FACETED SEARCH INTERFACE FOR LIBRARY PORTALTO SUPPORT SCHOLARLY INFORMATION SEEKING FROM E-RESOURCE COLLECTION: A CASE OF NIT ROURKELA

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INTRODUCTION

One of the key purposes of the libraries is to serve or provide resources for the people of their interests. Academic libraries offer print and digital resources for their users to research, teach, and learn related to their interests. Print and digital resources are not separated in the library collection; both reside in the library. The substantial development of electronic publishing, distribution, access mechanisms, content delivery, and reading habit greatly impacted the collection development of digital or electronic resources, not only for acquiring but also for its organization and management.

With the advent of the digital revolution, libraries built the collection of electronic resources. The academic library manages all kinds of resources, from print to electronic.

A portal provides resources and a system for describing, organizing, and creating knowledge structures for digital documents that can be accessed for search purposes. Portals require a system capable of performing the following functions (Kumbhar, 2012): (i) accurate descriptions of complex digital objects and documents for search purposes; (ii) organizing these digital objects into a user-friendly and easily navigable or searchable structure; (iii) create knowledge structures with deep hierarchical levels and complex relationships to accommodate these entities and place them appropriately in collections so that search sources can use multiple paths or search strategies.Broughton & Slavic (2007)and the structuring of an associated classification or controlled vocabulary. This paper explains how that methodology was applied to the humanities in the FATKS project, where the objective was to explore the potential of facet analytical theory for creating a controlled vocabulary for the humanities, and to establish the requirements of a faceted classification appropriate to an online environment. A detailed faceted vocabulary was developed for two areas of the humanities within a broader facet framework for the whole of knowledge. Research issues included how to create a data model which made the faceted structure explicit and machine-readable and provided for its further development and use. Findings: In order to support easy facet combination in indexing,

and facet searching and browsing on the interface, faceted classification requires a formalized data structure and an appropriate tool for its management. The conceptual framework of a faceted system proper can be applied satisfactorily to humanities, and fully integrated within a vocabulary management system. Research limitations/implications: The procedures described in this paper are concerned only with the structuring of the classification, and do not extend to indexing, retrieval and application issues. Practical implications: Many stakeholders in the domain of resource discovery consider developing their own classification system and supporting tools. The methods described in this paper may clarify the process of building a faceted classification and may provide some useful ideas with respect to the vocabulary maintenance tool. Originality: As far as we are aware there is no comparable research in this area Paper type: Research paper Research context This paper describes part of the work of a recent research project carried out at the School of Library, Archive & Information Studies, University College London, funded by a grant from the (then developed a faceted classification model for organizing e-resources in portals.

Dr. S R Ranganathan coined the term facet in the mid-20th century. He identified five main categories to represent the entities that represent information in the knowledge organization process: personality, material, energy, space, and time (Hudon, 2020). Thus a facet is a combination of information about a specific indexed field and is typically named after the field. Facets are independent properties or dimensions that allow classifying objects. For example, books can be categorized by author, subject, and date facets(Russell-Rose & Tate, 2013).Faceted search is a technique that applies classic facet theory in the online digital environment, combining free, unstructured text search and faceted navigation that allows users to refine their search results using multiple filters(Niu, 2014). The filters are based on a facet classification system.

CONCEPT

Electronic resources are those materials that require computer devices to access; those may either access remotely or locally via any network. The most frequently faced electronic resources are e-journals, e-books, various kinds of databases, images, audio-video resources (Johnson et al., 2012). An electronic or digital resource can be defined as any material conceived and created digitally or converted to a digital form. A library's digital collection or e-resource collection includes online resources hosted elsewhere, physical publications, digital media files, and born-digital resources. (Library of Victoria, n.d.).

TYPE OF ELECTRONIC RESOURCES IN ACADEMIC LIBRARIES

A wide range of electronic resources is available in academic libraries, and the most familiar e-resources managed by the academic libraries are as follows:

Electronic Journals:The term e-journals can be defined as generally scholarly publication distributed electronically offline and online and accessible in computerized or digital format. The electronic journal may be paper equivalent or purely electronic (born-digital), may be open access or subscription basis, maybe peer-reviewed, or non-quality controlled(Mukherjee, 2010).E-journals began to seriously impact academic and special libraries in the mid-1990s(Genoni, 2007).

Databases: A database, also known as an electronic database, is a collection of data or information organized toretrievefrom a computer.(Encyclopaedia Britannica, 2021). In the library, databases are the searchable electronic index of published resources, academic journals, newspaper magazines, books, web resources, and various multimedia resources(Maria, n.d.). Various types of databases are managed and maintained by the library, such as full-text, bibliographic, statistical, directory, etc.(ma & Cole, 2000). The medium of availability of the databaseis CD-ROM/DVD, online or web-based.

Electronic Books: An e-book, also known as an electronic book, is a digital file that contains text and images similar to printed books, has a similar display, and is distributed electronically. (Attwell, 2021). E-books have entered the mainstream of academic life, and people increasingly expect to receive e-book materials from their academic libraries (Ashcroft, 2011).These e-books are available in various types, including textbooks, reference books, novels, etc. (Ahmad, 2015) onvarious software and reading devices.

Electronic Theses and Dissertations: E-thesis and dissertation (ETD)are defined as the thesis and dissertation submitted, archived, disseminated in electronic formats. Electronic publication's growth helps students and researchers quickly accessits search capability and locatecompared to print format. ETD can also help make information more readily available, allow search and access quickly, and make dissemination faster in less expensive ways, so many libraries are in the process of digitizing thesisforbroader availability(Weisser& Walker, 1997).

Electronic Newspapers: Electronic newspapers must meet the definition of newspapers and remote-access electronic serials containing the latest news of special or general interest, published in a machine-readable format, and accessible electronically(AACR-2, 2006). An electronic newspaper is a self-reliant and refreshable edition of a conventionalnewspaper by the concerned editorial boards(Kavithanjali, 2019).

Electronic Magazines:Electronic magazines are also rapidly proliferating. An e-zine is a more technical term for small magazines and newsletters distributed via electronic means (Muthuvennila S., 2018).Most e-zines are online versions of printed magazines that can be accessed through online services. Some e-zines are created exclusively for online publication and do not appear in conventional printed form(Falk, 1995)e-books are written by authors (multimedia authors, that is.

Multimedia and Interactive Resources: Many digital or electronic resources are multimedia and interactive.Multimedia resources made up a significant portion of the library's non-printed collection of materials in the form of photos, filmstrips, maps, slides, film, sound records, audio reels, audio and video cassettes, laserdiscs, and video discs(Bakhshi, 2013), and in various types such asText &Graphics: slideshow or presentation,diagrams,infographics; Audio: podcast; Video: screen capture, lectures,animation; Other: webinar, blogs, interactive content, learning modules, etc. Interactive resources are both ways to respond simultaneously. These resources are more advantageous in that they provide students with feedback. Examples ofinteractive resources are quizzes, interactive online courses, computer-based tests, business, engineering simulations, 3-D models, etc. ("Digital Resources," 2001).

Institutional Digital Repository: The Institutional Repository (IR) is an online place for the digital collection, preservation, and dissemination of the intellectual artifacts of institutions such as

scholarly articles, reviews, abstracts, and digital versions of dissertations. The IR may also include other digital assets generated in the day-to-day academic life, such as administrative documents, course notes, or learning objects(Ramírez-Montoya & Ceballos, 2017).

ELECTRONIC RESOURCE MANAGEMENT OR MANAGEMENT OF ELECTRONIC RESOURCES

Electronic resources have enabled libraries to improve their services variously. As most e-resources are available on the web, users can access them anytime and anywhere without geographical barriers. The electronic resources can be equipped with powerful search and retrieval tools that enable the users to perform search and retrieval more effectively and precisely(Jewell, 2001). Academic libraries now completely shift from print to electronic journals and face incredible challenges to manage effectively. Compared to traditional print materials, the electronic resources are convenient to access, easy to search, and downloadable, so the users prefer electronic resources (Wu & Chen, 2012).The electronic resources transfer the library collection that proliferates and becomes more diverse. The libraries are acquiring more e-resources for their collections due to comprehensive benefits and usefulness.Each type of library has its system for managingprint and electronic resources, which has significantly impactedacademic libraries' tools and skills to manage and provide access to their collections. A specialized system for electronic resource management has also been developed(Breeding, 2018).The acquisition, organization, access, delivery, maintenance of the e-resources conveniently need strategies to manage the e-resources. The "Management of Electronic Resources" or "Electronic Resources Managements" is addressed through various research and practices(Patra, 2017).There are two fundamental aspects to managing electronic resources (Breeding, 2004) :

- Details of the front-end delivering content to library users; and
- Management of business details of internal staff functions related to the acquisition, payment, and licensing.

To manage the e-resources with all parameters, the DLF Electronic Resource Management Initiative developed a conceptual model involving a specific Electronic Resource Management Applications or System for the library, represented as a "life cycle" and visualized in a circular diagram (Tim Jewell, n.d.).The five major components of the electronic resource management lifecycleare mentioned below and illustrated in Figure-1 (Patra, 2017).

- Acquisition;
- Access;
- Administrative;
- Support; and
- Evaluation or monitor.

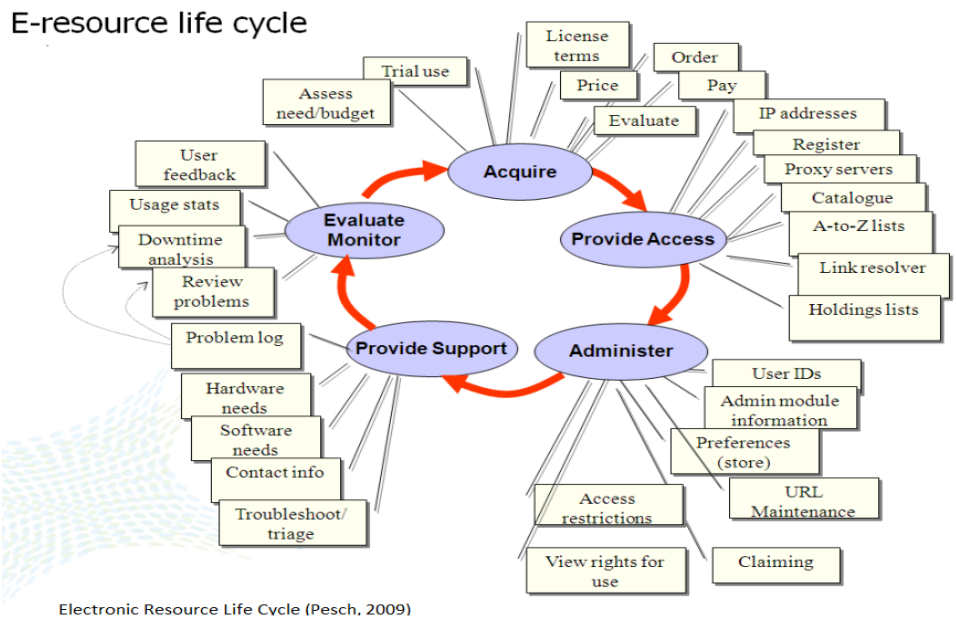

Figure 1: ALA's Core Competences for Librarianship

Source: Pesch, 2009

In the front end, delivering the content to the library users is vital, which can manage in the 'access management' stage of the e-resource life cycle. The library provides access or displays the e-resources to the users for retrieval purposes. There are various online access tools for the access management system, such as (Patra, 2017):

Directly from the publisher site by authentication and authorization;

Online Public Access Catalogue access;

- Library Portal;
- Subject Index;
- Federated Search;
- Discovery Services;
- Link Resolver; and
- Browsing List

LIBRARY PORTAL ASA PLATFORM FORRESOURCE DISCOVERY

The library portal supports users in accessing and delivering e-resources holding in most cheaply and easily. A library portal is a customized integrated information service that allows users to access library resources and services from a single location, andtheacademic library portal has the following features(Masrek et al., 2010):

- It is a tool for resources and service discovery;
- It helps users to personalize and customize to direct the required resources;
- It helps in cross-searching of heterogeneous resources;
- It helps in cross-linking of document delivery from other information services;
- It helps users to manage the search results effectively;
- A single point and simpler to authentication and authorization; and
- A unified presentation of the resources.

FACETED SEARCH INTERFACE

The term facet in the library and information science traces back to the theories and classification system of Ranganathan, Bliss,and PaulOtlet in the mid-twentieth century. S R Ranganathan described facet as a generic term that denotes a compound subject component. According to La Barre (2007),the "facet represents the categories, properties, attributes, characteristics, relation, functions or concept of the documents or entities being organized"(Hudon, 2020). Facets are the properties of information elements. They are often derived by analyzing the text of an item of the database field such as author, descriptor, format, language, etc. In the web-based resource discovery system, subject access based on facet classification is more powerful and flexible in information browsing and searching(Slavic, 2008). The facet classification system classifies the information elements in the facet search technique to filter the required information (Tunkelang, 2009)to narrow the search results for accurate information retrieval. Facet search provides a unique experience, and flexible frameworks enable users to satisfy different information needs, from simple to complex explanatory. Faceted navigation provides multiple filters for each aspect of the content(Catherine Elizabeth Hall, 2016).Facet allows users to navigate the information space torefine their selections in each dimension progressively. For example, users can browse a collection of books by selecting a specific author, subject, or date range. Selections are made by applying facet values that determine the current outcome.(Russell-Rose & Tate, 2013).

Facet search interface seamlessly combine keyword search and browsing and allows information seeker to find the required information quickly and flexibly. The facet interface helps the users explore the system rather than feel being lost, and it allows evaluating and manipulating the result(Gudivada et al., 2018). The query results are also organized, ranked, and help in meaningful categories support learning reflection, discovery, and information finding(Niu, 2014). According to Russell-Rose & Tate (2013), the facet search interface has the following characteristics:Facet search can minimize the blind search or zero results;

- Facet can be either single or multi-select;
- The facet search interface has three layouts: vertical, horizontal, and hybrid
- There are three main choices: closed by default, open by default, or a combination of the two;
- The display format of facets should match the facet values. Hyperlinks, checkboxes, range sliders, color wheels, visualizations, and tag clouds can each be appropriate depending on the content and the facet; and
- The facets offer an appropriate information existence.

SCOPE OF THIS PAPER

The scope of the paper is limited to the faceted searching and browsing systems embeddedin the library portal of Central Library, NIT Rourkela for information retrieval from the e-resource holdings such as Online Public Access Catalogue, Browsing List, Subject Index.

Other search and retrieval options for the e-resource discovery, such as institutional digital repositories (IDR), electronic thesis & dissertation (ETD) repository, Subject Guide,etc., havea faceted search interface. This paper is not covered those because the search interface is not embedded in the portal but hyperlinksthe original platform or services from the portal.

METHODOLOGY

For this paper, systematically related literatures are reviewed, and both observation and case study methods are followed to evaluate the library portal of Central Library, NIT Rourkela.

FACETED SEARCH INTERFACE FOR LIBRARY PORTAL OF NIT ROURKELA

Figure-2 is the screenshot of the library portal home page of Biju Patnaik Central Library of NIT Rourkela. The prominent services extended in the library portal are OPAC, digital archive, resource discovery, remote access, user awareness, various alerts, e-resources such as databases, e-journals, e-books, standards, cases, e-thesis, video lectures, etc. The portal also provides information about library sections such as circulation, periodicals, acquisition, digital, and their policies, procedures, related documents, various events, FAQs, social media, user guides, virtual tours, etc. This library portal is designed, developed, and maintained with open sources Content Management System (CMS) Joomla.

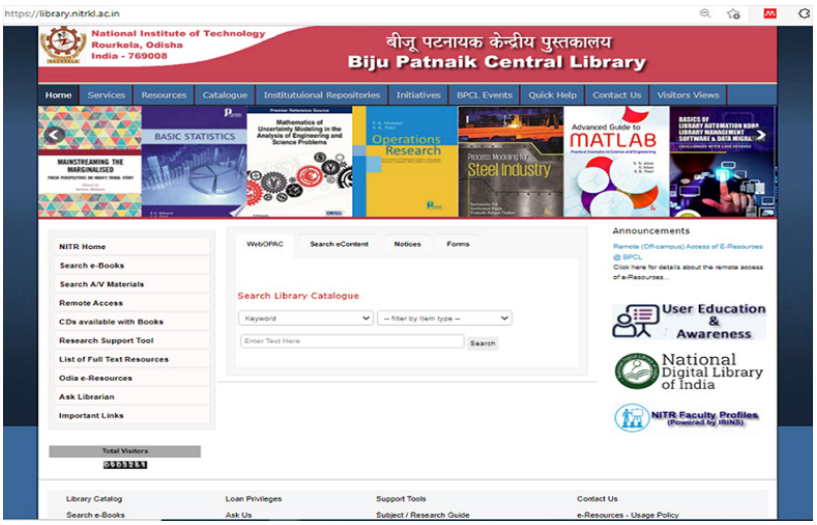

Figure-2: Snap shot of Library web portal

The library portal is embedded with the following faceted searching and browsing systems for information retrieval from the e-resource holdings, such as:

- Online Public Access Catalogue
- Browsing List
- Subject Index

ONLINE PUBLIC ACCESS CATALOGUE

The library catalogue (OPAC) search interface is embedded on the portal. As shown in Figure-3, the facet of the index termssuch as keyword, title, author, subject, series,call number, access number, ISBNis presented in the first dropdown menu for filtration. Another dropdown menu 'filter by item type'includes General/Textbook, E-Book, Reference Books, Book Banks, Bound Volume, CD/DVD, Thesis, Videocassette, and a search box with autofill or auto-suggestion are followed for the narrower and precise search.The search result is expanded and then hyperlinked to the original OPAC for display and visualization.

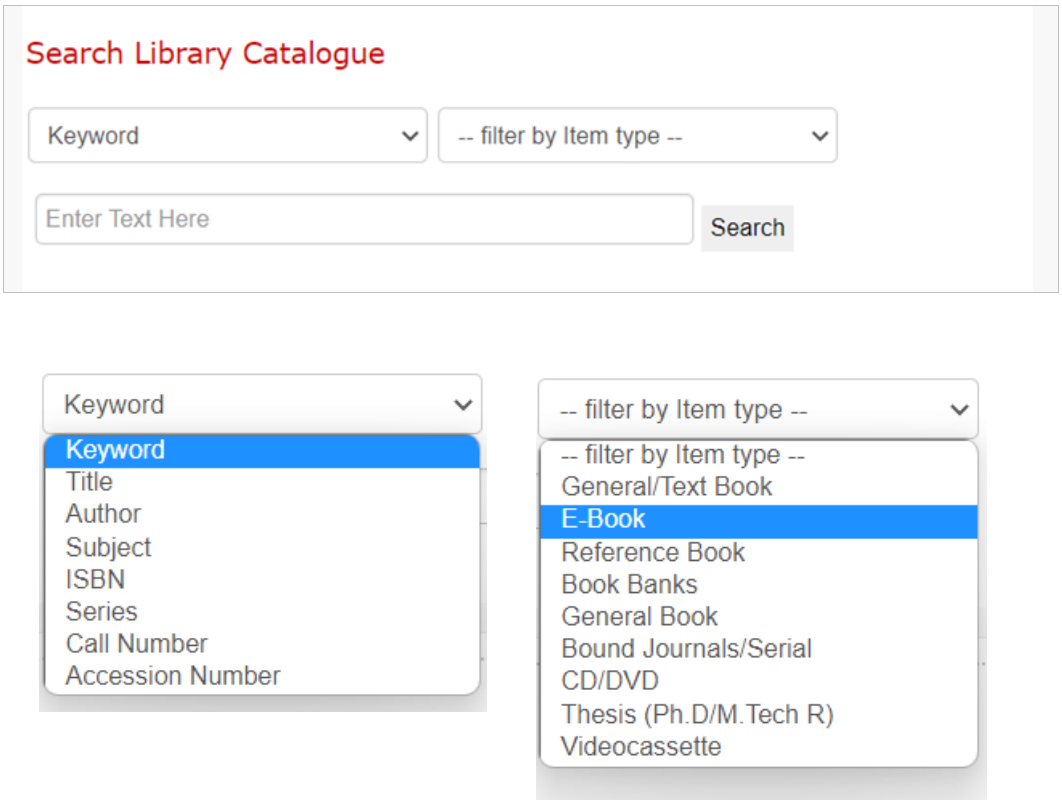

Figure 3: Snap shot of Library catalog search

BROWSING LIST (A-Z LIST)

The library developed a web page designed in HTML, PHP, and CSS to list all the e-resources procured, which is embedded on the library portal. The figure-4 illustrates the facet value search option on the left side where search by Title and Subject are incorporated. For facet filtering,the option of material type or category is given through a value dropdown menu such as Conference, Monographs, Serials, Journal & Magazines, E-book, Proceeding, Standard. Another frequently occurring value by publisher name in the checkbox is specified for precise search and proper navigation. This result's default displays or visualization isbrowsableas A-Z list of publication titles with the publication date.

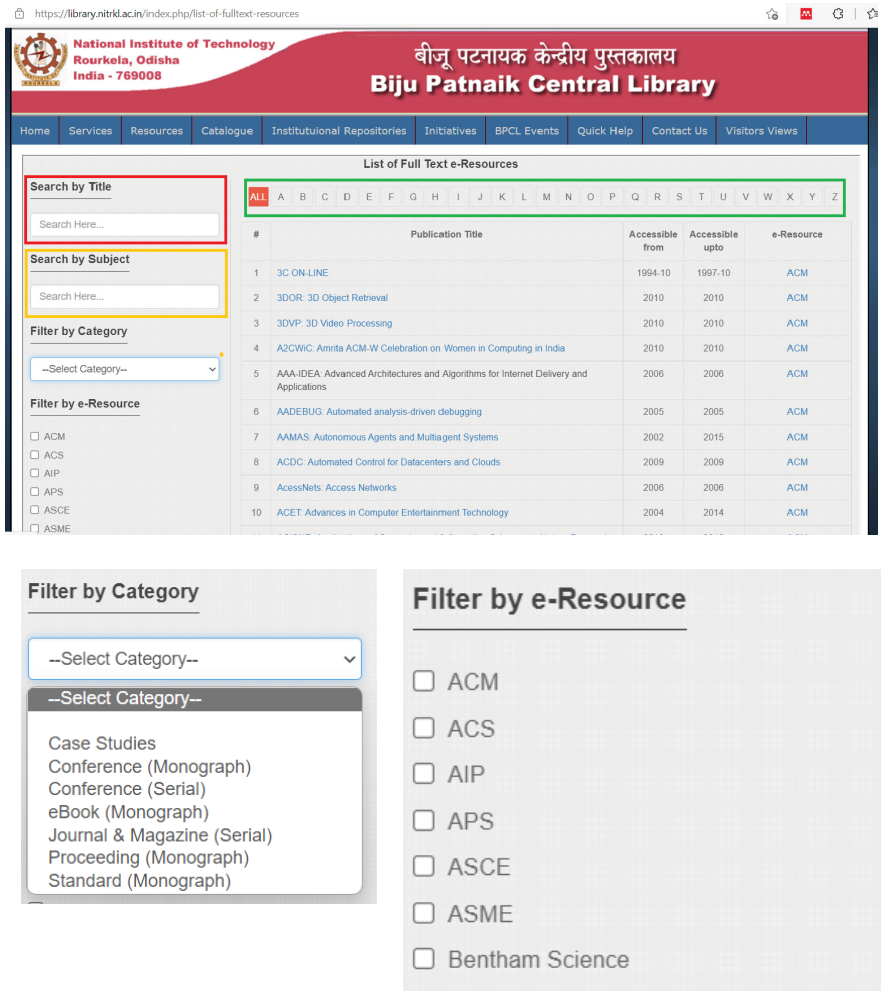

Figure 4: List of full text e-resources

SUBJECT INDEX

The library portal includes a search interface, "J-Gate," a journal discovery and index tool. It indexed the e-journals that are procured as well as that are available in open access mode. Figure-5 shows a free text search box with facet value for journal types for filtration of required documents such as Full text, Peer-reviewed journals, Personal & Industrial Journals, and Only Indian Journals. The advance search, browsing option, and retrieved result are hyperlinked to the original platform for more search and navigation options.

Figure 5: Snap shot of Discover journal articles window

CONCLUSION

Using facet as a refinement of the search and browsing of the desired information or documents from the electronic holding of the embedded library and information system through the library portal is beneficial and supportive to the library users with an actual information retrieval experience. However, the library portal of NIT Rourkela has incorporated various e-resources access systems; only a few of them are embedded with the library portal home page, whereas others are hyperlinked to their original system or services. The embedded access or discovery system such as OPAC, Subject Index, Browsing (A-Z) List met the features of the facet search interface. Itenhanced the user-based services to retrieve the required information or documents in minimum time and most accessible way with first sight impression.

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