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# Collaborative Content Development and Management in the Library and Information Centers: An Overview

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***Abstract*** **- The 20th and present 21st century is the substantial years in the internet power. The creation of data and the data processing are the two major factors for accelerating the availability of the information in the internet. It is also considered as the online resources which are most useful resources for the development of the content and related databases in different subjects as ready reference sources. Another job of the content developer is to disseminate the content through the internet to the passion professionals for fulfilling the thirsty of the knowledge. So, considering the importance of the content and content management, this article aims to elaborate providing details of information for the need of the hours. It would be helpful for the thirsty learners for digital content through different file formats, tools and technologies.**

***Keywords:*** **Collaborative Content Development, Content Management, Content Format, Text File Format, Audio File Format, Video File Format, Image File Format**

## I. INTRODUCTION

Any document contains information can be any media formats like, audio, video, graphics or in the form of simple text. During traditional period, Librarians and information Professionals had played major roles in storing, processing and disseminating the content to the users' during their need of the hours. But in recent times, the printed materials like, books, theses, reports, dissertations etc. have been supplemented with CDs, NPTEL and/or through the electronic formats. In this regard, internet is playing an important role in disseminating information and creating the medium of communication.

The content which is delivered over the internet contains objects like, books, multimedia, websites, animation, audio and video lectures and online tutorial materials on different topics in different domain areas of different subjects. The media may be interactive or customisable as per the requirement of the library clients. The objects of the customers can be changed according to their needs and it can be edited taking to the requirement of the users publishing in web content dissemination way. So, the possibilities in changing the contents makes it potential areas of the study of the users' by which readers are getting better facilities than the traditional pattern of services and content management.

## II. OBJECTIVES OF THE STUDY

The aim of this article is to elaborate the following points of study for the betterment of the users' satisfaction and better content management and development through collaborative manners. Here, the library and information centres play an important role in developing and managing the content for the day to day users as a whole. The major focal points of the content management through collaborative content management are

1. To explain content, content development and collaborative content development.
2. To tell about the different types of content management through different tools and Content formats.
3. To explain best practices of collaborative content development.
4. To describe the web content development and its implications like, libraries and information centres and
5. To highlight the issues and challenges relating to quality of the content, authenticity and validity of the content.

## III. COLLABORATIVE CONTENT DEVELOPMENT

Collaborative content management may be otherwise called as collaborative document management. It is the work of the documents collection by many people and it can be served from the table to anywhere in the world (https://www.onbase.com/). Content is the subject matter or the thought expressed in the document. The substance of the Content is to satisfy the users. The idea of the content may be of great value but if the matter is not presented effectively, the impact of the matter goes in waste. The packaging and presentation of electronic documents can be embedded with the mixture of audio, video or may be both, graphic and textual. It is the skill of the presenter or the creator to develop the content and present it individually or through collaborative manner. So it needs support of the tools like, text editing, graphic editing, audio capture and editing, and video capture and editing. The content format of the text, audio, video or graphics in an electronic environment exists on different file formats. It is important because, it facilitates to archive and preserve the matter for a longer period. The different kinds of formats of audio, video, graphic and text which are essential for the web content development and management are given below.

TABLE I CONTENT FORMAT FOR COLLABORATIVE CONTENT MANAGEMENT

| S. No. | Types of Formats | Features of the Format | Name of the Formats | Benefits in Designing Web Content |
|---|---|---|---|---|
| 1 | Text File Formats | Text file is generally represented by the .txt extension. It is Unicode based and this type of file does not allow any kind of formatting on the document such as bold, italics, font colour or images etc. | .htm/.html/files | The web browser identifies the WebPages, reading codes permitting display on the screen. |
| | | | .xml files | This is plain text file used for data storage, exchange and transfer. |
| | | | .rtf files | This format carries features such as bold, italics, font colour, images etc. |
| | | | .doc files | This file may be created, viewed and edited using programmes such as MS word. It is a proprietary format of the Microsoft having many features such as bold, italics, justification, bulleting etc. |
| | | | .odt files | PDF stands for portable document format developed by adobe systems. It is helpful in transferring the document in the internet so that, their appearance would not be changed in any other system. |
| | | | .pdf files | Open document text is an XML based format. It includes several XML files and configuration files in Zipped format. |
| | | | .ps files | Post script file is unreadable unless an on screen viewer like 'Ghostscript' or any other post script viewer is opened. |
| 2 | Audio File Formats | Sound or audio files are required for the online live news broadcasting and compatibility in the internet. | .au files | PC users require it to upload applications to hold in the Waveform and Modify to play these files. |
| | | | .mid files | It is used to control audio in the multimedia industry. |
| | | | .aiff files | Audio inter change file format was developed by Apple. It is used for audio on the internet. |
| | | | .mp3 | It stands for MPEG layer three. This format allows high level compression for playing MP3 files. |
| | | | .voc files | It is designed for storing digitised voice data in two part structures. The header defines the contents and the data block contains the audio information. |
| | | | .wav | It is essentially used for internet and multimedia. It handles both compressed and non-compressed storage formats. |
| 3 | Video File Formats | It is most popular with films being available in the DVD and VCD. It is specially used in the multimedia laboratory and it is most disk space occupying types. | .avi files | Audio Video Interleave file format developed by Microsoft. It can be opened in most of the video players such as Video LAN Client, Real player and Microsoft's Windows media Player. |
| | | | .mov/.movie files | It is used in quick time movies and it is a multimedia format widely used in websites for streaming audio and/or video. |
| | | | .mpg/.mpeg files | This format uses MPEG video which is a series of video standards defined by the MPEG. The major standards are MPEG-1, MPEG-2, and MPEG-4. |
| | | | .qt files | Quick Time is a file format or storing and playing movies with sound. |
| 4 | Graphic File Formats | This type of format solves the problems relating to image, colour, original resolution, thinness of the image and easy to preserve. The graphic styles is of two types that is raster graphics and Vector Graphics | .bmp files | It is standard windows raster graphic format emphasises quick display. It occupies more space and allows downloading quickly. |
| | | | .cgm files | Computer Graphics metafile (CGM) is an ANSI standard graphic file format (GFF) for 2D both vector and raster graphics. It holds data and information for reconstructing graphical images. |
| | | | .gif files | A graphic interchange file is used for archiving information. |
| | | | .jpeg/.jpg files | Joint photographic experts group (JPEG) designed this format for high compression. It discards extra data, stores images in small sizes and compatible in the web. |
| | | | JAS files | It has also high level compression and designed to create smallest possible image files for 24 bits per pixel colour images and 8 bits per pixel gray scale images. |
| | | | PICT Files | This is the Apple Macintosh graphic (AMG) file format. It can be imported and exported using clipboard cut, paste and copy etc. in almost any text or graphic programs. |
| | | | Raw files | This file is used for transferring different applications in between. |
| | | | .tiff files | Tagged image file format (TIFF) is used for allowing high resolution graphic and supported by most of the image editing and scanning software. It is generally used for screen display and printing photographs. |

Source: IGNOU BLIS Martial (BLIE-228), Web Products and services, Block-4

In the above table I, it is cleared that, content management and collaborative management is more compatible for accessing the content for different groups in different file formats which are discussed in the table I. So, it is clear that, different file formats are necessarily important to make the database more compatible, profitable and user oriented.

## IV. WEB CONTENT MANAGEMENT SYSTEM

Web content management system (WCMS) is otherwise called as software content management system (SCMS) (https: //en. wikipedia. org/ wiki/ Web_ content_ management_ system*)* specifically for making the content management databases. It provides support authorising collaboration in content management for users' categories. It supports users those who are having limited knowledge in languages for creating and managing the websites both in inter and intranet system. This system allows utilising the ability in managing and editing the documents, output of the multiple authors, and participation. Some of the major content management software which is useful and important for library and information centres worldwide is given below.

TABLE II MAJOR WEB CONTENT MANAGEMENT SOFTWARE OF THE WORLD

| S. No. | Name of the Software | Year of Estd. | Name of the Developer/ Author | Website | Key Features |
|---|---|---|---|---|---|
| 1 | Ametys CMS | 2015 | Ametys | www.ametys.org | It is an OSCMS written in Java. It is very much useful for content storage, and gadget rendering. |
| 2 | Apache Lenya | 1999 | Apache Software Foundation | lenya.apache.org | It is a Java/XML based on Apache Cocoon content management framework OSCMS. It was last released on March 14, 2011. |
| 3 | ATutor | 2002 | Inclusive Design Research Centre, OCAD University | http://atutor.ca | It is an OSWCMS used in various contexts like, online course management, professional teachers' development, academic and career research development. |
| 4 | Bricolage (Software) | 2011 | David Wheeler | http://www.bricolagecms.org | It is an OSCMS written in the Perl programming language. World Health Organization (WHO), Rand Corporation, Macworld, and The Tyee use Bricolage for their websites. |
| 5 | BrowserCMS | 2009 | Patrick Peak, Paul Barry, Jeffrey Dettmann, Juan Alverez, BrowserMedia | browsercms.org | It is created by Browser Media is an OSWCMS written in Ruby. The three mail goals of this software is to provide services to Non-technical clients who needs to maintain their website content, provides support to designers who wants to build websites for clients, and Rail developers who wants to provide CMS using common Rail conventions. |
| 6 | C1 CMS | 2007 | C1 CMS development | cms.orckestra.com | It is an open source .NET-based web content management system (WCMS) available both in MPL 1.1 license and C1 CMS's commercial license. |
| 7 | Cascade Server | - | Hannon Hill Corporation | https://www.hannonhill.com/products/cascade-cms/index.html | *It* is an award-winning content management system empowers non-technical users, enables decentralization of website management, improves the visitor experience, increases conversion rates, improves content freshness, improves accountability, lowers support costs, ensures consistency in layout and accuracy of content, increases revenue provides a predictable cost of ownership. |
| 8 | censhare | 2001 | censhare AG | www.censhare.com | It is a commercial Digital Experience Platform in the form of an ECMS. It is manufactured by the censhare AG, Germany. It integrates media information in a single system, organizes content, and automates relevant processes. |
| 9 | Cloud CMS | 2010 | Gitana Software, Inc | www.cloudcms.com | It is an ECMS offered under both SaaS and On-Premises model using Docker containers. |
| 10 | Concrete5 | 2008 | wwwcrete5.org.con | concrete5.org | It is an OSCMS for online content publishing and also in the intranets. It allows users to edit content in the sites and images directly from the page. |
| 11 | Contegro CMS | 2005 | Labyrinth Solutions Ltd | contegro.com | It is a commercial website content management system (CMS) based on ASP.NET framework & Microsoft SQL Server database. |
| 12 | ContentBox Modular | 2012 | Ortus Solutions, Corp | www.ortussolutions com/products/ | It is an OSCMS for CFML, created by Ortus Solutions Corporation designed as |

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|---|---|---|---|---|---|
| | CMS | | | contentbox | modular MVC software based on Hibernate ORM and the ColdBox Platform. |
| 13 | Daisy | 2011 | Outerthought | http://www.daisy cms.org | It is a Java/XML OSCMS which is based on Apache Cocoon content management framework (ACCMF). At present, it is used for project documentation, management of content-rich websites. |
| 14 | django CMS | 2007 | Divio AG | django-cms.org | It is an OSCMS platform written in Django and Python meant for publishing content on the WWW intranets. |
| 15 | Documentum | 2016 | OpenText | documentum.open text.com | It is owned by OpenText and provides a good platform for enterprise content management (ECM). |
| 16 | dotCMS | 2009 | dotCMS LLC | www.dotcms.com | It is an OSCMS written in Java for content management websites and its applications. |
| 17 | DotNetNuke (DNN) | 2006 | DNN Corporation | www.dnnsoftware.com | It is a WCMS based on Microsoft .NET written in C#. It is available in DNN Evoq (Community Edition) and DNN Evoq Engage (commercial proprietary licenses) editions. |
| 18 | Drupal | 2000 | Dries Buytaert | https://www.drupal.org/ | It is one of the best content management software used for making different websites. It has massive features like, easy content authoring, trustworthy performance, and outstanding security. The tools of this software are helps to build versatile and structured content management websites for users needs. |
| 19 | eZ Platform | 2016 | eZ Systems | http://ezplatform.com | It is a PHP programming based content management system which is developed by eZ Systems company. |
| 20 | Hippo CMS | 2017 | BloomReach | www.onehippo.org | It is an OSCMS available in English, Dutch, French, German and Spanish languages. It was acquired by BloomReach in October 2016 as an e-commerce personalization company. |
| 21 | IBM Lotus Web Content Manager | 2016 | IBM | ibm.com/lotus/web contentmanagement | It is a proprietary WCMS by the Lotus Software division of IBM. |
| 22 | ImpressCMS | 2008 | The ImpressCMS Project | ImpressCMS.org | It is an OSCMS for building and maintaining dynamic websites. It is written in PHP language using MySQL database. |
| 23 | ImpressPages | 2009 | ImpressPages | impresspages.org | It is an open-source PHP framework CMS includes the features like, MVC engine, inline editing and drag & drop interface. |
| 24 | Joomla | 2005 | Open Source Matters, Inc. and the Joomla community | www.joomla.org | It is a free and OSCMS for web content publishing developed by Open Source Matters. |
| 25 | Kajona | 2017 | Kajona Community | http://www.kajona.de | It is a PHP based open source CMS suitable for international websites. |
| 26 | Kentico CMS | 2006 | Magesh Sekar | www.kentico.com | It is a WCMS for website development, online stores, Web 2.0 community sites, and intranets. It is based on ASP.NET and Microsoft SQL Server. |
| 27 | Magnolia (CMS) | 2003 | Magnolia International Ltd | www.magnolia-cms.com | It is an OSCMS developed by Magnolia International Ltd., Switzerland. |
| 28 | Mambo Software | 2008 | Mambo Foundation Inc. | mambo-foundation.org | It is an OSCMS applicable for creating and managing different websites through simple web interface. |
| 29 | Midgard (Software) | 2012 | The Midgard Community | www.midgard-project.org | It is an OSCMS environment for data-intensive applications for installing additional web functionalities, including wikis, and blogs. |
| 30 | MODX | 2004 | MODX LLC | modx.com | It is an OSCMS meant for publishing different contents on the websites and intranets. It is written in PHP language and provides supports to MySQL, and Microsoft SQL Server. |
| 31 | Nucleus CMS | 2015 | The Nucleus Group | nucleuscms.org | It is open source blogs management software (OSBMS) written in PHP language and supports MySQL as database. It is used for updating web content and considered as an insubstantial content management system. |

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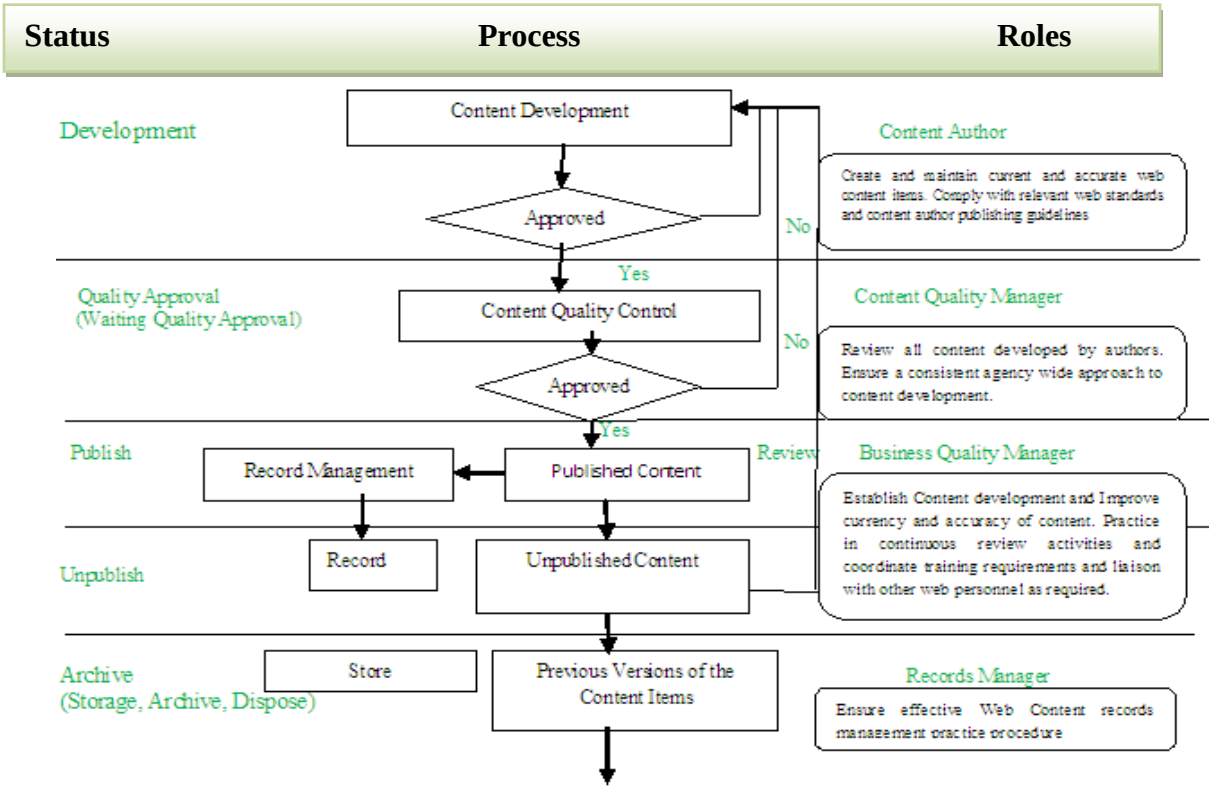
|---|---|---|---|---|---|
| 32 | Nuxeo | 2015 | Nuxeo | http://www.nuxeo.com | It is an OSCMS provides platform for business companies. It provides information management solutions such as, Document Management, Digital Asset Management, and Case Management. |
| 33 | OU Campus | 1999 | OmniUpdate | http://www.omniupdate.com | It is a WCMS for colleges, universities and many other higher educational institutions. It uses cloud computing software as a service (SaaS) product delivery model. |
| 34 | papaya CMS | 2013 | papaya Software GmbH | papaya-cms.com | It is an OSCMS based upon XML data format. Its XSLT is templating language using PHP programming language. |
| 35 | Plone | 2017 | 456 Worldwide Current Contributors | plone.com | It is an OSCMS built on top of the Zope application server. It is basically used for intranets and websites for large organizations. |
| 36 | ProcessWire | 2003 | ProcessWire | processwire.com | It is an OSCMS, CMF and web application framework WAF written in the PHP language. It is largely used for websites development, web applications, web services, content feeds and its related applications. |
| 37 | Pulse CMS | 2016 | Pulse CMS | pulsecms.com | This software is designed for small websites enables to add web content management system (WCMS) capabilities to an existing site easily. |
| 38 | Radiant (Software) | 2006 | John W. Long, Sean Cribbs, Jim Gay | radiantcms.org | It is an OSCMS written in Ruby. It is created and designed by John W. Long which is basically used in Railway web applications |
| 39 | SilverStripe | 2017 | SilverStripe | silverstripe.org | It is an OSCMS and CMF for creating and maintaining websites and web applications. The mainstay of the software is SilverStripe Framework and PHP Web application framework. |
| 40 | SPIP (Software) | 2001 | Minirezo | spip.net | It is OSCMS designed for website publishing, and online collaborative editing. It is basically used for institutional websites, community portals, academic and personal WebPages, and different news sites. |
| 41 | Tiki Wiki CMS Groupware or simply Tiki | 2002 | Tiki Software Community Association and community volunteers | tiki.org | It is an open source wiki based CMS written in PHP language for enabling websites and different portals on the internet, intranets and extranets. |
| 42 | TYPO3 | 1998 | TYPO3 Association | typo3.org | It is an OSCMS written in PHP programming Language. It can be run on several web servers such as Apache or IIS on many operating systems. |
| 43 | WebGUI | 2016 | Plain Black Corporation | www.webgui.org | It is an OSCMS written in Perl. It permits the users to arrange content in pages and website visitors to view and interact data with basic articles to complete the Content management system (CMS) and custom applications. |
| 44 | Webnodes CMS | 2010 | Webnodes AS | www.Webnodes.com | It is developed by Webnodes AS through a demerger from Webscape AS based on the ASP.Net technology. |
| 45 | Wolf CMS | 2015 | Frog CMS | www.wolfcms.org | It is OSCMS software written in the PHP language. It is published under the GNU General Public License version 3. |
| 46 | Wordpress | 2005 | Automatic Corporation | https://wordpress.com/ | It is a blogging platform run on WordPress is an open source used by bloggers which was owned and hosted online by Automatic. |
| 47 | XOOPS | 2013 | The XOOPS Project | xoops.org | It is an OSCMS written in PHP language. It is based on modular architecture allowing users to customize, update and putting subject matter into their websites. It facilitates the user to use the database freely and allows modifying and redistributing the website. |

Source: The author has collected the data and facts from the various websites
CMS-Content Management System; OSCMS-Open Source Content Management System; ECMS-Enterprise Content Management System; WCMS-Web Content Management System; WAF-Web Application framework; CMF-Content Management framework

Content development and the collaborative content development are two sides of a same coin. Business Quality managers maintain best five stages like, Content development, quality approval of content development, Publish content, Unpublished content and Archive of the content graphically represented for better understanding of the content development and management process in below. Apart from the facts present in the table-2, there are various other public and private developers are also providing technical supports for content management services to the database users. It is in other way can be said that, information archival and dissemination of information to the library and information centre users is a very necessary and indispensable thing for the library and information users. The following diagrammatical presentation taking to the collaborative content development and management providing benefit to the library users is given below.




Source: IGNOU BLIS Martial (BLIE-228), Web Products and services, Block-4, PP.46

Fig. 1 Content Development life cycle

In the above figure-1, it is stated that, any document which has less relevance can be sent for further modification or another review. If the document is not fit for the content creation may be disposed off permanently. The content archiving generally made for future reference. Here, the sole responsibility of the content management is in the hands of record manager to control and keep the record systematically for future use.

## V. PRESENT ISSUES AND CHALLENGES

Web content should be legible, simple and adhering taking to the web standards. It should be made according to the necessities of the users. Research and development is changing the needs of the users. So, it may be changed to meet the demands of the library clienteles with cost effective manner. Otherwise the number of users will come to refer and use the matte though it may be need taking to their economical standard. But frequent changes of the content and unsuitable platform of the software create problems to the users. It should be customisable, interactive and better look by which the client can rely upon the software looking to the future perspective. There are several quality based issues involved in website design. Some of the important issues relating to the web content management and collaborative content development are, web content upgrading, connectivity of data, web response, content becomes misfit to the browsers, accessibility for the visually challenged People, use of colours, conformance to old standards and authentication of the content.

## VI. CONTENT MANAGEMENT SYSTEM AND ITS IMPLICATIONS IN THE LIBRARY

The content management system in the academic and library system has pivotal importance. Connell (2013) stated that, technical expertise for in-house operation, interest in open source solutions and definite needs like, workflow management and requirement of customization are the most important points should come under the purview of content

management system (CMS). If the CMS is not operated perfectly, the long term reverse effects will fall upon the users and content provider staff members. In this way, it can be said that, it should be very much user-friendly program which will allow to uploading text and images and/or editing files through online (https://www.innovativearchitects.com/) providing facilities like, addition, deletion of web content and permits to search, retrieve and reuse the content for day to day use. Generally, it should be cost effective and flexible solution for all types of organisations and library and information centres. In result, it is easy for the users to control, manage, and structure the content for dissemination and access of the content. In addition to this, it allows the web administrator to make the system up-to-date and keep the database useful for data automation and collaborative environment for content sharing through internet and also intranet remotely. So, it is helpful to the users and the content creator taking to the present needs. Here, lastly it can be said that, this facility to the users enhances the importance of the library services in this present world.

## VII. CONCLUSION

Present information era is characterised by multidisciplinary in nature. The academic engagement and the relationship between the research and profession, and inter-disciplined research and training are the essential factors for promoting collaborative content management. Different Content formats for content development and management facilitates content preparation and information dissemination. The above table I signifies that, different content formats are the essential factors for audio, video, sound and graph management both in web content management and application. In the same manner, table-2 tells about the different web content management development developed by the different database developers worldwide. The system and development relating to the content management can be utilised in different domain areas providing information to the library users and also help them in creating different websites personally and professionally. So, it is a useful and collaborative effort of different personnel like, computer programmers, content manager, web page developer and graphic designer and all others. Lastly it is said that, it is indeed for the library and information centres for data storing, editing, adding and deleting the data. .

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