period

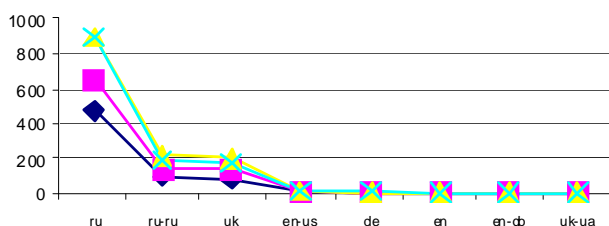


Fig. 4. Resource visit distribution from different languages for the September-December 2012 period

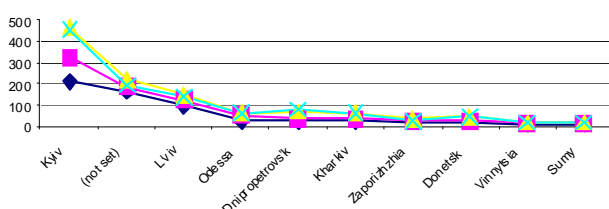


Fig. 5. Resource visit distribution from different Ukraine cities for the September-December 2012 period

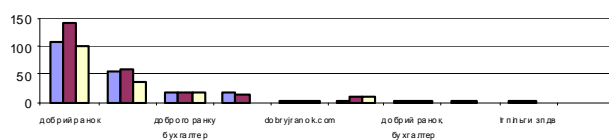


Fig. 6. Resource visit distribution of the search engines under the keyword content-search for the 09-12.2012 period

Globalization and localization is one of the modern market requirements. For successful marketing studies is use statistical basis. Globalization is more than a simple Web-pages conversion from one language to another. It still is to promote local brands (localization). Within globalization and localization is using content strategy,

information hierarchy and navigation structure. For appropriate systems implement the following tasks: create content in languages that its list is predefined; global/local content preservation in different databases; support services for text automatic translation; content changes track and its approved.

## Conclusion

In the article the justification is needed in the information resources processing methods and means development in electronic commerce content. This is implemented by the architecture improving of electronic content commerce systems. Improving such systems is to automate processes of the commercial content formation, management and implementation. This paper is analyzes the terminology and classification of electronic content commerce systems. This is done to determine the characteristic design and simulation patterns, trends, process of electronic content commerce systems. Also, the article outlines the shortcomings of existing content management methods and means. For electronic content commerce systems is developed and described a content management model. This made it possible to develop a generic architecture for typical electronic content commerce systems and standardized methods of information resources processing in these systems. The paper improved the overall architecture of electronic content commerce systems. It is different from the existing modules presence of information resources processing. This is enabled the stages implementation of the content life cycle.

The authors have developed an operational method of content management to achieve the effect on the systems developer level (the time and cost reducing of development, quality improvement through the use of proven solutions). In the work are the general guidelines for the architecture design of electronic content commerce systems. They are different from the existing phases in more detail and modules presence of information resources processing. This allows is effectively implement simple information resources processing at the systems developer level (time and resources reducing to develop, the quality improve of electronic content commerce systems). In the article is the modules architecture of electronic content commerce systems for the commercial content life cycle stages. Also in the article is software application developed and implemented of commercial content management to achieve the work effect at the owner (profitability improving, users interest increasing) and user (clarity, the interface standardization simplification, choice increased) in electronic content commerce systems.

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