

Creation of Union Databases at INFLIBNET

1. Introduction

With the changing environment of librarianship, the focus on access to information, rather than ownership, library professionals have manifold responsibilities. Shrinking local resources and growth of resource sharing and document delivery through network environment, union catalogue in one form or another is important features in today's library world. INFLIBNET Centre has taken the initiative of building union catalogue of academic libraries in India, which contains bibliographic description of holding information for books, serials and theses in all subjects areas held in university libraries in India. INFLIBNET union catalogue is traditional union catalogue, in which records from multiple sources and formats are incorporated in to a single database. Recently, entire database platform have been changed and developed new web based search engine. The main feature of the new tool is that we tried to integrate different database on one server, which contains 12 lakh unique records of books.

2. Union Catalogue

Union catalogue contains bibliographic description of location and holding information for different type of printed document in all subject fields held in various university libraries in India. It integrates a group of individual catalogue in to one central place and facilitates to identify location. It serves as discovery and delivery mechanism of different type of materials owned by the participating libraries and is key to resource sharing among libraries. Union database represents a vital linking of individual library collections. At the same time it functions as a central pool of data, which can be used for collection development and Inter Library Loan by participating libraries. Overall, it represents the holdings of university libraries in India.

INFLIBNET centre has been developing following Union databases:

Bibliographic database

Books

Serials

Theses

Non-Bibliographic database

Research projects

Experts

Books database

This database is the major source of bibliographic descriptions for use in research and collections development. This being comprehensive database, contains holding of books catalogued by university libraries in India. Currently, it has 50 lakh (aprox.) bibliographic records, covering 97 university libraries in India, funded by UGC under INFLIBNET Programme, which is being

processed for merging in union database. The list of entire status is given in annexure-1. It provides bibliographic information contributed by the universities about each book with the library name. Database covers monographs, reference books, conference proceedings, and textbooks etc., which are normally classified by the universities under their book collection. The participating libraries are regularly contributing the records for merging their local holdings in to this National Union database and the number of records is continuously growing. INFLIBNET Centre processes and standardizes these records and makes them available for wider access to the users across the country

a. Serial Database

This union database of serial covers the bibliographic information of current serials, serial holdings, secondary serials and current serials of Document Delivery Centers, identified by INFLIBNET Centre. It has approximately over 51000 journal titles contributed by 197 institutions. It covers bibliographic information along with holdings details and university name. The database is regularly being updated and can be accessed from INFLIBNET Web site. Following table describes about the current statistics of the database:

Sl. No	Database	Unique Titles	Holdings	Universities/ Institutions
1	Current Serials	11,892	51,026	197
2.	Serials Holdings	13,751	47,591	102
3.	Secondary Serials	462	1437	115
4.	Current Serials DDC	3688	5097	6

b. Theses Database

Theses database has over 1, 40000 records of the doctoral dissertations submitted to the Indian universities. The important information contains in this database are, name of researcher, title of the thesis, guide, university name and year of award. The records contributed by the university are regularly being updated at INFLIBNET Centre. It is one of the major bibliographic sources of information for researchers in India

c. Research Projects

Research Project Database is details of the accomplished and ongoing funded projects, carried out by various faculty members, working at various universities in India. . Currently, it contains more than 9000 research project's information funded by various funding agencies viz. UGC, ICAR, ICMR, DST and DBT etc. The details of the project information have been collected from the project directors, and funding agencies.

d. Experts Database in Science and Technology

Experts database in Science and Technology (EDST) is a joint venture of INFLIBNET and NISSAT. The database is being developed in a project mode funded by NISSAT, Ministry of

Science and Technology, Department of Scientific and Industrial Research, New Delhi. EDST is the premier database of profiles of scientists / researchers and other faculty members working at leading R & D and other institutions involved in teaching and research in India. The database offers expertise of more than 25,000 faculties/professors from the nation's leading institutions. It provides comprehensive information about the background, skills, and accomplishments of the scientists, professors, doctors and other scientific community. It provides access to relevant and accurate information that is compiled from various sources, verified and presented in a common format. The Web interface to the database enables the faculties to search, edit, update, browse and save the profiles from remote clients. In addition to this INFLIBNET has also compiled 13000 profiles of academic community, working in different universities. It is most comprehensive database of its kind in the country and continues to expand further.

3. Bibliographic Format and Standards

The standards have been adopted for the member libraries by the INFLIBNET to promote the development and maintenance of a bibliographic database that will serve the purposes of all member libraries to create quality records.

3.1 Cataloguing standards

It is important to make the database the best possible database for current and easy-to-find information. Therefore, it is essential that every member library cooperate in inputting only accurate and standard cataloging. Since the computer cannot distinguish between good and substandard cataloging, each library has to accept the responsibility of abiding by the standards. For the content of the information, INFLIBNET adopted following standards:

Anglo-American Cataloging Rules, 2nd ed. current revision. For bibliographic description

Library of Congress Subject Headings. LCSH should be used whenever possible.

In spite of the common standards for all the libraries, catalogue records in the database do not conform to one specific cataloguing standard. These records exhibit a variety of cataloguing practices. Lack of consistency, topographical errors and uniformity, which can easily be called local variation by the participating libraries, is major concern for INFLIBNET. The database contains records in various formats, which leads to much complication and editing of records.

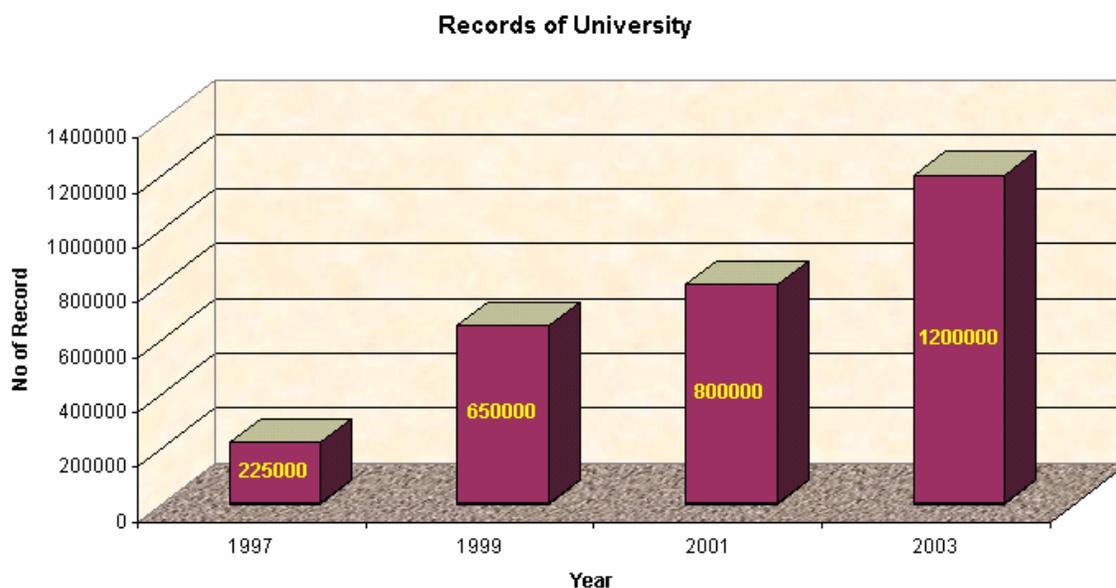
3.2 Communications format

Converting printed catalogue in to machine-readable bibliographic records consists of fields, which includes tags, subfields and field delimiters. Common Communication Format (CCF) was initial choice and all the participating libraries have been advised to use this format. Simplified guidelines regarding to use this format have been published and distributed to all the libraries. Later on, INFLIBNET decided to adopt MARC 21. New interface for transfer of data from CCF based records to MARC 21 and vice versa have been developed.

4. Growth of Union catalogue: Historical Perspective

The history of the development of union catalogue goes back to year 1994-1995, when university libraries were given funds to set up infrastructure and convert their card catalogue in to machine readable form. Since the funding to university libraries for converting the records in to machine readable form was done on phase manner, the contribution from these libraries were very slow. At that time, except CDS/ISIS and LIBSYS, there were no proper and suitable software for the

libraries to initiate retro-conversion of their holdings. This led to use of different software using different formats. The records from newly funded university started contributing their holding of bibliographic records after one year of the funding i.e. 1995-1996. By the year 1997, INFLIBNET has collected, 2 25000 unique records of books. In the 1999, INFLIBNET compiled 39,24,479 records from 48 libraries and after processing these records INFLIBNET published 653742 unique records on the web sites for online access. The databases have been developed using CDS/ISIS, which adheres to ISO –2709. The following diagram describes of the growth of database:



After the year 2001, we started receiving large amount of data from the participating libraries and compiled 80 lakh bibliographic records from 89 universities. These records have regularly been processed and merged with the existing union. At present, after processing, we have 12 lakh unique records of books in the database. On account of large volume of data, which needs to be processed for online access, additional manpower was recruited. This manpower have been engaged in editing and standardisation of remaining records and expected to complete very shortly. Once complete the editing, it is expected to be one of the biggest online databases in the country, which is freely available for online access round the clock

5. Online Access to Database

Before advent of CD-ROMs and World Wide Web, online access or searching meant that you connect to the remote computer via a modem to perform some type of literature search. The growth of Online public access catalogues, (OPAC) online searching has come to mean the searching of any computerised database, no matter whether it's situated on your own PC's hard disk, on a CD- ROM, or on a remote database server, since most PCs now a days link to internet. INFLIBNET too has made provision to access it's database on various mode.

5.1 I-NET

In the year 1997, access to the database was made available through I-NET PAD.

5.2 Access through Web

With the advent of World Wide Web, Web enabled search software have been developed to access all the databases. In 1998 all the databases have been transferred to RDBMS, (Sybase). Here, we required interfaces compatible to ISO – 2709, which have been developed for each database to transfer the data from CDS/ISIS to RDBMS (SYBASE). For access of these records through web, we developed separate interface using the Middle Tier Architecture, using CGI and PERL, which is still operational for access of books database, whereas other databases, viz. Experts, projects and serials have been mounted on MSSQL. The database can be accessed from <http://www.inflibnet.ac.in>

5.3 Development of new tool and Architecture

Keeping in view the advancement of IT, we adopted latest tools for development of new retrieval tools for the entire database. A newly developed web interface tool provides access to all the databases. We have decided to use JAVA as a basic programming language and MSSQL as database server. The implementation of an online access using sophisticated tools needs in depth planning and strategy. In the beginning, we transferred the experts and serials data, which worked well. Later on gradually, we mounted all the databases on one server. Utility programme for conversion from ISO – 2709 for existing data have been developed. For the development of web based access to the data base, following software and hardware were used.

a.) Server Side Programming:

J2EE [Java 1.2, EJB 2.0 (Enterprise JavaBeans), JSP (Java Server Pages),JDBC (Java Database Connectivity), JavaMail, Servlet, HTML, JavaScript

b.) Middleware Application Server

WebLogic Server Platform 7.0, WebLogic Builder for Component Building, EJB Container, HTTP (WebServer) Container, JSP Container, Connection Pooling

3.) Database Server

Microsoft MS-SQL Server 2000

New and enhanced tools for searching the database have many new features. Some of them are listed below:

Downloading of data according to MARC 21 and CCF for authorised users

Generating the ILL request form the web

Using new programming language and specialised tools.

Feedback from for tracking the errors in the records.

Efficiency in the search term with users friendly help messages.

Provision for Advanced search

Navigation of records with various display format

Integrated search for all the serials database

All the databases are on one server

It reveals the statistics of the records of each library

Restriction of search limits

6. Search for records

Searching is the process of retrieving bibliographic records from a database. As shown in figure-1, databases can be searched from the given site. All the databases are linked from main web page. One can click to the to the desire database and type bibliographic information about an item in a search statement at appropriate place and send the search statement to the system. The system matches your information in union catalogue and displays the search results, which is given at Figure 2.

6.1 Display records

The system will list the hit results with default displays fields and link the title to location information. If you click to the title, system will display the detail information about the searched title and its availability, where one can find link to location information. When you click to the location information, it will display the detail information of the contact person with full address.

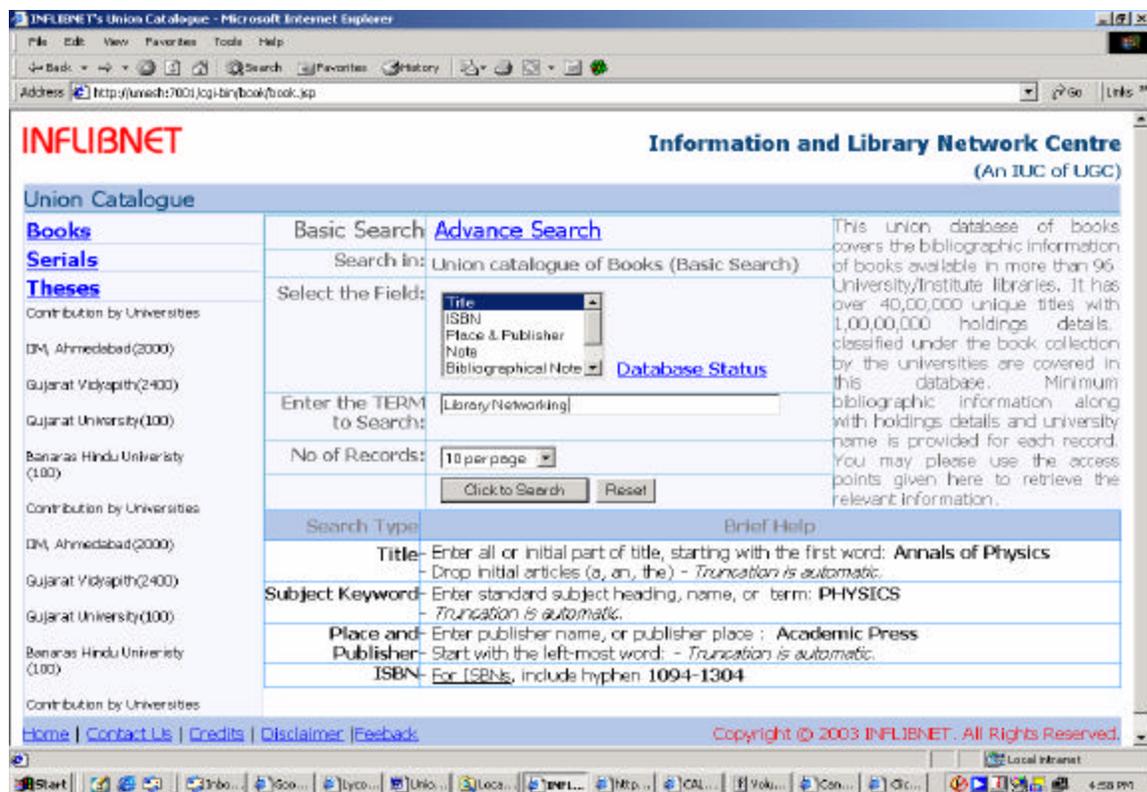


Figure 1

6.2 Safe or download file

The system has a provision to save file according to various format. These saved records can be loaded on to local system, which is known as copy cataloguing. You can also download limited records and edit them for the use of your library, which will increase the quality in the database. Saving of records are accessible only to authorized institutions.



The screenshot shows the INFLIBNET Union Catalogue interface in a Microsoft Internet Explorer browser window. The page title is "INFLIBNET Information and Library Network Centre (An IUC of UGC)". Below the title, there are navigation tabs for "Books", "Serials", and "Thesis". The main content area displays a search results table with the following data:

No.	Title	ISSN	Publisher	Year	Database
1	Wilson Library Bulletin	0043-5661	H.W. Wilson Co.	1914	Serials Holdings
2	Library Journal	0363-0277	Cahners Publishing Company (New York), Printing and Publishing Division	1876	Serials Holdings
3	Libri: international library review	0024-2067	Munksgaard International Publishers Ltd.	1961	Serials Holdings
4	Journal of Education for Library and Information Science	0749-5786	Association for Library and Information Science Education	1960	Serials Holdings
5	The International Library and Information Review	1057-2317	Academic Press Ltd.	1969	Serials Holdings
6	Library Association Record	0024-2195	Library Association	1889	Serials Holdings
7	Library Progress	0970-1062	Dr. A.K. Sharma, Ed. & Pub.	1961	Serials Holdings
8	Journal of Library and Information Science	0353-3540	National Taiwan Normal University, Department of Social Education	1975	Serials Holdings
9	American Library Directory	0005-910X	R.R. Bowker, A Reed Reference Publishing Company	1900	Serials Holdings

Figure 2

The screenshot shows the INFLIBNET Union Catalogue interface. The page title is "INFLIBNET Information and Library Network Centre (An IUC of UGC)". The main heading is "Union Catalogue". There are tabs for "Books", "Serials", and "Thesis". The "Serials" tab is selected, showing "Serials Holdings".

Bibliographic Details

ISSN	0363-0277
Key Title	Library Journal
Publisher	New York, NY; Cahners Publishing Company (New York), Printing and Publishing Division; US
Date of Publication	1876
Serial Frequency	20/YR
Classification Scheme Notation	020
Subject Descriptor	LIBRARY AND INFORMATION SCIENCES
Date of entry	17/04/2003
Bibliographical Level (Database)	Serials Holdings
URL	http://www.inflibnet.ac.in

Serial available at following Universities/Institutions

No.	University/Institute	Available Volume	Missing Volume	Email Request
1	American Research Study Centre	Vol.96-91,1961-66; Vol.94-95,1969-70; Vol.105-109,1980-84; Vol.114-1989-	Vol.92-93,1967-68; Vol.96-104,1971-79; Vol.110-113,1985-88	<input type="button" value="Request"/>
2	Andhra University	Vol.115-118		<input type="button" value="Request"/>

Figure 3

6.3 Request for ILL

The union catalogue search will enable the user to send ILL request from the web. To improve user satisfaction and library service, libraries can initiate ILL and document delivery service. Libraries can lend and borrow material from its collections by using integrated web interface for interlibrary loan which generated request form as shown in figure 4 .

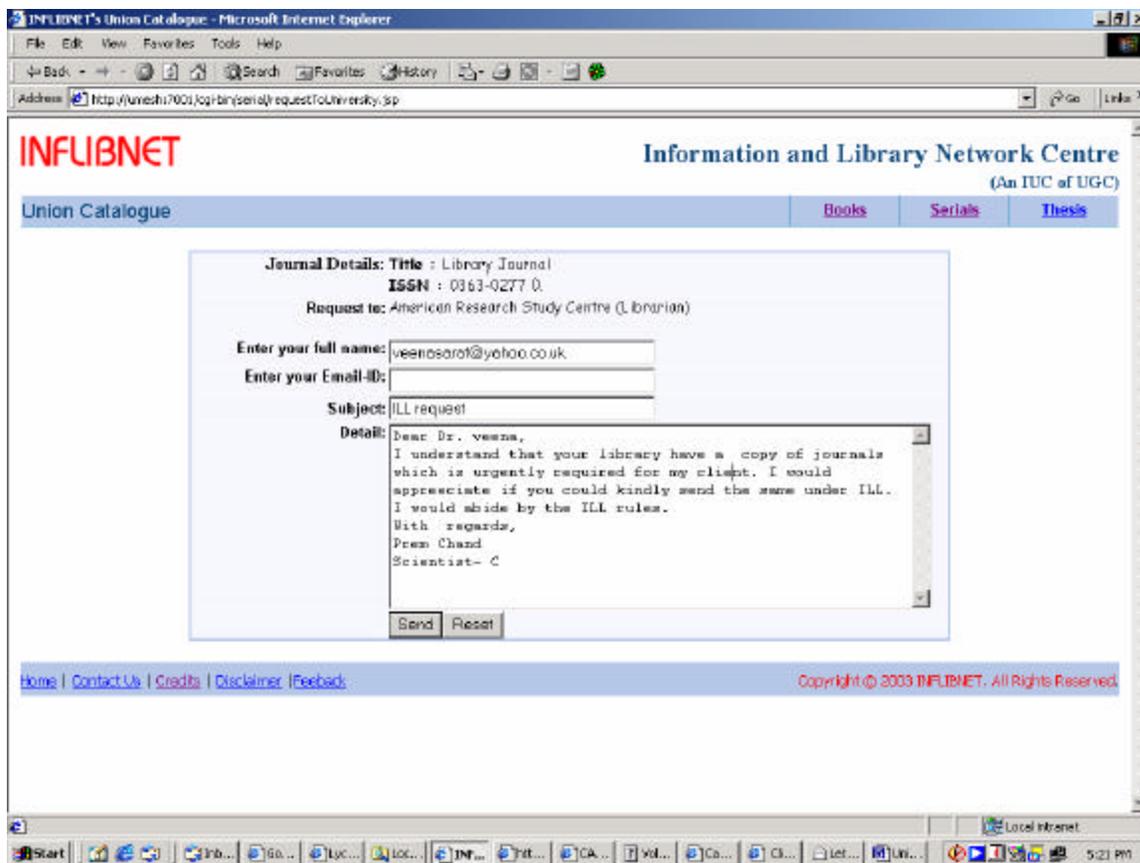
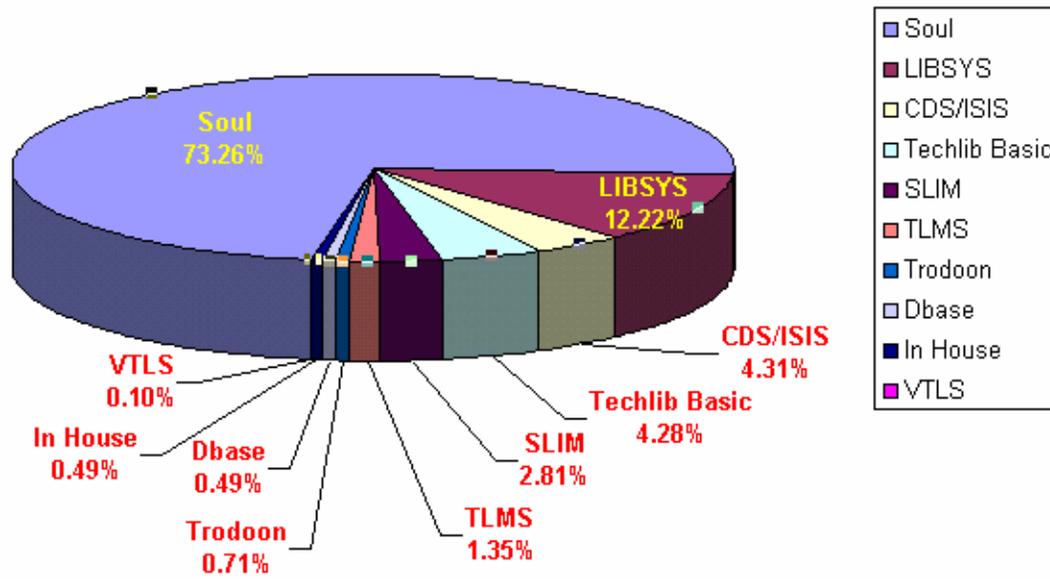


Figure 4

7. New dimension and implementation of SOUL

Keeping in view the problems of different format used by different software, developed by commercial vendors, INFLIBNET initiated development of library management software and it was finally released in the year 2000 during CALIBER at Chennai. This low cost and affordable software works on client server architecture mode, which is very efficient, user friendly and affordable. It is based on the standards adopted by INFLIBNET, which is now installed in more than 250 institutions and many more are on pipeline. This helped us to maintain the consistency and uniformity of records, which is very crucial for both participating library and central agency, which is involved in building the union catalogue. The editing, authentication, detection of duplicate records and merging in to master database became somewhat more convenient.



Conclusion

Development of union catalogue is continuous process, which needs consistent collaboration and participation from member libraries. At the moment the integration and adoption of new standards and development of new interface for existing data for enhanced search services to the user is major concern for INFLIBNET, which has been resolved. The logical step of any union catalogue is resource sharing, ILL and document delivery and it is high time that member library will make use of this database is prime source for initiating such services. Libraries are also requested to contribute the data on regular interval and adhere to the guidelines.

Annexure 1

Status of Database: Books as on 13/7/2004

Sr. No	University Name	Date of Receipt	No.of Rec.	SOFTWARE
1.	Alagappa University			
2.	Aligarh Muslim University			LIBSYS
3.	Allahabad University		6000	LIBSYS
4.	Amravati University		48600	SOUL
5.	Andhra University	26/02/2003	202440	SOUL
6.	Anna University	21/04/2004	98641	ISO file
7.	Annamalai University			
8.	Arunachal University		25000	LIBSYS
9.	Assam University, Silchar		20000	SOUL
10.	Avinashlingam Inst.for Home Science		105000	SOUL
11.	Awadhesh Pratap Singh University			
12.	Babasaheb Bhimrao Ambedkar, Bihar			
13.	Banaras Hindu University		45000	SOUL
14.	Banasthali Vidyapith		50000	SOUL
15.	Bangalore University		130000	SOUL
16.	Barkatullah Vishwavidyalaya			
17.	Berhampur University			
18.	Bharathiar University	30/12/2002	87115	SOUL
19.	Bharathidasan University		21178	MARC (ISO)
20.	Bharati Vidyapeeth		13608	Text File
21.	Bhavnagar University		35000	SOUL
22.	Birla Institute of Technology, Ranchi			
23.	Birla Institute of Technology & Science, Pilani		72000	LIBSYS
24.	Central Inst. of Higher Tibetan Studies		40,000	LIBSYS
25.	Central Inst.of English & Foreign Lang.	21/08/2003	45000	SOUL
26.	Chatrapati Shahu Ji Maharaj University		5000	SOUL
27.	Chaudhry Charan Singh Uni. Merut			
28.	Cochin Uni. of Science & Technology			Conversion problem
29.	Deccan College PG & Research Institute			

30.	Deendayal Upadhyay University, Gorakhpur		10000	CDS/ISIS
31.	Delhi University			
32.	Devi Ahilya Vishwavidyalaya		18000	SOUL
33.	Dibrugarh University		57446	CDS/ISIS
34.	Dr. B R A Agra University		81000	SOUL
35.	Dr. Baba sahib Mar.Univ, Aurangabad	17/01/2002	36015	CDS/ISIS
36.	Dr. Harisingh Gour Vishwavidyalaya,			
37.	Dr.Ram Manohar Lohia Awadh			
38.	Gandhigram Rural Institute	23/10/2002	25148	SOUL
39.	Gauhati University, Guwahati		10000	CDS/ISIS
40.	Goa University	12/11/2002	109886	CDS/ISIS
41.	Gokhale Institute of Politics & Economics			Conversion problem
42.	Gujarat University			SOUL
43.	Gujarat Vidyapith		425000	SOUL
44.	Gulbarga University (Old Records : 73000)	15/6/2004	84964	SOUL
45.	Guru Ghasidas University			
46.	Guru Jambheshwar University			
47.	Guru Nanak Dev University	29/3/2004	109025	Dbase
48.	Gurukula Kangri Vishwavidyalaya		2208	
49.	H.N.B Garhwal University		5000	Excel
50.	Himachal Pradesh University		46582	CDS/ISIS
51.	Indian Institute of Technology, Roorkee		70000	TRODOON
52.	Indira Kala Sangeet Vishwavidyalaya		6000	SOUL
53.	International Inst. for Pop. Sciences		50000	SOUL/SLIM
54.	Jadavpur University, Calcutta		223670	CDS/ISIS
55.	Jai Narain Vyas University			SOUL
56.	Jain Vishva Bharati Institute		4715	SOUL
57.	Jamia Hamdard University		35000	CDS/ISIS
58.	Jamia Millia Islamia		10000	VTLS
59.	Jammu University (received new data) (through e-mail)	31/3/2004	20000	CDS/ISIS
60.	Jawaharlal Nehru Tech. University, Hyderabad		25000	SOUL
61.	Jawaharlal Nehru University, New Delhi		49949	LIBSYS
62.	Jiwaji University, Gwalior (16000+9000)	31/3/2004	25000	SOUL
63.	Kakatiya University		56837	SOUL
64.	Kameshwar Singh Darbhanga Sanskrit (Total items: 6496, Unique Rec:1351)	7/6/2004	1351	SOUL

65.	Kannada University			
66.	Karnatak University		107000	SOUL
67.	Kerala University		131249	LIBSYS
68.	Kumaun University		3828	CDS/ISIS
69.	Kurukshetra University		200000	
70.	Kuvempu University		18697	CDS/ISIS
71.	Madurai Kamraj University			Conversion problem
72.	Maharaja Sayajirao University		81034	SOUL
73.	Maharshi Dayanand Saraswati University, Ajmer (Old Records: 2498)	15/6/2004	8216	SOUL
74.	Maharshi Dayanand Univ, Rohtak			LIBSYS
75.	Mahatma Gandhi Chitrakoot Gramoday	6/4/2003	5000	SOUL
76.	Mahatma Gandhi Kashi Vidyapeeth			
77.	Mahatma Gandhi University		30000	SOUL
78.	Mangalore University		35000	LIBSYS
79.	Manipur University		52000	SOUL
80.	Manonmaniam Sundaranar University		27122	
81.	Maulana Azad National Urdu Univ.		5000	
82.	Mizoram University			
83.	Mohanlal Sukhadia University	1/5/2003	66000	SOUL
84.	Mother Teresa Women's University			
85.	Nagaland University		15000	SOUL
86.	Nagarjuna University		32794	
87.	Nagpur University		80000	LIBSYS
88.	National Law School of India University		5000	
89.	North Bengal University	31/3/2004	72745	CDS/ISIS
90.	North Eastern Hill University		80000	LIBSYS
91.	North Gujarat University	6/12/2002	28000	SOUL
92.	North Maharashtra University		35000	SOUL
93.	Osmania University		102741	CDS/ISIS
94.	Pandit Ravishankar Shukla University (received new data) (35611+61094)	31/3/2004	61094	CDS/ISIS
95.	Panjab University		200000	Techib
96.	Patna University		1000	
97.	Pondicherry University		37174	LIBSYS
98.	Potti Sreeramulu Telugu University		5000	
99.	Punjabi University		27000	Techlib

100.	Rabindra Bharati University		16924	CDS/ISIS
101.	Rajasthan University			
102.	Rajasthan Vidyapeeth			
103.	Ranchi University			
104.	Rani Durgawati Vishwavidyalaya		20000	LIBSYS
105.	Rashtriya Sanskrit Vidyapeetha	19/12/2002	24000	SOUL
106.	Sambalpur University	19/5/2004	32993	CDS/ISIS
107.	Sampurnand Sanskrit Vishwa.		10000	
108.	Sardar Patel University		50000	DBASE
109.	Saurashtra University			SOUL
110.	Shivaji University	23/10/2002	30788	
111.	SNDT Women's University		56105	SOUL
112.	South Gujarat University		25000	SOUL
113.	Sri Chandrashekharendra Saraswati Vishwamahavidyalaya	22/11/2002	46000	SOUL
114.	Sri Krishnadevaraya University, Anantapur (Andhra Pradesh)	18/5/2004	35167	SOUL
115.	Sri Lal Bahadur Shastri Ras. Sanskrit Vidy.			
116.	Sri Padmavathi Mahila Vishw.		14575	
117.	Sri Sathya Sai Inst. of Higher Learning		20000	SOUL
118.	Sri Venkateswara University, Tirupati (30184+26420)	25/5/2004	56684	CDS/ISIS
119.	Swami Ramanand T. Marat. Uni.		15000	SOUL
120.	Tamil University			
121.	Tata Institute of Social Sciences		56423	SOUL
122.	Tezpur University	6/11/2002	20000	LIBSYS
123.	Thapar Inst.of eng and Technology		10000	SOUL

124.	The Babasaheb B. Amb. Uni, Lucknow			
125.	Tilak Maharashtra Vidyapith		18500	
126.	Tilakmanjhi Bhagalpur University		500	
127.	Tripura University, Agartala			CDS/ISIS
128.	University of Burdwan		4693	SOUL
129.	University of Calcutta		15000	
130.	University of Calicut		27801	LIBSYS
131.	University of Hyderabad		200000	LIBSYS
132.	University of Kalyani		4323	
133.	University of Kashmir		57597	SOUL
134.	University of Lucknow			
135.	University of Madras		50000	SOUL
136.	University of Mumbai (Old Records: 50000)	15/6/2004	125000	SOUL
137.	University of Mysore			TLMS
138.	University of Pune		100000	LIBSYS
139.	Utkal University, Bhubaneswar			
140.	Vidyasagar University	1/11/2003	17895	SOUL
141.	Vikram University		1000	
142.	Visva Bharati, Santinike tan			
	TOTAL RECORDS		5348040	
	No. of contributors		106	
	Non contributors		36	
	Total		142	

Expected to contribute shortly= 2 Univ.

Format problem: 5 Univ