

# Improving Access to Electronic Resources: Report of the Task Force on Access Integration

Submitted by: Linda Barnhart, UCSD  
Sue Chesley, UCSC  
Vicki Grahame, UCI  
Marilyn Moody, UCSB  
Stephen Schwartz, UCLA  
Roy Tennant, CDL  
Steve Toub, CDL  
Camille Wanat, UCB, Chair

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## **Executive Summary**

The Task Force's charge was to develop a white paper defining the relationship between UC Library catalogs, databases, and web sites as access paths to library materials. The group began by exploring the concept of integration as it applies to the discovery, delivery, and management aspects of library access systems. The committee's focus was primarily on discovery integration, though we found that delivery and resources management are never far below the surface and inform our recommendations.

The task force also investigated current practices of ARL Libraries, UC campus libraries, and other consortia for integrating access to electronic resources. Virtually all libraries use library catalogs as well as a variety of other methods to provide alternate routes or views of abstracting and indexing databases, electronic journals, and other web-based research tools. The research in this area shows that users value quick and convenient routes to these electronic materials while libraries seek to maximize usability and visibility of the tools. The Task Force also notes several special problems faced by institutions as they develop electronic resource databases: providing subject access, defining the large variety of types of materials, and the quandary of whether to include free and unlicensed resources. We also investigated electronic pathfinders and other creative methods for providing guidance in choosing appropriate tools for specific research needs based on subject and level of research. The Task Force found only a few innovative projects around the country that integrate discovery by methods such as cross-database searching tools and customized gateways. We recognize the growing value of such products and recommend further development in this area.

Within the University of California Libraries, there is no clear uniformity. The solutions libraries have chosen to provide these alternate views of electronic resources range from well developed databases to simpler databases and lists of A&I resources and electronic journals. One idea was clear: the various campus databases and lists as well as the CDL Directory receive very high use. Clearly UC users value this type of approach in addition to the catalog. The creation of such lists and databases means redundant work on the part of catalogers and the creators of the alternate lists on individual campuses and across the UC system. The Task Force agreed that a collaborative approach is ideal. The investigation of the current problems with CDL Directory revealed one issue in need of immediate resolution, the inclusion of locally licensed materials.

Based on this research, the Task Force developed a set of core principles for any access integration tool and explored methods for creating directory-style tools from catalog records. We considered several options including using the catalog as sole gateway to electronic resources, relying on individual campus databases and lists of electronic resources, and creating a centralized database of resources.

The final recommendation regarding the CDL Directory reflects a phased approach. The first phase will remedy the most pressing problems with the CDL Directory. At the end of phase one, duplication of effort will be much reduced and each campus will have a directory for its electronic materials which will include both resources that are licensed locally and those licensed systemwide. There would be no "CDL Directory" as such (no union view); a union view of electronic resources would be available in Melvyl. The second and final phase requires much broader and deeper work to develop UC-wide metadata standards and to rearchitect the technical infrastructure of UC library applications in order to provide for truly flexible and robust access integration.

Recommendations follow:

Recommendation 1: The Task Force recommends that we proceed with some short-term changes to the existing CDL Directory discovery tool while pursuing a long-term solution that promises to be a more flexible and comprehensive solution to our problems. The first phase would accommodate the urgent need to provide access to core materials such as electronic journals, databases, and other reference texts,

to incorporate locally licensed materials, and to automate the data entry; this would be a redesign of the existing discovery tool. The second phase would allow for customized (or co-branded) views, develop a route to provide custom subject views for campuses that chose to use other than the central subject vocabulary, and take the time to consider alternative infrastructure and major software development. The Task Force developed a list of Functional Requirements, prioritized to facilitate the two phases; it can be found in Appendix B. This recommendation will require some UC-wide agreement on data standards for successful implementation (see Recommendation 5).

Recommendation 2: We recommend that subject guides and pathfinders continue to be developed locally at this time, but links to campus-developed subject guides should be incorporated in the custom views developed in any next generation directory-style products.

Recommendation 3: We urge that cross database search solutions continue to be pursued by UC, and that the upcoming SearchLight re-examination include user input, careful consideration of tailoring options, and potential use of commercial software. We also urge that UC carefully monitor the ARL Scholars Portal Project in view of its potential for cooperative research and development of an innovative research tool.

Recommendation 4: To maximize potential of the SFX server and to meet our users needs, UC libraries should begin work immediately to determine how the SFX server will incorporate access arranged by campus licenses as well as CDL-arranged licenses.

Recommendation 5: A standards team should be charged to deal with a number of tasks related to the record standards and coding issues that support discovery of electronic resources:

- Coding within bibliographic records that designates the item to be included in the new Directory;
- Conformance to data description standards;
- Minimum required fields for all UC library items;
- Vocabularies for each of the common fields;
- Strategy for “type” field(s) for electronic resources;
- Strategy for subject field(s) and handling broad subject access (i.e., using LC Classification numbers to map to a hierarchical broad subject vocabulary);
- Enhancements to the existing SCP guidelines, creating AACR2 cataloguing standards that would apply to all UC libraries; and
- Mapping between AACR2 and other data description standards (EAD, TEI).

Recommendation 6: The Library Technology Advisory Group (LTAG) should consider overseeing development of a common UC Library Application Infrastructure. Possible issues include:

- Data format standards (MARC, XML, etc.);
- Standards and infrastructure for more automated data flow. This may include: unique IDs, exporting, harvesting, merge/purge, syndication, opening up applications to handle data flow;
- Systemwide toolkits that provide campus-customized views that are managed by campus staff;
- Authentication/security standards; and
- Standards and infrastructure for durable URLs and URL resolution servers.

Recommendation 7: SOPAG should consider how UC libraries can best develop a cooperative research agenda to examine the continuing challenges posed by electronic library research tools.

## **I. Introduction**

The Task Force on Access Integration was charged by the Systemwide Operations and Planning Advisory Group (SOPAG) with the development of a white paper on the relationship between our various catalogs, databases, and web pages as access paths to library materials. [See Appendix 1 for the full charge.] Appointed to the Task Force were: Linda Barnhart (UCSD), Sue Chesley (UCSC), Vicki Grahame (UCI), Marilyn Moody (UCSB), Stephen Schwartz (UCLA), Roy Tennant (CDL), and Camille Wanat (UCB, Chair). Steve Toub (CDL) joined the group in mid-summer, as we realized we needed the specific expertise he brought as manager of the current CDL Directory; he served as a full member of the Task Force from the moment he first joined our discussion. To complete its work, the Task Force extensively examined the web sites of all ARL libraries to explore the community's approaches to the questions posed by the charge and reviewed the literature related to the topic. Karen Coyle and Mary Heath assisted our exploration of the capabilities of the new Melvyl and the ALEPH platform. Numerous other colleagues, from CDL and our campuses, assisted Task Force members as we pushed and pulled at the ideas that arose in relation to access integration. We thank them all. The Task Force held three meetings in person, as well as 10 conference calls; remaining work was done via email.

The cluster of issues surrounding access to electronic materials is a matter of great interest and concern within the library community. Individual libraries are responding to these issues in a variety of ways (outlined below) and the community at large is grappling with them as well. The Library of Congress' Bicentennial Conference on Bibliographic Control for the New Millennium and last spring's Digital Library Federation Forum, in particular, included many papers related to the Task Force's charge.

The primary stakeholders in how libraries design access paths to electronic materials are, of course, the users. Their needs range from "a few good things" to comprehensive research — their time frames from immediate to open-ended. We seek to serve the beginning undergraduate to the researcher experienced in their field. Some users approach their research wanting to find information from a narrow subject area, while others need broad interdisciplinary approaches. Some want to do known item searches, or search for items by matching individual characteristics. Others want to approach their searches in multiple ways, often in the same search. A fast and quick search by simple keyword may satisfy the needs of many users, while others require more sophisticated and complex searching. Designing productive access paths for our users is indeed daunting.

The Task Force recognizes that there is no one solution at this stage that will completely meet the needs of all users and library staff. In fact, there is no one solution. The cluster of issues presented by electronic resources and the changing face of library research routes are many and require an open and flexible approach on the part of libraries. Thus, our goal is to recommend some solid steps that build upon our common goal of supporting access to information for our users and that have the flexibility to support further experimentation and the inclusion of new developments.

## II. Terminology and a Framework for Analysis

“Access integration” is not a well-defined term; it is open to multiple interpretations depending on the context and, as well, means quite different things to different people. Setting aside how we accomplish “access integration,” how do we even talk about it? So the Task Force examined library access paths and, particularly, how “integration” relates to their various dimensions.

Libraries provide access to a variety of materials. These materials may be available in various physical formats or manifestations (print, electronic, microform, video, etc.) and various intellectual formats (books, journals, databases, etc.). A book, for example, may be located on a shelf in the stacks or an electronic full-text version may be available at a URL, but the important piece of the puzzle is that there is an electronic surrogate for that book, a “record” in a catalog that lists the title, author, location, and other *metadata* about that book. Metadata is what makes library access systems work. Metadata about library materials provides the ability to discover, deliver, and manage library resources.

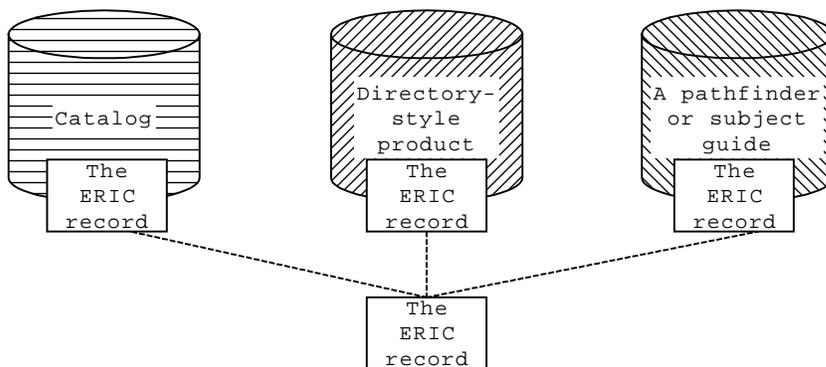
There are three important dimensions related to library access systems: discovery, delivery, and management. “Integration” relates to each of these dimensions, though for different purposes and in different ways.

### Discovery

*Discovery* refers to the ability of users to locate library materials, largely by navigating through buckets of metadata. There are a variety of products for discovering library materials: the OPAC, a list of electronic journals, a list of databases, a database of electronic resources, a cross-database search tool (such as SearchLight), subject guides or pathfinders, specialized search engines (such as the proposed Scholars Portal), and so on.

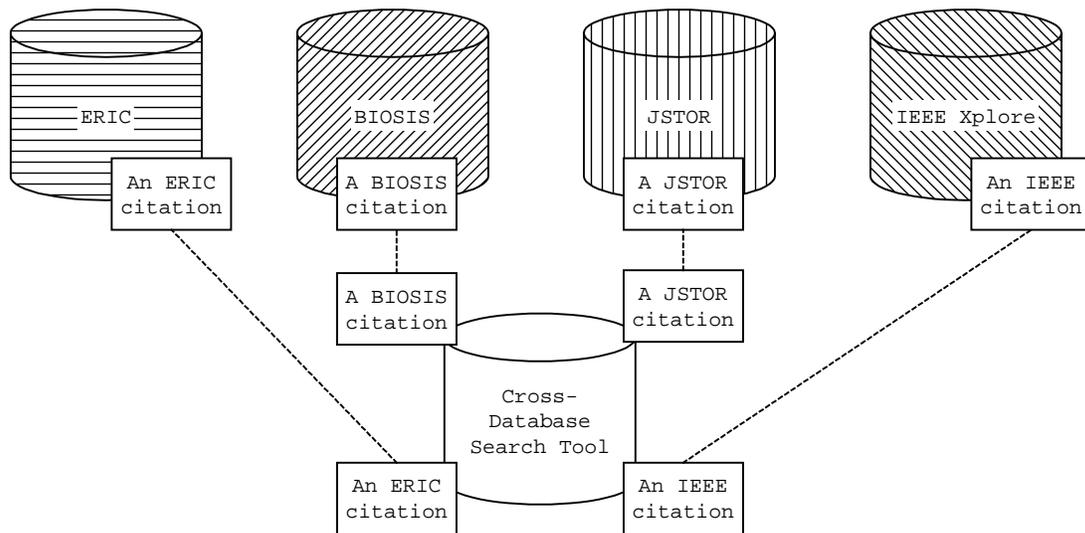
Discovery tools (or access paths) depend on the ability to effectively navigate through “records” (metadata of library resources). *Integration* can occur in a number of ways:

1. Different discovery tools can be *integrated* by their common use of a single record for an item. For example, a “record” for JAMA may be utilized in a campus OPAC, in Melvyl (PE), in the CDL Directory, in a campus list of electronic journals, and in a campus subject guide or pathfinder, among other discovery systems.



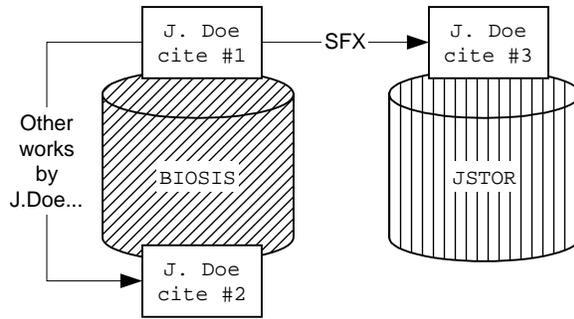
Theoretically, the same exact record--metadata for the ERIC database in this case--could be used in separate products.

- Records from multiple sources can be located by means of a single discovery tool, thus providing an *integrated* view. A cross-database search tool might search across a limited number of parallel A&I databases (such as Database Advisor did or Flashpoint at Los Alamos National Laboratory does) or might search a broader range of databases and web resources (such as SearchLight). Other examples of this type of integrative tool would be ARL's proposed Scholars Portal project or applications of the Open Archives Metadata Harvesting Initiative.



Cross-database searching lets the user see metadata that lives in many different databases, if the metadata records share the same standards.

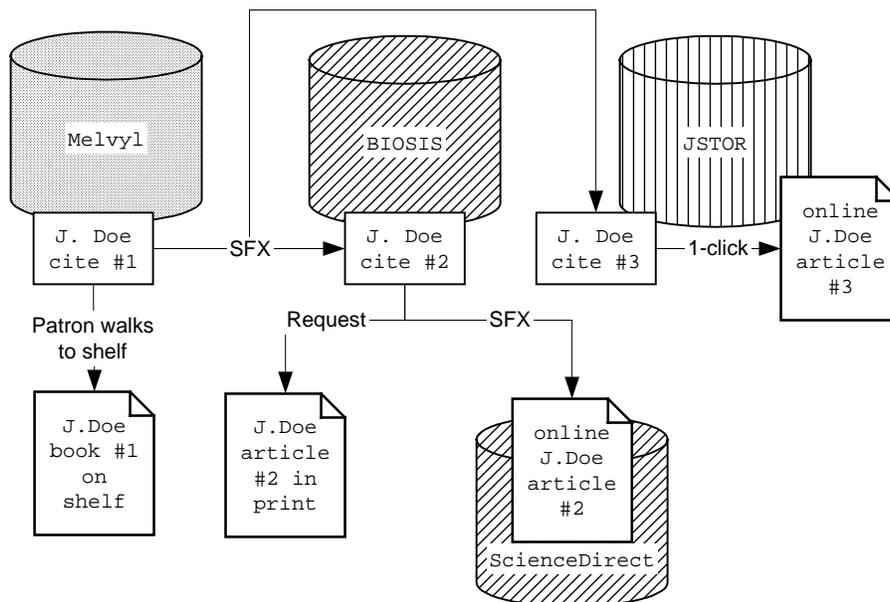
- Records can provide the hooks to enable context-sensitive discovery of other records in the same collection or in different collections. SFX is a prime example of this in the way it can tie discovery tools together to provide an *integrated* access path for the user. For example, it can suggest author or citation searches once a library user has identified one desirable item (this is in addition to its delivery role outlined below).



Records and systems that share standards can provide the user with additional items.

**Delivery**

*Delivery* refers to the aspects of the access system that enables users to get from their desired “record” to the point where they can use the material itself. *Integration* occurs as multiple delivery systems work well together, interact well with various discovery tools, and are easily incorporated into users’ workflows. For electronic materials, users may be able to click from the “record,” the item’s surrogate, directly to the item itself. There are a variety of technologies (persistent URLs, unique IDs, SFX, PKI, IP recognition, cookies, etc.) that make this possible. For print materials, aspects of delivery might include viewing circulation status and retrieving books from the stacks, or making an ILL or document delivery request.



Different methods of delivery

For the most part, this cluster of issues is not specifically mentioned in the details of the Task Force's charge but the Task Force feels that they must be a critical part of any encompassing view of access integration. These issues are closely tied to anything that speaks of "access paths to library materials."

As noted above, delivery tools are those that enable the user to drill down from identification of an item to getting it in hand. UC has demonstrated a strong and continuing commitment to these tools, as reflected in the long and robust existence of our Melvyl union catalog, its incorporation of circulation status and the Request function within the Melvyl system, its use of a PURL server to reliably point to a sizable fraction of UC's licensed resources, its development of article-level links in the A&I databases it has hosted in the past, and the projected use of SFX and Open URL technology in its move to other hosts for these A&I databases. The Task Force assumes that the commitment to these and similar tools will continue with future development and so has not focused on them throughout the rest of the report.

### **Management**

*Management* refers to those aspects of the access system that enable the effective discovery and delivery of library materials. This includes acquisitions, cataloging, licensing, authentication, and so on—the "under the hood" issues that enable libraries to facilitate discovery and delivery for the user.

Management aspects are *integrated* when the right hooks are built into library access systems so that management information is linked efficiently and effectively.

Electronic resources have presented new management challenges, in that they do not fit into the old "mark it and park it" model of the print-only era. Electronic resources require more dynamic mechanisms to keep the entire integrated system functioning for the user at the discovery and delivery nodes since life cycles of materials can be short, providers and authentication schemes can change, and web resources can be temporarily unavailable. These management factors are part of the reason that many ARL libraries have developed freestanding databases of their electronic resources.

Successful delivery of reliable services to users in a scalable and sustainable fashion ideally requires integrated library systems that synchronize acquisitions, cataloging, and display in all appropriate discovery tools — the catalog, web lists/databases of electronic resources, and subject guides. Key features of any integrated system must include responsiveness to increasingly dynamic materials, accuracy, efficiency, and reduced redundancy. Libraries are spending extra people-hours and technology costs when all three of the above dimensions are not seamlessly integrated.

The next section of this white paper examines a variety of routes by which libraries present resources to their user communities. We examined these routes by their potential utility to users as well as their feasibility. While our focus, as guided by our charge, is primarily on discovery integration, the dimensions of delivery and resource management are never far below the surface and inform our recommendations.

### **III. Current Practices in Research Libraries: Findings**

In order to explore current and best practices in research libraries, the Task Force began by examining the web sites of ARL member libraries, UC libraries, and some consortia, looking particularly at what approaches were being used with respect to electronic resources (such as electronic journals, A&I databases, other reference works, and subject guides). Additionally, we looked for the presence of multi-database search tools and any other innovative approach to the presentation and integration of library resources. We also examined other noteworthy library web sites and researched the literature. We note

that the situation is very fluid: our survey of ARL sites was conducted in late spring but merely represents a snapshot of an ever changing situation as, even over the short time span of the intervening months, individual sites changed dramatically in how they tackled these issues.

### **Library Catalogs**

The catalog, or OPAC, remains the classic overall database provided by all academic libraries, encompassing both print and electronic resources (as well as many other formats such as scores, videos, microform, recordings, etc.). The catalog typically includes electronic materials licensed or purchased by the institution and may also include listings of some free materials (for example, government publications formerly published in print/microform—but now electronic). However, the catalog usually does not include many freely available Internet resources that some institutions have included in their other listings of electronic resources.

The classic catalog serves both a discovery and an inventory function. Electronic materials have strained its discovery function as there has been a desire for broader subject headings and type (format) categories than cataloging has traditionally provided. Also, there is a lack of consensus and standards both within and among institutions on what these broader subject classes and format categories should be. Electronic materials have also strained the inventory function, with their continual mutations of electronic location, provider, and even content. Few institutions have chosen to take a hard line in restricting discovery of electronic materials to the catalog alone.

### **Presentations of Multiple Views in General**

The catalog has always been put forward as the Library's definitive database of the institution's owned/licensed materials. But users have always shown some desire for alternate views into the library's resources, for reasons of efficiency, and, indeed, libraries have responded by providing these alternate views even in the print-dominated library of the past.

Over the decades, these alternate views of particular parts of the library's collection have manifested themselves in products such as printed serial lists and in spatial arrangements which include periodical rooms with an alphabetic arrangement of current titles and reference rooms with separate physical sections for abstracting and indexing sources or for reference books such as dictionaries, directories, handbooks, etc. In many respects, the existence and arrangements of web lists/databases on library web sites are simply a parallel manifestation in our virtual library spaces. But they exist to serve the same user requirements and need to be recognized as such. User behavior correctly seeks out "least effort" solutions; Chrzastowski (1999) notes that:

"Least effort is not laziness, but instead applauds the foresight of the individual for achieving the objective while saving time and energy. Libraries have long been supporters of this philosophy, which can be seen as a restatement of one of Ranganathan's Laws, 'Save the time of the reader.' Libraries also have a long history of supplying users with least effort technologies that have moved us from handwritten catalog cards to Web catalogs and fulltext electronic journals."

There is increasing recognition that users want and need multiple views, particularly if the library is to remain relevant to fulfillment of their information needs. Users expect minimal clicks to get to resources and libraries may increasingly lose students to general search engines if we cannot meet that expectation (Jewell, 2001).

Currently, the typical multiple views provided by libraries include the catalog itself, web lists or databases of electronic journals, web lists or databases of abstracting and indexing (A&I) sources, and, to a lesser extent, web lists or databases of other reference sources (often broken down by subject or format). Often

libraries provide an overall database of electronic resources combining the above categories. That these are valued by users is clear from the analysis of web statistics on library web sites and by the voluminous anecdotal evidence that public service librarians hear from their faculty and students. A recent study of MIT users indicated that they found lists of electronic journals and databases to be the “most valuable and useful content” on the library web site (Hennig, 2001).

How to create and present these alternate views is the essential problem. Many institutions maintain databases of their electronic resources and create their alternative views from those databases. At some institutions where no overall listing exists, one still often sees handcrafted lists of A&I databases or electronic journals within specific subject areas. At a few institutions, these electronic resource databases are based on the catalog records. As Jewell (2001) notes, “Providing such multiple paths to resources in a cost-effective manner requires establishing synergy between cataloging and the methods used to generate lists.” Knudson (1997) and Shadle (2000) illustrate this synergy as played out in their respective institutions (LANL and University of Washington).

The Task Force was specifically asked to address the implications of separating electronic resources from other, non-electronic, formats. Simply put, there are costs to the user in separating electronic resources—as well as in not separating them. The danger in providing separate access to electronic materials is that the user will ignore the very valuable non-electronic materials in our collections. Reliance on purely electronic materials may also introduce a bias towards newer materials (though as increasing amounts of older materials are digitized, that fear may lessen). However, a recent study of Harvard seniors cited by Waters (2001) indicates that students are not ruling out the value of print materials in their research. They used print materials more than Internet based sources, and rated them higher on most factors other than convenience. Libraries clearly need to continue to provide encompassing views (such as the catalog and subject guides) and as well should explore ways of making our non-electronic materials more visibly useful. The notion of including tables of contents and indexes in our catalog records has been raised in the past and deserves re-examination. OCLC’s recent announcement they are adding book summaries to WorldCat is another example of this approach.

However, it is well to realize that there are also costs to not providing separate views to electronic resources. Users will very correctly seek out the most convenient routes to the materials they seek. If libraries do not provide some of these routes, we violate our long held principle of saving the time of the user and risk losing these users to generalized search engines. Our institutions’ investments in library resources make it incumbent on us to maximize their usability and visibility. To do this, we need to provide multiple routes to the same tools, even when that means that some of these routes are electronic only.

### **Presentations of Databases**

Databases (primarily of the A&I variety) were the most common type of electronic resource given a discovery treatment outside the standard OPAC. These listings of databases were often database-driven, though on a number of sites still appeared to be handcrafted lists.

This is not surprising, since A&I databases are parallel in role to the discovery function of the OPAC, but covering a different type of material. Most users would not think to search the catalog for the link to a A&I database, any more than they would have searched the card catalog for a journal index 40 years ago—they would go to the library’s reference room looking for it instead. Since, for many disciplines, it is the A&I database that is even more critical to the user than the OPAC, the prominence that listings of databases receive on library web sites is appropriate. (In this sense, the OPAC is simply another database, which some library sites recognize by headings such as “Catalogs and Databases,” though this is fairly unusual.)

Browsable (A–Z) lists of databases were most common, with access by subject not far behind. The subject headings used to categorize databases varied widely — anywhere from 4 to nearly 100 subject categories (with many variations in between). The ability to do a keyword search of the database listing was not particularly common, except in the case where the user was dealing with an overall database of electronic resources (as with the current CDL Directory).

### **Presentations of Electronic Journals**

Most ARL libraries presented alternative views of their electronic journal collections, only slightly less commonly than listings of databases. Browsable (A–Z) lists were by far the most common presentation, with subject breakdowns reasonably common. Again, these listings appeared to be database-driven in most cases.

The ability to search a list or database of electronic journals by keyword was available about half as often as the A–Z browse list—not as commonly as one would have expected. Rarely was subject access available without an A–Z browse list and a search capability—but it did happen (most often in the case of handcrafted subject lists).

Statistics on the use of electronic journal lists or databases show heavy and consistent use. Library users have made it clear that these alternate presentations of electronic journals are highly valued.

There is a substantial literature on the need for and value of alternate views of electronic journals; Chrzastowski (1999) and Antelman (2000) are representative of the key points made in those articles.

### **Presentations of Other Electronic Resources**

Other types of electronic resources were represented less often than either databases or electronic journals, though with a significant level of frequency. Access to these resources by subject and by type was common. As with A&I databases and with electronic journals, the number of subject categories used by a site varied widely. Likewise, the number of types or formats (reference texts, directories, news, etc.) was highly variable.

### **Special Problem for all Electronic Resource Databases: Subject Categorization**

This was easily the most problematic area, with wide variation as to how institutions approached the problem. The number of categories used within ARL libraries ranged from 4 to about 100. The University of Washington reports that subject access is used relatively less often than other forms of access, a finding corroborated anecdotally in other settings.

Upon examination, it is clear that there are at least three different approaches to “subject.” Some sites view “subject” as an objective attribute of the material. A second approach is that of “subject” as determined by targeted audience (often departments, or majors in an institution). The third view is that of “subject” as determined by library organization (by collection or branch). The second and third approaches in particular often lead to multiple broad subject categories being assigned to a given item.

The Task Force heard much anecdotal evidence as to how difficult it is for institutions to settle on a subject scheme—“wars are fought over this.” Even institutions that appear to have settled upon an approach will say, “not everyone is happy with this.”

Wilson (2001) notes that most ARL libraries are not classifying electronic materials and that “it would be unfortunate and shortsighted for more than a century of classification in libraries to be suspended just when research is showing how applicable classification is for knowledge organization of electronic and Internet resources.” One example of such an application is assigning electronic resources to subject categories by using Library of Congress Classifications (LCC) and then mapping the classification to an institutionally developed hierarchical subject scheme. This approach is currently in use by the University of Washington and Columbia, and UCLA is in the midst of developing such a mapping for its electronic resources. The Columbia approach is well documented [<http://www.columbia.edu/cu/libraries/inside/projects/metadata/hilcc/>].

### **Special Problem for all Electronic Resource Databases: Type or Format Categorization:**

The problems encountered in this area are very similar in nature to those posed by subject categorization. There is wide variation in the number of types used. Approaches vary from the simplest view of only listing databases and electronic journals to the highly developed with 40–50 formats (including dictionaries, encyclopedias, atlases, book reviews, news, etc.). While there are commonalities, there is no standard set of types in wide use.

### **Special Problem for all Electronic Resource Databases: Free Internet Resources**

Practice relating to the inclusion of free Internet resources is quite varied. Some institutions catalog these resources, so that they appear in OPACs and possibly also in separate electronic resource databases. Other institutions include them in electronic resource databases but do not necessarily catalog them. In other cases, these resources show up on handcrafted lists of Internet resources developed by subject specialists, but are not always gathered into an institution-wide database of such resources. In all cases, the extent of inclusion of free materials is highly variable and largely dependent on the resources (particularly time) available for subject specialists to select and organize resources for inclusion. Within UC, databases such as Sage (UCSD) and INFOMINE (UCR) illustrate well-developed databases of Internet resources, encompassing both free and licensed resources. UCLA is also in the midst of developing one (ERDB).

There is a substantial literature on the question of what libraries should be doing with regard to free Internet resources. Pitschmann (2001) provides a thorough review, particularly of the collection development and staffing ramifications. Calhoun (2000) focuses on workflow issues. Baruth (2000) makes the case against the integration of online resources into the local OPAC, largely on the basis of scale and sustainability. CORC (OCLC’s Cooperative Online Resource Catalogue) presents a cooperative solution parallel to WorldCat for more standard library materials and Calhoun outlines its use in a research project at Cornell. However, difficulties with CORC have been noted related to expense and uneven quality of records (Millett, 2001). The key question appears to be whether future technological developments will bring relief:

“The primary question for the future is whether broad application of enhanced metadata standards and next-generation search engines will allow end users to mine the Web themselves with greater precision than is currently possible and, in so doing, bypass the current need for facilitated access.” (Pitschmann, 2001).

At the present time, however, this remains a difficult issue for libraries. Scale and sustainability pose serious manpower issues. However, by choosing to ignore free electronic resources, libraries risk forcing users to use general search engines and miss the opportunity to assist users in identifying quality resources—a value traditionally added by the library.

### **Cross-database Searching / Integrated Search of Separate Parallel Databases**

The Holy Grail of integrated searching is the single search box, into which the user types a query, and which returns highly relevant and non-duplicative research materials from a multitude of vetted sources. While the ideal has not been found yet, there is a small but steady stream of projects in this vein. There are relatively few such systems in place now, but it is likely that more will be making their debut soon, since they are a response to a commonly recognized problem and since commercial tools and services are becoming more widely available.

At this stage, they appear to fall into two categories: those that search a set of highly parallel sources (usually A&I databases) and those that attempt to encompass more (catalogs, databases, and selected web sites).

The first category is the more common and typically searches a range of A&I databases, often limited to a set of core databases. For example, Flashpoint at LANL searches 9 A&I databases central to the Lab's mission (Mahoney, 2001). Multi-SEARCH at the University of Arizona searches a limited set of core files, as does NLM's Gateway and the Department of Energy's EnergyPortal. OhioLink is working on such a multi-database search tool, requiring users to choose from small clusters of databases or to select their own cluster and providing de-duping of records. A number of institutions are using the commercial software product WebFeat for this purpose (such as the King County Library System in Washington and the University of Illinois at Chicago). UCSD's Database Advisor was an early example of this category.

CDL's SearchLight (the successor to Database Advisor) falls into the second category, encompassing catalogs, databases, and selected web sites. Campbell (2000) has extended the reach of such a product by calling for the cooperative creation of a Scholars Portal. The need for collaborative effort in this arena is echoed by Thomas (2000) who notes "that for an individual library to serve its users successfully, it must connect and ally itself with other libraries and developers of commercial search engines in a highly integrated fashion." ARL has formed a working group to further explore the concept of a scholars portal; their latest report notes the need for a "discovery tool that enables a user to search across certain limited but diverse and distributed websites, library catalogs, and databases of information resources to retrieve and integrate the results in a single presentation." (ARL Scholars Portal Working Group Report, 2001).

Many of our users, especially students, have a "Google mentality." If libraries resist that tendency too strongly in how we present library resources, we risk losing these users (and the University's research and instruction suffers). Therefore, it is important to continue development work in this area, even though it is difficult and progress will be slow. Integrated search tools are particularly important for users who do not know which database to search or simply feel that they should not have to choose.

At the current stage of development, this type of product best targets the unsophisticated user or the user researching an unfamiliar topic. Yet, a version that searches a large number of databases tends to provide overwhelming results—for an audience least able to cope with this type of results. Some approaches deal with this by limiting the number of databases searched to a core set or by requiring the user to pick the databases. There is some research to indicate that users prefer some degree of control over database selection and relevance feedback (Park, 2000). The integration of search results from disparate sources is not simple and requires further research on the desired characteristics of non-duplication and improved filtering and ranking. So far, these tools do not appear to target specific user groups or user needs (for example, creating tools that would provide the undergraduate with "a few good things" or tools that would provide a comprehensive search for specific fields). The development of good integrated search tools is clearly difficult and will require much more experimentation before libraries get it right.

### **Subject Guides/Pathfinders**

Most electronic resource databases or other discovery tools do not address the varying levels of research and information literacy among their users. In an effort to address some of these issues, most libraries have created subject guides and pathfinders to provide guidance on the best resources, in any format, for a variety of subjects. Integration of these tools into our suite of discovery options provides a necessary element of research advice and bibliographic instruction in a remote environment, and so it is no surprise that library web sites have been used as a means to distribute these subject guides to users. However, in many large libraries, pathfinders are often inconsistent across subject areas and often hard to find as they are distributed throughout the library's site. Human selection is a strong element in most pathfinders and is manifested in this discovery tool more often than in other tools.

Some institutions appear to have used their electronic resource databases to automatically generate subject guides. "Research QuickStart" at the University of Minnesota [<http://research.lib.umn.edu/>] and the University of Wisconsin's "Research By Subject" [<http://www.library.wisc.edu/subject/subject.html>] are two good examples of this approach. Still other institutions have included their subject guides as items in their electronic resource databases. These tools are often listed by subject and as a specific format type.

Subject guides are a form of generalized customization—an attempt to pull together a useful set of resources for a class of users interested in a particular subject.

### **Customized Gateways**

A number of institutions have developed tools that enable their users to develop a customized set of useful library resources. Examples of this My Library approach include North Carolina State University, Virginia Commonwealth University, and the University of Washington (My Gateway) among others. CDL developed MyLibrary@CDL as an example of this concept, though further development has been put on hold following an extensive evaluation process. In spite of expressed enthusiasm by users, it is not clear that most users value this tool adequately to consistently continue to use it over time (Ghaphery, 2000 and Jordan, 2000). Other problems mentioned in the literature include the difficulty of incorporating and maintaining the type of library circulation account and request features that users desire.

### **UC Situation**

The UC campuses are fairly typical of the ARL library sites in general, exhibiting a wide range of the variations listed above. There is no uniformity of approach. Solutions range from well-developed databases that include licensed electronic resources as well as Internet resources (illustrated by Sage and INFOMINE) to simpler databases and lists of A&I databases and electronic journals (and those often only at subject levels below that of the entire library collection). Subject access is just as problematic for UC campuses as elsewhere; many point to the CDL Directory for their subject approach to databases and electronic journals (with caveats that this may not include everything—specifically, locally licensed materials). Browsable A–Z lists of electronic journal titles and A&I databases are fairly common within UC, though not uniformly available. Search capability (by keyword or by exact title) in electronic journal or resource databases is available about half the time.

At the UC-wide level, the CDL Directory provides a database of electronic resources licensed via CDL. Only UCSF has been able to input their locally licensed materials up until now (and thus the CDL Directory provides overall access to these materials for that campus); materials individually licensed by other campuses do not appear. The subject vocabulary used by the CDL Directory has been controversial (similar to reports of conflict elsewhere). The fact remains that many campuses do point to those subject

breakdowns for lack of any better scheme in place locally. The CDL subject vocabulary — while not to everyone's taste — appears to be adequate for many, though the content is not. The current CDL Directory has come under considerable scrutiny over the past year (see CDL Directory documents in the bibliography). The Web Design Advisory Group has proposed an alternate scheme for the subject breakdown, utilizing LC Classifications. Since the CDL Directory was initially put into place as an experiment, it has even been suggested that it be scrapped at this point. Further development is on hold pending this Task Force's recommendations.

The various campus databases and lists of electronic journal titles and of A&I databases, the electronic resource databases, and the CDL Directory all receive very heavy use. Clearly, UC users value this type of approach in addition to (and, for some purposes, in place of) the catalog.

All cataloged electronic resources appear in both local catalogs and Melvyl. An online resources catalog is planned for Melvyl-T, a logical base consisting of those records with an 856 field (URL) with subfield indicators of 40 or 41.

SearchLight is the cross-database search tool provided by CDL. The Task Force understands that CDL is planning focus groups of users to determine what features they would like; after this, the issue of SearchLight's future will be taken up with the CDL Tools and Services Working Group, which has made recommendations about suggested enhancements based on meetings with campus library staff.

#### **IV. Access Integration Design Principles**

Underlying our recommendations are a number of principles. While not a comprehensive list, we do believe these core assumptions should hold:

##### User-Centered Discovery Tools and Delivery Services

1. Users should be able to easily select the appropriate discovery tool.
2. If two discovery tools exist that are similar but not quite the same (for example, a CDL list of electronic journals and a campus list of electronic journals), we should combine these tools so users only see one discovery tool.
3. Redundancy of approach (provision of multiple views) is desirable if these differing views are needed to meet differing user needs.
4. Within a discovery tool, access paths should be clear, easy to use, and require "minimum clicks."
5. Within a discovery tool, users should be able to control filters and sorts.
6. Campus users should be presented with what is available to them (whether licensed by CDL or by their campus).
7. One of the available views should provide a single place to look for all library resources: print and electronic, regardless of format, whether the authorized user is on or off campus, etc.
8. There should be separate views that cater to access/discovery of electronic resources.
9. Graceful integration of discovery tools and delivery services is critical.
10. The differences between delivery modes (access an item online vs. request an item and it will be sent vs. walk to shelf to retrieve item) should be easily understandable to the user.
11. Within discovery tools and delivery services, speed of system processing and screen rendering is critical.
12. Delivery services should be as consistent as possible across discovery tools.
13. Design and implementation methodology should be user-centered.

#### “Integration-ready” Management Functionality

14. All metadata should conform to common standards, allowing for use in other (“common”) systems.
15. Local metadata standards must not conflict with common metadata standards, allowing for local enhancement without sacrificing ability to be used in the “commons.”
16. Avoid redundant staff effort and development (for example, a catalog record should provide the basis for other views without data reentry, do not duplicate tool development between CDL and individual campuses).
17. Aim for seamless portability of metadata across products including graceful merging and updating of records.
18. Any tool developed should be scalable and extensible.
19. The ability to measure usage should be considered in the design.

### **V. The CDL Directory: Current Roles and Problems**

#### **Current Roles**

The Task Force was asked to explore the current roles of the CDL Directory as well as other web-based lists of licensed resources. Many of them have already been touched on above in our survey of the library scene with respect to this type of tool. These roles include:

- Provision of an efficient look-up tool, less ponderous and quicker than searching the catalog for most users.
- Provision of a desired tool, as evidenced by the rapid adoption and heavy usage of such tools by our users; they appear to be a preferred route, especially to electronic journals and databases. Use of the CDL Directory, and of various electronic resource lists/databases on the campuses, is very high and indicates that our users want this form of access.
- Provision of broad subject access to standard resources such as databases, electronic journals, and other resources — a type of access not usually provided in catalogs. While usage is not quite as high as for browsable A–Z lists in general, or searchable lists, usage of subject listings is very substantial.
- Provision of a hierarchical subject approach for browsing.
- Ability to embed on local campus web sites a search screen that searches the CDL Directory and presents results; likewise, the ability to point to specific browse screens.
- Provision of a short description of electronic resources if appropriate; this is especially useful for resources such as databases.
- May provide information on license and access restrictions; practically speaking, this is often of more concern to library staff than to users whose concerns are more binary in nature (do I have access or not?).
- Partially provides holdings information in support of the Request function. “Partial” in that the current CDL Directory only lists CDL-licensed materials, hence the Request function has not been able to satisfactorily handle the cases where a campus may have licensed the materials.
- Recording rudimentary usage statistics for resources; this was posed as a potential use for the CDL Directory at one time. This has never come to fruition, nor is it clear that it would be worthwhile to pursue. At best, it would provide a very incomplete measure of usage due to the multiplicity of routes that UC users will take to reach electronic resources (article-level links in A&I databases, bookmarked favorites, URLs in catalog records, etc.).

#### **Current Problems**

- The key problem is that the CDL Directory does not reflect the electronic resources licensed/selected by the campuses. Its current restriction to CDL-licensed materials has seriously hampered its

usefulness, confused our UC users, and compelled campuses to develop their own electronic resource listings (at the cost of considerable duplicative effort).

- The largely manual nature of adding and updating records is another central problem, as it is currently configured. There is a need for either automatic or batch data input from campuses.
- There are some commonly felt problems with display: complicated results screens, too few results per screen as the default, too many clicks to get to material. There is an overall desire for leaner entries for the default results display.

However, rather than enumerate a complete laundry list of display problems with the existing Directory, the Task Force prefers the more positive approach of listing functional requirements of a solution. These are listed in Appendix B.

## VI. Creating Directory-style Discovery Tools from a Catalog

The Task Force examined the issue of whether or not directory-style listings can be created from the catalog database(s). As part of that examination, we examined the fields used in the current directory to see whether or not they could be mapped to appropriate MARC fields. The chart in Appendix C outlines how the current Directory fields that are not available or not consistent in MARC might be mapped to appropriate MARC fields.

The short answer to the question is “yes” but not without system-wide data description standards (that is, having all campuses follow some level of common cataloging practice). There are, however, a number of issues that need to be resolved.

- **Synchronicity.** A number of items in the current Directory do not have catalog records. This includes listings for electronic journal publishers and providers (for example, JSTOR, Project Muse, IEEE Xplore, ScienceDirect, etc.), some electronic databases, and some electronic reference texts. Some of these have catalog records in Melvyl, but not Shared Cataloging records. The OAC finding aids do not have catalog records at present, but OAC is in the process of developing minimum-level MARC records for all OAC finding aids. While there is some disagreement as to whether the finding aids should continue to be reflected in the Directory, they should certainly be in the catalog (and, by extension, in the Online Resources Collection (logical base) of Melvyl-T).
- **Inclusion.** Just how do the desired records get into a directory? The presence of an 856\$u would not be enough in itself, since that would snag many materials that we would not want in a Directory listing (e-books for example). Melvyl-T will have a logical base of electronic materials and we are not trying to re-create that entire subset in the Directory. The Directory should provide alternate views for highly used materials for which catalog access is not by itself adequate as a discovery path. The answer is a “hook” or tag that says “make this record available to the directory.” It was noted that there are all kinds of ways to tag records and that libraries are doing it all the time.
- **Subject categories.** Not all catalog records for materials such as electronic journals and databases have appropriate subject headings (for the current CDL Directory subject vocabulary) nor do they have an LCC that might be used for a derived subject category. This would require agreement on catalog/record standards and their required use within UC.

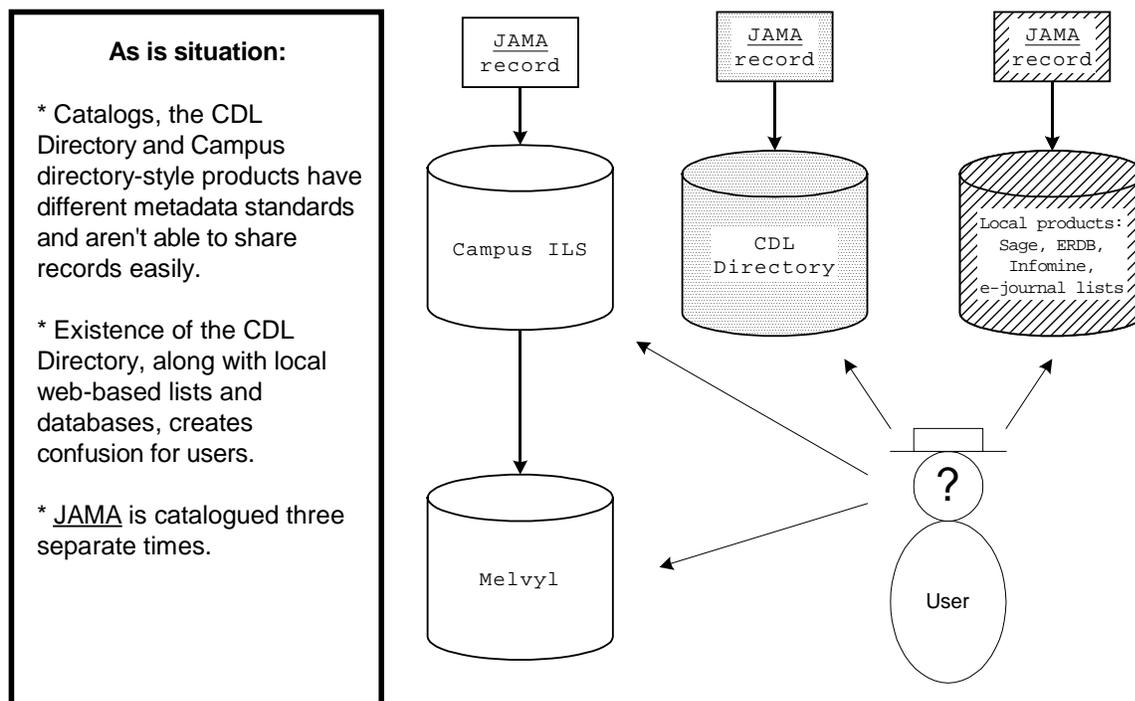
One possibility would be to pursue a variation of the proposal put forward by the Web Design Advisory Group. This would be to develop a map from LC Classification number to the CDL Directory subject vocabulary for the first phase. In a later phase for the Directory, make it possible to

have campus views reflect a local mapping from LCC number to a local campus subject scheme. Campuses could choose to use the centrally developed map if that was adequate for their needs, but could also develop their own if they preferred a different subject view. Given the difficulties of dealing with subject categories, yet the perceived need for these broad categories, a centrally developed scheme would probably be adequate for many campuses as long as the new Directory included local materials. We recognize the differences of opinion in these areas, but believe that it is important—for the sake of our users—to make some compromises in order to move forward with the development of discovery tools. Those campuses that wish to present a different subject view of these materials could do so with their own mapping. Any proposed architecture of the new Directory would need to accommodate this local mapping in the long run.

- **Types.** Types are categories that resources are placed in according to their format, medium, or source. Institutions almost always reflect the basic two types (electronic journals and databases) but often include more. The current CDL Directory uses only four types (Electronic Journals, Databases, Reference Texts, and Finding Aids. Project Sage and the proposed UCLA electronic resources database use over 50. There will need to be some agreement within UC on a core minimum set of types, as well as agreement on using other types, if desired, from a prescribed list of standard terminology.
- **Dynamic nature of electronic materials.** The temporal aspects of electronic resources require more frequent update cycles than are usual with MARC records. If our alternate views for electronic resources include an indication of availability (or non-availability) as some feel they should, then this requires thinking of the MARC record as changing frequently, and becomes an issue dictating how closely coupled the Directory and catalog databases are in terms of synchronicity.

## VII. Options for Directory-style Discovery Tools

The diagram below reflects the current situation with basic discovery tools.



This is an untenable situation that we must remedy in the near term. Indeed, delaying a centralized solution to this problem will result in wasted resources as some campuses solve the problem locally. In addition, the development of individual campus solutions may prove problematic for a centralized solution in the future.

### Options

For the sake of simplicity, we will limit the scope of our discussion to electronic journals, A&I databases, and reference texts. Note that the application that serves the functionality required for these core types would need to be modified only slightly to include other types.

We did not seriously consider keeping things “as is” since that is not a workable solution. UC users are presented with a patchwork of options with regard to the discovery and delivery of electronic resources that tends to be confusing at best. If the user chooses the current CDL Directory, that user does not see locally licensed materials (thus not reflecting a sizable part of each campus’ collection of electronic resources). If that user relies on locally developed lists, for most campuses there is no broad subject access without the development of handcrafted lists (with a very heavy maintenance cost). In order to provide adequate alternate views of electronic resources, campuses pay a heavy cost in the development and maintenance of such products. The duplication of effort for multiple views, both within and among campuses, is substantial.

We did consider the following options:

### **Option 1: The Catalog**

One of the most obvious solutions is to use either campus catalogs or Melvyl to provide the only listings of electronic resources. The Task Force looked very carefully at this option, since using a catalog would likely offer an efficient solution. But in our investigations it did not seem likely in the near term that we could create the kinds of displays and functionality that users demand for discovering and accessing these kinds of resources. Users have made it clear (through heavy usage of such tools, as well as anecdotal evidence) that they prefer other discovery tools for electronic journals and databases. Users find catalogs cumbersome for quick look-ups of distinct categories (such as journals) and find it illogical to search a catalog to locate and identify databases (since they are parallel in nature to the catalog itself). At this stage of development of online catalogs, they do not easily provide the economy of display that users prefer for electronic resources, and dramatically altering displays did not seem feasible in either Melvyl or campus systems. In addition, subject terminology continues to be a topic of great controversy, with library catalog systems offering the least flexibility in this regard. Most campuses do not catalog using fields that yield broad subject and type retrieval (as, for example, the 690 fields used by SCP and UCSD for electronic journals); without this approach, systemwide reliance on a catalog alone will not provide consistent subject/type retrieval within the catalog (or the online resources logical base). Therefore, after lengthy and thorough consideration, the Task Force deemed this option to be unsatisfactory.

### **Option 2: Campus Databases**

The opposite of the centralized database option is separate databases of electronic resources for every campus. The view that UC faculty, students, and staff most need for electronic resources is whatever they have access to (i.e., a campus view). Some campuses, such as UCSD, UCLA and UCR, already have full-featured systems in place or in development. Other campuses have partial solutions (for example, search and browse by title, but no subject access). While some campuses may choose to create and maintain their own local electronic resource directory, it is likely that not all campuses will be able to take on a local development effort to achieve full functionality. Therefore, this option would provide only a partial solution and would force redundant development.

### **Option 3: A Centralized Database**

Within this option, we considered several variations, from a completely centralized solution such as the CDL Directory with no campus-tailored views, to an option that would allow customized campus views, to a central “data warehouse” that would serve as a central repository for electronic resource metadata for local campus systems, but would not be publicly available. It is possible that one of these options, or a variant, would be sufficient for our needs, although each presents difficulties.

A directory without campus-tailored views would prevent campuses from making the maximum use of such a tool to connect their users with local sources of assistance (e.g., pathfinders, reference desks). A centralized database that allowed customized campus views would solve that particular issue, but not solve another problem that faces both of these first two options: a centralized database, even with some options for customization, would nevertheless limit the abilities of campuses to use their own subject vocabularies (for example, to align the subject categorization with campus departments).

### **Option 4: A Combination of Options 2 and 3**

The Task Force believes that a combination of Options 2 and 3 offers the best mix of local campus control when desired, centralized support when required, interface flexibility, and efficient use of resources. This option would entail the development by CDL of a common software application that would support custom views for each campus. CDL would be responsible for software maintenance and upgrades, while each campus would load and maintain their own data and screen displays. Data maintenance would use record feeds from SCP and local electronic resource records from campus

catalogs. A default interface would be available for those campuses that did not wish to put effort into local interface changes.

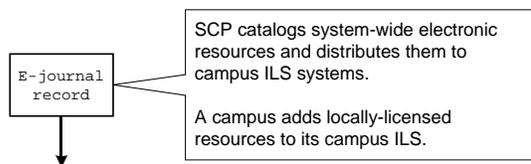
### **VIII. Recommendations: Moving Beyond the Current CDL Directory**

The Task Force feels strongly that alternate views for certain types of high-use electronic resources should be provided to our users and that there is much to be gained from cooperative development effort to meet this need. Therefore, a directory-style product should exist and should be developed to eliminate the duplicative work that currently exists in the maintenance of such alternate views (duplicate between CDL and the campuses, as well as duplicate between catalogs and separately maintained databases even on a single campus).

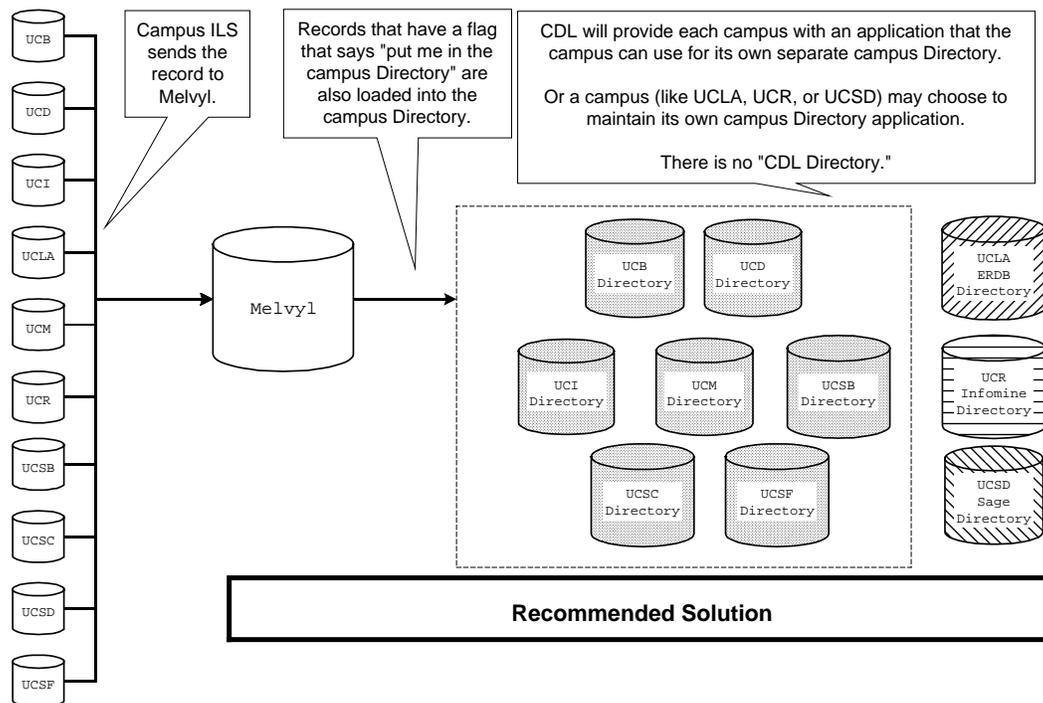
**Recommendation 1: The Task Force recommends that we proceed with some short-term changes to the existing CDL Directory discovery tool while pursuing a long-term solution that promises to be a more flexible and comprehensive solution to our problems. The first phase would accommodate the urgent need to provide access to core materials such as electronic journals, databases, and other reference texts, to incorporate locally licensed materials, and to automate the data entry; this would be a redesign of the existing discovery tool. The second phase would allow for customized (or co-branded) views, develop a route to provide custom subject views for campuses that chose to use other than the central subject vocabulary, and take the time to consider alternative infrastructure and major software development. The Task Force developed a list of Functional Requirements, prioritized to facilitate the two phases; it can be found in Appendix B. This recommendation will require some UC-wide agreement on data standards for successful implementation (see Recommendation 5).**

In brief, the Task Force recommends the following scenario: Each campus' data for inclusion in a directory (sent to CDL when their campus catalog records are sent to Melvyl) would live in a separate physical database, thus creating a centralized set of campus directories. There would be no "CDL Directory" (no union view); a union view of electronic resources would be available in Melvyl. A campus can use their campus directory with the infrastructure built centrally (based on the CDL Directory), or may choose to use their own data with their own existing application and interface. Campuses are responsible for data cleanup and identification of what they want in their campus directory (by means of their tagging and maintaining catalog records for electronic resources). In Phase 1, CDL takes care of the loading and management of the campus directory databases, and the interface design of the campus directory that is provided for the campus. In Phase 2, campuses load and manage their campus directory database locally based on tools that CDL provides for them. Campuses can choose to customize the interface design of their campus Directory or may continue to use the default interface developed by CDL. In both Phases, campuses are responsible for the integrity of their data for locally licensed resources. They are also responsible for loading SCP records into their local catalogs and tagging them for inclusion in their campus directory.

Phase 1 would continue to provide broad subject access for electronic resources — something most campuses have not tackled locally. Phase 2 would allow for the customization of that subject access to a locally developed subject scheme, if desired. By Phase 2, a finer breakdown of electronic resource types could be utilized, once standardization is achieved. Both of these aspects are explored in greater detail below.



**Campus ILS systems**



**Phase 1: Changes to Develop a New Directory**

The Task Force recommends some immediate steps that can be taken to solve the most pressing problems for discovering these kinds of electronic materials. Our goal is to provide a method by which a campus can access all its electronic journals, A&I databases, and reference texts (whether licensed by the campus or by CDL) by Summer 2002 through a centralized set of campus directories. We'll refer to this set of campus directories as the "Directory."

Campuses would add and tag their local holdings of electronic journals, A&I databases, and reference texts in their local catalog in such a way that when these records are added to Melvyl, they are also added to the Phase 1 directory. Based on IP address, users would see their campus Directory. In Phase 1, no customized campus interfaces would be available (though a campus with a highly developed directory-style product would likely continue with that).

Modest GUI changes would facilitate access to the core categories of "Electronic Journals," "Databases," and "Reference Texts" and improve other features (navigation bar, colors, and layout). CDL would modify the existing interface to accommodate all the "immediate priority" functionality listed in the Functionality Requirements in Appendix B. Continued use of the name "Directory" should be seriously questioned, since it is uninformative to users and open to misinterpretation. [However, since the name is so familiar to library staff, we have continued to use it in this report.]

In thinking about how to reinvent the Directory, CDL should consider whether the existing technological infrastructure will meet future needs. At present, many users complain of slow response times. Also, the existing patchwork of CGI scripts for web display and the relational table structure of the back-end database may be needlessly complex. When deciding how to adapt the CDL Directory to handle the new displays in the campus Directories, CDL may find it easier and more robust to work on a different platform than the existing one. CDL might also consider licensing metadata from third-party sources such as TDNet or Serials Solutions.

Loading of records into the campus Directories in Phase 1 might proceed as follows:

Campuses would use campus catalog records to generate a fresh campus directory. Campuses should already have most of the resources (both locally licensed resources and SCP records) in their catalogs. For every electronic resource that a campus wants in their campus Directory, they would need to have a MARC record with the following:

- A tag (to be determined) that will specify a record that should be added to the directory.
- LC Class number(s). CDL will map LC class numbers to the existing CDL Directory vocabulary so that subject tags are assigned to the records. Multiple LC Class numbers may be assigned to a single record.
- Major types must be indicated as “Electronic Journal” or “Database” or “Reference Text” (see discussion below).

In order for MARC records to fit into the database structure for the Directory, common record standards for elements such as those listed above must be agreed upon and implemented systemwide. Some of this data already appears in SCP records, but a challenge remains in defining the content and coding standards and communicating them for local campus use.

Campuses would FTP catalog records to CDL for loading into Melvyl. At the same time, this stream of records is copied into their campus Directory (that lives at CDL). Since there would be no "CDL Directory" (no union view), there would be no need to merge, or show a merged record, thus eliminating a major problem. As CDL staff plans for routine record loading in ALEPH, we recommend that they also develop a procedure for copying and loading Directory records. In order to move forward quickly, perhaps the Shared Cataloging Program (SCP) Steering Committee might be the most appropriate group to be assigned the task of identifying a “flag” that could be imbedded in the MARC record to enable this workflow. That group could also prepare guidelines for assigning LC classification numbers to electronic resources so they will map to subject terminology, since up to now classification numbers have not been required for those records.

There may be ramifications with including extra elements in the MARC record. Philosophically, using catalog data to support Directory records is a new purpose for the MARC record. The problem is not shoehorning the directory-style elements into the MARC format (which can certainly be accomplished; see Appendix C), but rather having the records serve multiple purposes in multiple systems. Can one selectively suppress parts of this “glorified” record for display in the library catalog? Cataloging is usually done at a level of specificity, customarily not at the broad level required by Directory-style products. If additional elements like type, short description, etc. are in a MARC record, will they confuse further the MARC display (or even a labeled OPAC display)? These are serious issues, but we will probably need to try this re-use of metadata and get more experience before we learn all the pitfalls.

A Standards Team (see Recommendation 5) should be appointed to prepare common data description standards for the new Directory. This group could be responsible for communicating to and implementing on the campuses the work of the SCP as mentioned above (defining a flag and preparing record classification guidelines). It could also delegate, coordinate, disseminate, and implement the additional work related to common standards, as noted below. The group should work in conjunction with various digital library standards efforts, now loosely coordinated at CDL, to ensure future

interoperability. Without common standards, UC will not achieve access integration in general, nor be able to develop a next-generation Directory.

One area of major difference between library catalogs and Directory-like products is in the user expectations for subject access. Directory-like products generally have lower granularity, as well as a hierarchy that often relates to disciplines or campus programs. The Task Force recognizes that mapping to the subject vocabulary of the CDL Directory for this first phase will not be entirely satisfactory to all. However, from experience on some UC campuses and from anecdotal evidence from other institutions, it is clear that we might never develop a subject vocabulary that pleases all library staff across all campuses (or, perhaps, even within a campus).

In the interest of improving access to core electronic materials for our users in a timely fashion, we recommend that this first phase continue to utilize the current subject vocabulary, but that the terminology be “driven” by LC classification. The CDL subject vocabulary has proven to be functional, and many UC web pages currently point to it for provision of subject browse capability. Statistics show that many users utilize it. The Task Force recommends a table be developed to map LC classification numbers to the current Directory subject headings. We note the excellent work in this area already done at Columbia and in progress at UCLA; these efforts should form a sound basis for this task. We thus support the basic recommendation of the CDL Web Design Advisory Group, made in July 2000. Moving to this technique allows for greater flexibility, smoother implementation of hierarchies, and the later possibility for campuses to develop their own maps to terminology preferred on their individual campuses.

The Task Force could not resolve entirely the issue of the extent to which to implement “types” (or “formats”) in the Directory in Phase 1. There is total agreement that the types “Electronic Journals” and “Databases” should be utilized at this stage and given prominence. The forces driving alternate access to electronic journals and databases are quite clear and compelling. We had substantive discussion about the inclusion of a third category, either the currently used “Reference Texts” or the broader “Other Web Resources,” with no clear consensus. Utilizing a broad category such as “Other Web Resources” would allow campuses to add anything to the new Directory. This would have the advantage of opening the Directory to a wider range of web resources than it does presently, most of them free. For those campuses that catalog these resources, coding them for the Directory would provide another access path. By including such materials in the Directory, the collection of usage data might be made possible (if this capability was designed into this phase).

Some Task Force members felt, however, that it might be better to wait until a standard list of types was determined, which would facilitate shorter and more useful search results. As exemplified by the use of 50 plus types in Sage (and also adapted by UCLA’s ERDB), it seems that expectations for a Directory-like product reach beyond the major categories of electronic journals, databases, and reference texts. We therefore recommend that the Standards Team study the need for additional types and develop a common vocabulary for describing electronic resource *types* (e.g., directories, dictionaries, encyclopedias, etc.). Based on this work, in Phase 2 other web resources could be included with a finer degree of precision. Also, by then, UC would have experience with the “logical base” of electronic resources within ALEPH (a broader subset than proposed for the Directory), and categorization and retrieval needs might be more clearly demonstrable.

In order to successfully implement Phase 1, CDL would need to allocate adequate resources for development, training, and support.

## **Phase 2: The Longer Term**

As a more complete solution, we recommend developing a common directory application that can provide custom views for each campus. CDL would be responsible for writing and maintaining the code, but campuses could load and maintain their own applications if they wished. There would not be a public “union view” of electronic resources except for the “Online Collection” in Melvyl. Campuses that chose not to host their version of the application could have hosting provided by CDL (as in Phase 1).

The Task Force recommends that this solution also provide SFX services for electronic resources in campus directories, regardless of the licensing body (e.g., one campus only). Automatic link checking, simple (for the user) authentication, and other items noted as “Medium term” or “Long term” in the Functional Requirements section above should also be addressed.

As in Phase 1, one or more LC Classifications (LCC) could be assigned to each record, which would be mapped to a generalized vocabulary for electronic resource discovery. By default, the LCC would map to the existing CDL Directory subject vocabulary. However, in Phase 2, any campus that wished to do so could map the LCC to a locally developed subject vocabulary. With the experience of Phase 1 in hand, however, many campuses may choose to continue with the mapping to the current Directory subject vocabulary.

Although we recommend beginning with addressing the particular needs for discovering electronic journals, A&I databases, and reference texts in Phase 1, some campuses will want to provide this kind of discovery service for other kinds of electronic content. To support such efforts in Phase 2, while building a common infrastructure that will allow other campuses to follow in the future, a common vocabulary should be developed to describe electronic resource *types* (e.g., maps, dictionaries, encyclopedias, etc.). We suggest that this task be taken on by the Standards Team (see Recommendation 5). The experience of UCLA and UCSD in this area can form a basis for this effort, since they have been addressing it for their own needs, but other campuses should be involved to make sure the vocabulary can be effectively used by all campuses.

By focusing on providing an infrastructure, and standard methods and procedures for populating each campus database, we can leverage our labor across the University while also providing for local needs and opportunities. For example, should a campus wish to use this infrastructure to provide access to all kinds of free Internet resources, they easily could.

As Phase 1 proceeds, the Task Force recommends the appointment of either the CDL Web Design Advisory Group or the CDL Tools and Services Working Group to consult with CDL on the implementation of this solution.

## **IX. Recommendations: Other Access Integration Tools**

### **Pathfinders**

At this stage of electronic resource presentation strategies, the Task Force feels that these subject guides are best left to the local level. Subject guides are focused to meet very specific needs of campus curricula, campus departments, or even specific courses, and thus are far less amenable to central development. A co-branded view of the next generation Directory should allow the ability to link back to campus-developed subject guides, especially for the benefit of users looking for guidance in choosing appropriate research tools.

While the Task Force was intrigued with the concept of developing a software tool that would facilitate the creation of pathfinders, we are not explicitly recommending it at this time. However, after the next

generation Directory is developed, a group of reference and instructional librarians should be charged to explore whether or not such a software tool would be useful.

**Recommendation 2: We recommend that subject guides and pathfinders continue to be developed locally at this time, but links to campus-developed subject guides should be incorporated in the custom views developed in any next generation directory-style products.**

## **Cross-database Searching**

### SearchLight

The Task Force believes that cross-database search services like SearchLight are both essential to our clientele and extremely difficult to make effective and sustainable. We also understand that these kinds of services are still in their infancy, and further research and development will likely need to take place before the best solutions are found. Therefore, we encourage the CDL to follow through on its plans for SearchLight focus groups with users and to take this input to the CDL Tools and Services Working Group for consideration regarding next steps. We strongly urge that SearchLight as a concept continue to be pursued, but that all options for tailoring cross-database search solutions be considered (for example, cross-database search services focused on a particular discipline). We also trust that those involved will continue to monitor the market for software that could replace solutions we are presently creating and maintaining in-house.

### Scholars Portal

The work of the ARL Working Group on the Scholars Portal should be monitored with an eye toward determining the appropriate stage for UC to become more deeply involved. The UC representatives on that working group should be charged with alerting SOPAG when/if such an opportunity arises. Given the very difficult challenge of creating useful and intuitive interfaces to large and diverse sets of information resources, cooperative development will likely be essential to success. This Working Group may offer an organizational structure for cooperative research and development among research libraries to develop an innovative research tool. The University of California libraries should be poised to take advantage of it.

**Recommendation 3: We urge that cross database search solutions continue to be pursued by UC, and that the upcoming SearchLight re-examination include user input, careful consideration of tailoring options, and potential use of commercial software. We also urge that UC carefully monitor the ARL Scholars Portal Project in view of its potential for cooperative research and development of an innovative research tool.**

## **SFX**

To maximize potential of the SFX server and to meet our users' needs, UC libraries should begin work immediately to determine how the SFX server will incorporate access arranged by campus licenses as well as CDL-arranged licenses. To do less is a disservice to our users. There are many essential materials well represented in A&I databases that have only campus-arranged access. Users on those campuses should reap the full benefit of those licenses and that means it must be reflected in the SFX server links to A&I databases. We understand that the SFX server may also be used to support the Request function—another reason for it to incorporate campus access arrangements. (Currently, the Request function relies on the CDL Directory to determine if an online copy may be available—but, of course, can only do that check partially due to the fact that locally licensed materials are not reflected there.)

**Recommendation 4:** To maximize potential of the SFX server and to meet our users' needs, UC libraries should begin work immediately to determine how the SFX server will incorporate access arranged by campus licenses as well as CDL-arranged licenses.

## **X. Recommendations: Securing Effective Access Integration for the Long Term**

### **UC Library Data Description Standards**

The first step in moving toward access integration is for various UC library applications to be able to share common standards in the way that records are structured for flexible and varied uses. AACR2 works well for catalogs, but electronic items may conform to other standards (EAD, TEI headers) or may lack standards. If UC library items lack common data description standards, UC libraries will not achieve effective access integration in general, nor be able to develop a revitalized Directory in particular.

**Recommendation 5:** A standards team should be charged to deal with a number of tasks related to record standards and coding issues that support discovery of electronic resources:

- **Coding within bibliographic records that designates the item to be included in the new Directory;**
- **Conformance to data description standards;**
- **Minimum required fields for all UC library items;**
- **Vocabularies for each of the common fields;**
- **Strategy for “type” field(s) for electronic resources;**
- **Strategy for subject field(s) and handling broad subject access (i.e., using LC Classification numbers to map to a hierarchical broad subject vocabulary);**
- **Enhancements to the existing SCP guidelines, creating AACR2 cataloguing standards that would apply to all UC libraries; and**
- **Mapping between AACR2 and other data description standards (EAD, TEI).**

As noted above, some of these issues would need to be dealt with in Phase 1 of a revitalized Directory. We recommended that perhaps the SCP Steering Committee could take on those tasks for the sake of efficiency. However, another group (either new or existing) could coordinate, delegate, disseminate, and implement the longer-term tasks related to common standards for electronic resources.

### **UC Library Infrastructure for Effective Applications**

Applications need to be able to use data and components of other applications. There are a variety of technologies that will need to be explored and developed over the long-term.

**Recommendation 6:** The Library Technology Advisory Group (LTAG) should consider overseeing development of a common UC Library Application Infrastructure. Possible issues include:

- **Data format standards (MARC, XML, etc.);**
- **Standards and infrastructure for more automated data flow. This may include: unique IDs, exporting, harvesting, merge/purge, syndication, opening up applications to handle data flow;**
- **Systemwide toolkits (for example, an Electronic Journals database) that provide campus-customized views that are managed by campus staff;**
- **Authentication/security standards; and**
- **Standards and infrastructure for durable URLs and URL resolution servers.**

Some of the above issues will necessarily have to be dealt with as a Phase 2 Directory is developed.

### **Areas for Further Research**

The Task Force has made a number of recommendations above for concrete steps to improve access to electronic materials for our users. In the course of its discussions, however, the Task Force also identified a number of topics that warrant further exploration as UC continues to develop next generation library research tools. These include:

- Managing large result sets, including categorization of search results;
- Implementing recommendation systems that help separate the wheat from the chaff and have the “best” results come up first;
- Metadata harvesting, including the de-duping of records;
- Incorporating user observation-based research in the design of UC library applications;
- Developing reliable, concrete, actionable metrics/benchmarks that can be used to measure our success in the provision of electronic resources; and
- One University, One Library, One OPAC?
  - Can we do away with campus OPACs if local ILS modules can be hooked into ALEPH?
  - Should UC Libraries share acquisitions modules?

**Recommendation 7: SOPAG should consider how UC libraries can best develop a cooperative research agenda to examine the continuing challenges posed by electronic library research tools.**

## **XI. Bibliography**

Anderson, Barbara. (1999). Web Lists or OPACs: Can we Have our Cake and Eat it, Too? *Library Computing* 18(4):312–316.

Antelman, K. (1999). Web Lists and the Decline of the Library Catalog. *Library Computing* 18(3):189–95.

*ARL Scholars Portal Working Group Report*. (May 2001). <http://www.arl.org/access/scholarsportal/>

Baruth, Barbara. (August 2000). Is Your Catalog Big Enough to Handle the Web? *American Libraries* 31(7):56–60.

*Bicentennial Conference on Bibliographic Control for the New Millennium*. In particular, note the papers:

- The Topical Discussion Group 7: “What Steps Can the Library Take to Achieve Integrated Access to the Catalog and Other Discovery Tools?”
- Sarah Thomas, “The Catalog as Portal to the Internet”
- Karen Calhoun, “Redesign of Library Workflows: Experimental Models for Electronic resource description.”

All of the papers and discussions can be found at:

<http://lcweb.loc.gov/catdir/bibcontrol/recommendations.html>

Campbell, Jerry D. (2000). The Case for Creating a Scholars Portal to the Web: A White Paper. *Proceedings of the 136th Annual Meeting of the Association of Research Libraries*.

<http://www.arl.org/arl/proceedings/136/portal.html>

CDL Directory background reading — see “Reports, Proposals, etc” section at:

[http://www.cdlib.org/libstaff/system\\_services/wdag/](http://www.cdlib.org/libstaff/system_services/wdag/)

for copies of:

CDL Directory Vocabulary and Resource Submission Project Update (1/30/01).

CDL Vocabulary—LC Classification Proposal (7/3/2000).

CDL Directory Resource Submission Policies (8/12/2000).

CDL Directory: Background and Current Issues (8/12/2000).

Chrzastowski, Tina E. (1999). E-journal Access: The Online Catalog (856 field), Web Lists, and “The Principle of Least Effort.” *Library Computing* 18(4):317–322.

Ghaphery, Jimmy and Dan Ream. (2000). VCU’s My Library: Librarians Love It .... Users? Well, Maybe. *Information Technology and Libraries* 19(4):186–190.

[http://www.lita.org/ital/1904\\_ghaphery.html](http://www.lita.org/ital/1904_ghaphery.html)

Hennig, Nicole. Improving access to E-journals and Databases at the MIT Libraries: Building a Database-Backed Web Site called “Vera”. Preprint available at

<http://www.hennigweb.com/publications/vera.html>

Jewell, Timothy D. (2001). Selection and Presentation of Commercially Available Electronic Resources: Issues and Practices. Washington, D.C.: Digital Library Federation, Council on Library and Information Resources. <http://www.clir.org/pubs/reports/pub99/pub99.pdf>

Jordan, William. (2000). My Gateway at the University of Washington Libraries. *Information Technology and Libraries* 19(4):180–185.

Knudson, F. L. et al. (1997). Creating Electronic Journal Web Pages from OPAC Records. *Issues in Science & Technology Librarianship* No. 15. <http://www.library.ucsb.edu/istl/97-summer/article2.html>

Mahoney, Dan and Mariella di Giacomo. (2001). [Flashpoint@LANL.gov](mailto:Flashpoint@LANL.gov): A Simple Smart Search Interface. *Issues in Science & Technology Librarianship* No. 31. <http://www.library.ucsb.edu/istl/01-summer/article2.html>

Mason, Julie et al. (2000). INFOMINE: Promising Directions in Virtual library Development. *First Monday* 5(6). [http://firstmonday.org/issues/issue5\\_6/mason/index.html](http://firstmonday.org/issues/issue5_6/mason/index.html)

Millett, Tony. (2001). Information Online 2001. *Library Hi Tech News* 4:11–15.

Park, Soyeon. (March 15, 2000). Usability, User Preferences, Effectiveness, and User Behaviors When Searching Individual and Integrated Full-text Databases: Implications for Digital Libraries. *Journal of the American Society for Information Science* 51(5):456–468.

Pitschmann, Louis A. (2001). Building Sustainable Collections of Free Third-Party Web Resources. Washington, D.C.: Digital Library Federation, Council on Library and Information Resources. <http://www.clir.org/pubs/reports/pub98/pub98.pdf>

Sage project (UCSD). <http://libraries.ucsd.edu/about/>

Shadle, Steve and Alex Wade. (2000). Putting It All Together: The Involvement of Technical Services, Public Services, and Systems to Create a Web-Based Resource Collection. *Serials Librarian*, 38(3/4):341–347. (Description of U. of Washington's Digital Registry.)

Thomas, Sarah E. (October 2000). Abundance, Attention, and Access: Of Portals and Catalogs. *ARL Bimonthly Report* 212. <http://www.arl.org/newsltr/212/portal.html>

Waters, Donald J. (August 2001). The Metadata Harvesting Initiative of the Mellon Foundation. *ARL Bimonthly Report* 217. <http://www.arl.org/newsltr/217/waters.html>

Wilson, Mary Dabney. (2001). Flying First Class or Economy? Classification of Electronic Titles in ARL Libraries. *Portal: Libraries and the Academy* 1(3):225–240. [http://muse.jhu.edu/journals/portal\\_libraries\\_and\\_the\\_academy/v001/1.3wilson.pdf](http://muse.jhu.edu/journals/portal_libraries_and_the_academy/v001/1.3wilson.pdf)

## **XII. Appendices:**

### **Appendix A: Charge to the Task Force on Access Integration**

BACKGROUND: When the UC Libraries began licensing electronic content, those resources were few enough that it was both easy and desirable to give them prominence by building web pages that listed them. As the number of licensed electronic resources increased, maintenance of these lists became increasingly difficult. Additionally, the licensing efforts of the CDL for the UC system as a whole, and the creation of electronic finding aids presented access issues that neither the local catalogs nor the MELVYL and PE databases could resolve. Initially, the CDL Directory was an effort to both alleviate those issues and provide the same quick access as the web page lists.

Many of us have now shifted from maintaining lists of electronic resources on web pages to dynamically generating the pages from catalog or other databases. The issues of access integration, however, are still very real, as we struggle with facilitating a wide range of both user and staff needs, and integrating access to both electronic and non-electronic formats. While the most immediate questions being posed are focused on the CDL Directory and its role in providing access to electronic resources, the issues being raised are much broader and longer term.

To explore and delineate these issues and bring them to a broad discussion level, SOPAG is appointing this Task Force *to develop a white paper on the relationship between our various catalogs, databases, and web pages as access paths to library materials.*

CHARGE: The charge to this Task Force has five parts.

- 1) Investigate the current roles of the CDL Directory and other web-based lists of licensed resources (regardless of how they are created) - these uses might include such functions as providing a hierarchical search and browse for broad level subjects; providing enhanced description, licensing, and access information; providing holdings information for services such as Request; and gathering rudimentary use statistics (by recording clicks on specific titles, for example).
- 2) Explore the relationship between these web-based products and the catalog databases - can the web products be created from the catalog databases?
- 3) Explore what new services are needed in providing access to electronic resources, what kind of data these services require, and the implications of separating electronic from other, non-electronic formats.
- 4) Investigate and assess what other libraries are doing to resolve these access integration issues.
- 5) Suggest a path on which the UC libraries might concentrate their efforts to best serve their collective needs for representing electronic resources.

## Appendix B: Functionality Requirements for a Directory-style Discovery Tool

As part of its deliberations, the Task Force created a set of functional requirements for any directory style products. The priorities (immediate, medium term, and long term) are framed in terms of how quickly the requirement needs to or can be addressed.

### Discovery Requirements

1. The content must include locally licensed items along with items licensed by CDL: includes all items for which campus users have access. (*Immediate*)
2. Provides multiple points of access. (*Immediate*)
  - a. Ability to search by keyword and exact title. (*Immediate*)
  - b. Ability to search with limits for type, subject, location. (*Immediate*)
  - c. Have pre-selected views for the major types: electronic journals and databases. (Analogous to what traditional print libraries have provided—journal lists, separate reference areas, periodical rooms, etc.). (*Immediate*)
  - d. Ability to browse by title (e.g., A–Z, within Subject, within Type). (*Immediate*)
  - e. Ability to browse by subject—need agreed upon UC vocabulary such as CDL or LCC with mapping capability available to local campuses. (*Immediate*)
3. Displays all resources available to local campus. (*Immediate*)
4. Displays union view of all resources at any campus. (*Long term*)
5. Provide access to lists of resources with minimal clicks or decisions. (*Immediate*)
6. Provides compact presentation of results/records.
  - a. Default results should be lean and compact. (*Immediate*)
  - b. Display more records per page than the default “20.” (*Immediate*)
7. Local display of a central Directory should be co-brandable in such a fashion that the user is aware that content is jointly supported between the campus and CDL and that functional links (to pathfinders, e-reference services, proxy server information) to the home campus are prominently visible. (*Medium term*)

### Delivery Requirements

8. URL resolution services for both CDL and campus-licensed materials (such as PURLs, SFX, Open URL Technology). (*Medium term*)
9. Automatic link checking with notification to management of broken links. (*Medium term*)
10. One-click authentication for all licensed content. (*Medium term*)

### Management Requirements

11. Entry of items into Directory should piggyback on current workflows and require minimal maintenance for both CDL and campus titles—whenever possible. The core principle is to avoid duplicate software development and data entry, as well as manual work. (*Immediate, but recognize that full achievement of this will take some development*)
12. Automatic data update from campus acquisition and licensing systems. (*Long term*)
13. Automatic distribution of metadata to campuses. There are actually two levels that are important here. First is receipt of accurate metadata distribution from publishers to libraries in general (over which we have limited influence). The other level is from CDL to campus libraries. Campuses need CDL to provide output files with new or updated data; campuses need real-time response to a query in a usable output file. (*Medium term*)
14. Enable expedited notification and link/resource outages. (*Long term*)
15. Enable publication of temporary out of service public message. (*Long term*)
16. Provide flexibility and extensibility in design so as to facilitate additional functionality later as needed. (*Immediate*)

### Appendix C: Directory to MARC Map

This chart illustrates the feasibility of using the MARC format to incorporate the current Directory fields into cataloging records for electronic resources. Only those unique Directory fields that are not standard in cataloging records are included. Standard fields such as title and author are not included since they are already represented in all MARC cataloging records.

Directory Field	Description	Mapping to MARC
Format	Current Values: <ul style="list-style-type: none"> <li>• Electronic Journal</li> <li>• [Electronic] Database</li> <li>• [Electronic] Reference Text</li> <li>• [Electronic] Finding Aid</li> </ul> NOTE: The CDL shared cataloging records use the 655 Online resources.	The 655 field is defined as genre heading “Terms indicating the genre, form, and/or physical characteristics of the materials being described. A genre term designates the style or technique of the intellectual content of textual materials or, for graphic materials, aspects such as vantage point, intended purpose, or method of representation.”
Subject	Uses Directory’s controlled vocabulary.	If we wanted our own vocabularies, we could use 69x fields. Alternatively, if all vocabularies are based on LCCN, our vocabularies need not be stored in the MARC record; rather, the mapping from LCCN could take place at the point of conversion.
Description Short Description	Short Description is limited to 255 characters. Description is a Sybase text field.	520 field “Unformatted information that describes the scope and general contents of the materials. This could be a summary, abstract, annotation, review, or only a phrase describing the material.” We could set the first indicator to 2 (Scope and content). Multiple 520s are permitted and we could use a subfield to denote that this descriptive note applies to the CDL Directory.
Access Information (Availability/License)	Values <ul style="list-style-type: none"> <li>• Available to all users</li> <li>• Available to individuals with personal subscriptions, or to individual members of the sponsoring society</li> <li>• Licensed</li> <li>• Trial period?</li> </ul>	506 field “Information on the restrictions that govern access to or the limited distribution of the described materials.” Multiple 506s are permitted and we could use subfield 5 to denote that this access information applies to the CDL Directory.
Access Information	Values	538 field “Technical information about an

(Access instructions)	<ul style="list-style-type: none"> <li>• May require a password for remote access.</li> <li>• Adobe Acrobat is required to view article reprints.</li> <li>• Telnet software is required to connect to this resource.</li> <li>• Registration may be required for first time use.</li> <li>• Once connected, you need to select the database you want.</li> </ul>	item, such as the presence or absence of certain kinds of codes, recording densities, parity, blocking factors, software programming language, computer requirements, peripheral requirements, trade name or recording systems, number of lines of resolution, and modulation frequency”
Access Information (Terms and conditions)	A constant value: always links to the same URL. This page links to a page that provides access to PDFs of vendor licenses.	Not necessary.
Access Information (Experimental status)	This experimental resource is the result of applied research. Its underlying technology is new; some inconsistencies may appear.	Not necessary.
Interim Screen	An extra URL is used before linking into CDL-hosted, OCLC, RLG.	Should be able to develop a workaround.
Guide Name Guide Location	Points to CDL’s bibliographic instruction materials. Could also point to tutorials or help on the actual resource.	We could use 730 if there is no overlap. If there is overlap we could use a 9xx field.
Relation URL	The <A HREF=’ ’> to the “Continued by:” “Continues:” and “See also:” value is hard-coded in this field.	We can use subfield o (“Other item identifier”) to provide the code of the related item so we are able to link directly to it.
Provider	The organization that makes the resource available electronically.	710 field is currently being used by Shared Cataloging for this e.g. JSTOR
Coverage	Dates/volumes of holdings.	This is being added to the 856 \$3 on CDL shared cataloging records

Notes: The quoted information is from the MARC 21 formats:

<http://lcweb.loc.gov/marc/bibliographic/ecbdhome.html>

In addition to the fields listed above, we have the opportunity to use one or more 9xx fields, which may make it more convenient data entry. See

<http://www.oclc.org/oclc/tb/tb239/239.htm> for an example of how OCLC is using 956 for CORC records.