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## Potential Role of Subject Gateways, Portals and OPAC's in Electronic Journals Access

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### Abstract

*Outlines the access methods and new technologies in accessing local and global electronic resources in the libraries. The subject gateways, portals, search engines and Library OPAC's (Online Public Access Catalog) are an important method of providing current and reliable information in a variety of disciplines and research areas. This paper describes various access points that disseminate information to researchers, librarians, and other web users in the various disciplines. Summarizes some of the issues, and explore the potential role of World Wide Web portals in helping library consortia to fulfill their objectives. At the end the paper highlights the importance of portal service to the Indian academic community in the light of UGC-Infonet E-Journals consortium.*

**Keywords :** Aggregators, Portals, Gateways, E-Resources

### 0. Introduction

Over the last decade there has been an information revolution using digital methods of publishing and online access. This has led to certain print based journals being available online and the frequent appearance of new e-journals. Libraries can benefit greatly from this publishing phenomenon, particularly with the utilisation of high-speed Internet access. Busy library staff is faced with the task of selecting e-journals appropriate to the needs of teachers and students. However, with this change, the professional staff will have new challenges and responsibilities for librarians to manage this environment in terms of wise expenditure of funds, obtaining reasonable contracts for use, ensuring ongoing access to digital content (archiving), preserving the rights of authors/publishers/users, maintaining rights of privacy, and offering the best possible access.

Will portals be the answer to managing and providing access to resources available for academic libraries as well as other content needed by the academic community? Will consortia help move libraries towards a different way of providing access? What about our role in the academy? Many academic institutions have selected a portal as the way to provide access to a wide range of information to current and prospective students, alumni, and donors. Institutional portals can help support the educational mission of the institution and can develop new constituencies. Library portals can also do the same.

Libraries are searching for a Google - like tool backed by authoritative citations and numerous options. The ideal portal will help users overcome the information overload that is besetting libraries and will combine powerful searching with the diverse resources and services that users find when they use a library. Portals should provide library experience of that quality without actually requiring people to come to the library.

### 1. Consortia Initiatives in India

Several library consortia around the country have been formed on different lines and objectives. Presently many consortia are functioning viz. FORSA (Forum For Resource Sharing In Astronomy & Astrophysics),

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CSIR Consortia, HELINET (Health Sciences Library & Information Network), INDEST (Indian National Digital Library In Science And Technology) and UGC-Infonet E-Journals Consortium etc.

All these consortia offers access to multiple electronic resources from different reputed publishers. The resources subscribed under the consortia can be divided in to following three categories.

- ✍ Full text Journals and Databases: JSTOR, Project Muse, Society publications, etc.
- ✍ Bibliographic Databases: Chemical Abstracts Service, Biological Abstracts etc.
- ✍ Gateway Portals: Ingenta, J-Gate, Ebscohost etc.

### 1.1 UGC-Infonet E-Journals Consortium

The University Grants Commission (UGC) has initiated a programme to provide electronic access over the Internet to scholarly literature in all areas of learning to the university sector in India. The programme is wholly funded by the UGC. All universities which come under UGC's purview will be members of the programme, and it will gradually be extended to colleges as well. The programme is being executed by Information and Library Network (INFLIBNET) Centre, Ahmedabad, which is an autonomous institution under the UGC. Access to various E-Journals has started from January 1, 2004.

The programme will increase in a very fundamental way the resources available to the universities for research and teaching. It will provide the best current and archival periodical literature, from all over the world, to the university community. The programme will go a long way in mitigating the severe shortage of periodicals faced by university libraries for many years, due to the ever widening gap between the growing demand for literature, and the limits of available resources.

The E-Journals programme is a cornerstone of the UGC-INFONET effort, which aims at addressing the teaching, learning, research, connectivity and governance requirements of the Universities. The E-Journals programme demonstrates how communication networks and computers can be used to stretch and leverage available funds in furthering these aims. The UGC provides funds for the programme, which will be cost free for the universities.

The E-Journals programme aims at covering all fields of learning of relevance to various universities including:

- ✍ Arts, Humanities and Social Sciences
- ✍ Physical and Chemical Sciences
- ✍ Life Sciences
- ✍ Computer Science, Mathematics, Statistics, etc.

The literature made available includes journals covering research articles, reviews and abstracting databases. Access is provided to current as well as archival literature. Portals are provided which will enable users to navigate easily through all the literature that is made available under the program.

## 2. Improving the Usability of Electronic Journals

Encouraging the use of electronic journals is in the long-term interests of vendors and libraries. Publishers and librarians should cooperate in removing barriers that discourage legitimate use. Uncertainty about what is contained within a particular electronic journal or journal aggregation package can cause users

considerable trouble and discourage use. Such uncertainty can be eased by providing libraries and their users with clear and consistent information about the e-journal content and the rules for its use. The libraries should understand the transition period and make its best efforts to change the mind sets of its users with number of awareness programs, training etc.

### 2.1 Finding and accessing electronic journals

Electronic Journals are electronic versions of print journals or, in some cases, journals available in electronic form only. Electronic journals are made available most often via the Web. Whilst electronic journals offer a whole range of benefits for users, such as desktop delivery, multiple access, distribution around a university campus, keyword searching etc., their arrival presented new challenges for libraries in terms of access and management. It was often necessary for libraries to work with each individual publisher to arrange electronic access - obtaining and distributing passwords, IP authentication, handling registration and licence arrangements, etc. Users themselves had to learn a variety of different publisher's systems, interfaces and search engines. These administrative and access difficulties became significant as numbers of electronic journals have grown. Libraries were keen therefore to find services to streamline and simplify the management of, and access to, electronic journals - using intermediaries or one-stop shops, which offer a comprehensive all-round service viz. portal service.

### 2.2 Problems in accessing e-journals: Finding the right e-journal

The task of locating appropriate e-journals can be exhausting. A good starting point is to use a search engine such as Google. Results can be rewarding, but searching often requires time, thoughtful selection of search terms and patience to obtain the most suitable resources. Gateway searches through university-subscribed databases are often of the required academic level. Many university libraries started developing portals and journal search sites such as provide users with a searchable database, giving details of e-journals. Annotated lists of journals provide a précis of e-journal sites, which can aid in the search for appropriate journals. By shifting through the multitude of publications and subscribing, or selecting, only the best material, library staff can introduce their library users to a range of timely, cost-effective and relevant e-journals. Library staff can add significantly to their own knowledge base with access to relevant library, education and technology e-journals. The role of intermediary is essential here to provide the end user a better access to his/her required resources.

## 3. Electronic Journals Access Made Easy

Subject gateways, Portals, Aggregators, Search Engines and Library OPACs are an important method of providing current and reliable information in a variety of disciplines and research areas. The general features of such a system are described in the next section.

### 3.1 Search Engines

A search engine is a collection of software programs that collect information from the Web, index it, and put it in a database so it can be searched. Search Engine is automated keyword searching tools, it use piece of software, usually known as a 'spider' or 'crawler' to gather the information from web and other servers and generate indexes. Search engine crawl the networks continuously to update their databases. It usually indexes the full-text of web page, meta data and holds lot of information in the databases. They are quite comprehensive and freely available but not complete. The key difference between subject gateways and the popular automated large-scale Web indexing systems such as AltaVista is the quality of the results, which the end-user receives. This is dependent on the nature of the cataloguing process.

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Web search leader Google Inc. unveiled Google Scholar, a new search product aimed at helping users search scholarly literature such as technical reports, theses and abstracts. Google Scholar, at <http://scholar.google.com>, searches a specific subset of Google's index and covers a wide range of fields, from medicine and physics to economics and computer science.

### 3.2 Subject Gateway

A subject gateway, in the context of network-based resource access, can be defined as some facility that allows easier access to network-based resources in a defined subject area. The simplest types of subject gateways are sets of web pages containing lists of links to resources. Subject gateways are online services and sites that provide searchable and browseable catalogues of Internet based resources. Subject gateways will typically focus on a related set of academic subject areas viz. SOSIG, EEVL, etc.

#### 3.2.1 Basic gateway facilities

Most subject gateways allow the end-user to either search or browse the database of resource descriptions. For example, the SOSIG gateway consists of a browsable multi-level menu of sub-areas and resources, as well as a WAIS-based search mechanism. In addition, most gateways allow the user the options of case sensitive searching and stemming, where resource descriptions containing variations of a term are located. SOSIG incorporates a thesaurus containing social science terminology. This gives users the option of generating alternative terms/keywords with which to search the resource catalogue. SOSIG also allows users to search on resources that are located in distinct geographic areas, such as in the whole world, just in Europe or just in the UK.

### 3.3 Subject Portal

The Joint Information Systems Committee (JISC) defines a portal as "A network service that brings together content from diverse distributed resources using technologies such as cross searching, harvesting, and alerting, and collates this into an amalgamated form for presentation via a web browser to the user. For users, a portal is a, possibly personalised, single point of access where searching can be carried out across one or more than one resource and the amalgamated results viewed. Information may also be presented via other means, for example, alerting services and conference listings or links to e-prints and learning materials."

### 3.4 Online Public Access Catalog (OPAC)

OPAC is online public access catalog. In traditional library it provides information about what is available in the library. Present day OPACs mostly reflect now a day's print as well as electronic collections. Research library catalogs serve as authoritative sources of access. The phrase, "if you can't track it, you don't own it," is quite real for the library that is trying to monitor thousands or millions of items. From the last few years, libraries have started retrospective conversion projects, bringing metadata about all their monographs and other collections into one place this has helped librarians and users to know about what is available in the library. But relatively few libraries track some of the newest, and most popular, resources they provide: the electronic journals available through database aggregators and online publishers.

## 4. Role of Aggregators

A company who specializes in selling content from multiple sources via the Web. Generally, the aggregator's site is focused on a particular subject matter. Although aggregators are most common in the Scientific, Technical and Medical (STM) world, many are now popping up in other fields such as

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Libraries, Technology Management, Education and other areas. These are companies, which have come into being as part of the electronic services environment to offer libraries a range of bibliographic and full-text services through a common search interface. Libraries have placed great faith in aggregators such as Ebsco, Ovid Technologies, Ingenta etc. because of their proven ability to package and present services in a reasonably transparent fashion to end users. The role of such aggregators, however, has been challenged over the past couple of years by the large commercial publishers who, for the time being, deny the aggregators access to valuable information content. This has resulted in libraries to have caution before they get on to access the journals through aggregator products.

There are, however, significant opportunities for content providers and aggregators to make strategic alliances, where both parties can benefit without eroding each other's market. From the customer viewpoint such strategic alliances are highly desirable as it works out economical. The interfaces and access which aggregators provide to libraries cover a range of bibliographic and abstracting services which are highly valued by customers. The value-added component from the publisher viewpoint is that the customer can be directed in a transparent way to the content service whenever a citation to a journal in that content service is picked up through the bibliographic search on the aggregator platform. Such 'arms-length' arrangements are already a developing feature in the evolution of the market place.

The larger subscription agents developed services to address these issues, offering a broad range of functions and benefits, including:

- ✍ Single interfaces and search engines for accessing a range of titles from multiple publishers;
- ✍ Keyword searching across all the titles offered in the service, usually searching within the tables of contents and abstracts;
- ✍ Browsing the contents of selected or favorite journals, as new electronic issues become available;
- ✍ Simplified password administration, usually on the basis that one password, or a small no. of passwords, allows access by all members of an institution to all titles in the agent's service;
- ✍ Library management functions, including the facility to input information on holdings of print titles;
- ✍ Regular data for libraries on the usage of the electronic journals;
- ✍ Services to alert end users to new tables of contents as well as more comprehensive SDI services.

#### 4.1 Ingenta

Since its launch in May 1998, Ingenta has developed and grown to become the leading Web infomediary empowering the exchange of academic and professional content online. Ingenta provides publishers of academic and professional content with technology-driven solutions for leveraging the Web as a profitable distribution and marketing channel. Ingenta provides libraries and researchers with access to the most comprehensive collection of academic and professional content available online. More than 8,000 academic, research and corporate libraries, institutions and consortia, from around the world, currently rely on Ingenta for managed access to academic and professional content.

The acquisition of Catchword helped Ingenta to give publishers access to the most comprehensive set of online publishing solutions available in the market.

Ingenta has created a specialized gateway for users of UGC-InforNet consortium. This Gateway is a searchable database of more than 11 million citations from over 20,000 journals. The Gateway is a powerful, easy to use service as a means of expanding access to current, scholarly research. Electronic,

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fax and Ariel document delivery is also available for millions of articles with fees. The purpose of subscribing to Ingenta services is to provide one stop solution to the faculty and research scholars through single window access to large number of journals. The end users gets full text access to subscribed titles and up to the abstract level information for all other collections which are not subscribed under UGC-Infonet E-Journals consortium. In simple terms users instead of searching each of the 20-25 publishers individually, they search in a single window through this portal and get full text access to all the collections subscribed.

#### 4.2 J-Gate

The features of J-Gate, which provides an integrated search engine to the contents of all journals subscribed by the consortium. Other features include: abstracts and contents of over 12,000 journals, access to free e-journals, email addresses of the authors, better coverage of Indian journals, list of libraries which subscribe to the journals etc. Facilities are also available for browsing by subject, publisher or journal title. Full text access to all the free journals is also available. Another important feature of this portal service is that the user can restrict their query to only UGC-Infonet subscribed journals while searching. It also offers Table of Contents (TOC) service for about 12,000+ e-journals. It has a comprehensive searchable database with good number of articles, with 4,000+ articles added every day.

#### 4.3 SwetsWise

SwetsWise is a journal subscription management tool for information specialists. The service offers a straightforward interface simplifying online access to electronic publications as well as allowing to control and organize subscriptions efficiently and effectively.

#### 4.4 EBSCOhost Electronic Journals Service

EBSCOhost Electronic Journals Service (EJS) is a gateway to thousands of e-journals containing millions of articles from hundreds of different publishers, all at one web site.

### 5. E-Journal Holdings Data Services

Keeping track of the specific holdings available through all of a library's subscriptions to electronic journals can be a daunting task. This is especially true for the products that combine a large number of electronic journals, such as Elsevier Science, Kluwer etc. The titles and holdings may vary over time, and it may be difficult to determine the specifics of the beginning and ending dates of each title. The number of historical issues may change during the license period as the publisher digitizes additional material. Some titles may vanish from one aggregated service and turn up in another as the aggregators compete for access to content.

The volatile nature of the aggregated electronic journal products plus the sheer number of titles involved create an enormous amount of work for those who maintain the serial holdings in the library's catalog. To help the users INFLIBNET is maintaining a serials union catalog and it can be accessed by web from <http://www.inflibnet.ac.in> under the database category. For each electronic journal, the corresponding record would have a URL that allows users to link to that journal on the Web.

#### 5.1 Accessing Electronic Journals Through INFLIBNET Website

The UGC-Infonet E-Journals Consortium has its website providing access to various types of information such as number of titles, subjectwise arrangement, publisherwise arrangement, contact details etc. If

you have a specific journal title which you wish to access, or if you want to check whether a particular title is available electronically, the simplest method is to go to the A-Z list of e-journal titles.

You may notice that some journal titles appear more than once in the subject list. This is because these titles are multidisciplinary subjects. It is useful to list all available links for each title because in the event of difficulties accessing the title via one service then the alternatives may still be working. Another common problem with all e-journals is that coverage is not always as complete as it may seem. For example, when you access a journal's web page you may notice that one or more issues of a particular volume may be unavailable. Sometimes individual articles from issues are missing. This comes about for various reasons involving the supply chain between publishers and service providers. However, if you have an alternative service to try you may find that your article or issue is available there. For most e-journals Adobe Acrobat (PDF) reader is required to view the articles in full text. This software enables you to view and print the articles in the same format as they would appear in the printed version.

## **6. Emerging Technologies**

The online catalog of a library provides one means for accessing electronic resources. Through title searching and subject headings, users can find any electronic journal the library subscribes to and go to that journal through the link provided. The main limitation of this approach is that it works only to find the journal itself, not the individual articles. Now many technologies are coming to help the librarian in providing access to the e-journals.

### **6.1 E-Journal Locator Resources**

Many western country libraries maintain an electronic finding aid that consists of lists of electronic databases and e-journals on their Web site apart from the main online catalog. These e-journal locaters work as good navigational tools for researchers who want a quick way to get to an e-journal without the complexities of the online catalog. These lists of e-journals may in fact be database-driven applications that also offer significant information about each e-journal, including the dates of coverage and a description of the types of material available, in addition to the title and URL. Like the online catalog, this approach takes the researcher to the e-journal itself, and not to individual articles. Keeping these journal locator applications up-to-date also requires significant effort. Rather than relying on manual work, many libraries will extract data from their online catalog or rely on an e-journal holdings service to automatically populate the e-journal locator.

### **6.2 Linking to Full Text**

Library users, however, might not care about finding an e-journal, but might want to read the full text of articles on their research topics. This process typically involves searching an Abstracting & Indexing(A&I) resource that yields lists of citations of the articles that contain the information. Finding good ways to link the user from that citation to the full text is one of the key challenges in the development of a library's information environment. Within self-contained, aggregated products like EBSCOhost and those from ProQuest, the process is simple and automatic. Yet, the scope of these products is limited to a specific set of disciplines. The real challenge lies in connecting the user that searches an A&I database with the full text in an e-journal that's located elsewhere. Citations in A&I resources are increasingly able to provide links directly to the full text of the article they describe. Through the efforts of CrossRef, an initiative of over 200 publishers, citations include digital object identifiers (DOIs) that can be used to provide links to full text. It is also important to provide links to full text from references within an article, allowing a researcher to easily navigate among resources.

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### 6.3 OpenURL and CrossRef - Based Link Resolvers

In order for information providers to equip their products for optimal integration with library linking systems, they are being asked to implement the OpenURL. This has caused some confusion concerning primary and secondary publishers who use the CrossRef/DOI system for cross-publisher links to full-text, because of the mistaken perception that the OpenURL and the DOI are competing technologies. They are not. CrossRef and the DOI provide persistent identification of scholarly content and centralized linking to the full text and other resources designated by the publisher. The OpenURL enables library-controlled links to a multiplicity of resources related to a citation and is designed for localized linking.

Yet the linking that's possible through the publisher-provided links of A&I resources or in article citations isn't always effective. These links may point to resources that the local library doesn't subscribe to. Given that many resources are available through multiple sources, knowing which version to link to is a problem. It would be unfortunate for the link to point to the article in one resource when the researcher would have been able to access it through another. This scenario has grown to be called the "appropriate copy" problem. A growing genre of products has emerged in response, both to address this problem and to offer additional services and options to searchers as they navigate among library-provided electronic resources. The basis of these products is link resolvers that rely on a database of the library's profile of subscriptions to determine the appropriate links that a library user should be presented with in a citation. Through a standard syntactical construct called the OpenURL, the producers of A&I databases, the publishers of electronic information, and the developers of link resolvers are able to create an environment where all the components work together. If the local library uses a link resolver, a citation in an A&I resource would have a button for the user to press that would then launch a menu that presents the various options available, usually the link to the full text from the appropriate source. But since not all information is available electronically, other options might include a search in the online catalog to see if the library has a print version, or an option to request the item through interlibrary loan or document delivery.

Following are some of the major linking products available today:

- ✍ SFX from Ex Libris
- ✍ LinkSource from EBSCO
- ✍ LinkFinderPlus from Endeavor Information Systems
- ✍ WebBridge from Innovative Interfaces, Inc.
- ✍ Sirsi Resolver from Sirsi Corp.
- ✍ Article Linker from Serials Solutions
- ✍ 1Cate from Openly Informatics

#### 6.3.1 Some basic definitions

The OpenURL is a mechanism for transporting metadata and identifiers describing a publication, for the purpose of context-sensitive linking. The OpenURL standard is currently on the path to NISO accreditation.

A link resolver is a system for linking within an institutional context that can interpret incoming OpenURLs, take the local holdings and access privileges of that institution (usually a library) into account, and display links to appropriate resources. A link resolver allows the library to provide a range of library-configured links and services, including links to the full-text, a local catalogue to check print holdings, document delivery or ILL services, databases, search engines, etc.



CrossRef is a system for the persistent identification of scholarly content and cross-publisher citation linking to the full-text and related resources using the DOI. CrossRef DOIs link to publisher response pages, which include the full bibliographic citation and abstract, as well as full-text access (for authenticated users or at no charge, as determined by the publisher). The publisher response page often includes other linking options, such as pay-per-view access, journal table of contents and homepage, and associated resources. CrossRef is a collaborative membership network, and not a product for purchase.

DOI stands for Digital Object Identifier and is an open standard. A DOI is an alphanumeric name that identifies digital content, such as a book or journal article. The DOI is paired with the object's electronic address, or URL, in an updateable central directory, and is published in place of the URL in order to avoid broken links while allowing the content to move as needed. DOIs are distributed by publishers and by CrossRef, and there is no end-user charge associated with their use. As an identifier, the DOI can be incorporated into many different systems and databases.

#### 6.4 Federated Search

Another major area of interest is in applications that allow users to search multiple sources simultaneously so they don't have to decide which resource might have the information they need. This approach goes by various names: federated searching, cross searching, or metasearch.

A number of products with differing technological underpinnings are available in this category. The products are based on a mechanism that knows how to send a query to each individual resource behind the scenes, and then receive the results. When the user enters a search request, the system translates it into the form needed by each of the selected targets, gathers and collates results as they are returned, and then presents the orderly results. These metasearch applications typically involve presenting a set of broad subjects or disciplines, removing from the user the burden of knowing what kind of information is contained within each of the brand-name resources. As part of the configuration of the metasearch application, the library would maintain a profile of the electronic resources to which it subscribes.

These are some of the major products in this category now:

- ✍ ENCompass from Endeavor Information Systems
- ✍ MetaLib from Ex Libris
- ✍ Sirsi Single Search from Sirsi
- ✍ WebFeat Prism from WebFeat
- ✍ MuseSearch from MuseGlobal
- ✍ ZPORTAL from Fretwell-Downing

#### 6.5 The value of persistent links

Static URLs are not a persistent linking mechanism. If a URL is published as a link and the content it points to is moved, then that link will no longer function. DOIs address this problem. For instance, the publisher may need to migrate content from one production system to another (pre-print to post-print), or content may move from one publisher to another if a journal, or the publisher itself, changes hands. In these cases the publisher simply updates the DOI directory; the DOI itself never changes, which means that all the links to that content that have already been propagated still function. An OpenURL link that contains a DOI is similarly persistent.

Among the range of linking options they might display, local link resolvers frequently contain links to full-text at the publisher's website, as when the library subscribes to the e-journal in question or otherwise wishes to provide its patrons with access to publisher services and access options. While OpenURLs without DOIs can function persistently if the relevant metadata is updated within the institution's link resolver, this process is greatly streamlined via access to the CrossRef system. CrossRef provides a single source for linking reliably to hundreds of publishers without the need to track varied metadata-based linking schemes. Therefore, link resolvers benefit from using the DOI wherever linking to publisher-designated resources is appropriate.

## 7. Conclusion

Accessing electronic resources shows that librarians and users are facing a complex set of challenges. While a number of products have evolved for each aspect of the problem, the question is, how can they all be designed and implemented in such a way that they all work together, providing a clear and seamless interface for library users and avoiding redundant work for library staff? To date, no single product exists that provides comprehensive management of electronic resources. Will portals be the answer to managing and providing access to resources available from academic libraries as well as other content needed by the academic community? Will consortia help move libraries toward a different way of providing access? And, what about our role in the academy? The portal is one of the services offered by digital libraries. Many academic institutions have selected a portal as the way to provide access to a wide range of information to students, scholars and teachers. Institutional portals can help support the educational mission of the institution and can develop new constituencies. Library portals can do the same. Librarians welcome the development of CrossRef and other publisher-based linking systems. However, to be fully effective, publisher-based systems must be linked to local library systems and to non-commercial sites. Future use will be heaviest for those publisher sites that offer the greatest variety of links and linking capabilities. At a minimum, all the applications that a library employs to manage its electronic resources should draw from the same knowledgebase of its electronic holdings. A library should not have to maintain the same information in multiple ways. If the library catalog, linking environment, electronic resource management system, and metasearch engine cannot all share the same physical knowledgebase, then it should at least be possible to have a master copy of the data that is automatically distributed through these applications.

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